THE FOOD BEHAVIOR CONSIDERATIONS, PHYSICAL ACTIVITY BEHAVIOR PATTERNS, AND BODY COMPOSITION INDICES OF ADOLESCENTS IN PUERTO RICO

DISSEMINATION

Presented in Partial Fulfillment of the Requirements for the Degree Doctor of Philosophy in the Graduate School of The Ohio State University

By

Alexander Vigo-Valentín, Ph.D

The Ohio State University
2008

Dissertation Committee:

Professor Samuel Hodge, Adviser
Professor Jacquelyn Monroe
Professor Adrienne Dixson

Approved by

Adviser
College of Education and Human Ecology
ABSTRACT

The purpose of this study was to determine and describe the food behavior considerations, physical activity behavior patterns, and the body composition indices of school-age adolescents living in Puerto Rico. Participants were from public middle and high schools in Puerto Rico and their age ranged from 11 to 18 years. This study was based on a secondary data analysis of pre-existing data. Results of this study showed that adolescents in Puerto Rico were exhibiting food behaviors and physical activity behavior patterns that were challenging the accomplishment of healthy lifestyles. Specifically, there was a low consumption of fruits, vegetables, and fish, while most of the adolescents in Puerto Rico tend to consume soft and sweetened drinks, fried foods, and baked sweets which are behaviors that may increase the risk of health related conditions such as cardiovascular diseases and diabetes. Moreover, it was found that a significant proportion of adolescents in Puerto Rico were not meeting the daily physical activity recommendations (Healthy People, 2010, USDHH, 2006) for adolescents and were either at risk of being overweight or overweight. These results suggest a need to develop wellness and physical activity interventions at school settings, communities, and the development of new regulations and policies by the local government focusing on attacking the overweight rates in Puerto Rico among adolescents, which are consistently higher than those reported for adolescents in the United States of America.
DEDICATION

Dedicated to my parents who have blessed me with the love, knowledge, and experience needed to pursue my goals.
ACKNOWLEDGMENTS

I have been very grateful for having an incredible family who has supported me throughout my entire career. Without hesitation, there was always an affirmative response from my parents (Geno y Joe) to my decisions regarding what and where I would like to study. I want to say thanks to my parents for saying yes from the beginning of this journey in summer 1989 when I decided to attend the School Specialized in Sports located at the Albergue Olímpico in Salinas, Puerto Rico. Since then, there has been an invaluable support to pursue my goals as a physical education teacher and future professor. Thanks for always being there for me, I love you both.

Thanks also to all my family, specially my aunt (Nelly), my uncle and aunt (Tio Edwin y Maggie), and my godfather (Padrino Ruben). Throughout my steps in this world, they have always been there, especially in very crucial moments. They have helped me to reach the top of the ladder. For my aunt, thanks for being my second mom and being always there for me. For my uncle, even when you were not living in Puerto Rico, I always feel you are very close to me. Thanks for all your support and for that wonderful year in Orlando (2003-2004).

Padrino, I do not know if I would have pursued this degree if you would not have brought me that summer camp application for the Albergue Olímpico Summer Camp. I love you all and thank God for giving me this wonderful family who worked together toward my all aspirations.

Dr. Hodge, your knowledge, experience, and professionalism not only have influenced me as a graduate student, but also have impacted other Hispanics and Puerto Ricans here at OSU
and in Puerto Rico. Your honesty, positive advice, and encouragement make people see the world in a different way. Thanks for all your support and fight for continuing the Puerto Rico en Forma project. Your time, dedication, and contribution to Puerto Rico are invaluable. I will always take with me all the advice you provided to me throughout my four years at OSU. I will miss the breakfast at the Blackwell Hotel at 6:30am. Directly and indirectly, I have learned a lot from you. Also, thanks to Dr. Monroe and Dr. Dixson for your support throughout the Ph.D. journey. Without hesitation, you both have been encouraging and motivating me to achieve my goals. I feel that, more than leaving with two wonderful mentors; I am leaving with two incredible friends. Thanks for all your support to the Puerto Rico en Forma project and contribution to the Puerto Rico residents.

My studies at OSU have brought a lot of new experiences. Additionally, it has brought one of the most important people in my life that has been motivating me throughout most of my years at OSU (Shafa, my fiancée). It means everything when a person loves you and supports you regardless of the moment. I know it was hard to be at Barnes and Noble after work every day until 11:30pm, and thanks to your support we achieved the goal. I love you for your willingness to share your heart, experiences, knowledge, family, and culture. You are the most beautiful, humble, and simple person I have ever met in my life. I love you for just being you and you always put a smile in my heart. I also thank Nadhil (Shafa’s mom-my mother in law) for her support, encouragement, and prayers during this process, and for always taking care of us while here in Columbus.
I also have to thank several people who are in Puerto Rico and have contributed to what I have become. I have to give special thanks to Dr. Luis Del Rio who inspired me to pursue a Master in Puerto Rico and a doctoral degree outside of Puerto Rico. Luis thanks for all your friendship and advice, and for always giving me the opportunity to learn more about our profession. Also, this dissertation would not be possible without the support and collaboration of some special people at the Department of Recreation and Sports (DRD) in Puerto Rico. David Bernier (Kike), Secretary of the DRD, thanks for giving us the opportunity to contribute to the Puerto Rico en Forma Project through the data collection and evaluation process. This project has enriched our knowledge and experiences as doctoral students, and it has permitted us to give that knowledge and experience back to Puerto Rico. Reynaldo Soler (Rey), you tenancy, professionalism, and dedication is outstanding and Puerto Rico should be proud of having public servant like you who are willing to sacrifice your time and go beyond that extra mile to impact the health and wellness of Puerto Ricans. Raquel Skerrett, you have done an incredible job and contribution to the Puerto Rico en Forma Evaluation Team. You have accomplished a lot of success in your life and I know you will keep achieving all your goals. Thank you both (Rey and Raquel) for always asking about my progress on my PhD. Thanks to Ana Benitez for all your job regarding the traveling and accommodations for the Puerto Rico en Forma team. To the Puerto Rico evaluation team, I really value all your collaborations during the data collection process, without you all, all the contribution to the Puerto Rico en Forma project would not be possible.
VITA

May 10, 1976……………………………………………Born- Mayagüez, Puerto Rico

2002……………………………………………………..M.A. Interamerican University,
Puerto Rico

2000……………………………………………………..B.A. Physical Education,
University of Puerto Rico

2004-2008……………………………………………….Graduate Teaching Associate,
The Ohio State University

2008……………………………………………………..Adjunct Faculty, Capital
University

PUBLICATIONS

Ohio Project: Progress in preventing childhood and youth obesity, How do we
measure up? Columbus, Oh: Ohio Collaborative.

Ejercicio. Article 47. Retrieved September 11, 2001, from
http://www.sobreentrenamiento.com/PubliCE/Articulo.asp?ida=47&tp=s.
FIELDS OF STUDY

Major Field: Education

Specialization: Physical Education Teacher Preparation

Minor Fields: Research, Physical Activity and Health Promotion
# TABLE OF CONTENTS

Abstract .......................................................................................................................... ii
Dedication ....................................................................................................................... iii
Acknowledgements ....................................................................................................... iv
Vita ................................................................................................................................. vii
Fields of study ............................................................................................................. viii

Chapters
1. Introduction ............................................................................................................... 1
Statement of the problem .............................................................................................. 10
Theoretical Framework and Purposes ........................................................................... 11
Purpose of the Study ..................................................................................................... 13
Research Questions ...................................................................................................... 14
Significance of the Study ............................................................................................... 14
Delimitations .................................................................................................................. 15
Limitations ..................................................................................................................... 16
Definition of Terms ........................................................................................................ 16

2. Review of Literature .............................................................................................. 19
Obesity .......................................................................................................................... 19
Targeting and Defining Overweight and Obesity ......................................................... 21
Obesity Rates among Puerto Ricans ............................................................................. 25
Factors Influencing Overweight and Obesity ............................................................... 27
Food Behavior .............................................................................................................. 28
Physical Activity .......................................................................................................... 33
Theoretical Framework ................................................................................................. 40

3. Methods
Research Design and Data Source ............................................................................... 43
Participants .................................................................................................................... 44
Variables Subjects to Secondary Data Analysis ....................................................... 45
Instrumentation ........................................................................................................ 46
Data Analysis .............................................................................................................. 50
Food Behaviors .......................................................................................................... 58
FBC 1-3 Fruits Consumption ...................................................................................... 59
FBC 4-7 Vegetables Consumption ............................................................................. 63
FBC 10 Vegetarian ....................................................................................................... 70
FBC 11-12 Fish Consumption .................................................................................... 72
FBC 13-15 Chicken Consumption ............................................................................. 78
FBC 16-17 Eggs Consumption .................................................................................... 82
FBC 18-22 Sweetened Drinks Consumption (Soft Drinks and Juices) ....................... 84
FBC 23-24 Eating food at Restaurants ....................................................................... 95
FBC 25-26 Eating Fried Foods .................................................................................. 99
FBC 27 Reading Nutritional Facts ............................................................................. 103
FBC 28-29 Running out of Food ................................................................................ 105
FBC 30 Consumption of Baked Sweets ..................................................................... 111
FBC 31 Perceptions of their Diet ............................................................................... 114
Physical Activity Behavior Patterns ......................................................................... 117
Summary of Physical Activity Behavior Patterns ................................................... 118
Participation in Physical Activities per Day ............................................................... 134
Sunday ......................................................................................................................... 134
Second Physical Activity for Sunday ........................................................................ 137
Monday ......................................................................................................................... 139
Second Activity for Monday ..................................................................................... 142
Tuesday ......................................................................................................................... 144
Second Physical Activity for Tuesday ....................................................................... 147
Wednesday .................................................................................................................. 149
Second Physical Activity for Wednesday .................................................................. 152
Thursday ....................................................................................................................... 154
Second Physical Activity for Thursday ..................................................................... 157
Friday ......................................................................................................................... 159
Second Physical Activity for Friday ........................................................................ 162
Saturday .................................................................................................................. 163
Second Physical Activity for Saturday .................................................................. 167
Body Composition .................................................................................................. 169

5. Discussion, Implications, and Recommendations

Discussion ............................................................................................................... 180
Research Question 1 Answered ............................................................................. 180
  Research Question 2 Answered ........................................................................... 188
  Research Question 3 Answered ......................................................................... 192
Recommendations .................................................................................................. 193
Future Research ..................................................................................................... 197
Conclusions ............................................................................................................ 200

List of References .................................................................................................. 202

Appendices

A. Institutional Review Board Exemption ............................................................... 215
B. Letter of Support Department of Recreation and Sports ................................. 217
C. Spanish and English Versions of the Instruments ............................................. 219
  a. Demographic Sheet ......................................................................................... 220
  b. Food Behavior Checklist (Spanish Version) ................................................... 221
  c. Food Behavior Checklist (English Version) .................................................... 223
  d. 7—Day Physical Activity Recall (Spanish Version) ........................................ 225
  e. 7—Day Physical Activity Recall (English Version) ......................................... 226
  f. BMI Charts ..................................................................................................... 228
LIST OF TABLES

Table 1.1. Comparison of BMI cut-off points between adults and children.......................... 4
Table 2.1. BMI cut-off points for adults (NHLBI, 2000)................................................................. 24
Table 2.2. BMI cut-off points and Categories for Children (CDC, 2000)................................. 25
Table 4.1. Total sample, age mean and standard deviation of the participants by gender, school level, and regions................................................................. 55
LIST OF FIGURES

Figure 2.1. Diagram shows Bronfenbrenner (1979) levels of Social Ecology Model............. 41
Figure 4.1. Distribution of disability status among adolescents in Puerto Rico..................... 56
Figure 4.2. Adolescents’ descriptions of health-related conditions.................................. 57
Figure 4.3. Adolescents’ fruit consumption per week....................................................... 59
Figure 4.4. Adolescents’ fruit consumption by gender..................................................... 60
Figure 4.5. Adolescents’ consumption of fruits per week by school level........................... 61
Figure 4.6. Fruit consumption per week by regions........................................................... 63
Figure 4.7. Adolescents’ vegetable consumption............................................................... 64
Figure 4.8. Vegetable consumption per week by gender................................................... 65
Figure 4.9. Vegetable consumption per week by school level......................................... 66
Figure 4.10. Vegetable consumption per week by regions............................................... 67
Figure 4.11. Adolescents’ milk consumption by gender..................................................... 68
Figure 4.12. Adolescents’ milk consumption by school level............................................. 69
Figure 4.13. Adolescents’ milk consumption by regions.................................................... 70
Figure 4.14. Distribution of female and male who adhered to a vegetarian diet.................... 71
Figure 4.15. Distribution of adolescents by school level who adhered to a vegetarian diet... 71
Figure 4.16. Distribution by regions on the adolescents who adhered to a vegetarian diet.. 72
Figure 4.17. Adolescents’ fish consumption by gender....................................................... 73
Figure 4.18. Adolescents fish consumption by school level.............................................. 74
Figure 4.19. Adolescents’ fish consumption between different regions.............................. 75
Figure 4.20. Adolescents’ fish consumption during the previous week to data collection.... 75
Figure 4.21. Adolescents’ fish consumption by gender during the previous week............... 76
Figure 4.22. Adolescents’ fish consumption by school level........................................ 77
Figure 4.23. Adolescents’ fish consumption by regions.................................................. 78
Figure 4.24. Adolescents’ chicken consumption.............................................................. 80
Figure 4.25. Soft drinks consumption by gender............................................................. 85
Figure 4.26. Consumption of soft drinks by school level............................................... 85
Figure 4.27. Adolescents’ soft drinks by regions............................................................. 86
Figure 4.28. Adolescents’ soft drinks consumption......................................................... 87
Figure 4.29. Adolescents’ consumption of different types of soft drinks by gender.......... 87
Figure 4.30 Adolescents’ soft drinks preferences by school level.................................... 88
Figure 4.31. Adolescents’ consumption of different types of soft drinks by regions........ 89
Figure 4.32. Adolescents’ sweetened drinks consumption by gender............................ 91
Figure 4.33. Adolescents’ consumption of sweetened drinks of adolescents by regions..... 92
Figure 4.34. Adolescents’ sweetened juice consumption during the previous week........ 92
Figure 4.35. Adolescents’ consumption of sweetened juices by gender........................... 93
Figure 4.36. Consumption of sweetened juices by school level....................................... 94
Figure 4.37. Adolescents’ consumption of sweetened juices by regions........................... 95
Figure 4.38. Percentage of adolescents eating food at restaurants................................... 95
Figure 4.39. Percentage of middle and high school adolescents who ate food at restaurants. ......................................................................................................................... 96
Figure 4.40. Eating food at restaurants by regions............................................................ 97
Figure 4.63. Comparison between moderate and vigorous physical activity participation... 119

Figure 4.64. Percentages on time adolescents engage in physical activities. ....................... 120

Figure 4.65. Distribution of the reasons for participating in physical activities .................. 121

Figure 4.66. Distribution of participation participating in physical activities by gender....... 122

Figure 4.67. Distribution of participation in moderate and vigorous physical activities by gender................................................................................................................. 123

Figure 4.68. Distribution of participating in physical activities for 60 minutes or more by gender.................................................................................................................................................................................. 124

Figure 4.69. Distribution of males participating in personal, physical education, and organized sports and physical activities. .................................................................................................................................................................................. 125

Figure 4.70. Distribution of females participating in personal, physical education, and organized sports and physical activities. .................................................................................................................................................................................. 125

Figure 4.71. Distribution of participation in physical activities among middle and high school adolescents.................................................................................................................................................................................................................................................. 126

Figure 4.72. Distribution of participation in moderate physical activity among middle and high school adolescents................................................................................................................................................................................................................................................... 127

Figure 4.73. Distribution of participation in vigorous physical activity among middle and high school adolescents. .................................................................................................................................................................................................................................................. 127

Figure 4.74. Distribution of adolescents’ participation in 60 minutes or more of physical activity bu school level.................................................................................................................................................................................................................................................. 128

Figure 4.75. Distribution of participation in different type of settings among middle school adolescents .................................................................................................................................................................................................................................................. 129

Figure 4.76. Distribution of participation in different type of settings among high school adolescents.................................................................................................................................................................................................................................................. 129

Figure 4.77. Distribution of participation in moderate physical activity among different regions in Puerto Rico. .................................................................................................................................................................................................................................................. 130
Figure 4.78. Distribution of participation in vigorous physical activity among different regions in Puerto Rico. ........................................................................................................................................... 130

Figure 4.79. Distribution of participation in 60 minutes or more on physical activities among different regions in Puerto Rico. ........................................................................................................................................... 131

Figure 4.80. Distribution of participation in personal physical activities among different regions in Puerto Rico. ........................................................................................................................................... 132

Figure 4.81. Distribution of participation in physical activities during physical education class among different regions in Puerto Rico. ........................................................................................................................................... 133

Figure 4.82. Distribution of participation in organized sports among different regions in Puerto Rico. ........................................................................................................................................... 133

Figure 4.83. Distribution of body weight (kg) by gender. ................................................................................................................. 169

Figure 4.84. Distribution of body weight (kg) by school level. ................................................................................................................. 170

Figure 4.85. Distribution of body weight (kg) by regions. ................................................................................................................. 171

Figure 4.86. Distribution of body height (kg) by gender. ..................................................................................................................... 172

Figure 4.87. Distribution of body height (kg) by school level. ..................................................................................................................... 172

Figure 4.88. Distribution of body height (kg) by regions. ..................................................................................................................... 173

Figure 4.89. Distribution of BMI (kg/m$^2$) by gender. ......................................................................................................................... 174

Figure 4.90. Distribution of BMI (kg/m$^2$) by school level. ......................................................................................................................... 174

Figure 4.91. Distribution of BMI (kg/m$^2$) by regions. ......................................................................................................................... 175

Figure 4.92. Distribution of BMI categories among adolescents in Puerto Rico. ......................................................... 176

Figure 4.93. Distribution of BMI categories by gender. ......................................................................................................................... 176

Figure 4.94: Distribution of BMI categories by educational level. ................................................................................................. 177

Figure 4.95. Distribution of BMI categories by regions. ......................................................................................................................... 178
CHAPTER 1

INTRODUCTION

The prevalence of obesity among the United States (US) population and other countries has been characterized as a serious health concern (Hedley et al., 2004). In fact, both overweight and obesity have become a priority for public health specialists (Hill & Peters, 1998). In 2000, approximately 65% of the adult population in the US was overweight or obese (Flegal, Carroll, Ogden, & Johnson, 2002). Due to high-risk health conditions such as obesity, life expectancy is decreasing in the US (US Census Bureau, 2007). Furthermore, the prevalence of overweight and obesity among adolescents has increased dramatically and has been considered an epidemic. Seventeen percent of children and adolescents have been determined to be obese (Koplan, Liverman, Kraak, & Wisham, 2007). For instance, Ogden, Flegal, Carroll, and Johnson (2002) showed that the prevalence of overweight among children increased 5.8% between 1988-1994 and 1999-2000. Moreover, they found that 40% of adolescents [i.e., 12-19 years of age] were “at risk of overweight” or overweight and as much as 20% were overweight.

The terms overweight and obesity have been used interchangeably. However, obesity refers to a body “weight that excess the threshold of a health criterion standard to a greater degree than overweight” (Thomas & Kotecki, 2007, p. 418). On the other hand, overweight is known as overpass healthy weight standards for a particular age or height (National
In short, the definition of these two terms means that an individual who is obese is considered overweight, but an overweight person is not necessarily obese. Both overweight and obesity can easily be determined by several measures of body composition (e.g., body mass index).

Body mass index (BMI) is a widely accepted and inexpensive measure to determine body fatness among children and adults (National Institute of Health [NIH], 2000). It is estimated using the relationship between height and weight. For the general population, BMI highly correlates with body fat. However, BMI may not be appropriate for various groups such as women who are pregnant, athletes, and bodybuilders (Dietz, & Robinson, 1998). Factors such as body frame size and muscle mass can influence the BMI among those populations. Nonetheless, for most the following formula is suitable to calculate BMI:

\[
\text{BMI} = \frac{\text{Weight (kilograms)}}{\text{Height (meters)}^2}
\]

Cut-off points are used to determine the BMI category among adults and children (Dietz & Robinson, 1998). Specifically for adults, *Underweight* refers to a person with a BMI of 18.5 kg/m². *Normal* BMI is determined to be between 18.5 and 24.9 kg/m². Once BMI is 25 kg/m², individuals are classified as *overweight*. An *obese* person has a BMI of above 30 kg/m². However, the adult cut-off points may not be suitable to explain overweight and obesity among adolescents (Cole, Bellizzi, Flegal & Dietz, 2000). According to Boumjte, Huang, Lee, and Lin, (2005), the use of the term “obesity” should be excluded as a category to abate children from adverse overtones that may influence their childhood. Nonetheless, the overweight category does not separate those children and adolescents who are at highest risk of health-related conditions such as diabetes from those who are at lower risk of health-related diseases.
Regarding adolescents, the probability of health-related conditions is not well predicted using the adult cut-off points. Accordingly, researchers have made great efforts to standardize the BMI categories for children and adolescents from 2 to 20 years of age (Cole et al., 2000; Prentice, 1998). So far, the National Center for Health Statistics (NCHS) and the Center for Chronic Disease Prevention and Control (CDC) (2000) have developed the BMI-for-age growth charts for children and adolescents and they have standardized the BMI categories for these populations. Four categories are established depending on the percentile range, even though the same BMI formula is used to determine their estimated BMI. A normal category is defined as a BMI between the 5th and 84.5th percentile and a child at risk of overweight is between the 85th and 94.9th percentile. BMI above the 95th percentile is defined as overweight, while a BMI below the 5th percentile is considered underweight (Table 1.1).

Children and adolescent age and sex are used to differentiate their BMI. For instance, a girl aged 12 years with a BMI of 26kg/m² is considered overweight, even though the same BMI (i.e., 26kg/m²) would be considered normal for a 19-year-old girl. Regarding sex, a 20-year-old girl is at risk of overweight when a BMI of 31.5kg/m² is reached, but a boy with the same BMI and age is classified as overweight. The BMI-for-age growth charts are based on children and adolescent percentiles.
Table 1.1 Comparison of BMI cut-off points between adults and children

<table>
<thead>
<tr>
<th>BMI Categories</th>
<th>Adults [&gt; 20 years old]</th>
<th>Children [2-20 years old]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Underweight</td>
<td>&lt; 18.5</td>
<td>&lt; 5&lt;sup&gt;th&lt;/sup&gt; percentile</td>
</tr>
<tr>
<td>Normal Weight</td>
<td>18.5 – 24.9</td>
<td>5-84&lt;sup&gt;th&lt;/sup&gt; percentile</td>
</tr>
<tr>
<td>At Risk of Overweight</td>
<td>N/A</td>
<td>85-95&lt;sup&gt;th&lt;/sup&gt; percentile</td>
</tr>
<tr>
<td>Overweight</td>
<td>25 – 29.9</td>
<td>95&lt;sup&gt;th&lt;/sup&gt; percentile</td>
</tr>
<tr>
<td>Obese Class I</td>
<td>30 – 34.9</td>
<td>N/A</td>
</tr>
<tr>
<td>Obese Class II</td>
<td>35-39.9</td>
<td>N/A</td>
</tr>
<tr>
<td>Obese Class III</td>
<td>&gt; 40.0</td>
<td>N/A</td>
</tr>
</tbody>
</table>

Differences on BMI patterns have been found between adolescents of diverse ethnic groups (see Definition of Terms for description of each ethnic group discussed in this document). For instance, White Americans have reported the lowest BMI compared with other ethnic groups. Black Americans and Hispanics have the highest percent of children at risk of overweight and overweight (Ogden, Carroll, Flegal, & Johnson, 2002). Statistics show that 25% of Hispanic adolescents in the US are either at risk of overweight (Ogden et al., 2002) or overweight and almost one third are overweight (Mirza et al., 2002). In fact, Hispanic heritage has been identified as a factor increasing the probability of being overweight among children and adolescents (Bumtje, Huang, & Lin, 2005).

The serious concern of at risk and overweight status among children increases the probability of overweight and obesity in adulthood. According to Guo, Chumlea, and Roche
(2002), there is a high probability that children with a BMI at the 75th percentile are more likely to become overweight or obese during their adulthood. They determined that the BMI of an 18-year-old male could be a predictor of adulthood obesity. From the public health perspective, it is important to reduce both childhood and adulthood obesity that would result in less health care expenditures (Bouchard, 2000).

Health care expenditures have increased due to changes in body composition (Marcus & Forsyth, 2003). Furthermore, obesity has reached higher medical expenditures compared with smoking and drinking behaviors (Sturm, 2002) and is related to increased morbidity and mortality (Must et al., 1992; Rodriguez et al., 2006). In fact, because of obesity, health costs are projected to reach $73 billion of the total medical expenditures in US (Finkelstein, Fiebelkorn, & Wang, 2004). Data also reveal that overweight and obese adults spend 7% more on medical expenditures than adults who were not obese or overweight (Finkelstein et al., 2004). Elmer, Brown, Nichols, and Oster (2004) found that BMI has a positive association with healthcare services. People with greater BMI spend more on medical services than those with a BMI of 25kg/m\(^2\) or lower (Elmer et al., 2004; Thompson, Brown, Nichols, Elmer, & Oster, 2001). Specifically, 27% of the national health care charges were associated with physical inactivity and excessive body weight (Anderson et al., 2005). Thompson et al. (2001) stated that medical expenditure increase significantly disproportionally with at risk and overweight adolescents.

Behavioral and social factors have been associated with the despaired increase in at risk and overweight among children. Children food behavior patterns are factors that contribute to overweight. It has been found that those adolescents at risk of overweight and those overweight tend to exceed the necessary total daily calories. Moreover, factors such as inadequate consumption of fruits, vegetables, fruits juices and soft drinks are associated with
body weight. Approximately, 45% of children consume more calories than needed (Sweeney, Glaser, & Tedeschi, 2007) and most children do not meet the daily minimum recommended food group servings (Muñoz, Krebs-Smith, Ballard, & Cleveland, 1997). For instance, they do not meet the recommended guidelines for fruits and vegetables consumption, but their consumption of fat and cholesterol exceed the food recommendations. Boys and girls have shown different eating habits. There is a tendency of boys to meet some of the recommended nutritional guidelines. For example, boys tend to reach the daily needs for grain, vegetables, and meat groups while their female counterparts do not exhibit the same food habits (Muñoz et al., 1997). Moreover, young girls typically consume less milk and water than boys (Sweeney et al., 2007).

Food behavior among Hispanic adolescents seems to be disparate compared to other ethnic groups. Hispanic adolescents tend to have higher fat, sodium, cholesterol, and total daily caloric intake compared to Asian, Black, and White American children (Sweeney et al., 2007). While White American adolescents are more likely to meet the recommended guidelines on several food groups such as dairy, grain, and fruits (Muñoz et al., 1997), Hispanic adolescents have the highest consumption of sweetened juice, and soft drinks (Sweeney et al., 2007). According to Bumtje et al. (2005), higher consumption of soft drinks increases the probability of being at risk or overweight. Similar food behavior has been found with Puerto Rican adolescents living in Connecticut. More specifically, Tanasescu, Himmelgreen, Rodriguez, and Pérez-Escamilla (2000) found that Puerto Rican children who were overweight tended to have more portions and frequency of fruit juices. Overall, children tend to have deficiencies in their consumption of calcium and fiber, and overweight children used to have more soft drinks and fat intake (Sweeney et al., 2007). To date, all the data based evidence on Puerto Rican children and adolescents were determined on those
who live outside of Puerto Rico. The available data on food behaviors among Puerto Rican residents is limited to adults and food groups such as fruit and vegetables.

A sedentary lifestyle has been identified as a contributor to the prevalence of overweight and obesity, regardless of age (Becker, Rockett, Gillman, & Colditz, 2003; Bourn, 2001; Visscher, Kromhout, & Seidell, 2002). Regardless of age, physical activity goals have been included to increase physical activity levels on the US population. Physical activity is imperative for health enhancement and disease prevention (Bouchard, Shephard, & Stephens, 1994). According to the CDC (2006), most people can benefit from daily physical activity. Some of the benefits of physical activity reported are positive changes in BMI, decreases in the risk of cardiovascular diseases, diabetes, and cancer (Bouchard, 2000). However, physical activity behaviors tend to decrease from childhood to adulthood (Bouchard et al., 1994).

In 2002, Vainio and Bianchinni studied the prevalence of physical activity of US adults. They found that only 50% were engaged in moderate physical activity, less than one quarter participated in vigorous physical activity, and more than 25% were sedentary. For such reasons, the United States Department of Health and Human Services (USDHHS) (1980, 2000) has published *Healthy People 2000* and *Healthy People 2010* as guidelines to establish specific health goals (USDHH, 1980, 2000). Three of the main goals include (a) increase regular physical activity among children, (b) increase vigorous physical activity in adults, and (c) decrease sedentary behavior (USDHH, 2000). The latest document, *Healthy People 2010* (USDHH, 2000), include the following goals for adolescents:

- Increase the proportion of adolescents who engage in moderate physical activity for at least 30 minutes on 5 or more of the previous 7 days.
- Increase the proportion of adolescents who engage in vigorous physical activity that promotes cardiorespiratory fitness three or more days per week for 20 or more minutes per occasion.
• Increase the proportion of the Nation’s public and private schools that require daily physical education for all students.
• Increase the proportion of adolescents who participate in daily school physical education.
• Increase the proportion of adolescents who spend at least 50 percent of school physical education class time being physically active.
• Increase the proportion of adolescents who view television 2 or fewer hours on a school day.
• Increase the proportion of trips made by walking.
• Increase the proportion of trips made by bicycling. (pp. 17-24).

The lack of physical activity among young populations has become a serious concern. In fact, more than one third of children do not participate in any type of physical activity (i.e., sedentary lifestyle). The CDC (2005a) has estimated that 28% of students are not engaged in physical activities on a daily basis. Nevertheless, as a positive fact, almost 70% of adolescents meet the recommendations for physical activity (CDC, 2005a). A sufficiently physically active child is a child who engages in physical activity for at least 60 minutes most days of the week (US Department of Agriculture, 2005). This recommendation can be used for adolescents to produce changes in physical activity behavior and body composition. Moreover, this recommendation can influence those children at risk of overweight or overweight (Berkey et al., 2003).

Hispanic adolescents have shown a high prevalence of sedentary lifestyles. Their physical activity behaviors seem to be lower compared with other ethnic groups such as Asian, Black, and White Americans. The USDHHS (2003) has established that, 37% of Hispanic adolescents do not engage in physical activity at least three days per week. As a consequence, Hispanic adolescents have a higher probability of being at risk of overweight or overweight (Yang, Telama, Viikari, & Raitakari, 2006). One third of adolescents do not participate in physical activities such as physical activity programs that should contribute to their overall long-term health status.
The physical activity behavior patterns of Puerto Rico’s residents, a Commonwealth of the US, have been included in the physical activity statistics reported by the CDC. The population in Puerto Rico has one of the lowest physical activity rates among US populations. From 2001-2005, the Puerto Ricans declined by 12% in meeting the recommended physical activity levels (CDC, 2005). The CDC (2005) stated that, 67% of the adult population do not meet the minimum recommendations for physical activity. Furthermore, it is reported that the population of Puerto Rico has the highest decline in physical activity among all states and territories of the US (CDC, 2005b). Nevertheless, data on physical activity behavior patterns of children and adolescents in Puerto Rico is not included in the data provided by the CDC. Hence, there is a lack of evidence on physical activity that otherwise could lead to well-developed and specific strategies for this population. Among Puerto Rican adolescents, available data are based on studies conducted in the US or particular subgroups in Puerto Rico (e.g., children with diabetes and children of low socioeconomic status) (Crespo et al., 2002; Mirza et al., 2004; Ramos, 2003; Tanasescu et al., 2000). Moreover, the sample sizes and locations were not strong enough to extrapolate the results to the general population of adolescents in Puerto Rico. Therefore, for this population, the physical activity levels are still unclear because limited data are available on Puerto Ricans (Crespo et al., 2002; Mirza et al., 2004; Ramos, 2003; Tanasescu et al., 2000).

Of concern, several health-related diseases have seriously affected the health status of Puerto Rican residents in the last few decades. For instance, according to Garcia-Palmieri (2004) asserted, cardiovascular diseases are the primary cause of death in Puerto Rico. Furthermore, cancer tends to be the second cause of death among Puerto Ricans living on the island and, in fact, the prevalence of cancer is expected to grow. Every year, approximately 1,500 individuals die of cancer. Moreover, approximately 10% of the
population in Puerto Rico has been diagnosed with diabetes, however, it is expected that a significant number of people who may be diabetic have not been diagnosed yet. Several studies have identified a significant relationship between health-related diseases (i.e. cardiovascular, diabetes, cancer) and obesity. In other words, higher body weight, due to fatness, increases the risk of cardiovascular, cancer, and diabetes. Besides genetic factors, special attention has been given to eating habits and physical activity. Eating behaviors refers to the actions and attitudes of people toward the consumption of food. It has been identified that food behaviors of people who are obese consist of decreasing healthy food while increasing unhealthy food. For instance, fruits, vegetables, and milk consumption are some of the healthy food groups that tend to decrease among people who are obese. On the other hand, among people who are obese, there seems to be an increase in fast foods, fruit juices, and soft drinks. Those factors are identified as contributors to weight gain. Physical activity is another factor that has been significantly related to obesity and an important component to reduce the risk of health-related conditions. People with lower physical activity levels tend to show higher BMI. In contrast, it has been demonstrated that people with higher physical activity levels can reduce the risk of health-related conditions.

*Statement of the problem*

Due to the serious concerns about the dramatic and consistent increase in the prevalence of several health risk factors such as obesity, and health-related conditions such as cardiovascular diseases, diabetes, and cancer among Puerto Rico’s residents, there is a need to determine and describe the dietary habits and physical activity behaviors of school age adolescents in Puerto Rico. Moreover, there is a need to determine and describe the body composition of this particular population in Puerto Rico. Most of the literature related to
obesity, food behavior, and physical activity refers to Puerto Rican adults and those adolescents living in the US (CDC, 1998, 2005b; Tanasescu et al., 2000). In other studies of children living in Puerto Rico (Asociación Puertorriqueña de Diabetes, 2006; Mirza et al., 2004), available data is not sufficient enough to guide development of specific and precise interventions and programs to affect healthy lifestyles. For instance, even when the CDC has reported food behaviors among Puerto Rican adult residents, only the consumption of fruits and vegetables were included. This represents a lack of data on other food groups such as milk consumption, fast food intake, and soft drinks which are vital factors that influence obesity. Understanding food behaviors among Puerto Ricans can lead to advances in local policies that may promote positive food behaviors of those areas identified as healthy factors, while, at the same time, the promotion of new policies can be vital to restrict negative food behaviors.

One can develop strategies that lead to decrease the prevalence of obesity and the risk of health-related conditions when data about the present status of food behavior, physical activity, and body composition are available. As well, understanding physical activity behavioral patterns among Puerto Ricans may provide guidelines to promote similar programs focused on the tendencies of Puerto Rican adolescents rather than tendencies of adolescents from other countries with different behaviors. As a result, this current study may inform policy makers, educators, and others to move toward some useful changes in best healthy practices for Puerto Ricans.

Theoretical Framework and Purposes

The Social Ecology Model (SEM) can help to understand health-risk factors that may be influencing individual or community health (Gree, Lewis, & Bediako, 2005). SEM represents
the interaction between several levels of environments and human behavior factors, and how those environmental factors are interconnected and indirectly/directly affects an individual’s development. According to Giles-Corti et al. (2002), the bidirectional interaction between people and the environment may “passively” or “actively” influence there behavioral patterns. Human development was defined “as the person’s evolving conception of the ecological environment, and his relation to it, as well as the person’s growing capacity to discover, sustain, or alter its properties” (Giles-Corti, 2002, p. 9). According to Bronferbrenner (1977), the way the environment is perceived affects the manner people behave while interacting within a particular setting. SEM is a system in which all subsystems are connected and are influenced by each other. Moreover, the focus of SEM is based on several levels of subsystems, which show a reciprocal interrelation among them. Bronferbrenner (1979) identified: (a) the microsystem, (b) mesosystem, (c) exosystem, and (d) macrosystem as subsystems that play a vital role in the model. Microsystem refers to the immediate environment that is interacting with a particular individual. Within the mesosystem, it is included the relationship and influence of other variables such as parents and teachers on adolescents, while the mesosystem refers to those factors that influence people’s behavior indirectly. For instance, mesosystem level could include aspects such as neighborhood and organizations. However, people’s behaviors can be impacted by policies, laws, and institutional regulations, which would belong to the exosystem. According to this model, the political and economical can have indirect or direct influence on the other level of SEM and as a result indirectly influence people’s behavior. Each subsystem has the same level of importance on the individual behavior and development. Specifically, the intrapersonal factors are imperative in the process of understanding and modifying particular health behaviors, but also health can be extremely influenced by cultural factors and behavior
(Green, et al., 2005; Kaplan, Everson, & Lynch, 2000). According to Dishman, Washburn, and Heat (2004), “this theory also holds that activity history and habits are strong predictors of future behavioral patterns in social context” (p. 406). In that context, for this particular study, the microsystem level was used in understanding the food behavior considerations, physical activity behavior patterns, and body composition indices of adolescents in Puerto Rico as explanations of possible health risk behavior that were compromising their healthy lifestyles.

**Purpose of the Study**

Due to the steady ascending trend over the past 25 years or more in the prevalence of overweight and obesity, and health-related risk conditions of Puerto Rico’s residents, more research is needed in this area for this population. The purpose of this study was to determine and describe the food behaviors considerations (e.g., food security), physical activity behavior patterns, and body composition indices of adolescents in Puerto Rico. Stated differently, the end sought was to determine and describe the eating habits and considerations, physical activity behavior patterns, and body composition indices of school-age adolescents in Puerto Rico. Furthermore, this study examined differences on selected variables (e.g., dietary habits, physical activity behavior patterns, and body composition indices) between school age males and females, and between middle and high school students. Lastly, owing to the existing literature and current findings the researcher study articulated strategies and recommendations to counter overweight, obesity, and health-risk behaviors of school-age children and youth in Puerto Rico.
Research Questions

1. What are the food behaviors considerations of middle and high school students in Puerto Rico?
   a. Do female and male students differ in their food behaviors considerations?
   b. Do middle and high school students differ from their food behaviors considerations?

2. What are the physical activity patterns of middle and high school students in Puerto Rico?
   a. Do female and male students differ in their physical activity patterns?
   b. Do middle and high school students differ in their physical activity patterns?

3. What are the body composition indices of middle and high school students in Puerto Rico?
   a. Do female and male students differ in their body composition indices?
   b. Do middle and high school students differ from their body composition indices?

Significance of the Study

As mentioned previously, there is a serious concern about the increased rates of obesity and health-related conditions such as cardiovascular diseases, diabetes, and cancer among Puerto Ricans living in the mainland. However, little is known about adolescents’ behaviors on health risk factors as eating habits and physical activity that significantly impact health-related conditions. Even though there is a high correlation between eating habits, physical activity levels, and body composition and health-related diseases, empirical data on food behavior, physical activity behavior patterns, and body composition measures are missing
from the literature relative to Puerto Ricans. The Puerto Rico Behavioral Risk Factor Surveillance System (2004) and the CDC (2006) have reported physical activity levels and fruits and vegetables consumption of adult residents of Puerto Rico. But, Crawford and Ball (2002) stated that the lack of descriptive data on physical activity and food behavior reduce the possibility of developing an effective intervention to decrease the obesity epidemic. Dishman, Washburn, and Heat (2004) suggested that, particular risk factors cannot be improved without establishing the prevalence rates which also aids to determine particular subgroup(s) in needs of intervention. To date, it is unknown if there are significant differences between school age males and females and between middle and high school students in eating habits and other considerations (e.g., food security), physical activity, and body composition. Moreover, Springer, Hoelscher, and Kelder (2006) stated that the present health risk factors status of adolescents might have a significant implication on adulthood overweight and obesity. Therefore, the current study is important to determine and describe the food behaviors considerations, physical activity behavior patterns, and body composition indices of school age adolescents living in Puerto Rico. As well, differences between school-age females and males and between middle and high school students were examined. Moreover, findings of this study may help determine particular subgroups in need of improving those variables mentioned above, and to establish some implications and recommendations for Puerto Rico’s government (e.g., Department of Education and Department of Recreation and Sports in Puerto Rico).

Delimitations

Several delimitations frame this study. First of all, all data used in the study were secured from a preexisting data set of adolescents between 12 and 20 years of age who were
randomly sampled across ten strata (regions) and enrolled in public schools in Puerto Rico. More specifically, data used in this study comes from existing data of the Puerto Rico en Forma Project, which was secured from middle and high school students at public schools that were randomly selected across ten regions that covered the entire island. That is, this study was based on a secondary data analysis of a pre-existing data set.

**Limitations**

Limitations of secondary data analysis are threats to data collection procedures and issues of instrumentation (Nicholl & Beyea, 1999). In most cases, researchers do not have control over the data collection process (Castel, 2003). Therefore, it is important to determine the sources, purposes, instruments, and the ways data were collected (Garmon, 20007). For the purpose of the current study, a pre-existing data set from the Puerto Rican government was used.

**Definition of Terms**

This section will define the most relevant terms in the context that they will be used.

*Asian Americans.* Asian Americans refer to ethnic groups in US who are descendents from Asian countries such as China, Japan, and Korea (US Census Bureau, 2000).

*At risk of overweight.* At risk of overweight refers to the BMI classification from 75th to 85th percentile for children and adolescents (i.e., 2-20 years of age) (Cole, Bellizzi, Flegal, & Dietz, 2000).
Black Americans. Black Americans refer to ethnic groups in US who are African descendents, which primarily consist of African Americans (Hodge, Kozub, Robinson, & Hersman, 2007).

Body Mass Index. Body mass index is a mathematical equation that is determined by the body weight and height. Put simply, BMI is a popular approach that has been highly correlated with body fat, especially on adult populations (CDC, 2007).

Food Behavior. Food behavior refers to people eating habits in several food groups such as vegetables, fruits, milk consumption, and fast foods. In addition, it includes individual food insecurity (Townsend et al., 2003).

Hispanic. Hispanic refers to ethnic groups in US and its territories who are descendents from Spanish-speaking countries such as Mexico, Puerto Rico, Cuba, and South America (US Census Bureau, 2000).

Moderate Physical Activity. Moderate physical activity is defined as physical activity that produces slightly increased heart rate and breathing. As a result, one would be able to maintain a conversation while performing those activities. It could include activities such as volleyball, softball, and walking (Dishman, Washburn, & Heath, 2004).

Obesity. Obesity refers to excessive body fat that result in a higher risk of health-related conditions. It includes people with BMI estimates greater than 30kg/ m² (Bouchard, 2000).

Overweight. Overweight are those adolescents with a BMI greater than 85th percentile would are considered overweight as well (Cole, Bellizzi, Flegal, & Dietz, 2000).
Physical activity. USDHHS has defined physical activity as any body movement produced by skeletal muscles that contribute to one's energy expenditure (US Department of Health and Human Services, 1996).

Vigorous Physical Activity. Vigorous physical activity refers to physical activities that highly increase heart rate and breathing. Vigorous physical activity may include activities such as soccer, basketball, and running (Dishman et al., 2004).

White Americans. White Americans refer to ethnic groups in US who are descendents from Europe, the Middle Eastern, and North Africa (US Census Bureau, 2000).
CHAPTER 2

REVIEW OF LITERATURE

This chapter is a summary of the relevant literature related to food behavior, physical activity, and prevalence of overweight and obesity among adolescents in US. As well, literature concerning adults and adolescents in Puerto Rico will be presented for those areas where it is available. The first section will include the trends and evidence of factors related to at risk of overweight and overweight among adolescents. Then, food behavior factors such as fruits and vegetables intake, milk consumption, soft drinks, and food insecurity and their relationship with body composition in the context of adolescents will be presented. The literature review will also include physical activity behaviors of adolescents and its importance on body composition and all causes of mortality.

Obesity

The prevalence of overweight and obesity has become a serious concern for health and government agencies in the US (Flegal, Carroll, Ogden, & Johnson, 2002; Ogden, Flegal, Carroll, & Johnson, 2002). Obesity refers to excessive accumulation of fat that increase body weight (Thomas & Kotecki, 2007). However, overweight is defined as a person with a body weight higher than the recommended for their height and body frame (Jackson, Morrow,
Hill, & Dishman, 2004). Flegal et al. (2002) found that at least 65% of the population in the US was either overweight or obese. In fact, 32% of the adults population (20 years and over) were obese (Ogden et al., 2006). Evidence shows that people who are obese increase the risk of several health-related conditions (CDC, 2005). For instance, the increase in health diseases such as diabetes, hypertension, and cancer are associated with the prevalence of obesity (Daniels et al., 2005). It is more likely that at risk and/or overweight adolescents develop those types of health-related conditions during their adulthood than those who maintain their normal body weight.

The prevalence of overweight among children has increased dramatically. Approximately, 17% of children and adolescents are overweight, while almost the same percent (i.e., 16.7%) of adolescents are obese (Koplan et al., 2006). There is a serious concern regarding Hispanic children who have exhibited serious changes on body composition. Hispanic adolescents have reached the highest prevalence of overweight in US (Sulemana, Smolensky, & Lai, 2006). Only African American adolescents have a higher prevalence of overweight than Hispanics. According to Ogden et al. (2002), at least 19% of Hispanic adolescents were overweight. Hill and Trowbridge (1998) stated that at risk of overweight and overweight children represent a serious concern for adulthood obesity and health-related conditions. There is a high probability of health-related conditions among overweight children. For example, conditions such as diabetes, dyslipidemia, and hypertension have been associated with overweight children. Similarly, Hedley et al. (2004) found that approximately 30% of adolescents are at risk of overweight or obesity in the US. Hedley et al.’s study (2004) conducted with 4,018 and 4,258 children between 1999-2000 and 2001-2002 respectively. Moreover, they found that nearly 16% of the children were overweight (Hedley et al., 2004).
As a consequence of the increase in obesity rates, health-related expenses have impacted both personal and public health budgets (Finkelstein, Fielbelkorn, & Wang, 2004). Previous researchers have found that obese populations have an increase of 36% on their medical expenditures (Sturn, 2002). Finkelstein et al. (2004) created a model that forecasts medical expenditures based on obesity, insurance status, and sociodemographic characteristics. The researchers found that in 2003 medical expenditures related to obesity was approximately $75 billion which $17 billion was covered by Medicare and $21 billion sponsored by Medicaid. Data also showed that large states such as California and New York have the highest medical expenditures. Similarly, Thompson et al. (2001) aimed to estimate future medical expenditures with body mass index (BMI) estimates among the adult population from the state of Oregon. Using a strata sampling approach, the researchers tracked participants for a period of nine years. BMI was classified in three different categories (i.e., 20 -24 normal, 25 – 29 overweight and > 30 kg/m² obese). Using a mail survey approach, the researchers collected data on medical histories, healthcare services, medications, and BMI estimates. Results of the study showed that more than half of the participants were overweight or obese. They found that people with higher BMI estimates tended to use healthcare services more frequently. Furthermore, medical expenditures were less on those people who were not obese or overweight. For example, medical cost from 1990 – 1998 increased approximately to $6,000 more on those participants who increased their BMI.

Targeting and Defining Overweight and Obesity

In the US, the Department of Health and Human Services (USDHHS) has made extraordinary efforts to develop national goals to improve the health quality of the US population. As a result, a comprehensive document called Healthy People 2000 was published
in 1990 by USDHHS. *Healthy People 2000* included 22 essential areas that covered physical activity and nutrition. The main goal of *Healthy People 2000* was to provide strategies that contribute to the health of people living in US by the end of the century. However in the 1980’s a similar document was published and several areas were included into *Healthy People 2000*. Several objectives regarding overweight and obesity were included into *Healthy People 2000* (USDHHS, 1990). For instance, the goals of *Healthy People 2000* (USDHHS, 1990) were reducing the prevalence of overweight and obesity of children, youth, and adult populations in US. Moreover, there was a focus on increasing physical activity levels and on improving eating behaviors of children and adults (National Center for Health Statistics, 2005). Even though the USDHHS published and the national health goals, none of the behavioral objectives such as physical activity and nutrition were met by the end of the century (NCHS, 2005). Furthermore, the prevalence of overweight and obesity in the US population did not reach the goals established in *Healthy People 2000* (USDHHS, 1990).

Lately, the USDHHS (1999) published *Healthy People 2010*, which extended the national health goals established on previous publications (e.g., *Healthy People 2000*). Specifically, *Healthy People 2010* attempted to increase the life expectancy and quality of people living in the US. To reach the goals of decreasing 15% and 5% of the prevalence of obesity in adults and overweight in children respectively, *Healthy People 2010* (USDHHS, 2000) includes several goals such as: (a) increasing fruits, vegetables, fat-free and low-fat milk consumption, and (b) increasing to at least 30-60 minutes of moderate physical activity almost every day (USDHHS, 2000).

Overweight may be defined as the excessive body weight for a particular body frame and height (Jackson et al., 2004). Obesity refers to excessive body fat that increases the risk of several health related conditions such as diabetes, and cardiovascular diseases (Jackson et al.,
For many years, these two terms (i.e., overweight and obesity) have been used interchangeable. Even though an overweight person may not be obese, a person who is obese is considered overweight (MacDonals, 2003).

Different definitions have been used for overweight and obesity for many years (Kuczmarski & Flegal, 2000). One of the first definitions of overweight and obesity was given by the Metropolitan Life Insurance Company (Hall, 2003). The Metropolitan Life Insurance Company developed the standard height-weight tables, which endeavor to establish “desirable” weight based on body frame, height, and sex (Hall, 2003). However, this intention for classifying body weight had several limitations such as methods of collecting data [e.g., self-reported, inaccurate equipment], and population characteristics (mostly White males) (Kuczmarski & Flegal, 2000).

To date, there are several methods to assess body composition such as underwater weighing, bioelectric impedance, skinfold thickness, waist-to-hip ratio, and BMI (Jackson et al., 2004). BMI is determined when body weight is divided by the square of the body height. The National Heart, Lung, presented in table 2.1:
<table>
<thead>
<tr>
<th>Category</th>
<th>BMI Criterion Standard (kg/m²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Underweight</td>
<td>Less than 18.5 kg/m²</td>
</tr>
<tr>
<td>Normal or healthy</td>
<td>18.6 to 24.99 kg/m²</td>
</tr>
<tr>
<td>Overweight</td>
<td>25 to 29.9 kg/m²</td>
</tr>
<tr>
<td>Obesity I</td>
<td>30 to 34.99 kg/m²</td>
</tr>
<tr>
<td>Obesity II</td>
<td>35 to 39.99 kg/m²</td>
</tr>
<tr>
<td>Obesity III</td>
<td>40 or greater kg/m²</td>
</tr>
</tbody>
</table>

Table 2.1 BMI cut-off points for adults (National Heart, Lung, and Blood Institute, 2000).

There has been a positive association between BMI and relative mortality rate (Thomas & Kotecki, 2007). In other words, regardless of sex and age, people whose body weight reach obesity III have a higher risk of mortality than those who body weight is not classified as overweight (World Health Organization, 2002). These categories are suitable for adults, but the use of them may not be appropriate for children and adolescents.

BMI charts for children from 2 to 20 years of age are slightly different than those developed for adults. Primarily, BMI charts for children are based on weight, height, age, and sex (Dietz & Robinson, 1998). Therefore, differences in categories on children with the same calculated BMI can be observed at different age and for different sex. CDC (2000) has published the BMI-for-age growth chartsspecific to boys and girls. Essentially, BMI-for-age growth charts for children include four categories based on children percentiles. To determine the BMI category in children, the CDC (2000) identify: (a) underweight as a BMI
below 5th percentile, (b) normal as a BMI between 5th and 85th percentile, (c) at risk of overweight between 85th and 95th percentile, and (d) overweight over 95th percentile (Table 2.2). Thus, percentile ranks determine the relative position of a child when compared with other children of the same sex and age. As one may notice, the obese category is not included into the BMI-for-age growth charts published by the CDC (2000). Boumjte et al. (2005) stated that the term “obesity” can negatively influence their childhood, therefore should not be used to describe body composition among children. However, because there is a lack of evidence that particular BMI cut-off can be associated with health-related conditions on children and adolescents, the use of obesity as it is define may not be appropriate for this age-population.

<table>
<thead>
<tr>
<th>Category</th>
<th>BMI Criterion Standard (based on percentile)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Underweight</td>
<td>Less than 5th percentile</td>
</tr>
<tr>
<td>Normal or healthy</td>
<td>5th - 85th percentile</td>
</tr>
<tr>
<td>At risk of overweight</td>
<td>85th - 95th percentile</td>
</tr>
<tr>
<td>Overweight</td>
<td>95th percentile or greater</td>
</tr>
</tbody>
</table>

Table 2.2. BMI cut-off points and Categories for Children (Center for Disease Control and Prevention, 2000)

*Obesity Rates among Puerto Ricans*

Since 1952, Puerto Rico has been a Commonwealth of the U.S (Fernández, 1975) and to date it has 4 million habitants (US Census, 2006). The prevalence of overweight and obesity in Puerto Rico has changed during the last 40 years. In 1975, Fernández reported that 38%
of Puerto Rico’s residents were either overweight or obese. Overweight was defined as a person with an extra 10-20% pounds her/he recommended body weight (Fernandéz, 1975). In order to be considered obese, a person should have over 20% of their recommended body weight. Nevertheless, due to varied use of those definitions of overweight and obesity, it is difficult to determine the actual increase in the prevalence of overweight and obesity across time periods.

However, using the BMI approach, the prevalence of overweight and obesity in Puerto Rico increased nearly 20% by 1998 (CDC, 1998). Specifically, 56% of Puerto Rico’s residents were classified as either overweight or obese. In 2006, the greatest increase was observed with the obese category, which increased 5%, while 3% was the increased of the overweight population. The CDC (2006) reported that, in general, 64% of the population over 18 years old living in Puerto Rico were either overweight or obese. A recent evaluation report, Puerto Rico en Forma Evaluation Report found that 68% of Puerto Rico’s residents were either overweight or obese (Hodge, Del Rio, & Vigo-Valentín, 2007). This report showed an increase in the prevalence of overweight and obesity among adults in Puerto Rico. Findings of this evaluation report shows that 37% of the adolescents in Puerto Rico were either at risk of overweight or overweight. The prevalence of at risk of overweight or overweight among Puerto Rican adolescents is slightly higher (i.e., 30%) than US adolescents (Crespo & Arbesman, 2003). However, more empirical evidence is needed to determine particular prevalence or trends of children and adolescents in Puerto Rico.

Moreover, the concern with regard to the prevalence of overweight and obesity among Puerto Rico’s residents is the positive association of these conditions with health-related diseases such as diabetes and cardiovascular diseases. In Puerto Ricans, these associations are supported with a study called The Estudio Continuo de Salud conducted by the Health
Department in Puerto Rico (Ramos, 2003). With a sample size of 47,962 participants from across the island, researcher found that the prevalence of several health-related conditions such as diabetes and hypertension were higher with people who were overweight and obese than the general population. For instance, the Asociación Puertorriqueña de Diabetes (2006) reported that at least 13% of the Puerto Rico residents have been diagnosed with diabetes. In fact, Ho et al. (2006) showed that the prevalence of diabetes is higher among Puerto Ricans living in the island compared to those in the US. Further, Garcia-Palmieri (2004) stated that cardiovascular diseases have dominated the causes of death among Puerto Ricans. Moreover, Rodríguez et al. (2006) found that Puerto Rico is the second territory with the highest prevalence of death due to coronary heart diseases among Caribbean islands. Haggar et al. (2007) reported that Puerto Ricans in the US have higher death rates than other Hispanic populations.

Factors Influencing Overweight and Obesity

The causes of overweight and obesity have been connected with several factors such as energy imbalance, which may include eating behavior considerations and physical activity behavior patterns (Hill & Trowbridge, 1998). However, genetic theory is not well supported by some researchers who have established that changes in obesity have become faster than changes on individual genetics (Thomas & Kotecki, 2007). States differently, researchers have pointed out that changes in human genetics occur in a very slowpace, but eating habits and physical activity behavior patterns have dramatically changes in the last decades. In facts, poor eating habits and lack of physical activity have had stronger support as two modifiable factors that increase the risk of overweight and overweight rates on children and adolescents (Crespo et al., 2001). Therefore, there is a higher probability that modifications in people’s
body composition are highly correlated to these two factors (i.e., food behaviors and physical activity levels).

*Food Behavior*

During the last 15 years, dietary guidelines have been established for the population in the US. In 1992, the US Department of Agriculture (USDA) published “The Food Guide Pyramid” as an effort to help Americans pursue healthy eating behaviors. The USDA was attempting to decrease the high consumption of fats that predominate US diets. They recommended decreasing the intake of sugar, saturated fat, cholesterol, sodium, and alcohol. This food guide pyramid provided specific guidelines for carbohydrates, fruits, vegetables, meat, dairy products, and fat (USDA, 1992). For example, it was recommended that Americans should consume a minimum of 5 daily servings of fruits and vegetables. Still, by 2003, only 22.6% of people living in the US and its territories were meeting this goal (CDC, 2003). Due to the fact that US populations did not meet the food guidelines and recommendations, the USDA revised and published the new “Dietary Guidelines for Americans 2005” (USDA, 2005). The new document provided by the USDA (2005) states that:

> The recommendations are based on the preponderance of scientific evidence for lowering risk of chronic disease and promoting health. It is important to remember that these are integrated messages that should be implemented as a whole. Taken together, they encourage most Americans to eat fewer calories, be more active, and make wiser food choices. (p.vi)

Interestingly, a physical activity component was adopted into the new food guidelines for Americans. This inclusion of physical activity reflects the importance of these two factors
together on weight management. In fact, the level of physical activity would determine the food servings and the total daily calories (USDA, 2005).

The eating habits of populations living in the US have been widely described (Devaney, Gordon, & Burghardt, 1995; Hill & Trowbridge, 1998). Studies have shown a decrease in the food behavior quality of children and adolescents (Borrud, Enns, & Mickle, 1997; Nicklas, 1995; USDA, 1993). Apparently, the consumption of soft drinks and fast foods have influenced the fruits, vegetables, and milk intake (Nielsen, Siega-Riz, & Popkin, 2002). In 1995, Devaney described the eating behaviors of students from 1st to 12th grade measured by a 24 hours food recall survey. He found that most of the students tended to consume more calories than the daily-recommended amount established by the USDA. In fact, those students had a high fat and cholesterol intake, which resulted in a high calories diet. Ten years later, Bumtje et al. (2005) reported similar findings than those published by Devaney (1995). Bumtje et al. (2005) measured children and adolescents between 2 and 18 years of age and found that the high calories diet increased the risk of being at risk of overweight or overweight.

However, several studies have attempted to determine the correlation of eating behaviors with the risk of overweight and obesity. Particularly, vegetables, fruits, soft drinks, milk, and fast food consumption have been identified as factors that may contribute to the risk of overweight and overweight. Researchers have already established that children and adolescents in the US have low consumptions of important food groups such as vegetables and fruits (Muñoz, Krebs-Smith, Mallard-Barbash, & Cleveland, 1997). In contrast, fruit juice intake is highly consumed among children and adolescents and tends to be a factor associated with obesity (Berkey, Rockett, Field, & Gillman, 2004; Casey et al., 1997).
According to Rockett et al. (2004), there is a positive association between fruit juice consumption and BMI estimates among adolescents. Conducting a secondary data analysis with data obtained from the Growing Up Today Study, they found that higher BMI is present with adolescents who had higher consumptions of fruit juices than those who did not exhibited the same behaviors. Previously, similar results were reported by Casey et al. (1997) who studied the influence of excess fruit juice consumption among children on obesity and found that overweight and obese children tended to drink more fruit juices than children with normal body weight. One of the serious concerns that of the fruit juice consumption among Hispanics. Hispanic children and adolescents tend to have higher fruit juice consumption than their Asian, Black, and White American counterparts (Sweeney, Glaser, & Tedeschi, 2007). Moreover, Puerto Rican students in US who are overweight and obese have higher servings of fruit juices (Tanasescu et al., 2000). To date, there is a void of empirical evidence on food behaviors among children and adolescents living in Puerto Rico.

As well, soft drinks have been associated with the increase in overweight and obesity among children and adolescents. The consumption of soft beverages has increase dramatically worldwide and it has been associated with body composition changes in adolescents (Vartanian, Schwartz, & Brownell, 2007). It seems that the consumption of soft drinks tend to dramatically increase the total caloric intake. Harnack, Stang, and Story (1999) showed that those students who had more than nine ounces of soft drinks daily have higher total calories than those who tend to consume lower ounces of soft drinks. In fact, a literature review conducted by Malik, Schulze, and Hu (2006) demonstrated that most of the studies conducted to determine association between soft drink consumption and overweight and obesity found a positive association between these variables. As for fruit juice consumption, Hispanic children and adolescents tend to have higher consumptions of soft
drinks than their counterparts (Sweeney, Glaser, & Tedeschi, 2007). Still, no evidence on children and adolescent in Puerto Rico limited the food behavior conclusions in this age population.

The American Heart Association has recommended a limit of up to 30% of calories from total fat. No more than 10% of the total calories should come from saturated fat. Recently, the state of New York tried to establish some regulations that include food calorie information and to ban artificial Trans fat from fast food restaurants. Trans fats is defined as “unsaturated fatty acids that are formed when vegetables oils are processed to become solid” (Thomas & Kotechi, 2007, p.119). According to Shapiro (1997), Trans fats can increase blood cholesterol and coronary heart disease. Furthermore, the times eating at fast food restaurants was positively correlated with BMI. Those people who eat more times at fast food restaurants increased dramatically the total caloric intake per week and their BMI estimates.

Recently, it has been hypothesized that food insecurity may have a positive relationship with obesity (Dietz, 1995). Later studies reaffirmed this association between both food insecurity and obesity (Adams, Grummer-Strawn, & Chavez, 2003; Olson, 1999; Townsend et al., 2001). However, a national self-reported study was conducted by the Washington State Department of Health (2006) to determine the association between food security and obesity. Findings of this study showed that people who were more insecure about running out of food tended to have higher BMI estimates than those who felt food security. However, those studies were conducted with adults and no data was reported for children and adolescents. In 2005, Gulliford, Cheryl, and Brian conducted a study, which attempted to determine the association between food insecurity and BMI estimates of adolescents from Trinidad and Tobago. The results of the study contradicted findings among adults. The
researchers found that there was no relationship between food insecurity and BMI estimates among adolescents in Trinidad and Tobago. Nevertheless, research results on children and adolescents in the US show a positive correlation between food insecurity and at risk of overweight and overweight among children and adolescents (Casey et al., 2006). A secondary data analysis was conducted using data from the National Health and Nutrition examination survey 1999-2002 and included children from 3 to 17 years of age. Findings of that study reflected a positive correlation between food insecurity and at risk of overweight and overweight. However, those results were not found in all participants. The higher correlations were found with children between 12 and 17 years old, girls, and children of low socioeconomic status. Data on food behavior in children and adolescents in Puerto Rico is sparse.

As noted, food insecurity appears to correlate with overweight and obesity among adults. However, contradictory results may be found among children and adolescents from different nationalities. The evidence of children and adolescents support the association between these variables, but more studies are needed to establish the effect of food insecurity on obesity.

Eating patterns among Puerto Ricans living in the US mainland has changed dramatically during the last 30 years. It seems that Puerto Ricans had much healthier eating habits two decades ago compared their present dietary habits. Fernandez (1975) revealed that between 1960 and 1970, fruits, vegetables, and milk predominated in the Puerto Rican diet. However, the data evidenced that the consumption of some of these food groups decreased while others increased. For example, from 1950 to 1970, people tend to decrease the fruits and vegetables intake, while increasing the consumption of milk and dairy products, and fats (Fernandez, 1975). A recent report on Puerto Ricans showed that the consumption of these
food groups differs between adolescents and adults (Hodge et al., 2007). Adults tend to consume less vegetables, fruits and milk than adolescents while fat intake increases between adolescents and adulthood. However, eating at fast food restaurants also decrease between these two age-stages.

Physical Activity

Sedentary lifestyle is a priori concerns for public health organizations today. It is well documented that sedentary lifestyles directly increase mortality and morbidity rates. Specifically, adulthood has been associated with less physical activity and higher rates of obesity. In addition to obesity, lack of physical activity may lead to the development of several chronic diseases such as cardiovascular disease, diabetes, and cancer (Eckel et al., 1998). Several studies have found that people who were less physically active showed higher risks of mortality than their higher physically active peers (Bijnen, Caspenser, & Mosterd, 1994; Crespo et al., 2002; Fletcher et al., 1996). They also found that physical inactivity was a better predictor for health-related conditions (e.g., diabetes, coronary heart diseases, and cancer) than even obesity and being overweight. Interestingly, Crespo et al. (2002) did not find a significant correlation between being overweight (i.e., BMI 25 – 29 kg/m²) and mortality after controlling for physical activity. Put simply, physically inactive people may have higher risks of mortality than those overweight people who are physically active.

According to studies reviewed by Blair, Kohl, and Paffenberger (1989) participation in moderate physical activity has a positive impact on all-cause mortality. Lee and Skerrett (2001) demonstrated that the levels of physical activity and fitness play an important role in mortality risk. They found that people with higher physical activity and fitness levels tend to decrease the risk of mortality. In terms of coronary heart disease, physical activity can
decrease at least 50% of the risk of suffering this health condition (Dishman, Washburn, & Heath, 2004). What is more, Zimmet et al. (1990) found that the prevalence of diabetes has increased as a consequence of abandoning physically active lifestyles. According to the Surgeon General’s Report (USDHHS, 1996), physical activity can decrease the risk of colon cancer. Moreover, the risk of cancer can be reduced by 20% in people who are more physically active (World Cancer Research Fund and American Institute for Cancer Research, 1997).

Even with these facts, only 46% of the US population has been engaged in recommended physical activity (CDC, 2005). The data on physical activity confirmed that 39% of the US population has engaged in a total of 10 or more minutes of moderate or vigorous physical activity during a period of a week. Moreover, CDC data illustrated that 16% of the population has reported less than ten minutes total of moderate or vigorous physical activity (MVPA) throughout a week (CDC, 2005). When those data is disaggregated by gender, it showed that only 48% of US males have reached the recommended amount of physical activity, while 44% of females had the same MVPA recommendation (CDC, 2005).

Evidence shows that there are differences between diverse ethnic groups in their physical activity levels. White Americans seem to be more physically active than any other ethnic group. Fifty one percent of White Americans tend to engage in 30 minutes of moderate physical activity or 20 minutes of vigorous physical activity (CDC, 2005b). Among Black Americans, 58% do not meet the recommended guidelines for physical activity (i.e., 30 minutes of moderate physical activity or 20 minutes of vigorous physical activity). Besides Black-Americans, Hispanics tend to be the second ethnic group with lower physical activity levels. Only, 44% of Hispanics engage in 30 minutes of moderate physical activity or 20 minutes of vigorous physical activity (CDC, 2005b). Puerto Rico, as a Commonwealth of the
US, has been included in the physical activity statistics reported by the CDC. It is reported that Puerto Rico’s population has one of the lowest physical activity participation compared with other states of US and its territories. From 2001-2005, Puerto Rico had a decline of 12% on people who has met the recommended physical activity levels (CDC, 2005b). Sixty seven percent of the adult population in Puerto Rico has not met the recommended physical activity levels.

Physical activity guidelines have been established for the general population to decrease the risk of chronic diseases such as obesity, cardiovascular diseases, diabetes and cancer (Bouchard, 2000). The Center of Diseases Control and Prevention (2005c) has promoted the engagement of moderate physical activity for at least 30 minutes on a daily basis. Moderate physical activities have been defined as activities that, while being performed, people could maintain a conversation comfortably (Thygerson & Larson, 2006). In addition, a moderate physical activity should utilize approximately 150 kilocalories of energy per day or 1,000 kilocalories per week (Jackson, Morrow, Hill, & Dishman, 2004). This recommendation has been integrated into the new nutritional pyramid developed for the US population and in which integrated physical activity is a component of the nutritional guidelines (Ilkay, 2006). Another physical activity recommendation is performing vigorous activities for 20 minutes at least three days per week (American College of Sports Medicine, 1998). In vigorous activities people may not be able to maintain a conversation for a long period of time (Thygerson & Larson, 2006). These recommendations are based on one of the components of physical activity such as intensity that is related with the effort of people during the exercise bout (Jackson et al., 2004). Other types of physical activity recommendations may include walking steps on a daily basis. Physical activity professionals have established that general population should walk a minimum of 10,000 – 12,000 steps during each day (Tudor-Locke & Bassett,
2004). According to Hatano (1993), this number of steps (i.e., 10,000) may use 300-400 calories per day. The general population should be accumulating certain amounts of time or steps while engaging in physical activity throughout the day as a method to modifying health problems (Blair, LaMonte, & Nichaman, 2004).

Research on exercise has been used to establish the minimum physical activity recommendations on duration, intensity, frequency and mode. Moreover, epidemiological research has been the foundation for supporting those recommendations. Researchers have focused on the amount of physical activity needed to decrease the risk of several health related diseases. Studies from researchers such as Karvonen et al. (1957) have served to initiate the beginning of a series of physical activity recommendations by the American College of Sports Medicine. As a major outcome, researchers found that higher levels of fitness were produced by high intensity exercise. However, participants who engaged in moderate physical activity improved their work capacity. One of the first national exercise recommendations, in 1975, established that people obtained positive health benefits by performing physical activity three to five days per week. Durations of 20 to 45 minutes and intensities of 70 to 90 percent were also recommended. Over the years, the recommended frequency remained the same, while duration and intensity increased. For example, physical activity recommendations for 1995, established minimum exercise durations of 20 and 60 minutes as the maximum amount of time and in terms of intensity of exercise, 40 to 85 percent of the heart rate. The new physical activity recommendations developed by CDC (2006b) have established a minimum duration of 30 minutes at least 5 days a week for moderate physical activities. For vigorous physical activity, the minimum recommendations have been modified to 20 minutes or more at least three times per week.
In fact, exercise and physical activity recommendations do not have to be met in one bout session. The CDC and ACSM have established that physical activity recommendations can be met on one or more bouts. Osei-Tutu and Campagna (2005) studied the effects of accumulated physical activity (i.e., short and long bouts) on body composition and cardiovascular capacity. Results showed that both short-bout and long-bout significantly increase adults’ VO$_2$ max. Participants in the control group experienced a decrease on this factor. There were no significant differences between short-bout and long-bout on VO$_2$ max. In terms of body fat percentages, the only group that experienced a significant reduction was the long-bout physical activity group. Healthy People 2010 has established several goals such as (a) reduce the amount of people who are not engaged in physical activity during their leisure-time, (b) increase the proportion of people who are engaged in daily physical activity, (c) increase amount of people who are engaged in vigorous physical activity, (d) increase proportion of people who are engaged in muscular strength and endurance activities, and (e) increase proportion of people who are engaged in flexibility activities (U.S. Department of Health and Human Services, 2000). Recommendations for physical activity include (a) 30 minutes or more per day of moderate physical activity (e.g., brisk walk, cycling) for five or more days per weeks, or (b) 20 minutes or more per day of vigorous physical activity (e.g., running, aerobics) for three or more days per week (i.e. recommended physical activity).

Even with all the evidence and recommendations for physical activity (Bouchard, 2000), many people confront limitations to engage in physical activity. In addition to developing recommendations for physical activity, efforts may have to include decreasing those perceived barriers on particular populations. Personal, social, and environmental factors can influence physical activity participation (Buckworth & Dishman, 2002; Dishman & Sallis,
Personal factors that contribute to a lack of physical activity can include expected outcomes (Steinhardt & Dishman, 1989), physical activity performance confidence (McAuley & Blissmer, 2000), and enjoyment (Motl et al., 2001). Demographic variables can also be considered as personal factors (Dishman et al., 2004). Demographic barriers may include socioeconomic status, ethnicity, and age. According to Sallis, Prochaska, and Taylor (2000), adults and adolescents with lower socioeconomic status tend to be less physically active because of a lack of opportunity facilities and programs. As well, the physical activity levels of Black Americans and Hispanics are lower than White Americans (Kimm et al., 2002).

Moreover, there is a decrease in physical activity with aging, which means that adolescents are more physically active than adults (Stone, McKenzie, Welk, & Booth, 1998). Social and physical factors can be considered as environmental barriers (Bandura, 1989). As social factors, family and peer support are positive by associated with levels of physical activity (Duncan, Duncan, & McAuley, 1993; Wallace, Raglin, & Jastremski, 1995). Inaccessibility and distance to physical activity facilities (Cervero & Gorham, 1995; Sallis et al., 1990) and safety issues (Dishman, 1994) have been associated with physical environmental barriers to physical activity.

Consistently studies have shown increases in the prevalence of overweight and obesity among adults. Of concern also are increases in at risk of overweight and overweight on children and adolescents. Priority attention has been given to the association of two modifiable behaviors such as eating habits and physical activity. It is known that changes in eating habits have produced changes in body composition. Over the years, individuals have decreased the consumption of healthy food groups such as fruits, vegetables, and milk. At the same time, there are tendencies to increase soft drinks (e.g., sodas, sweetened drinks, and fruit juice) and fast foods which are factors that have been associated with overweight and
obesity. As well, it is known that physical activity levels have declined during the past decades. In other words, regardless of age, people tend to be more physically inactive, even when it is well known that participation in physical activity is one of the factors that can contribute to decrease the risk of all causes of mortality.

Puerto Rico’s residents have experienced similar patterns in terms of overweight and obesity. It seems that overweight and obesity have consistently increased among people living in Puerto Rico. Eating behaviors such as fruits and vegetables intake have also seen changes in this population. Today, Puerto Ricans tend to eat less fruits and vegetables than several years ago. What is more, it has been difficult to determine the trends on adolescent population. There is a lack of empirical evidence on other components of food behaviors such as milk intake, fast food consumption, and soft drink intake with adolescents in Puerto Rico. As well, the same issue is present with the participation of physical activity with adolescents in Puerto Rico. Most of the data provided by CDC refers to adult populations in Puerto Rico. It is evidenced in the literature reviewed that the obesity rates and the prevalence of health-related conditions among people living in Puerto Rico have increased over the past 25 years or more. Recently, the government of Puerto Rico launched a project called Puerto Rico en Forma (i.e., Puerto Rico in Shape), which is designed to impact eating habits and physical activity behaviors of adults and children/youth in Puerto Rico (Hodge et al., 2007). Data from this project could yield useful information on risk factors associated with obesity and health-related conditions such as food behaviors and physical activity behavior patterns among adolescents in Puerto Rico. The specific goals of Puerto Rico en Forma include (a) decrease the prevalence and incidence of obesity and overweight, (b) increase physical activity levels, and (c) improve eating habits of Puerto Rico’s residents. This initiative is a result of several concerns on the health status of Puerto Ricans.
Theoretical Framework

Bronfenbrenner (1979) developed the Social Ecology Model (SEM) motivated by the reciprocal influence between the human development and environment. SEM was created as a possible explanation for showing the relevance of conducting research in a natural setting. SEM represents the interaction between several levels of environments and human behavior factors, and how those environmental factors are interconnected and indirectly/directly affects individual development. Human development was defined “as the person’s evolving conception of the ecological environment, and his relation to it, as well as the person’s growing capacity to discover, sustain, or alter its properties” (p. 9). According to Bronfrenbrenner (1977), the way environment is perceived affects the manner people behave while interacting within a particular setting. For example, peers, parents, school, community, and government policies could influence the level of physical activity among high school students. For example, students may perceive that community is not designed to perform physical activity safely and as a result they decide not to pursue a physically active lifestyle. SEM is a system in which all subsystems are connected and are influenced by each other. Moreover, the focus of SEM is based on several levels of subsystems, which show a reciprocal interrelation among them. Bronferbrenner (1979) identified: (a) the microsystem, (b) mesosystem, (c) exosystem, and (d) macrosystem as subsystems that would be playing a vital role in the SEM (Figure 2.1).
Each subsystem has the same level of importance on individual behavior and development. *Microsystem* refers to the immediate environment that is interacting with a particular individual. It integrates the human developing setting in which the interaction among people should be produced face to face. As an example, the motivation of parents toward physical activities to their child is considered an element of the microsystem. Because there is a reciprocal interaction between the individual and the environment, the individual’s behavior can be motivated by a particular situation that takes place in the microsystem.

Bronfenbrenner (1980) stated that children are able to modify their microsystem based on their behavior. According to Dishman, Washburn, and Heat (2004), “this theory also holds that activity history and habits are strong predictors of current behavioral patterns in social context” (p. 406). For this particular study, the microsystem level was used in understanding...
the food behavior considerations, physical activity behavior patterns, and body composition
indices of adolescents in Puerto Rico.

Bronfenbrenner (1980) asserted that children development is not only conditioned to the
immediate surrounding setting, but also by other factors called mesosystem. *Mesosystem*
consists of the interrelation among two or more settings. Those subsystems are considered a
piece of the microsystem. The interrelation between two settings such as parents and
teachers can positively influence student motivation toward physical activity and healthy
lifestyles. Among all levels of the SEM, mesosystem becomes the higher level that can
influence behavior and development of people directly (Grzywacz & Fuqua, 2000).

*Exosystem* refers to events that occur in the setting, but do not affect the individual behavior
directly. Individual presence is not necessary during the events, although it would influence
the behavior indirectly. Exosystem includes several informal and formal environments where
influences and forces influence a large society. They have an effect on the setting or
environment that encloses individuals. As an example, organizations that immerge at the
local level may persuade the environment in which a person is interacting. Thus, it would
provoke changes in people’s behavior. * Macrosystem* would not have a direct impact on
individuals in terms of behavior. However, this subsystem influences the entire culture, and
community. Mostly, subsystems under the macrosystem tend to be alike. Those
environments included in the macrosystem produce changes in people’s daily living,
routines, and practices. The behavior people exhibit may experience changes because of
cultural transformation. Aspects such as economic, level of education, and political system
are rooted into the macrosystem. Bronferbrenner (1979) brought a critical point that the
subsystem can experience changes based on people behavior. It is a reciprocal interaction
among subsystems and individuals.
CHAPTER 3

METHODS

This chapter includes the research approach, source of data, participants, and the variables, instrumentation, and data analysis.

The purpose of the current study was to determine and describe the food behavior considerations, physical activity behavior patterns, and body composition indices of adolescents in Puerto Rico. To that end, a secondary data analysis of pre-existing data on middle and high school adolescents from across seven regions in Puerto Rico was moreover from the findings and existing literature, the researcher articulates strategies and recommendations.

Research Design and Data Source

The current study was descriptive using a secondary data analysis approach on preexisting data for determining and describing adolescents’ food behavior considerations, physical activity behaviors, and indices of body composition. Subject to institutional review broad (IRB) approval, the researcher sought to secure data for the current study from Puerto Rico’s Department of Recreation and Sports (DRS) from a preexisting data set, which was
originally gathered to establish baseline measures and eventually to be used to evaluate the effectiveness of the *Puerto Rico en Forma Project*. The government of Puerto Rico has launched a project called *Puerto Rico en Forma* (i.e., Puerto Rico in Shape) which is designed to impact eating habits and physical activity behaviors of adults and children/youth in Puerto Rico.

The specific goals of *Puerto Rico en Forma* include (a) decrease the prevalence and incidence of obesity and overweight, (b) increase physical activity levels, and (c) improve eating habits of Puerto Rico’s residents. This initiative is a result of several concerns on the health status of Puerto Ricans.

The initial Puerto Rico en Forma evaluation project was conducted using a descriptive cross-sectional survey approach (Fraenkel & Wallen, 1990). This methodological approach enabled the data collectors to sample: (a) students from public middle and high schools and (b) adults from the general population in their local communities and at public venues across Puerto Rico’s seven geographical regions. Participants were evaluated on measures of dietary habits, physical activity levels and patterns, and body composition indices.

**Participants**

Participants of this study included adolescents living in Puerto Rico at the time of data collection. Mainly, adolescents enrolled in public schools which were randomly selected from 7 regions and their voluntarily participation. The Department of Education in Puerto Rico has an enrollment of 575,648 students approximately (National Center for Education Statistics, 2006). Moreover, nearly 100% of adolescents enrolled in public schools in Puerto Rico are Hispanic.

The evaluation team surveyed adolescents between 12 and 18 years of age. This student completed self-reports on demographic variables, food behaviors, and physical activity levels
and patterns. In addition, the participants’ weight and height were measured. Then, BMI estimates were determined using a specific BMI formula (Hodge et al., 2007).

Variables Subjects to Secondary Data Analysis

Food behavior measurements establish eating habits of adolescents in Puerto Rico. Mainly, a researcher can determine the absence on consumption of one or more food groups. On the other hand, overeating patterns can also be determined by measuring food behavior of adolescents in Puerto Rico. For example, by assessing food behaviors, the researcher is able to identify excessive fat consumption, lack of fruits and vegetables intake, and soft drink patterns. As a result, these behaviors can lead to inappropriate nutrition patterns. Food behaviors were assessed using secondary data analysis from data previously gathered using a modified Food Behavior Checklist (Hodge et al., 2007).

Pre-existing physical activity data of adolescents in Puerto Rico were collected to measure participation on moderate and vigorous physical activity (MVPA) levels. Moderate physical activity has been defined as activities that produce some increase in breathing or heart rate. For example, volleyball, softball/baseball, slow walking, and golf are considered moderate physical activities. Vigorous physical activity refers to activities that include the following characteristics: (a) large increase in breathing and heart rate, and (b) difficulty in maintaining a conversation while performing the activity (Bouchard, 2000). Physical activities such as soccer, full court basketball, high intensity aerobics, and running are as vigorous physical activities. For the original data set, physical activity was measured using a modified Visual 7-Day physical activity recall survey (Hodge et al., 2007; Lum, 2003).
Body mass index is a widely acceptable measurement used to determine body fatness in children and adults. It is calculated with the ratio between body weight and height in meters. Four main categories have been used to classify adolescent BMI. A BMI following under 5\textsuperscript{th} percentile belongs to the underweight category, while BMI between 5\textsuperscript{th} and 85\textsuperscript{th} percentile is considered normal. An adolescent at risk of overweight is determined when her/his BMI is between 85\textsuperscript{th} and 95\textsuperscript{th} percentile. BMI was estimated with the ratio of students’ height and weight.

Instrumentation

This section describes instruments used to measure the variables of interest (i.e., food behaviors, physical activity behaviors, and body composition). The original data were collected using several instruments, these were: (a) a revised food behavior checklist (FBC) (Hodge et al., 2007; Townsend, Kaiser, Allen, Joy, & Murphy, 2003); (b) a modified visual 7-Day physical activity recall (7DPAR) survey (Hodge et al., 2007; Lum, 2003); and weight and height scales (Eklund, 1984).

Prior to data collection, the FBC and 7DPAR instruments were modified and translated from their original English version to Spanish (Hodge et al., 2007) and back translated using a cross-cultural translation technique to establish relevancy of the instruments to the participants’ language and culture (Banville, Desrosiers, & Genet-Volet, 2000). Banville et al. (2000) stressed that when research is based on instruments developed for different cultures, “it is necessary for the good of the scientific community to translate and validate” (p. 385) each instrument in the various cultures to ensure cultural meaningfulness. Specifically, Banville et al. (2000) proposed several steps that should be complete in order to ensure and maintain the cultural relevancy of a particular instrument. First, researchers must have to
translate and back translate the instruments from the original language to the participants’ language and then back to the original language. Spanish speakers mostly from Puerto Rico translated the instruments used for the Puerto Rico en Forma project to Spanish. This ensured that words and sentences used include in the translated instrument were relevant for the Spanish speaker in Puerto Rico rather than from other Spanish-speaking country. Then, instruments (i.e., food behavior checklist and physical activity) were revised and evaluated by a team that focuses on the integrity of both the Spanish and English (i.e., back translated) instruments, as proposed by Banville et al. (2000). Once translations and back translations were done, adolescents from public schools (i.e., middle and high schools) in Puerto Rican were selected to pretest the food behavior checklist and 7-Day physical activity recall instruments. In fact, Banville et al. (2000) recommended allowing bilingual participants to complete both the translated and back-translated instruments to ensure clarity and appropriateness of the instruments. Therefore, several bilingual participants from Puerto Rico completed this process. Then, the food behavior checklist and 7-day physical activity were retested with adolescents in Puerto Rico to ensure concurrent validity and reliability of the instruments (Banville et al., 2000).

In using this cross-cultural translation and validation technique, they concluded that, “the quality of the information gathered will be enhanced, making cross-cultural comparison possible” (p. 385). The evaluation team of the Puerto Rico en forma Project followed this technique for translating and validating each instrument used (Hodge et al., 2007). The following section will include a review of those instruments used to measure the variables of interest in the Puerto Rico en Forma Project evaluation.

According to Townsend, Kaiser, Allen, Joy, and Murphy (2003), the Food behavior checklist (FBC) offers an exceptional opportunity to measure eating patterns in community settings.
The use of other instruments such as 24-hour dietary recall and multiple-day may not be appropriate in this type of setting (Townsend et al., 2003). FBC consists of 22 multiple choice items which measure eating patterns on several food groups such as fruits, vegetables, soft drinks, milk, and fast food. In addition, FBC is designed to measure the food insecurity of participants. Townsend et al. (2003) determined that this instrument is sensitive enough to measure consumption of saturate fat, cholesterol, and vitamin A among participants. The language used in the instruments was determined to be appropriate and easy to read for even 4th grade children.

The FBC (Townsend et al., 2003) was revised specifically to ensure cultural relevancy to Puerto Rico’s primary language (Spanish), culture, and foods (Barville et al., 2000). More specifically, several English and native Spanish speakers from Puerto Rico and elsewhere who translated and back translated the FBC for use with adolescents and adults in Puerto Rico to increase the validity and reliability of the instrument. In brief, after an initial evaluation was conducted with Puerto Rican adolescents from various middle and high schools across 10 geographical regions on the island, project evaluators revised the FBC to establish relevancy of the instrument to the participants’ language and culture (Hodge et al., 2007).

The project evaluators of Puerto Rico en Forma used the Visual 7-Day physical activity recall (7DPAR) survey during a pilot test conducted in March, 2007 to determine physical activity participation (i.e., moderate and vigorous physical activity) among adolescents (Hodge et al., 2007). The 7DPAR is an adequate instrument for use on adolescent to elderly populations.

Studies conducted to determine validity and reliability of the 7DPAR instrument have shown a reasonable instrument to measure physical activity among young adults, and elder populations (Sallis, et. al, 1985; Washburn, Jacobsen, & Sonko, 2003; Washburn, Smith,
Concurrent validity of 7DPAR has been established by several other physical activity measures such as VO\textsubscript{2}max, motion sensors (pedometers, and accelerometers) and body fat percentages. To determine the concurrent validity of the instrument, 7DPAR has been correlated with accelerometers and found that a moderate correlation (i.e., .50 to .53) exists between both 7DPAR and accelerometers. Sallis and Saelens (2000) studied the strength and limitations of self-reports. One of the primary advantages of self-reports is that allow researchers to collect data among participants of different ages groups, and also a large numbers of participants can be measured using a less expensive method. Nevertheless, aspects such as social acceptance response may influence the effectiveness of 7DPAR. Jacobs, Ainsworth, Hartman, and Leon (1993) conducted a study to evaluate reliability and validity of several physical activity questionnaires. Reliability of the instruments was found to be .77 after one month. Moreover, a similar reliability coefficient (.67) was found with vigorous physical activity. 7DPAR allows researchers to measure different domains of physical activity (e.g., intensity, frequency, and mode), settings where activities take place (e.g., worksite, and daily living activities), and amount of minutes activities are performed.

Based on the findings and feedback from an initial pilot testing for the Puerto Rico en Forma Project, the Visual 7DPAR developed by Lum (2003) was translated and modified and back translated. Spanish speakers mainly from Puerto Rico who attempted to use regional jargon to ensure participant understanding made the translation of the instrument. The evaluation team of the Puerto Rico en Forma was in charge of all the modifications made to the Visual 7DPAR (Lum, 2003) in order to provide higher sensitivity to this instrument (Hodge et al., 2007).
Body Mass index (BMI) was determined by the ratio between weight and height in meters. Evaluators of the Puerto Rico en Forma project measured the participants’ body weights with a dial weighting scale. A dial weighting scale is a device commonly used to measure body weight and that helps to determine body mass. Stadiometer were used to measure standing height among participants. This instrument was mounted upright attached to a flat surface and used to determine the height of participants in either millimeters or inches. It includes a slide with a measuring arm supported by an upright rail (Eklund, 1984).

Data Analysis

For the purpose of the current study, secondary data analysis procedures were used on measures of food behavior, physical activity, and body composition. Recently, the use of secondary data analysis has helped to expand studies on population health (Garmon, 2007). For example, the US Department of Health and Human Services, CDC, and other governmental agencies have collected data that, researchers have used as secondary data analysis to describe, correlate, and predict several variables. In this way, secondary data analysis allows researchers to expand what is already known about specific subject areas (Castle, 2003). In fact, this method helps researchers to investigate important aspects of the population’s health (Garmon, 2007) such as physical activity and obesity. For instance, in nursing, secondary data analysis was recently used for “improving the health of population and meeting current health care demands” (Garmon, 2007, p. 95). Secondary data analysis is defined as the reanalysis of a particular data set that was collected for another research purpose (Vogt, 2005). In other words, researchers obtain data from other sources and analyze these data for different purposes beyond the original study. Moreover, secondary
data analysis attempts to answer research questions that have not been included in the primary study (Nicholl & Beyea, 1999).

Several advantages have been found with the use of secondary data analysis. The inexpensive cost and less time consuming aspects make secondary data analysis a viable way to contribute to empirical evidence (Mainous & Hueston, 1997). For example, while some primary studies may take one or two years to complete, a study can be done in few months with the use of secondary data analysis (Hoffert, 2005). Because, secondary data analysis involves less time, current issues can be studies more readily to develop interventions and policies (Hofferth, 2005). Furthermore, a comprehensive analysis of large sample sizes can be considered as another advantage of secondary data analysis (Nicholl & Beyea, 1999). With large sample sizes, researchers are able to be more accurate due to the fact that in some cases they have the opportunity to analyze a diverse (e.g., socioeconomic status, ethnicity, and age) sample (Hoffert, 2005). In fact, the sample may be better representation of the population.

However, secondary data analysis may include some disadvantages that could influence the results and interpretation of the study. Smaldone and Connor (2003) stated that, many times, it is complicated to locate existing data. In addition, Pollack (1999) mentioned that reliability and validity of the instruments may be a limitation of secondary data analysis. For instance, threats to data collection procedures and instrumentation can be an issue in using secondary data analysis (Nicholl & Beyea, 1999). In most cases, researchers do not have control over the data collection (Castel, 2003). Therefore, it is important to determine the sources, purposes, instruments, and the ways data have been collected (Garmon, 20007).

In the current study, secondary data analysis was used with descriptive statistics to determine and describe the characteristics of adolescents in Puerto Rico on selective variables: food behavior, physical activity, body weight and height, and BMI. Central tendencies were used to
estimate a score that best represents sample populations (Weinberg & Abramowitz, 2002). Thus, means were used to determine food behaviors, physical activity participation, body weight and height, and BMI of adolescents. In addition to central tendencies, variability was used to estimate to show how scores differs as a function of gender and grade level (Gravette & Wallnau, 2004). According to Gravette and Wallnau (2004), standard deviation is "the most commonly used and the most important measure of variability" (p. 109).

To analyze differences between groups a probability level of .05 was set a priori to answer the research questions specific to males and females, and between middle and high school students. Analysis of variance (ANOVA) was used to examine group differences on gender and grade level. With two or more groups, it is difficult for researchers to establish the magnitude of the differences between means (Salkind, 2004). General Linear Model ANOVA is similar to independent t-test with the difference that it measures two or more samples’ means (Weinberg & Abramowitz, 2002). The main difference between GLM ANOVA and a t-test is that GLM ANOVA can be used to establish the magnitude of mean differences (Weinberg & Abramowitz, 2002). Another advantage of ANOVA is that, in addition to measuring the variances between groups, researchers can also observe the variances within group means and whether or not there is interaction between variables (Ary et al., 2002). The total of variances can be divided within groups and between groups (Ary, et al, 2002). Variance within a group refers to separation of scores that is present in each group (Weinberg & Abramowitz, 2002). The variance between groups can be defined as the separation of distance between each of the groups. The ratio (i.e., F-ratio) of the variance within groups and between groups is used to establish if there are significant differences between score means (Weinberg & Abramowitz, 2002). The result of the F-ratio value is compared to the F-distribution table in order to determine if there is a significant difference
among groups (Ary et al., 2002). F-distribution is established with the degree of freedom determined by the amount of groups and sample sizes (Weinberg & Abramowitz, 2002). In addition, the number of participants in the study could increase the F-ratio thus increasing the chance of significant differences among groups (Ary et al., 2002). In addition, Bonferroni post hoc test were used to determine those groups by gender and school level that significantly differed from other groups.
CHAPTER 4

RESULTS

Sample Description

The data were obtained from the Department of Recreation and Sport (DRS) in Puerto Rico, which is the government agency responsible for designing and implementing most of the physical activity, sports, and wellness programs in Puerto Rico. The original data were collected between September 8 and 15, 2007 and it included a representative sample of adolescents from the secondary public schools (i.e., middle and high schools) across seven different regions. More specific, six hundred thirty two \( (n=632) \) adolescents from across the island participated during the data collection (Table 4.1). The age mean of the participants was 14.2 years (SD= ±1.7), which ranged from 11 to 18 years of age. The data analysis indicated that the sample was distributed by a higher percentage of females than males. More than half (52\%) of the adolescents were females, while only 47.5\% were males. Participants from middle school represented 58.2\% of the total sample, while almost 42\% were enrolled in high school. Those schools were located in seven different regions across Puerto Rico. Approximately, 14.5\% of the adolescents were from the Northwest region and 11.6\% of adolescents were from the North region. Moreover, 6.9\% of the participants were from the South Central. Almost 14\% of the adolescents lived in the Northeast, while 14.3\% were living in the Southwest. The region with the highest percentage of participants was the
Southeast region with 30%, while the Metropolitan area had 9% of the adolescents participating during the data collection.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Total Sample</th>
<th>Age Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adolescents</td>
<td>632</td>
<td>14.2</td>
<td>1.69</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>330 (52%)</td>
<td>14.23</td>
<td>1.67</td>
</tr>
<tr>
<td>Male</td>
<td>298 (47.5%)</td>
<td>14.16</td>
<td>1.71</td>
</tr>
<tr>
<td>School Level</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Middle School</td>
<td>356 (58.2%)</td>
<td>13</td>
<td>1.03</td>
</tr>
<tr>
<td>High School</td>
<td>256 (41.8%)</td>
<td>15.8</td>
<td>0.835</td>
</tr>
<tr>
<td>Regions</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Northwest</td>
<td>84 (14.5%)</td>
<td>13.3</td>
<td>1.1</td>
</tr>
<tr>
<td>North</td>
<td>67 (11.6%)</td>
<td>12.5</td>
<td>1</td>
</tr>
<tr>
<td>South Central</td>
<td>40 (6.9%)</td>
<td>16.2</td>
<td>0.92</td>
</tr>
<tr>
<td>Northeast</td>
<td>79 (13.6%)</td>
<td>15.8</td>
<td>0.88</td>
</tr>
<tr>
<td>Southeast</td>
<td>173 (29.9%)</td>
<td>15.1</td>
<td>1.3</td>
</tr>
<tr>
<td>Southwest</td>
<td>83 (14.3%)</td>
<td>13.63</td>
<td>1.4</td>
</tr>
<tr>
<td>Metropolitan</td>
<td>53 (9.2%)</td>
<td>13.83</td>
<td>0.58</td>
</tr>
</tbody>
</table>

Table 4.1. Total sample, age mean and standard deviation of the participants by gender, school level, and regions.

Approximately, 90% of the participants reported that they did not have any type of disability. When the data were analyzed by gender, 91% of the male adolescents reported they did not have any type of disability, but 9% did report they had at least one type of disability (Figure 4.1). Among female adolescents, approximately 90% of the female adolescents did not have any type of disability. The data analysis showed that 5% of the participant had visual/hearing impairments, while 2% reported they had mental and learning disabilities. More females tended to report visual impairments (6.4%) than males (3.1%). GLM ANOVA test revealed no significant differences between male and female students on their disability status, \( F(1) = 1.29, p = 0.26 \).
A higher number of adolescents from the middle schools reported at least one type of disability compared to adolescents from the high schools. A total of 9% of the middle school adolescents and 9.3% of the high school adolescents reported that they had a particular type of disability. Visual and/or hearing impairments were the most common disabilities reported by these middle and high school students. Approximately, 4% and 6.6% of the middle and high school adolescents reported they had visual and/or hearing impairments. The least common disabilities among these secondary school adolescents were learning and language disabilities. GLM ANOVA test revealed no significant differences between male and female students in their disability status, \( F(1) = .15, p = 0.70 \).

The data showed that the participants from most of the regions reported that they had visual and/or sensorial disabilities. For instance, 6.8% of the adolescents from the Northwest region, 8.6% from the South Central, 9.1% from the Southwest, and 7.7% from the Metropolitan regions reported that they had visual and/or sensorial impairments. Some 5% of the adolescents from the North region stated they had speech/language disabilities. Less so, 1.6% of the adolescents from the Northeast region reported they had diabetes.
GLM ANOVA test revealed no significant differences between adolescents from the different regions on their disability status, $F(6) = 1.53, p = 0.16$.

Even though the majority (65.5%) of the adolescents did not report health-related conditions, 34.5% did report they had at least one type of health-related condition (Figure 4.2). Asthma was the most frequently reported health-related condition. In fact, a total of 15% of the adolescents affirmed that they had asthma. Approximately, 2% of adolescents had diabetes, while almost 1% had some sort of cardiovascular condition.

Figure 4.2. Adolescents’ descriptions of health-related conditions

Between male and female adolescents, 27% of the males reported they had health-related conditions, while a higher percentage (41%) of the females reported this as well. The cases of asthma among females (16%) tended to be higher than the cases among males (13%). A lower percentage (0.2%) of adolescents reported they had osteoporosis. Whereas, 17.3% of the adolescents reported they had other types of health-related conditions, which were not
identified. GLM factorial ANOVA results showed that there were significant differences between female and male adolescents on health-related conditions, $F(1) = .27, p = 0.00$. More female adolescents from Puerto Rico tended to report health-related conditions than males.

Among adolescents from the middle schools, 19.3% reported they had asthma while 14.4% had other types of medical conditions. Less so, 9% of the adolescents from the high schools had asthma, but 20.4% reported they had other types of medical conditions. GLM factorial ANOVA showed that there were no significant differences between middle and high school adolescents on health-related conditions, $F(1) = .54, p = 0.46$.

In terms of regions across Puerto Rico, the Metropolitan region presented the highest number of adolescents with health-related conditions. Specifically, 42.6% of the adolescents living in this region had some sort of medical conditions. Interestingly, the Southeast region (2.5%) was the only region that reported cardiovascular conditions among adolescents. However, there were 11.7% of the adolescents from the Southwest reporting asthma. More so, 25% of the adolescents from the North region reported the same medical condition (i.e., asthma). Among adolescents from the Northeast region, 35.6% did have other types of medical conditions. GLM factorial ANOVA showed that there were no significant differences between adolescents from different regions on health-related conditions, $F(6) = 1.97, p = .07$.

**Food Behaviors**

The food behavior checklist (FBC) developed by Townsend et al. (2003) and revised by Hodge et al. (2007) was used to report the adolescents' food behavior patterns and other aspects such as food insecurity. For instance, aspects such as consumption of vegetables and
fruits, milk, and sweetened drinks (e.g., soft drinks and juices), and fried foods were measured and analyzed.

**FBC 1-3 Fruits Consumption**

Overall, 93% of the adolescents in Puerto Rico tended to eat fruits on a regular basis, while 7% did not eat fruits. In fact, most (87%) adolescents in Puerto Rico usually ate between one and four servings of fruits per week (Figure 4.3). Only 9% and 4% usually ate five or six, or more than seven fruits per week respectively. Moreover, more than half (55.3%) of the adolescents did eat between one and four servings of fruits during the previous week to the data collection.

![Fruit Consumption](image)

**Figure 4.3. Adolescents’ fruit consumption per week**

Ninety one percent (91%) of the male adolescents reported eating fruits regularly and only 9% did not eat fruits on a regular basis (Figure 4.4). Moreover, 88.6% of the male adolescents usually eat more than one fruit per week, while approximately 11% usually eat
seven or more servings of fruits. During the previous week to data collection, approximately 19% of the male adolescents did not eat fruits. However, 81% of the male adolescents did eat fruits during the previous week. Among females, 94% of them tended to eat fruits, while 6% did not eat fruits. But, 71% of the females usually ate between one and four servings of fruits per week. In fact, 29% of the female adolescents in Puerto Rico usually ate more than five servings of fruits per week. About 19% of the female adolescents did not usually consume fruits every week. However, 28% tended to have between three and four servings of fruits per week and 26% usually ate one or two servings of fruits per week. GLM ANOVA test revealed no significant differences between male and female adolescents on fruit consumption, $F(1) = .01, p = 0.91$.

![Figure 4.4. Adolescents’ fruit consumption by gender](image)

Fruit consumption was also analyzed by educational level. The results show that, 89% of the middle school adolescents did eat fruits on a regular basis, but 11% did not eat fruits (Figure 4.5). Specifically, 81% of the middle school adolescents ate between one and four
servings of fruits regularly. The middle school adolescents also reported that, during the previous week to the data collection, 63.3% of them did eat between one and four servings of fruits; however, 24% did not eat fruits during the previous week. A lower percentage of middle school adolescents did eat between five and six (7.1%) or seven or more (5.7%) servings of fruits. At the high school level, almost 98% of the adolescents did eat fruits on a regular basis. Only 2% of the high school adolescents did not consume fruits. Among those high school adolescents who tend to eat fruits, 30% usually eat three or four servings of fruits per week. Twenty nine percent (29%) and 26% of the high school adolescents usually ate between one and two or between five and six servings of fruits, respectively. A lower percentage of adolescents usually ate seven or more servings of fruits. In fact, the week prior to the data collection, a higher percentage (36.8%) of high school adolescents did eat five or six servings of fruits. Moreover, 26.3% of the high school adolescents did eat between three and four servings of fruits. A lower percentage (18.6%) did eat one or two servings of fruits, but only 5.3% of them did eat seven or more servings of fruits. GLM ANOVA test revealed no significant differences between middle and high school adolescents on fruit consumption during the previous week to the data collection, $F(1) = 2.87, p = 0.91$.

![Figure 4.5. Adolescents' consumption of fruits per week by school level.](image)
When the data were analyzed by regions, the results showed that all (100%) of the participants from the South Central and the Northeast regions tended to eat fruits (Figure 4.6) each week. Even though the South Central and the Northeast had the higher number of adolescents that tended to consume fruits, the Southeast region had 91% of adolescents who regularly consumed fruits. The Metropolitan region had the lowest percentage (81.1%) of adolescents consuming fruits, but the results from other regions (i.e., North, Northwest, and Southwest) showed that between 83% and 96.5% of the participants did consume fruits. Even though, in the Northwest region, 48.6% of the adolescents usually ate three or four servings of fruits, 38.9% did eat one or two servings of fruits. In the North region, 41.4% of adolescents ate only one or two servings of fruits on a regular basis, and the same percentage (41.4%) also ate one or two servings of fruits during the previous week to the data collection. As well, in the Southeast, 46.4% of the participants usually had a limited consumption of one or two servings of fruits. Thirty four percent (34%) of the participants in this region reported that they did eat three or four servings of fruits during the previous week. In the Southwest and Metropolitan regions, more than 40% of the participants typically ate between three and four servings of fruits, 35.4% (Southwest) and 32.5% (Metropolitan) did eat only one or two servings of fruits. GLM ANOVA test revealed significant differences between adolescents from different regions on their fruit consumption per week, $F(6) = 3.82, p = .01$. Post Hoc results showed that the participants from the South Central region tend to eat fruits more often per week than the participants from the other regions.
**FBC 4.7 Vegetables Consumption**

Vegetable consumption among adolescents living in Puerto Rico was measured in four of the 31 items included in the modified food behavior checklist (Hodge et al., 2007). Results indicate that, 63.3% of the adolescents reported that they did eat vegetables; however, 36.7% do not regularly eat vegetables (Figure 4.7). In fact, among those adolescents who ate vegetables, more than half (53.8%) usually ate between one and two portions of vegetables per week. Moreover, 33.3% usually ate three or four portions of vegetables per week. Specifically, during the week prior to the data collection, 50.4% of the adolescents did eat one or two portions of vegetables. Even though one quarter (25%) of the adolescents did eat three or more portions of vegetables during the previous week to the data collection, 24.1% did not eat vegetables during the previous week.

Figure 4.6. Fruit consumption per week by regions.
Figure 4.7. Adolescents’ vegetable consumption

The results of the consumption of vegetables by gender showed that 59.3% of the male adolescents tended to eat vegetables, and 67% of the female adolescents tended to eat vegetables as well (Figure 4.8). Among those male adolescents who eat vegetables, more than half (53.3%) usually ate one or two servings and 34.6% usually ate three or four portions of vegetables per week. In comparison, 54.5% and 31.7% of the female adolescents usually ate between one and two or between three and four portions of vegetables per week. Moreover, a higher percentage (10.3%) of female than male (7.7%) adolescents usually ate five or six portions of vegetables per week. During the previous week to the data collection, most of the male adolescents (52.6%) did eat one or two portions of vegetables, while only 48% of the female adolescents did eat one or two portions of vegetables. Among those participants who did eat three or four portions of vegetables, females had a higher percentage (20.5%) than male (13.6%) adolescents. However, more males (26.3%) than females (22.5%) adolescents did not eat vegetables during the previous week. GLM ANOVA test revealed significant differences between the number of female and male students who usually eat...
vegetables, $F(1) = 4.18, p = 0.04$. Females tended to eat vegetables more often than males on a regular basis.

Figure 4.8. Vegetable consumption per week by gender

Data among middle and high schools showed that a higher percentage (78.7%) of the adolescents from the high schools ate vegetables compared to middle school adolescents (52.7%). In fact most (73.7%) of the adolescents from the middle schools tended not to eat vegetables regularly, while 54% from the high schools usually ate between one and two servings of vegetables. Almost 50% of the adolescents from middle (47%) and high (53.5%) schools self-reported they ate between one and two servings of vegetables during the previous week to the data collection (Figure 4.9). However, 22% of the students from the high schools ate between three and four servings of vegetables during the previous week. Moreover, one third (33.2%) of the students from the middle schools did not eat vegetables during the week prior to data collection. In fact, more than half (51.4%) of the adolescents from the high schools and 72.1% from the middle schools did not usually eat raw vegetables. GLM ANOVA test revealed no significant differences between the number of middle and
high school adolescents who usually eat vegetables, \( F(1) = 3.46, p = 0.06 \). However, GLM ANOVA test showed significant differences between middle and high school adolescents in their consumption of raw vegetables, \( F(1) = 12.97, p = 0.00 \). Compared to adolescents from the middle schools, adolescents from the high schools tended to eat raw vegetables more often than middle school adolescents.

![Figure 4.9. Vegetable consumption per week by school level.](image)

Results on vegetable consumption across regions in Puerto Rico showed that more than 50% of the adolescents in each region regularly ate vegetables (Figure 4.10). Specifically, ninety percent (90%) of the participants in the South Central and Northeast regions ate vegetables on a regular basis. Among different regions, the South Central and Northeast regions reported the highest percentage of adolescents eating vegetables. Usually, more than three quarter of the adolescents in the Northwest (76.1%), Metropolitan (76.9%), and North (78.4%) regions tended to eat one or two portions of vegetables. Within the South Central region, 94.6% of the participants ate vegetables, while 98.6% from the Northeast region did eat vegetables during the week prior to the data collection. Specifically, both regions showed
that participants tended to eat between one and two or between three and four portions (94.6% South Central; 97.2% Northeast) of vegetables per week on a regular basis. The Southwest region reported the highest percentage (32%) of participants that did not eat vegetables during the week prior to the data collection. GLM ANOVA test showed there were no significant differences by regions on vegetable consumption, $F(6) = .81, p = 0.56$.

![Figure 4.10](image) Vegetable consumption per week by regions.

**FBC 8.9 Milk Consumption**

Participants’ milk consumption was measured and the results showed that 85.9% of the participants drank milk on a regular basis. However, 14% of the total sample did not drink milk (Figure 4.11). Moreover, the results showed that 88% of the adolescents did drink milk or mixed it within their cereal during the week prior to the data collection. A slightly higher percentage (87.4%) of male than female (84.7%) adolescents tended to drink milk. However, during the week prior to the data collection, a higher percentage (89.6%) of females, compared to males (86.6%), consumed milk as a drink or within their cereal. GLM ANOVA test showed there were no significant differences between male and female adolescents in their milk consumption, $F(1) = .72, p = 0.40$. 

67
Among middle school students, 87% of them drank milk, while 13% did not typically drink milk. Moreover, most (84%) of the high school adolescents usually drank milk, while 16% did not report the same food behavior pattern (Figure 4.12). During the previous week to data collection, 85.5% and 91.9% of the middle and high school adolescents, respectively, did consume milk as a drink or within a cereal. GLM ANOVA test showed there were no significant differences between middle and high school adolescents in their milk consumption, $F(1) = .22, p = 0.64$. 

Figure 4.11. Adolescents’ milk consumption by gender
Across the seven regions in Puerto Rico (i.e., Northwest, North, South Central, Northeast, Southeast, Southwest, and Metropolitan), the results showed that at least 80% or more of the participants usually drank milk (Figure 4.13). In particular, the results from the Northwest region showed that 91.1% of its adolescents drank milk on a regular basis. Regions such as the South Central and the Southwest reported that 90.2% and 90.1% drank milk regularly respectively. Furthermore, all participants in the South Central region and 98.5% of participants in the Northeast region did consume milk as a drink or within a cereal during the week prior to the data collection. What is more, the adolescents within the Northwest, North, Southeast, Southwest, and Metropolitan regions reported that between 82.5% and 88% of their participants consume milk as a drink or within a cereal during the week before data collection. GLM ANOVA test showed there were no significant differences among adolescents from different regions in Puerto Rico, $F(6) = 1.09, p = 0.37$. 

Figure 4.12. Adolescents’ milk consumption by school level.
In general, only 4.6% of the participants adhered to a vegetarian diet, however 95.4% of the adolescents did not adhere to a vegetarian diet. In addition, more females tended to adhere to a vegetarian diet compared to males (Figure 4.14). In fact, 5% and 3.9% of the female and male adolescents respectively were vegetarian (Figure 4.14). GLM ANOVA test showed there were no significant differences between males and females on the number of vegetarians, $F(1) = .31, p = 0.58$.}

---

**Figure 4.13. Adolescents’ milk consumption by regions.**

**FBC 10 Vegetarian**

...
Figure 4.14. Distribution of female and male who adhered to a vegetarian diet.

In terms of school level, both middle and high school levels had the same percentage (4.4%) of the adolescents who adhered to a vegetarian diet (Figure 4.15). In fact, GLM ANOVA test showed there were no significant differences between middle and high school adolescents on the number of adolescents who adhered to a vegetarian diet, $F(1) = .06, p = 0.81$.

Figure 4.15. Distribution of adolescents by school level who adhered to a vegetarian diet.
The results also showed that the Southeast (9%) had the highest percentage of adolescents who adhered to a vegetarian diet. But, none of the participants from the South Central region adhered to a vegetarian diet. The Northwest (3.7%), Northeast (1.3%), Southwest (3.8%), and Metropolitan (2.0%) regions reported less than 4% of their adolescents engaging in vegetarian food behaviors. Only the North region reported more than four percent (4.6%) of participants who adhered to a vegetarian diet (Figure 4.16). GLM ANOVA test showed there were no significant differences between adolescents from different regions on the number of adolescents who adhered to a vegetarian diet, $F(1) = 1.25, p = 0.28$.

![Figure 4.16. Distribution by regions on the adolescents who adhered to a vegetarian diet.](image)

**FBC 11-12 Fish Consumption**

Generally speaking, the majority of the adolescents in Puerto Rico tended to eat fish. Approximately, 80% of the adolescents usually eat fish, while only 20% do not eat fish (Figure 4.17). In terms of gender, higher percentages of female than male adolescents tend to
eat fish. More than three quarters of the male (80.5%) and female (79.6%) adolescents ate fish. GLM ANOVA test showed there were no significant differences between male and female in their consumption of fish, \( F(1) = 0.00, p = 0.97 \).

Figure 4.17. Adolescents’ fish consumption by gender.

A higher percentage of high school adolescents eat fish compared to middle school students (Figure 4.18). Almost, three quarter (73%) of the adolescents from the middle schools ate fish, while a higher percentage of adolescents (89.3%) from the high schools tended to eat fish on a regular basis. GLM ANOVA test showed there were no significant differences between middle and high school adolescents on their consumption of fish, \( F(1) = 0.18, p=0.67 \).
The data by regions showed that all the participants (100%) in the South Central region and 96.2% of the adolescents in the Northeast region tended to eat fish (Figure 4.19). However, 70% or more of the participants from the other regions in Puerto Rico tended to eat fish on a regular basis. GLM ANOVA test showed there were significant differences between regions in Puerto Rico on the adolescents’ consumption of fish, $F(6) =3.23$, $p=0.04$. A Bonferroni post hoc test showed that adolescents from the South Central and the Northeast regions tended to eat fish more often on a regular basis compared to the participants from the other regions.
More than half of the adolescents (53.2%) reported that they had eaten one or two servings of fish during the previous week to data collection. What is more, 46.2% did eat three or more servings of fish during the past week. Only 6% ate three or four servings of fish during the previous week (Figure 4.20).

Figure 4.19. Adolescents’ fish consumption between different regions

Figure 4.20. Adolescents’ fish consumption during the previous week to data collection.
Results on gender show that, 53.4% of male and female adolescents had not eaten fish during the past week of the data collection. A slightly higher percentage of females (40.6%) than males (40.1%) did eat one or two servings of fish during the past week (Figure 4.21).

The results also showed a similar pattern among those female and male adolescents who had eaten three or four servings of fish during the previous week. Only 6.6% of the female and 5.7% of the male adolescents had eaten five or more servings of fish during the previous week. GLM ANOVA test showed there were no significant differences between male and female adolescents on their consumption of fish during the previous week, $F (1) = .05, p=0.83$.

![Figure 4.21](image)

Figure 4.21. Adolescents’ fish consumption by gender during the previous week.

During the previous week, 62.6% of the middle school adolescents did not consumed fish, but less so, 41.3% of the high school adolescents had not eaten fish. Only, 37.4% of the
middle school adolescents did eat one or more servings of fish, while more than half (58.9%) of the high school adolescents did eat more than one serving of fish during the previous week (Figure 4.22). More specifically, 35.6% of the middle school adolescents and 47% from high schools did eat one or two servings of fish during the past week. Moreover, 10.4% of the high school adolescents had eaten three or four servings of fish, while only 1.8% of the adolescents from middle school did eat the same number of servings of fish during the past week. GLM ANOVA test showed there were no significant differences between middle and high school adolescents on their consumption of fish during the previous week, $F(1) = .03, p = 0.86$.

Figure 4.22. Adolescents’ fish consumption by school level.

The data analyzed across regions on fish consumption during the previous week showed that the adolescents in the Southeast region of Puerto Rico had the highest percentage (68.7%) of participants who did not eat fish. But, the adolescents in the Northeast region of Puerto Rico had the lowest percentage (13%) of adolescents who did not eat fish during the
previous week (Figure 4.23). The South Central (68.3%) and Northeast (67.5%) regions reported the higher percentages of participants who did eat one or two servings of fish during the previous week. Moreover, only the Northeast region reported that almost 20% (19.5%) of the participants did eat three or four servings of fish during the past week. GLM ANOVA test showed there were significant differences between adolescents from the different regions in Puerto Rico in their consumption of fish during the previous week, $F(6) = 9.55, p=0.00$. A Bonferroni post hoc test revealed that the adolescents from the South Central and the Northeast regions tended to eat fish more often than adolescents from other regions.

Figure 4.23. Adolescents’ fish consumption by regions

FBC 13-15 Chicken Consumption

Almost 100% (96.9%) of the adolescents in Puerto Rico tended to eat chicken on a regular basis. No more than 3% of the participants in Puerto Rico did not eat chicken. In addition, 96.9% of the male and female adolescents tended to eat chicken on a regular basis. GLM
ANOVA test showed there were no significant differences between female and male adolescents on the number of participants who tended to eat chicken, $F(1) = .01, p = .92$.

In terms of chicken consumption by educational level, the data analysis showed that middle and high school adolescents had similar behavior patterns for eating chicken on a regular basis. In all, 97% of both the middle and high schools adolescents tended to eat chicken on a regular basis. Only 3% of the adolescents from middle and high school did not usually eat chicken. GLM ANOVA test showed there were no significant differences between adolescents from the middle and high schools in the number of participants who tended to eat chicken, $F(1) = .08, p = .79$.

Across the seven regions, most of the chicken eating behaviors were very alike among adolescents. Between 95.2% (e.g., Southwest) and 98% (e.g., Metropolitan) of the adolescents in all the regions tended to eat chicken. In fact, 100% of the participants from the South Central region reported that they eat chicken on a regular basis. GLM ANOVA test showed there were no significant differences between adolescents from the different regions in the number of participants who tended to eat chicken, $F(6) = .27, p = .95$.

Among those adolescents that ate chicken, only 7.3% did not eat chicken during the previous week to data collection. However, 40% did eat three or four servings of chicken during the previous week. Moreover, 32% of the participants did eat one or two servings of chicken, but only 20% did eat five or more servings of chicken during the previous week (Figure 4.24).
More male (8%) than female (6.7%) adolescents did consume chicken during the previous week. However, more female (74.1%) than male (69.3%) adolescents did eat between one and four servings of chicken during the past week. More male adolescents (11.7%) had eaten five or six servings of chicken, while only 10% of the females did eat the same number of servings during the past week. No more than 11% of the male and 9% of the female adolescents did eat seven or more servings of chicken. GLM ANOVA test showed there were no significant differences between male and female adolescents in their servings of chicken consumed during the previous week, $F(1) = 1.80, p = .18$.

Between middle and high schools, the middle school adolescents had the higher percentage of participants who ate chicken during the previous week. Approximately 8% of the middle school adolescents did not eat chicken, while 5.6% of the high school adolescents did not eat chicken. Nevertheless, 46.5% of the middle school adolescents did eat one or two servings of chicken, but only 14% of the middle school adolescents did do so. More high school (56.5%) than middle school (21%) adolescents ate three or four servings of

Figure 4.24. Adolescents’ chicken consumption
chicken during the previous week. However, only 18.2% and 25.8% of the middle and high school adolescents respectively did eat more than five servings of chicken during the past week. GLM ANOVA test showed there were no significant differences between middle and high school adolescents in their servings of chicken during the previous week, $F(6) = .27, p=0.95$.

The participant from the South Central region showed the highest percentage (12%) of adolescents who did not eat chicken during the previous week to data collection. However, the same region reported the highest percentage (70%) of adolescents who did eat three or four servings of chicken during the previous week. Similarly, the Northeast region had 68.4% of their participants who had eaten the same number of servings of chicken.

Moreover, these two regions (i.e. South Central, 14.6% and Northeast, 17.7%) and the Southeast region (15.3%) had the highest percentage of participants who had eaten seven or more servings of chicken. Between 45% and 48% of the participants from the Northwest (44.9%), North (47.6%), Southwest (45.2%), and Metropolitan (47.8%) regions did eat one or two servings of chicken during the past week. GLM ANOVA test showed there were significant differences between adolescents from the different regions on their servings of chicken during the past week, $F(6) = 3.00, p=0.01$. According to the Bonferroni post hoc test, adolescents in the Northeast and Southeast regions tended to eat chicken more often than adolescents in the other regions.

More than half (52.7%) of the adolescents in Puerto Rico usually ate their servings of chicken skinless. In contrast, 40.3% did not eat it skinless. Approximately, 55.5% of the male adolescents tended to eat chicken without the skin, but a higher percentage of more females ($n=180, 57.7%$) reported the same eating behavior regarding the chicken skin. GLM
ANOVA test showed there were no significant differences between male and female adolescents when eating the chicken skinless, $F(1) = 3.34, p = 0.07$.

Further, a higher percentage (59%) of middle school adolescents usually ate their servings of chicken without skin, but 41% of the same school level adolescents did eat chicken skinless. Even though, 53.2% of the high school adolescents ate their servings of chicken skinless, 46.8% reported that they ate their servings of chicken with the skin. GLM ANOVA test showed there were no significant differences between middle and high school adolescents when eating their servings of chicken skinless, $F(1) = 0.28, p = 0.60$.

When data were analyzed by regions, 65% of the participants from the Northwest and North regions usually ate their servings of chicken without skin. More than 49%, but less than 60%, of the adolescents in the South Central (53.7%), Northeast (49.4%), Southeast (50.6%), Southwest (58.9%), and Metropolitan (58.7%) regions tended to eat their servings of chicken skinless. GLM ANOVA test showed there were no significant differences between adolescents from the different regions when eating their servings of chicken skinless, $F(6) = 1.4, p = 0.24$.

**FBC 16-17 Eggs Consumption**

More than 90% (93%) of the adolescents usually ate eggs. Only 7% did not eat eggs on a regular basis. Moreover, 92.7% and 93.4% of the female and male adolescents respectively did eat eggs. GLM ANOVA test showed there were no significant differences between male and female adolescents in their egg consumption, $F(1) = 0.97, p = 0.33$.

Specific to middle and high schools, the high school adolescents reported a slightly higher percentage of participants usually eating eggs. Approximately 95% of the adolescents from the high schools tended to eat eggs, while, 91.5% of the participants from the middle schools...
usually ate eggs as well. GLM ANOVA test showed there were no significant differences between middle and high school adolescents on their consumption of eggs, $F(1) = .16, p=0.67$.

Almost 100% ($n=77, 99\%$) of the participants from the Northeast and 100% of the adolescents from the South Central region reported that they did eat eggs on a regular basis. What is more, more than 90% of the participants from the other regions in Puerto Rico did usually eat eggs. GLM ANOVA test revealed there were no significant differences between adolescents from the different regions in their consumption of eggs, $F(6) = .76, p=0.61$.

During the past week to data collection, more than half (59.3%) of the adolescents did eat between one and two eggs. However, 32% did not eat eggs during the previous week and only 9.4% of them ate three or more eggs during the past week. Some 70% of the female adolescents did eat eggs during the past week, while 30% did not report the same behavior. Specifically, 61.7% of the females did eat one or two eggs, 6.3% did eat three to four eggs, and 2.0% did eat five or more eggs. In terms of male adolescents, 65.7% did eat eggs during the week previous to data collection, but 34.3% did not eat eggs. In fact, most of the male adolescents (56.6%) did eat one or two eggs during the past week and 3.8% did eat three to four servings of eggs. GLM ANOVA test showed there were no significant differences between female and male adolescents in their egg consumption during the past week, $F(1) = .86, p=0.35$.

In terms of the school level, the percentage of high school adolescents that ate one or two eggs during the previous week was higher was compared to adolescents from the middle schools. Approximately, 68% of the high school and 53% of the middle school adolescents did eat one or two servings of eggs during the previous week. In addition, 10% of the adolescents from the middle schools did eat three or more eggs and only 6% of the high
school adolescents showed the same behavior. GLM ANOVA test demonstrated there were no significant differences between middle and high school adolescents on their consumption of eggs during the past week, \( F (1) = .17, p=0.69 \).

The results by regions revealed that the South Central (78%) and Northeast (81%) regions had the highest percentage of participants that did eat between one and two eggs during the past week. Much less so, 11.3% and 11.1% of the participants from the Southwest and the Metropolitan regions did eat three or four servings of eggs during the previous week. The Northwest region showed the highest percentage (3%) of the participants who did eat between five and six eggs during the previous week. GLM ANOVA test illustrated there were no significant differences between adolescents from different regions on their consumption of eggs during the past week, \( F (6) = .75, p=0.61 \).

**FBC 18-22 Sweetened Drinks Consumption (Soft Drinks and Juices)**

In terms of soft drinks consumption, the 91.7% of the adolescents in Puerto Rico usually drank soft drinks (i.e. regular or diet), and only 8.3% did not consume soft drinks. Male and female adolescents tend to have similar soft drinks behavioral patterns. In fact, 91% and 93% of the male and female adolescents typically consume soft drinks, respectively (Figure 4.25). GLM ANOVA test proved there were no significant differences between female and male adolescents on soft drinks consumption, \( F (1) = .25, p=0.62 \).
Almost 95% of the middle school adolescents usually consumed soft drinks, likewise most (87.7%) of the high school adolescents consumed soft drinks (Figure 4.26). To the contrary, 12.3% and 5.8% of the high and middle school adolescents respectively did not consume soft drinks. GLM ANOVA test revealed there were no significant differences between middle and high school adolescents on soft drinks consumption, $F (1) =1.73$, $p=0.19$. 

Figure 4.25. Soft drinks consumption by gender

Figure 4.26. Consumption of soft drinks by school level
The percentage of adolescents who usually consumed soft drinks was highest among those who were from the Metropolitan region. More than 95% (96.1%) of the participants from this region consumed soft drinks. However, other regions such as the Northwest (95.1%), North (92.2%), Southeast (93.5%), and Southwest (94%) reported that more than 90% of their participants consumed soft drinks. Less so, 82.1% and 85.4% of the adolescents from Northeast and South Central respectively consumed soft drinks (Figure 4.27). In fact, GLM ANOVA test revealed there were no significant differences between adolescents from different regions on soft drinks consumption, $F (6) =1.25, p=0.68$.

[Figure 4.27] Adolescents’ soft drinks by regions.

Adolescents were asked about their preferences on regular, diet, or both types of soft drinks and 60% of the adolescents reported that they usually drank regular soft drinks. Only, 5.6% of the participants usually drank diet soft drinks. However, 33.9% typically drink both diet and regular soft drinks (Figure 4.27).
Figure 4.28. Adolescents’ soft drinks consumption

But in fact, less female adolescents (58.7%) than male adolescents (63.1%) usually drank regular soft drinks, but more females drank either diet soft drinks (6.7%) or both regular and diet soft drinks (34.6%). Male adolescents had less consumption of diet soft drinks (4.4%) and both regular and diet soft drinks (32.5%) (Figure 4.29). GLM ANOVA test demonstrated there were no significant differences between male and female adolescents on the type soft drinks consumed, $F(1)=2.69$, $p=0.102$.

Figure 4.29. Adolescents’ consumption of different types of soft drinks by gender
Adolescents from the middle schools (n= 201, 64.4%) tended to consume more soft drinks than high school adolescents (54.5%). In contrast, high school adolescents typically drink more diet soft drinks than middle school adolescents. Approximately, 7% of the high school adolescents usually had diet soft drinks, while only 4.2% from the middle school student showed the same behavior patterns. Further, more high school (34.3%) than middle school adolescents (31.4%) drank both diet and regular soft drinks (Figure 4.30). GLM ANOVA test showed there were no significant differences between middle and high school adolescents on their soft drinks consumption, $F (1) =.52, p=0.47$.

Figure 4.30 Adolescents’ soft drinks preferences by school level

Almost 70% (69%) of the participants from the North region typically drank only regular soft drinks, while 50.8% of the adolescents from the Northeast region consumed regular soft drinks. Twelve percent (12%) from the Southeast region reported that they usually drank only diet soft drinks, but none of the participants from the South Central and Northeast regions did do so. However, adolescents from these two regions (i.e., South Central and
Northeast regions) usually drank both diet and regular soft drinks (Figure 4.31). GLM ANOVA test illustrated there were no significant differences between adolescents from different regions in Puerto Rico on the type soft drinks consumed, $F(6) =1.16, p=0.33$.

![Figure 4.31. Adolescents’ consumption of different types of soft drinks by regions](image)

During the previous week to data collection, almost one third (30.7%) of the adolescents did consume between three and four soft drinks, but only 8.2% did not consume soft drinks. Approximately, one quarter (24.7%) of the adolescents consumed one or two soft drinks and 12% of them did consume between five and six soft drinks. Moreover, 20.3% of them did consume seven or more soft drinks during the past week. Between male and female adolescents, 34% of the female adolescents did consume three or four soft drinks during the previous week, as well as 32% of the male adolescents. However, 23% of the male (23%) than female (18%) adolescents did drink seven or more soft drinks. Nevertheless, GLM ANOVA test showed there were no significant differences between male and female in soft drinks consumption, $F(1) =.21, p=0.65$. 

89
The results regarding the percentage of soft drinks consumed revealed that 33.5% of the middle school students did drink one or two soft drinks during the past week, while 14.1% from high school adolescents drank the same percentage of soft drinks. However, almost half (45%) of the adolescents from the high schools did drink between three and four soft drinks during the past week. Among middle school students, 23.8% adolescents did drink seven or more soft drinks during the past week. GLM ANOVA test demonstrated there were no significant differences between middle and high school adolescents on the number of soft drinks consumed, $F(1) = .22, p=0.64$.

The South Central region had the highest percentage (19%) of adolescent who did not consume soft drinks during the previous week. Both the Northwest (35.5%) and North (39.3%) regions reported that more than one third of their participants had drank one or two soft drinks, but more than 60% of the participants from the South Central (61%) and Northeast (60.8%) drank three or four soft drinks during the past week. Moreover, 20% of the adolescents from Southeast region did consume five or six soft drinks, while 4% from the Northwest region did drink seven or more soft drinks during the previous week. GLM ANOVA test illustrated there were no significant differences between adolescents from different regions in Puerto Rico on the number of soft drinks consumed during the past week, $F(6) = .88, p=0.51$.

Similar to soft drink behavioral patterns, the results showed that more than 90% (91%) of the adolescents in Puerto Rico typically drank sweetened juices. Merely, 9% of the participants did not typically drink sweetened juices. Instead, 93.3% of the male and 88.7% of the female adolescents usually drank sweetened juices (Figure 4.32). GLM ANOVA test showed there were no significant differences between male and female adolescents on their sweetened drinks consumption, $F(1) = .04, p=0.84$. 

Figure 4.32. Adolescents’ sweetened drinks consumption by gender.

In terms of school level, participants from both middle (91.1%) and high (91.3) schools reported that approximately 91% of them typically drank sweetened juices, while 8% of the participants from both school levels did not usually drink sweetened juices. GLM ANOVA test revealed there were no significant differences between middle and high school adolescents on their sweetened drinks consumption, $F(1) = 1.19, p = 0.28$.

All the adolescents from the South Central and Northeast regions drank sweetened juices on a regular basis. More than 80% of the adolescents from the other regions in Puerto Rico reported similar behavior patterns for sweetened juices. The region with the highest percentage of adolescents who did not drink sweetened juices was the Southwest region ($n=25, 15.5\%$) [Figure 4.33]. GLM ANOVA test showed there were significant differences between adolescents from different regions on sweetened drinks consumption, $F(6) = 3.15, p = 0.01$. Bonferroni post hoc test demonstrated that the South Central and Northeast regions tended drink sweetened juices more often on a regular basis than the Southwest region.
During the past week, 18.5% of the adolescents did not consume eight ounces of sweetened juices, but 81.5% consumed at least this amount. Specifically, 32.6% of the participants drank between one and two glasses of eight ounces of sweetened juices, while 19% did drink three or four glasses of eight ounces of sweetened juices. Approximately, 30% of the adolescents did drink five or more glasses of eight ounces of sweetened juices during the past week (Figure 4.34).

Figure 4.33. Adolescents’ consumption of sweetened drinks of adolescents by regions.

Figure 4.34. Adolescents’ sweetened juice consumption during the previous week
More female (21.5%) than male (15%) adolescents did not drink sweetened juices during the past week. However, a higher percentage of male adolescents (36.3%) did drink one or two glasses of eight ounces of sweetened juices. Moreover, 48.6% and 48.8% of the male and female adolescents respectively did drink three or more eight ounce glasses of sweetened juices during the past week (Figure 4.35). GLM ANOVA test showed there were no significant differences between female and male adolescents on the number of eight ounce glasses of sweetened juices consumed during the past week, $F(1) = .00, p = 0.98$.

![Figure 4.35. Adolescents’ consumption of sweetened juices by gender](image)

Less than one quarter of the adolescents from both middle (19%) and high (19%) schools did not drink sweetened juices during the previous week to data collection (Figure 3.36). However, 36.2% of middle school adolescents did drink one or two glasses of eight ounces of sweetened juices, while 27.6% from the high schools did so. But, only 7.7% of the middle school adolescents did drink between five and six glasses of eight ounces of sweetened juices, and 26.3% of the high school adolescents reported that they did drink the same amount of sweetened juices. GLM ANOVA test illustrated there were no significant
differences between middle and high adolescents in the number of eight ounce glasses of sweetened juices consumed during the past week, \( F (1) = .99, p=0.32 \).

![Figure 4.36. Consumption of sweetened juices by school level](image)

Even though the South Central (24.4%) and Northeast (25.3%) regions reported the highest percentage of adolescents who did not drink sweetened juices during the previous week, moreover results showed that the same regions had the highest percentage of participants (South Central, 43.9%; Northeast, 41.8%) who did drink between five and six eight ounce glasses of sweetened juices during the past week. Approximately, 44% of the participants from the North regions had drunk one or two glasses of eight ounces of sweetened juices, while 20% of the adolescents from the Northwest region did drink seven or more (Figure 3.37). GLM ANOVA test revealed there were no significant differences between adolescents from different regions in the number of eight ounce glasses of sweetened juices consumed during the past week, \( F (6) = .16, p=0.99 \).
Figure 4.37: Adolescents’ consumption of sweetened juices by regions

FBC 23-24 *Eating food at Restaurants*

Almost 90% of the adolescents in Puerto Rico typically ate food from restaurants. But, 12% of the adolescents from Puerto Rico did not usually eat food from restaurants. More specifically, 89% of the male and 87.6% of the female adolescents typically eat food from restaurants (Figure 3.38). GLM ANOVA test demonstrated there were no significant differences between male and female adolescents in eating food at restaurants, $F(1) = 1.90$, $p = 0.17$.

Figure 4.38. Percentage of adolescents eating food at restaurants.
Among high school students, 93.3% of them usually ate food from restaurants, while 15.8% did not show the same behavior patterns (Figure 3.39). Approximately, 84.2% of the adolescents from middle school ate food from restaurants, but 6.7% did not eat in restaurants. In fact, GLM ANOVA test showed there were no significant differences between middle and high school adolescents in eating food at restaurants, $F(1) = 0.57, p = 0.45$.

![Figure 4.39. Percentage of middle and high school adolescents who ate food at restaurants.](image)

In general across regions, 80% or more of the adolescents usually eat food at restaurants (Figure 4.40). More specifically, 94% of the adolescents who lived in the Northeast region had reported regularly eating at restaurants. However, 20% of the adolescents from the Metropolitan region did not regularly eat food from restaurants. GLM ANOVA test revealed there were no significant differences between adolescents from different regions in eating food at restaurants, $F(1) = 0.57, p = 0.45$.  

96
During the previous week to data collection, at least 76.7% of the adolescents in Puerto Rico did eat food from restaurants. Specifically, 41.7% of them did eat food from restaurants at least one or two times and more than 20% had eaten between three and four times. Further, 33.5% of the males and 33.7% of the females did not eat food from restaurants during the past week. Both male (41.8%) and female (41.1%) adolescents exhibited similar food behavior patterns toward eating food from restaurants at least one or two times during the past week. Some 25% of the male (24.7%) and female (25.2%) adolescents did eat food from a restaurant three or more times during the previous week (Figure 4.41). GLM ANOVA test showed there were no significant differences between female and male adolescents in eating food at restaurants during the past week, $F(1) = .19, p=0.66$. 

Figure 4.40. Eating food at restaurants by regions
A higher percentage of middle school adolescents (45.8%) did not eat food from restaurants during the prior week compared to 17.9% of high school adolescents who only did not regularly eat food from restaurants. In contrast, 47.2% of the high school adolescents did eat at least one or two times at a restaurant, and 31% did eat at least three or four times. However, GLM ANOVA test illustrated there were no significant differences between middle and high school adolescents on eating food at restaurants during the past week, $F(1) = 2.03, p=0.16$.

During the past week, 50.7% and 48.8% of the participants from the Northwest and the Metropolitan regions, respectively, did not regularly eat food from restaurants (Figure 4.42). Contrastly, almost 50% (49.4%) of the adolescents from the Northeast region did eat food from a restaurant between one and two times during the previous week and 40.5% ($n=32$) did eat three or four times at local restaurants. In the South Central region, 43.3% of the adolescents did eat food from a restaurant three to four times during the past week. GLM ANOVA test revealed there were significant differences between participants from different
regions in Puerto Rico on eating food from restaurants during the past week, $F(6) = 2.61, p=0.02$. Bonferroni post hoc test results indicate that the adolescents from the South Central and the Northeast regions did eat food from a restaurant more often than adolescents from other regions during the past week.

![Figure 4.42. Eating food at restaurants by regions](image)

**Figure 4.42. Eating food at restaurants by regions**

**FBC 25-26 Eating Fried Foods**

Adolescents were asked regarding their food behavior patterns toward fried foods, and in all 92.5% of them typically ate fried foods, although 7.1% did not eat fried foods. More female (93%) than male (92%) adolescents reported that they ate fried foods. However, GLM ANOVA test established there were no significant differences between female and male adolescents in eating fried foods, $F(1) = 1.29, p=0.26$.

The high schools had a higher percentage (96%) of adolescents who usually ate fried foods (Figure 4.43). Still, 91% of the middle school adolescents typically ate fried foods as well. Only, 8.4% and 4% of the middle and high school adolescents did not eat fried foods.
However, GLM ANOVA test showed there were no significant differences between middle and high school adolescents on eating fried foods, $F(1) = .15, p=0.70.$

![Bar chart showing eating habits by school level](image)

**Figure 4.43:** Eating fried food behavior by school level

All the participants from the Northeast region typically ate fried foods and 87.7% of the adolescents from the Southwest region reported the same food behaviors toward fried foods. Moreover, 95.1% of the participants from the South Central also reported that they ate fried foods. On the other hand, only 6.5% of the adolescents from the Southeast reported that they typically ate fried foods. GLM ANOVA test revealed there were no significant differences between adolescents from different regions in eating fried foods, $F(6) = 1.73, p=0.11.$

In general, more than half (57.1%) of the adolescents did not eat fried foods during the past week. However, 29.2% of them did eat fried foods at least one or two times and only 13.7% had eaten fried foods three or more times during the week prior to the data collection. What is more, 61% of the male adolescents did not eat fried foods, while 54% of the female
adolescents reported similar food behaviors as well. Additionally, 33.1% of the female adolescents did eat fried foods one or two times during the previous week, but only 26.3% males reported that they had eaten fried foods one or two times as well. GLM ANOVA test illustrated there were no significant differences between male and female adolescents in eating fried foods during the past week, $F(1) = .15, p = 0.70$.

There was a similar proportion of participants from middle (57.9%) and high (57.2%) schools reporting they had not eaten fried foods during the past week. Even though, more high school adolescents (35.4%) than middle school adolescents (23.1%) indicated that they did eat fried foods one or two times during the previous week, a higher percentage of middle school (14.5%) students did eat fried foods three or four times (Figure 4.44). GLM ANOVA test showed there were no significant differences between middle and high school adolescents in eating fried foods during the previous week, $F(1) = .11, p = 0.74$.

![Figure 4.44.Eating fried food behavior by school level](image-url)
Some 60% of the participants across several regions such as the North (61%), North (60%), South Central (62.5%), Northeast (60.8%) and Southwest (60.6%) did not eat fried foods during the previous week to the data collection (Figure 4.45). The Northeast regions revealed that 39.2% of their participants did eat fried foods one or two times during the past week. However, almost 20% (18.4%) of the adolescents from the Metropolitan region had eaten fried foods at least five or six times as well. Additionally, 39.2% of the adolescents from the Northeast region did eat fried foods one or two times during the past week. The results also illustrated that the Southeast region had the highest percentage (6.4%) of participants who did eat fried foods at least seven or more times during the previous week. GLM factorial ANOVA results demonstrated that there were no significant differences between the regions in Puerto Rico in the number of times participants had eaten fried foods during the previous week, $F(6) = 1.74, p=0.11$.

Figure 4.45. Eating fried food behavior by regions
When participants were buying food or drinks, only 17.6% of them always read the nutritional facts on the products. Moreover, 20.4% of the adolescents read the nutritional facts very often, but more than 25% (27.3%) of the adolescents in Puerto Rico sometimes read the nutritional facts of the products. However, 34.2% of the total sample did not read the nutritional facts of the products before buying them. Specifically, 34.3% of the females did not read the nutritional facts, while only 17.7% always read the nutritional facts of the products. In terms of male adolescents, 34.4% and 17% of them never read the nutritional facts or always read the nutritional facts, respectively. However, similar percentages of male (27.7%) and female (27.2%) adolescents sometimes read the nutritional facts. Among male adolescents, 20.2% read the nutritional facts very often, while 20.5% of the females read the nutritional facts of the products very often but not always (Figure 4.46). GLM factorial ANOVA results showed that there were no significant differences between male and female adolescents in Puerto Rico in the frequency with which they read the nutritional facts of the products, $F(1) = 1.54, p=0.26$.

Figure 4.46. Behavior patterns in reading the nutritional facts of products by gender
In terms of school level, 39.3% of the adolescents from the middle schools never read the nutritional facts of the products, but only 19.9% always read the nutritional facts. Approximately, 33% of the high school adolescents read the nutritional facts very often, while 27.3% of them sometime read the nutritional facts (Figure 4.47). GLM factorial ANOVA results revealed that there were no significant differences between middle and high school adolescents in Puerto Rico in the number of times they usually read the nutritional facts of the products, $F(1) = .00, p = .95$.

![Behavior patterns in reading the nutritional facts of products by school level](image)

Figure 4.47. Behavior patterns in reading the nutritional facts of products by school level

The results regarding the regions in Puerto Rico on the behavior of reading the nutritional facts before buying the products showed that, less than 1% of the participants across the regions (Northwest, North, Southwest, and Metropolitan) never read the nutritional facts (Figure 4.48). Less so, 33.5% and 21.8% of the participants from the Southeast and Northwest, respectively, did not read the nutritional facts. The lowest percentage (17.1%) of adolescents that did not read the nutritional facts was reported by the
South Central region. Even though the results from the North region showed that 23.4% of the adolescents always read the nutritional facts, 43.9% of adolescents from the South Central read the nutritional facts very often. GLM factorial ANOVA results demonstrated that there were no significant differences among different regions in Puerto Rico in the number of times the adolescents usually read the nutritional facts of the products, $F(6) = .99, p=0.43$.  

![Figure 4.48. Behavior patterns in reading the nutritional facts of products by regions](image)

**FBC 28.29 Running out of Food**

When adolescents in Puerto Rico were asked to report if their family ever ran out of food, only 1.9% of them indicated that their families often ran out of food (Figure 4.49). In contrast, 81.3% of them reported that their families did not run out of food. Just over 13% (13.5%) of the adolescents stated that their families sometimes ran out of food. Some 79.9% and 82.3% of the male and female adolescents, respectively, did not run out of food. Only, 2.2% of the male adolescents reported that their families often ran out of food. Moreover,
4.1% of the females stated that sometimes their families ran out of food. GLM factorial ANOVA results showed that there were no significant differences between male and female adolescents in Puerto Rico on how often their families ran out of food, $F (1) =.44, p=0.51$.

Figure 4.49. Running out of food by gender

The comparison between middle and high school adolescents demonstrated that 78.8% of the middle school adolescents and 84.7% of the high school adolescents reported that their families did not run out of food. Only 3.0% of the middle school adolescents often ran out of food. Moreover, 3.7% of the high school students sometimes run out of food and 14.9% of the middle school adolescents had run out of food only once (Figure 4.50). GLM factorial ANOVA results showed that there were significant differences between middle and high school adolescents in Puerto Rico on the number of times their families run out of food, $F (1) =2.30, p=0.01$. The families of middle school students tended to run out of food more often than high school students.
Most adolescents from the different regions reported that their families did not run out of food. Specifically, 97.3% of the adolescents from the Northeast, 94.6% from the South Central, and 85.7% from the Metropolitan regions did not run out of food (Figure 4.51). However, 16% of the adolescents from the Northwest and Southeast had run out of food at least once. GLM factorial ANOVA results indicated that there were significant differences between different regions in Puerto Rico on how often these adolescents’ families run out of food, $F(6) = 2.79, p=0.01$. Families of the participants from the Northeast regions did not run out of food as often as participant families from the Northwest, North, and Southeast regions.

Figure 4.50: Comparison in running out of food by school level
Adolescents responded to the question regarding whether or not they were worried that their families would run out of food and more than 60% of the sample (60.7%) reported that they were often worried that their families would run out of food (Figure 4.52). However, the data showed that 8.5% and 8.8% of the adolescents sometimes or only once they were worried that their families would run out of food, respectively. In fact, most of the female adolescents (82.3%) and male adolescents (79.9%) were not worried that their families would run out of food. Nevertheless, 15.4% of the male participants did worry that their families would run out of food at least once. GLM factorial ANOVA results confirmed that there were no significant differences between male and female adolescents in Puerto Rico on whether or not they were worried that their families would run out of food, $F (1) = 1.00$, $p = 0.32$. 

Figure 4.51: Percentages by regions on running out of food.

[Bar chart showing percentages by regions on running out of food]
Figure 4.52: Distribution by gender regarding being worried about running out of food.

Most of the high school adolescents (69.4%) reported that they often got worried that their families would run out of food and 55.1% of the middle school adolescents reported being often worried as well (Figure 5.53). Additionally, 11.3% of the middle school adolescents sometimes got worried that their families would run out of food, but only 9.8% of them were worried about it at least once. In effect, GLM factorial ANOVA results confirmed that there were significant differences between middle and high school adolescents in Puerto Rico on whether or not they were worried that their families run out of food, \( F(1) = 20, p = .06 \). The Bonferroni post hoc test revealed that high school students worried that their families would run out of food more so than their counterparts from the middle school.
More than half of the participants from all regions reported that they always worried that their families would run out of food. Noteworthy, 90% and 88.5% of the participants from the South Central and Northeast regions, respectively, reported that they always worried as well. Less so, 30.6% of the participants from the Metropolitan region worried that their families would run out of food at least once. Results from the Northwest region confirmed that 14.8% of the adolescents sometimes worried that their families would run out of food (Figure 5.54). GLM factorial ANOVA results confirmed that there were significant differences between regions in Puerto Rico on whether or not students worried that their families would run out of food, $F(6) =5.54 \, p=0.00$. Results of Bonferroni post hoc indicated that adolescents from the South Central and the Northeast regions were much more likely to worry about their families running out of food than adolescents from all other regions.
Figure 4.54. Worry about running out of food by regions

FBC 30 Consumption of Baked Sweets

The adolescents in Puerto Rico were asked whether or not they eat baked sweets such as cakes, donuts, pies, and cookies and approximately 50% of the sample reported that they did eat baked sweets at least one or two times a week (Figure 4.55). Specifically, 15.1% of the adolescents typically ate baked sweets between three and four times per week, and another 26% of them ate baked sweets at least five times or more per week. However, only 10.6% of the adolescents in Puerto Rico never ate baked sweets.

Figure 4.55. Adolescents’ consumption of baked sweets
Only 5.3% and 10% of the male and female adolescents, respectively, never eat baked sweets. However, more than half of the male adolescents (54%) typically ate one or two baked sweets per week (Figure 4.56). In terms of female adolescents, 48.2% and 18.1% did eat baked sweets between one and two times or between three and four times. Moreover, 18.6% of the male and 17.2% of the female adolescents in Puerto Rico ate baked sweets five or six times a week. GLM factorial ANOVA results indicated that there were no significant differences between male and females adolescents from Puerto Rico in their food behavior patterns toward eating baked sweets in a period of a week, $F(1) = 1.33, p=0.25$.

A higher percentage of adolescents from high schools (14.6%) than from middle schools (2.65%) never ate baked sweets. But, 45.1% of the high school adolescents and 55.2% of the middle school students did eat baked sweets one or two times per week on a regular basis (Figure 4.57). Moreover, 24.5% of the middle school adolescents ate baked sweets at least five or more, and 28% of the high school adolescents did report the same food behavior patterns in a period of a week. GLM factorial ANOVA results indicated that there were no
significant differences between adolescents from middle and high schools in their food behavior patterns toward eating baked sweets in a period of a week, \( F(1) = .25, p = 0.62 \).

![Graph showing adolescents' consumption of baked sweets by school level]

Figure 4.57. Adolescents’ consumption of baked sweets by school level

The South Central (19.5%) and the Northeast (19%) regions of Puerto Rico had the highest percentage of adolescents who never ate baked sweets. Similarly, only 1.2% of the adolescents from students in the Northwest region reported that they did not eat baked sweets. Except for the South Central (36.6%), the Southwest (49.4%) and the Northeast (36.7%) regions, students from the other regions in Puerto Rico (i.e., Northwest, 56.6%; North, 58.5%; Southeast, 53.3%; and the Metropolitan, 57.1%) reported that they did eat baked sweets at least one or two times a week. Moreover, 17.7% of the adolescents from the Southwest of Puerto Rico typically ate baked sweets three to four a week (Figure 4.58). Furthermore, 44% of the participants from the South Central usually ate baked sweets five or six times a week. GLM factorial ANOVA results indicated that there were no significant differences between adolescents from different regions in Puerto Rico in their food behavior patterns toward eating baked sweets in a period of a week, \( F(1) = .56, p = 0.76 \).
The adolescents in Puerto Rico described their eating habits and 34% of them reported that their eating habits were very good (Figure 5.59). Only, 10.6% of the adolescents asserted that they had very healthy eating habits. But more than 50% (52%) of the sample reported that their eating habits were either good or fair. Specifically, 24.3% of the sample reported that their eating habits were fair. Only, 3.4% of the adolescents said that they had very unhealthy eating habits. On the other hand, more than one third of the adolescents (37.5%) reported that their diet habits were very good. Similar percentages of female (10.8%) and male (10.5%) adolescents stated that they had a very healthy diet; moreover 28.4% of the male adolescents reported they had good eating habits, similarly 26.8% of the females claimed very healthy diet habits. GLM factorial ANOVA results confirmed that there were no significant differences between female and male adolescents in their perceptions for their eating habits, $F(1) = .81, p = 0.37$. 

Figure 4.58. Adolescents’ consumption of baked sweets by regions

**FBC 31 Perceptions of their Diet**
More middle school adolescents (13.4%) than high school adolescents (5.6%) reported they had very healthy eating habits, but more high school students (46%) than middle school adolescents (35.6%) said that their eating habits were very good (Figure 4.60). The same proportion of high school and middle school adolescents (28.2%) reported they had fair eating habits, while 28.5% of the middle school adolescents reported they had good eating habits. As well, 28.5% of the middle school adolescents reported that their eating behaviors were fair. GLM factorial ANOVA results indicated that there were significant differences between adolescents from middle and high schools on their perceptions regarding their eating habits, $F(1) = 2.38, p = 0.01$. Middle school students tend to have lower perceptions regarding their eating habits than high school students.
Some 27% of the participants from the Southwest region said they had very healthy diets. However, none of the participants from the South Central region had the same perception (Figure 4.61). In fact, 80% of the sample from this same region (i.e., South Central) rated their eating behaviors as very good. Almost 35% (34.1%) of the participants from the Southeast region reported that their eating behaviors were good, while 32.5% from the Northwest region stated they had fair eating behaviors. Moreover, some 6% of the sample from the North and Northwest regions reported that their eating behaviors were very unhealthy. GLM factorial ANOVA results confirmed that there were significant differences between adolescents from different regions in Puerto Rico in their perceptions of their eating habits, $F (6) = 5.06, p = 0.00$. In fact, the adolescents from the South Central and Northeast regions had higher perceptions of their eating habits.
Physical Activity Behavior Patterns

The participants’ physical activity behavior patterns were measured using a revised 7-day physical activity recall (7DPAR) instrument (Hodge et al., 2007). With the 7DPAR, participants were able to specify the activities they were performing day-by-day during the previous week to data collection. Moreover, the adolescents were asked to report the range of minutes they were involved in physical activities and if the physical activities were performed in their physical education classes, as part of an organized sport, or as a personal physical activity.

The Department of Recreation and Sports in Puerto Rico has developed a physical activity/wellness program called Puerto Rico en Forma (in Shape). Less than 20% of the adolescents knew about this project, while 80% of them did not know about it. In fact, only 19.7% of the males and females sampled knew about the Puerto Rico en Forma project. However, 20.7% and 18.7% of the middle and high school adolescents, respectively, did know that Puerto Rico’s government had developed a physical activity/wellness program.
Some, 22% of the adolescents from the Southeast and Southwest regions did know about the physical activity/wellness program. But, only 6.1% of the adolescents from the Metropolitan region knew about the same physical activity/wellness program.

**Summary of Physical Activity Behavior Patterns**

In general, approximately 50% or more of the adolescents from Puerto Rico participated in physical activities during the previous week to data collection. Interestingly, the lowest day of physical activity participation was Saturday (Figure 4.62). Specifically, 49% of the adolescents living in Puerto Rico engaged in some sort of physical activities during Saturday. However, Monday and Tuesday had the highest percentage of physical activity participation. In fact, 59% of the adolescents performed physical activity on Monday and Tuesday. A decline in physical activity was observed from Wednesday to Saturday. The percentage of adolescents participating in physical activities went down from 56% to 49% from Wednesday to Saturday.

![Physical Activity Participation Chart](image)

Figure 4.62. Distribution of adolescents participating in physical activities.
In terms of physical activity intensity, approximately three quarters of the adolescents participated in moderate physical activity (Figure 4.63). Basically, between 79% and 74% of the adolescents engaged in moderate physical activity during the previous week. Wednesday and Saturday (74%) were the days with the lowest participation in moderate physical activity. But, less than 21% of the adolescents engaged in vigorous physical activities throughout the previous week. The highest percentage of participation in vigorous physical activities was reported for Wednesday (21%) and Saturday (21%).

![Figure 4.63. Comparison between moderate and vigorous physical activity participation.](image)

Adolescents who participated during the data collection self-reported the amount of time they engaged in physical activities. In all, between 31% and 39% of the adolescents did engage in 60 minutes or more of physical activities (Figure 4.64), which is one of the recommended guideline for adolescents regarding physical activity. In fact, it was reported that 39% of the adolescents did perform 60 minutes or more of physical activities. But, with the exception of Saturday, more than half (54%-63%) of the adolescents did not engage in physical activities for at least 60 minutes per week.
Most of the adolescents in Puerto Rico reported that their participation in physical activities was for personal purposes rather than as a participant in organized sports, or within their physical education classes. For example on Sunday and Saturday, 75% and 76% of the adolescents did engage in personal physical activities, while between 17% and 20% of the adolescents participated in physical activities during their physical education classes from Monday through Friday. In terms of participation in physical activities as part of organized sports, 22% of the adolescents did participate in organized sports on Tuesday, but only 14% of them did engage in organized sports during Friday and Saturday (Figure 4.65).
Figure 4.65. Distribution of the reasons for participating in physical activities

The data analysis by gender showed that more than 50% of the female and male adolescents did engage in physical activities during the previous week (Figure 4.66). From Monday to Wednesday, females were more physically active. In fact, between 55% and 57% of the female did engage in physical activities during these days. The data from the male adolescents illustrated that on Monday 62% engaged in physical activities. However on Tuesday, Wednesday, Thursday, and Saturday males’ participation in some sort of physical activity decrease from 61% to 51%. GLM factorial ANOVA results confirmed that there were no significant differences between male and female adolescents in their physical activity participation, $F(1) = .04, p = 0.61$. 
In terms of intensity of physical activity, a higher percentage of males participated in vigorous physical activities than female adolescents, while a higher percentage of females engage in moderate physical activities than males. Less than 33%, but more than 27% of the males participated in vigorous physical activities compared to only less than 12% of the females did engage in physical activities of the similar intensity. However, less than 70% of the males, but more than 84% of the females engaged in moderate physical activities (Figure 4.67).
Regarding the amount of time spent in physical activity, less than 37% and more than 35% of the female and male adolescents, respectively, engaged in 60 minutes or more of physical activities. For males, during the previous Saturday, 46% participated in 60 minutes or more of physical activities. Less so, 37% of the females performed physical activity for 60 minutes or more on Thursday. Sunday had the lowest percentage (27%) of females engaging in physical activity for 60 minutes or more, while only 34% of the adolescents participated in 60 minutes or more on physical activity during the previous Monday (Figure 4.68).
Figure 4.68. Distribution of participating in physical activities for 60 minutes or more by gender.

More females than males participated in personal physical activities. More specifically, 56% to 63% of the males participated in personal physical activities from Monday to Friday (Figure 4.69). Among females, 64% to 75% participated in personal physical activities from Monday to Friday (Figure 4.70). However, participation in personal physical activities increased on both male and female adolescents during Saturday and Sunday. Less so, between 18% and 23% of the male and between 13% and 17% of the females participated in physical activities in physical education classes from Monday to Friday. Similar percentages of females and males engaged in physical activities while participating in organized sports. For example, 21% of the males and females engage in these types of physical activities on Thursday and Tuesday.
The results indicated that a higher number of middle school adolescents were physically active compared to high school adolescents. Specifically, more than 60% of the adolescents from the middle schools were physically active from Sunday to Saturday. In comparison, less...
than 40% of the adolescents from the high schools were physically active. The day-by-day data among middle school adolescents showed that a higher percentage of the participants from the middle schools were physically active on Saturday (68%) and Sunday (65%). Among high school adolescents, 38% of the adolescents were physically active during the previous Tuesday (Figure 4.71).

![Figure 4.71. Distribution of participation in physical activities among middle and high school adolescents.](image)

The data also revealed that more than 73%, but less than 83%, of the adolescents from the middle and high schools did engage in moderate physical activity. In fact, a higher percentage (75%-83%) of adolescents from the middle schools engaged in moderate physical activity compared to those at the high schools (69%-74%). Students’ participation in vigorous physical activity ranged from 14% to 22% among adolescents from middle and high schools in Puerto Rico. However, more adolescents from the high schools (17%-24%) than middle schools (14%-22%) participated in vigorous physical activities (Figure 4.72 and Figure 4.73).
Fewer adolescents from the middle schools than high schools engaged in 60 minutes or more on physical activities. The results showed that more than 29% but less than 34%, participated in 60 minutes or more on physical activities (Figure 4.74). Compared to middle
school adolescents, more than 33% of the high school adolescents participated in 60 minutes or more. Among high school adolescents, less than 47% but more than 33% engaged in 60 minutes or more of physical activities.

![Figure 4.74. Distribution of adolescents’ participation in 60 minutes or more of physical activity by school level](image)

Most of the adolescents from the middle schools reported that they participated in personal physical activities. In fact, between 68% and 79% of them did participate in these types of physical activities, while between 11% and 15% engaged in organized sports (Figure 4.75). Less so, between 9% and 17% of the adolescents participated in physical activities during physical education classes. In terms of adolescents from the high schools, between 54% and 76% of the adolescents performed personal physical activities during the previous week to the data collection. The data also showed that more than 16% but less than 32% of the adolescents from the high schools participated in organized sports, while between 7% and 22% engaged in physical activities during the physical education classes (Figure 4.76).
In summary, the Metropolitan area had the highest percentage of adolescents participating in moderate physical activities. More than 89% of the adolescents in this area participated in physical activity on a daily basis. Further, between 79% and 89% of the adolescents from the Northeast region engaged in moderate physical activity as well. However, in general, the North and the Southeast reported the lowest percentage of adolescents participating in moderate physical. For example, between 73% and 74% of the
adolescents from the North and the Southeast regions respectively participated in moderate physical activities. In terms of vigorous physical activities, the results revealed that the North region had the highest percentage (between 27% and 36%) of the adolescents participating in vigorous physical activities. Across regions, between 5% and 22% of the adolescents engaged in vigorous physical activities (Figure 4.77 and Figure 4.78).

Figure 4.77. Distribution of participation in moderate physical activity among different regions in Puerto Rico.

Figure 4.78. Distribution of participation in vigorous physical activity among different regions in Puerto Rico.
The data regarding the amount of minutes performing physical activity showed that the South Central had the highest percentage of adolescents who engaged in 60 minutes or more of physical activities. In fact, more than 44% of the adolescents did engage in 60 minutes or more of physical activity on a regular basis. More than 41% of the adolescents from the North region engaged in 60 minutes or more as well. One of the lowest percentages of adolescents participating in 60 minutes or more was reported by those in the Northwest region. Specifically, less than 28% of the adolescents from this region participated for 60 minutes or more in physical activities (Figure 4.79).

![Figure 4.79. Distribution of participation in 60 minutes or more on physical activities among different regions in Puerto Rico.](image)

More than 70% of the adolescents from the northwest participated in personal physical activities. From Sunday to Wednesday, more than 60% of the adolescents from the Southwest engaged in the same categories of physical activities. The lowest participation (40% or less) in personal physical activities was reported by those in the Northeast region.
Regarding physical education classes, the data showed that from Sunday to Wednesday, more than 33% of the adolescents from the Northeast region participated in physical activities during their physical education classes. But from Thursday to Saturday, more than 33% of the adolescents from the North region participated in physical activity during the physical education classes as well. Further, on Sunday, Thursday, Friday, and Saturday, the Northeast region reported the highest percentage (27% or more) of adolescents participating in organized sports. However on Monday, Tuesday, and Wednesday, more than 35% of the adolescents from the Metropolitan area engaged in organized sports (Figures 4.80 to 4.82).

Figure 4.80. Distribution of participation in personal physical activities among different regions in Puerto Rico.
Figure 4.81. Distribution of participation in physical activities during physical education class among different regions in Puerto Rico.

Figure 4.82. Distribution of participation in organized sports among different regions in Puerto Rico.
Participation in Physical Activities per Day

Sunday

Sunday was the first day of the week in which adolescents had to self-report their physical activity behavior patterns on the 7DPAR instrument. For this particular day, more than half (56.2%) of the adolescents reported they participated in physical activities (Figure 4.62). Specifically, 43% of the adolescents participated in moderate physical activities (e.g., walking, volleyball, baseball, and weight training) and only 11% of them performed vigorous physical activities (e.g., basketball, swimming, aquatic activities, and cycling) on the previous Sunday (Figure 4.63). Another 2.2% reported other types of physical activities. Among those adolescents who participated in physical activity on Sunday, 32.3% did performed walking as their primary activity. Moreover, 6.8% of the adolescents were engaged in volleyball, but in terms of vigorous physical activities, basketball was the activity most reported (7.1%) by the participants. Almost, 18% (17.6%) of the adolescents living in Puerto Rico reported that they performed between one and nineteen minutes of physical activity, but a similar percentage (17.9%) reported that they performed 60 minutes or more of physical activity (Figure 4.64). Less so, 11.4% of them performed between 30 and 59 minutes of physical activities.

According to their responses, 29% of the participants stated that the physical activity was performed as a personal physical activity. In other words, the activities were not part of an organized sport or physical education classes (Figure 4.65).

The results by gender showed that 65% of the male participants, who did perform physical activity, were engaged in moderate physical activities (Figure 4.67). However, a larger percentage of female adolescents (86.4%) were also performing moderate physical activities. Less so, 13.6% of the female and 35% of the male participants performed some
sort of vigorous physical activity. In fact, 67% of the females participated in walking activities, while less than half (46.7%) of the male adolescents participated in the same physical activities. Moreover, more females (17.8%) than males (5.9%) were engaged in volleyball activities. However, a higher percentage of male (25%) than female adolescents (1.6%) engaged in physical activities related to basketball. GLM factorial ANOVA results confirmed that there were significant differences between male and female adolescents in their participation in physical activities. \( F(1) = 5.76, p = .03 \). Male adolescents tended to participate more often in vigorous physical activities, while females usually participated more often in moderate physical activities on Sunday. Among those male adolescents who performed physical activity during the previous Sunday, 37.1% performed 60 minutes or more of physical activities and 27% of the female adolescents reported the same amount of time (Figure 4.68). Additionally, 22.9% and 17.8% of the male and female adolescents respectively did perform between 30 and 59 minutes of physical activities. However, 36.2% of the female and 25.3% of the male adolescents performed 19 minutes or less of physical activities. GLM factorial ANOVA results confirmed that there were significant differences between male and female adolescents on the amount of time they engaged in physical activities, \( F(1) = 9.08, p = .00 \). Males tended to spent more time in physical activities than females. Moreover, almost three quarters (74.1%) of the male adolescents and 76% of the females tended to participate in personal physical activities (Figures 4.69 and 4.70). However, 13.4% and 12.5% of the males engaged in organized sports (13.4%) and physical activities (12.5%) as part of their physical education classes.

Data from middle and high schools indicated that 77.8% of the middle school students participated in moderate physical activities and 72.8% of the high school students showed the same amount of minutes as well during the previous Sunday to data collection (Figure 4.68).
4.72). However, 21.4% and 19.5% of the high and middle school adolescents respectively engaged in vigorous physical activity and more than half (58.8% middle school and 56.7% high school) of the adolescents did participate in walking activities (Figure 4.73). Further, 13.6% and 12.7% of the middle school adolescents were participating in volleyball and basketball activities respectively. For high school adolescents, 9.2% participated in volleyball, while 13.3% were engaged in basketball activities. More than 30% of both middle (32.1%) and high school (30.8%) adolescents engaged in 19 minutes or less of physical activities. Moreover, 38.3% of the high school students participated for 60 minutes or more, while 28.5% middle school adolescents participated for the same amount of minutes (Figure 4.74). Most of the adolescents from the middle (78.7%) and high (68.2%) schools engaged in the activities as personal physical activities (Figure 4.75 and 4.76).

The Metropolitan (90.5%) and Northwest (86%) regions had the highest percentages of adolescents who engaged in moderate physical activities (Figure 4.77). But, 32% of the adolescents in the North regions reported that they participated in vigorous physical activities (Figure 4.78). Even though, across the regions, adolescents mainly participated in walking, volleyball, and basketball activities, 17.9% of the adolescents from the Northeast region participated in weight training activities and 14% of the adolescents from the North region were engaged in cycling activities. The highest percentage of adolescents who participated in 19 minutes or less of physical activity was reported by the Northwest region, but 54.5% of the adolescents from the South Central reported that they participated in 60 minutes or more of physical activities (Figure 4.79). However, 50% and 54.5% of the North and South Central regions reported 60 minutes or more of physical activity. Other regions such as the Metropolitan, Southwest, and Southeast regions reported between 32.1% and 33.3% of participation in physical activity for 60 minutes or more. Except for the Northeast
regions, most of the regions had 65% of the adolescents who engaged in personal physical activities. Only, 35% of the adolescents from the Northeast region participated in physical activities as personal activities (Figures 4.80, 4.81, and 4.82).

Second Physical Activity for Sunday

Using the modified 7DPAR, the sampled adolescents were able to record more than one physical activity per day. In general, 29.7% of the total sample reported they participated in an additional physical activity during the Sunday previous to the data collection. Among those who reported such participation, 54.3% of them engaged in moderated physical activities and 34.8% participated in vigorous physical activities. Moreover, 38.3% of them participated in volleyball and 13.8% participated in basketball. In terms of minutes of physical activity, only 33% of the adolescents participated in 60 minutes or more. In all, 67% of them engaged in 59 minutes or less of physical activities. Further, most of the adolescents (71%) performed physical activities for personal purposes.

Approximately, 60% (61.7%) of the male adolescents engaged in moderate physical activity and 45% of them engaged in vigorous physical activities. Among female adolescents, 57.2% of them participated in moderate physical activities, while only 27.5% participated in vigorous physical activities. A higher number of female adolescents (45%) participated in volleyball compared to male adolescents (31.5%). However, 23.6% of the males participated in basketball, while only 5.1% of the females did so. When the data were analyzed by minutes performed in physical activities, the results showed that 36% and 30.6% of the male and female adolescents, respectively, participated in 60 minutes or more of physical activities. In fact, 64% of the male adolescents participated in less than 60 minutes; while 69.4% of the
female adolescents had the same physical activity behavior. Most female (74.6%) and male (67.3%) adolescents participated in physical activity for personal purposes.

What is more, 64% of the middle school adolescents and only 31.1% of the high school adolescents participated in moderate physical activities. Moreover, only 26.2% of the middle school adolescents, but 55.6% of the high school adolescents were performing vigorous physical activities. Among middle school adolescents, volleyball (44.4%) and basketball (11.3%) were most reported by the adolescents. The high school adolescents reported that they participated in volleyball (22.2%) and jogging/running (20%) physical activities. Similar percentages of middle (32.3%) and high (33.3%) school adolescents performed 60 minutes or more of physical activities. But, 67.7% and 66.7% of the middle and high school students did not participate in 60 minutes or more of physical activities. Most of the adolescents from middle (75%) and high (63.3%) schools performed their physical activities as a personal activity.

The data analysis showed that 73.4% of the adolescents from the North region participated in moderate physical activities; however, only 21.1% of the adolescents from the Southeast region did participate in moderate physical activities. In terms of vigorous physical activities, the Northwest regions had the higher percentage (32.5%) of adolescents who were engaged in vigorous physical activities. The lowest participation in vigorous physical activities was reported by the Metropolitan region (17.7%). Most of the regions in Puerto Rico showed that more than 30% of their adolescents tended to perform volleyball as a second activity during the previous Sunday, except for the Southeast region. Only, 13.2% of the adolescents from the Southeast region reported that they were engaged in volleyball. The North region was the only region in where almost 40% (39.1%) of their participants performed baseball during the previous Sunday. In the Northeast region, 40% of the adolescents did engage in
basketball and 26.3% of the participants from the Southeast did participate in jogging/running activities. Across regions, more than 25% of the adolescents did participate in 60 minutes or more of physical activity during the previous Sunday. Moreover, the North region was the only region in which more than 50% (52.2%) of the participants engaged in 60 minutes or more of physical activity. Eighty percent of the participants from the Northwest region reported that they performed the activities for personal purposes, but 50% and 66.7% of the adolescents from the North and the Northeast regions asserted that their participation in physical activities were part of their physical education classes. Only, 21.4% of them participated in physical activities within an organized sport.

**Monday**

For the previous Monday of the data collection, 59.2% of the adolescents engaged in physical activities, while 40.8% did not engage in physical activities. Generally speaking, 75.5% of the adolescents engaged in moderated physical activities, but only 24.5% of them performed vigorous physical activities (Figure 4.63). More than half (53.5%) of the adolescents who engaged in physical activities did perform walking activities. The second activity most performed by the adolescents was volleyball (15%). Moreover, 31% of the adolescents who engaged in physical activities during the previous Monday did so for 60 minutes or more (Figure 4.64). However, 69% of them did not meet the recommended physical activity guidelines of 60 minutes or more. The adolescents (63.4%) reported that the majority of those activities were performed for personal purposes rather than as part of a physical education class (17.1%) or organized sports (17.8%) (Figure 4.65).

While 83.1% of the female adolescents participated in moderate physical activities, 67.6% of the male adolescents engaged in moderate physical activities as well (Figure 4.67). No
more than 32.4% and 16.9% of the male and female adolescents respectively participated in vigorous physical activities. The primary activity performed by female (63%) and male (43.8%) adolescents was walking. Moreover, 17.8% of the male adolescents engaged in basketball, similarly 18.5% of the female adolescents were engaged in volleyball. GLM factorial ANOVA results confirmed that there were significant differences between male and female adolescents in their participation in moderate and vigorous physical activities, $F(1) = 10.03, p = .00$. Male adolescents tended to participate more often in vigorous physical activities than females. Among males, 34.4% of them participated in physical activities for 60 minutes or more, while 55.6% did not engage in 60 minutes or more of physical activities (Figure 4.68). Less so, 27.6% of the female adolescents performed 60 minutes or more of physical activity, but more than 70% of them did not meet this recommended physical activity guideline for adolescents. GLM factorial ANOVA results confirmed that male and female adolescents differed significantly on the amount of time engaged in physical activities, $F(1) = 6.65, p = .01$. Male adolescents tended to spend more time in physical activities than females. However, 62.7% and 64.1% of the male and female adolescents respectively engaged in physical activities as a personal purpose. Only, 21% of the males reported that they engaged in physical activity during their physical education classes and 19% of the female adolescents reported that their physical activities were performed as part of an organized sport (Figures 4.69 and 4.70).

Among adolescents from middle schools, 78.3% participated in moderate physical activities, while 21.7% participated in vigorous physical activities (Figures 4.72 and 4.73). Less so, 69% of the adolescents from the high schools engaged in moderate physical activity, but 31% of them performed vigorous physical activities. Both middle (53.8%) and high (53.5%) school adolescents showed that walking was the primary activity performed. Among
middle school adolescents, 18.7% participated in volleyball and 11.3% engaged in basketball. Among high school adolescents, 11.4% engaged in basketball and 8.5% performed jogging/running activities. GLM factorial ANOVA results confirmed that there were significant differences between middle and high school adolescents on their participation in moderate and vigorous physical activities, $F(1) = 3.95, p = .05$. High school adolescents tended to participate more often in vigorous physical activities than middle school adolescents.

Merely, 30.1% and 32.6% of the middle and high school adolescents respectively did engage in 60 minutes or more of physical activities (Figure 4.74). However, 69.9% of the middle school adolescents and 67.4% of the high school adolescents engaged in 59 minutes or less of physical activities. More adolescents from middle school (71.2%) than high school adolescents (53.8%) participated in physical activity for personal purposes. However, a higher percentage of high school adolescents (26.5%) than middle school adolescents (11.7%) engaged in organized sports. More than 15% on both middle (17.2%) and high school (15.4%) students reported that their physical activities were performed as part of their physical education classes (Figures 4.75 and 4.76).

Among different regions in Puerto Rico, the Northwest region had the highest number (82.6%) of adolescents who participated in moderate physical activities (Figure 4.77). However, adolescents from the North region revealed the lowest participation in moderate physical activities with 63.7% participation rate reported. In terms of vigorous physical activities, the North region had the highest percentage (36.3%) of adolescents participating in these types of activities. But only 24% of the adolescents from the Southwest region participated in vigorous physical activities (Figure 4.78). For walking activities, 53.4% of the population sampled from the Southeast region engaged in these types of activities. However, 37.1% of the adolescents from the Metropolitan region performed volleyball. More than 5%
(6.8%) of the adolescents from North engaged in baseball and 15.8% of the adolescents from the Northeast performed weight training. Moreover, 25% of the adolescents from the South Central performed basketball, but 11.1% engaged in running/jogging activities. The only region that had at least 44% of the adolescents participating in 60 minutes or more of physical activities was the Southwest region. The North region was the second region with the highest percentages (41%) of adolescents engaged in 60 minutes or more of physical activities (Figure 4.79). In addition, 73% of the adolescents from the Northwest region reported that their physical activity participation was related to organized sports and 15.3% of the participants from this region also reported that their physical activity participation was as part of their physical education classes. However, 41.4% of the adolescents from the Northeast region asserted that they participated in personal physical activities (Figures 4.80, 4.81, and 4.82).

Second Activity for Monday

At least, 30.2% of adolescents reported that they engaged in a second activity on Monday to the data collection. Among those adolescents who engaged in other activities, 62.8% of them performed moderate physical activities, while 32% engaged in vigorous physical activities. Volleyball was the activity mostly performed by the adolescents (40.8%). However, 14.7% of the adolescents reported that they also engaged in basketball. Only 28.6% of the adolescents who engaged in a second activity on Monday engaged in 60 minutes or more of physical activities, while 71.4% engaged in 59 minutes or less of physical activities. For female, 63% of them engaged in moderate physical activity, but only 37% performed vigorous physical activities. Among male adolescents, 53.2% of them engaged in moderate physical activities, while 46.8% performed vigorous physical activities. Almost 50% (49.5%)
of the female and 32% of the male adolescents engaged in volleyball. However, 25.5% of the male adolescents performed basketball. Moreover, 11.3% of the female adolescents engaged in cycling activities. Some 33.3% and 23.6% of the male and female, respectively, performed 60 minutes or more on physical activities. Approximately, 17% (16.7%) of the male were involved in organized sports, 30.3% participated in physical activities as part of their physical education classes, and 53% of them performed physical activities for personal purposes. Among female adolescents, 14.7% engaged in organized sports, 13.2% engaged in physical activities as part of their physical education classes, and 72.1% of them performed physical activities for personal purposes.

For the adolescents from the middle schools, 66.2% participated in moderate physical activities, while 33.8% of them engaged in vigorous physical activities. Among high school adolescents, 56.2% of them performed moderate physical activities, but 43.8% of them participated in vigorous physical activities. For both the middle and high school adolescents, volleyball was the second activity mostly performed (middle school, 45.7%; high school, 28.1%). Also, 17.5% of the adolescents from the high schools engaged in baseball, and 15.7% of the middle school adolescents did participate in basketball. In fact, 29.4% and 24.5% of the middle and high school adolescents respectively performed physical activities for 60 minutes or more. Actually, almost 65% of the middle (64.9%) and high (64.7%) school adolescents participated in personal physical activities. However, 19.1% and 16% of the adolescents from the middle schools did participate in physical activities during their physical education classes and organized sports respectively. Among high school adolescents, 20.6% of them engaged in physical activities as part of the physical education class and 14.7% participated in organized sports.
Among the participants from the Northwest region that participate in a second physical activity during the previous Monday, 72.2% of them participated in moderate physical activities. Moreover, 70.5% of the participants from the Southeast region engaged in moderate physical activities. However, 48% of the adolescents from the Northeast region engaged in vigorous physical activities, while 38% of the adolescents from the North region did do so. More than 65% of the participants from the South Central region engaged in walking activities, but 23.8% of the adolescents from the North region performed baseball. Within the Southeast region, 20.6% of the adolescents participated in weight training and 33.3% of the adolescents from the South Central engaged in physical activities that involved running and/or jogging. The participants from the Southeast region were the only participants who reported at least 50% of participation in 60 minutes or more of physical activities. However, 38.1% of the adolescents from the North region engaged in the same amount of minutes on physical activities. Indeed, 90.5% of the adolescents from the Southeast region participated in personal physical activities, while one half (50%) of adolescents from the South Central participated in physical activities within the physical education classes. Moreover, the other half (50%) of the adolescents from the same region did engage in organized sports.

**Tuesday**

For the previous Tuesday to the data collection, 58.5% of the adolescents engaged in some sort of physical activities; however 41.5% of them did not participate in any physical activities (Figure 4.62). Among those adolescents who engaged in physical activities, 77.8% participated in moderate physical activities, while only 17.1% did engage in vigorous physical
activities (Figures 4.63 and 4.64). The physical activity most practiced by the participants was walking (51.4%) and volleyball (19.2%). In addition, basketball (11.1%) was another physical activity practiced by adolescents during the previous Tuesday. GLM factorial ANOVA results confirmed that there were significant differences between male and female adolescents on their participation in moderate and vigorous physical activities, $F(1) = 14.73, p = .00$. Male adolescents tended to participate more often in vigorous physical activities than females. In general, 33% of the adolescents performed 60 minutes or more of physical activities, but 66.7% performed 59 minutes or less of physical activities (Figure 4.64). GLM factorial ANOVA results confirmed that there were significant differences between male and female adolescents on the amount of time engaged in physical activities, $F(1) = 9.05, p = .00$. Male adolescents tended to spend more time in physical activities than females. In fact, 61.7% participated in personal physical activities, while 21.7% participated in organized sports. Only 16.6% of them engaged in physical activities as part of their physical education classes (Figure 4.65).

Within the male population, 67.4% participated in moderate physical activity, while 32.6% performed vigorous physical activities (Figure 4.67). Some 88% of the females engaged in moderate physical activity and only 12% participated in vigorous physical activities. The physical activity most practiced by males and females was walking (male, 40.9%; female, 61.4%). Even though, more female (23.8%) than male (14.4%) adolescents participated in volleyball and a higher number of males (20.7%) than females (2.1%) engaged in basketball during the previous Tuesday. Among male adolescents, 36.5% participated for 60 minutes or more on physical activities, while 29.8% of the female did do so (Figure 4.68). Moreover, almost 60% of the male (59.5%) and 63.7% of the female adolescents engaged in personal physical activities. However, 18.3% and 15.1% of the male and female engaged in
physical activity in their physical education classes. Less than one quarter of the male (22.1%) and female (21.2%) adolescents performed physical activity as part of an organized sport (Figures 6.69 and 4.70).

During the previous Tuesday to the data collection, 76% of the adolescents from the middle schools engaged in moderate physical activities, while only 21.3% participated in vigorous physical activities (Figure 4.72). Among high school adolescents, 74.3% of them engaged in moderate physical activities, but only 16.9% performed vigorous physical activities. Walking was the activity most practiced by middle (48.9%) and high (56.2%) school adolescents, but 23.5% of the middle school students engaged in volleyball as well. Furthermore, 11% of the adolescents from high school engaged in volleyball and 12.2% participated in basketball. In terms of minutes on physical activities, less than 30% of the middle (27.7%) and 41.6% of the high school adolescents reached 60 minutes or more of physical activities (Figure 4.73). However, more than 60% of the adolescents from the middle schools (68.1%) and 54.1% of the high schools participated in personal physical activities. Almost 20% (17%) of the middle school adolescents did engage in physical activity during their physical education classes and only 15% of the middle and 32.1% of the high school adolescents performed physical activity in organized sports (Figures 4.75 and 4.76).

The region with the highest participation in moderate physical activities was the Metropolitan (94.1%). However, the Southwest (84.7%), Northeast (86.5%), and the South Central (80%) regions had at least 80% or more of moderate physical activities (Figure 4.77). The North region had the highest percentages of participation in vigorous physical activity (30.3%) (Figure 4.78). For all the regions, walking was the physical activity most performed, but 44.1% of the participants from the Metropolitan region engaged in volleyball. Almost 10% of the adolescents from the North region participated in baseball and 13.5% of the...
adolescents from the Southwest region performed weight training. Nevertheless, 18.6% of
the population sample from the North region engaged in basketball and 11.6% did
participate in cycling activities. The only region with almost 50% of participation in 60
minutes or more on physical activity was the South Central region (47%). However, 40% of
the participants from the Southeast region performed 60 minutes or more of physical
activities (Figure 4.79). Within the Northwest region, 71% of the participants engaged in
personal physical activities, while 36% of the adolescents from the Metropolitan region
participated in physical activities in the physical education classes. Moreover, 40% of the
adolescents from the Northeast region participated in organized sports (Figures 4.80 and
4.82).

Second Physical Activity for Tuesday

For the previous Tuesday, only 27.2% of the adolescents engaged in a second activity. In
general 61% of them participated in moderate physical activities, while 33.8% engaged in
vigorous physical activities. Volleyball (39%) and basketball (17.4%) were the physical
activities mostly practiced by the adolescents. Approximately, 30% of the adolescents who
engaged in a second activity during the previous Tuesday participated for 60 minutes or
more, but more than 70% engaged in less than 60 minutes on physical activities. Mainly,
60.7% of them engaged in personal physical activities, and 20% engaged in both organized
sports and physical activities in their physical education classes.

For male adolescents, 53.8% of them participated in moderate physical activities, while
39.8% engaged in moderate physical activities. However, 69.7% and 25.1% of the female
adolescents participated in moderate and vigorous physical activity respectively. For both
male and female adolescents, volleyball was the second activity most practiced (male, 30.1%;
female, 49.4%). Moreover, 30% of the male adolescents participated in volleyball and 49.4% of the high schools also performed the same activity. In addition, 25.8% of the male adolescents engaged in basketball. Among those males that participate in a second activity on Tuesday, only 30% did do so for 60 minutes or more, while 25.6% of the female performed the same amount of minutes in physical activities. Three quarter (75%) of the female adolescents engaged in personal physical activities, while only 46.8% of the male engaged in physical activity for the same purpose. Nevertheless, 30.6% of the male adolescents participated in physical activities during the physical education class and 22.6% engaged in an organized sport. Among high school adolescents, 8.3% and 16.7% performed physical activities as part of their physical education classes and within organized sports respectively.

For the middle school population, 67.3% of them participated in moderate physical activities. Moreover, 49% of the high school participants participated in moderate physical activity as well. Only 29.2% and 32.2% of the middle and high school adolescents respectively participate in vigorous physical activities. For both grade levels, volleyball was the second physical activity most performed (middle schools, 44.2%; high schools, 26.4%). However, only 30.8% of the high school adolescents and 26.5% of the middle school adolescents engaged in 60 minutes or more on physical activities. In fact, 67% of the middle school adolescents engaged in personal physical activities, while only 50% of the high school did do so. However, 36.8% of the high school adolescents participated in organized sports and 20.3% of the middle school adolescents engaged in physical activity during the physical education class.

The results of the data showed that the Northwest region had the highest percentage of adolescents participating in moderate physical activities (74.2%). Closely, 72.7% of the participants from the North region engaged in moderate physical activity as well. The South
Central region had 50% of the adolescents participating in vigorous physical activities. With the exception of the Southeast region, which reported that 14.3% of their participants engaged in volleyball, baseball, and weight training, volleyball was the activity most performed by the other regions. The North (45.5%) and the Southwest (46.4%) reported 45% or more of their participants engaging in 60 minutes or more of physical activities. In addition, 69% of the adolescents from the Northwest region participated in personal physical activities, 50% from the North region engaged in physical activities as part of physical education classes, and 33.3% from the South Central engaged in organized sports.

Wednesday

The physical activity data for Wednesday showed that 56.3% of the participants participated in any sort of physical activity (Figure 4.62). However, 43.7% of the adolescents did not engage in physical activities. Among those who participated in physical activities, 74.7% engaged in moderate physical activity, while 70.2% engaged in vigorous physical activity (Figure 4.63). Walking was the physical activity most practiced by adolescents (29.3%). Nevertheless, almost 10% (9.7%) of the adolescents participated in volleyball and 7% engaged in basketball. Even when more than half of the participants engaged in physical activities, only 33% participated for 60 minutes or more which is the physical activity recommendations for adolescents (Figure 4.64). Another 66.9% engaged in 59 minutes or less on physical activities. Moreover, 65.8% of the adolescents participated in personal physical activities, while 17% and 16.3% of them engaged in physical activities as part of an organized sport or physical education class respectively (Figure 4.65).

In terms of gender, 87.3% of the female adolescents engaged in moderate physical activities and 12.7% participated in vigorous physical activities. Among the male population,
62% engaged in moderate physical activities, but 38% of them participated in vigorous physical activities (Figure 4.67). The data also showed that 61.7% of the females participated in walking activities compared to 42% of the male who did so. Moreover, 22.8% of the females engaged in volleyball while a very close percentage (22.2%) of the males did practice basketball. However, 11.4% of the males engaged in volleyball on Wednesday. GLM factorial ANOVA results confirmed that there were significant differences between male and female adolescents on their participation in moderate and vigorous physical activities, $F(1) = 19.14, p = .00$. Male adolescents tended to engage more often in vigorous physical activities more than females. In terms of the minutes spend in physical activity, 35.8% of the males participated in physical activities for 60 minutes or more compared to the females who only 30% of them engaged in physical activity for the same amount of time (Figure 4.68). GLM factorial ANOVA results confirmed that there were significant differences between male and female adolescents on the amount of time engaged in physical activities, $F(1) = 10.59, p = .00$. Male adolescents tended to spend more time in physical activities than females. Among those female adolescents participating in physical activities, 67.4% of them engaged in personal physical activities. Less so, 64% of the male also engaged in personal physical activities as well (Figures 4.69 and 4.70). While 18.8% of the females participate in organized sports, 20% of the male adolescents reported that they participated in physical activities as part of their physical education classes.

For the middle school population, 80.5% engaged in moderate physical activity, but only 19.5% performed in vigorous physical activities (Figures 4.72 and 4.73). Among high school students, 69.1% of them participated in moderate physical activities, while 30.9% participated in vigorous physical activities. For more than half of the middle (51%) and high (53.5%) school adolescents, walking activities were the activity most practiced during
Wednesday. However, 21.3% of the middle school adolescents engaged in volleyball and 12.4% of the high school adolescents participated in basketball. Almost 50% of the adolescents from high school that participated in physical activity during Wednesday engaged in 60 minutes or more of physical activities, but only 28.8% of the middle school spent the same amount of time in physical activities (Figure 4.74). Nevertheless, 72.4% of the middle school adolescents participated in personal physical activities. Among high school students, 56.7% of them engaged in personal physical activities, but 28% of them did participate in organized sports (Figures 4.75 and 4.76). Only 10.5% of the adolescents from the middle schools participated in organized sports. Moreover, 16.4% and 14.4% of the adolescents from the middle and high schools respectively engages in physical activity during their physical education class.

Comparing the physical activity behavior patterns of adolescents from different regions, the data showed that Southwest (87%) and the Northeast (85.6%) were the two regions with the highest percentage of adolescents engaging in moderate physical activities. However, 42.8% and 27.1% of the adolescents from the North and the Southeast regions respectively engaged in vigorous physical activities (Figures 4.77 and 4.78). For all the regions, walking was the activity most practiced during Wednesday. However, the North (40.5%) was the only region that had less than half of the participants engaging in walking activities. For the Metropolitan region, 39.4% of the adolescents engaged in volleyball, while the data from the North regions showed that 26.2% of their adolescents participated in basketball. GLM factorial ANOVA results confirmed that there were significant differences between adolescents from different regions on their participation in moderate and vigorous physical activities, $F (1) = 2.45, p = .03$. The adolescents from the Southeast region tended to engage more often in vigorous physical activities more than adolescents from Southwest and
Metropolitan regions. Only the South Central regions had at least 50% of their adolescents participating in 60 minutes or more on physical activities. However, the North and the Southeast regions had 41% of the adolescents engaging in 60 minutes or more on physical activities (Figure 4.79). Less so, almost 80% of the adolescents from the Northwest region engaged in physical activity for 59 minutes or less. More than half of the adolescents from all the regions reported that they engaged in personal physical activities during Wednesday. Moreover, 77.8% of the adolescents from the Northwest region in Puerto Rico engaged in personal physical activities. But, 28.6% of the adolescents from the South Central participated in organized sports and 38.1% from the Metropolitan region participated in physical activity during the physical education classes (Figures 4.80, 4.81, and 4.82).

Second Physical Activity for Wednesday

Merely, one quarter (25.2%) of the adolescents from Puerto Rico engaged in a second physical activity during Wednesday. Among those who participated in a second activity, 61% participated in moderate physical activities, while 34.6% engaged in vigorous physical activities. Volleyball was the activity most practiced (41.5%) for those who engaged in an additional physical activity during Wednesday. Only, 15.7% of the adolescents performed basketball as a second activity. Moreover, 31% of the adolescents engaged in 60 minutes or more on physical activities when performing a second physical activity. More than half (57.1%) of those adolescents participated in physical activities for personal purposes. But 26% of them engage in physical activities during their physical education classes. However, only 16% of them did so as part of organized sports.

Regarding the data by gender, the results showed that 52.8% of the male adolescents participated in moderate physical activities when they engaged in a second physical activity
on Wednesday. However, 70.8% of the female adolescents engaged in moderate physical activities. In addition, 43.8% and 23.6% of the male and female respectively performed activities that were classified as vigorous physical activities. For both males (33.3%) and females (51.4%), volleyball was the second activity most practiced on Wednesday. However fewer females (26.8%) than males (34.5%) engaged in 60 minutes or more on physical activities. But, a higher number of female (67.3%) than male (48.4%) adolescents participated in personal physical activities, while more males (36%) than females (16.4%) engaged in physical activities during physical education classes.

Among adolescents from the secondary schools who participated in a second physical activity on Wednesday, 68.4% of the middle school adolescents engaged in moderate physical activities, while 28% of them performed vigorous physical activities. For high school adolescents, 42.1% of them participated in moderate physical activities and 51.2% engaged in vigorous physical activities. Even though, 48.1% of the adolescents from the middle schools participated in volleyball, the same percentage (22.2%) of adolescents from the high schools engaged in volleyball and jogging/running activities. In fact, one third (33.3%) of the middle school adolescents and almost one quarter (24.4%) of the high school adolescents participated in physical activities for 60 minutes or more. More than half of the middle (58.2%) and high (60%) school adolescents participated in physical activities for personal purposes. However, 25.3% of the middle schools engaged in physical activities during physical education classes and 17.1% from high school participate in organized sports.

The results of the data by regions showed that, on a second physical activity, the Northwest region had a 71% of participation in moderate physical activities during Wednesday. However, 47.9% of the adolescents from the Southwest engaged in vigorous
physical activities. For the South Central, the second physical activity most practiced was volleyball (66.7%). However, 31.6% of the adolescents from the North region participated in baseball, but 21.7% of the adolescents from the Southeast were participating in weight training exercises. Almost one quarter (22.7%) of the adolescents from the Northeast performed basketball and 33.3% of the adolescents from the South Central engaged in basketball. Nevertheless, only the North (42.1%) and the Southeast (45.5%) region had more than 40% of their adolescents participating in a second physical activity for 60 minutes or more. In fact, 70% of the adolescents from the Southeast region engaged in personal physical activities. But, among the adolescents from the South Central, 50% participated in organized sports and another 50% engaged in physical activities during physical education classes.

Thursday

During the previous Thursday to the data collection, 53.2% of the adolescents were physically active (Figure 4.62). Moreover, 79.2% of them engaged in moderate physical activities, while 15.1% participated in vigorous physical activities (Figure 4.63). Among those adolescents who participated in physical activities, approximately 50% of them engaged in walking activities and 20% performed volleyball. However, only 37.5% of the adolescents reported that they engaged in 60 minutes or more on physical activities during the Thursday prior to the data collection. Thus, 62% did not meet the physical activity recommendations for adolescents (Figure 4.64). For those who participated in physical activities, 62.2% participated for personal purposes, while 20% engaged in physical activities during their physical education classes. Only 17.5% of the adolescents participated in organized sports during Thursday (Figure 4.65).
When data was analyzed by gender, the results showed that 88.3% and 70% of the male and female adolescents respectively engaged in moderate physical activities (Figure 4.67). Nevertheless, a higher percentage of males (25.5%) than females (5.2%) participated in vigorous physical activities. For both, male (41%) and female (61.2%) adolescents, walking was the most performed physical activity during Thursday. But 24.1% of the female engaged in volleyball, while 18.1% of the male adolescents performed basketball. Less so, 16.3% of the males also participated in volleyball. GLM factorial ANOVA results confirmed that there were significant differences between male and female adolescents on their participation in moderate and vigorous physical activities, \( F(1) = 10.05, p = .00 \). Male tended to participate more often in vigorous physical activities than females. Regarding the recommendations for physical activity for adolescents, 38.3% and 36.7% of the males and females respectively engaged in 60 minutes or more on physical activities (Figure 4.68). In fact, more female (695) than male (55%) adolescents participated in personal physical activities, but more male (23.3%) than female (16.7%) adolescents engaged in physical activities during the physical education classes. As well, 20.8% of the males did participate in organized sports, while 14.3% of the females did so (Figures 4.69 and 4.70).

Among the secondary school adolescents, the results of the adolescents from middle school showed that 82.5% engaged in moderate physical activities, while 14.6% participated in vigorous physical activities (Figures 4.72 and 4.73). The results of the adolescents from high school confirmed that 73% and 17% engaged in moderate and vigorous physical activities respectively. Walking was the activity most performed by both the middle (52.9%) and high (49.2%) school adolescents. However, for the middle school adolescents, 23.8% participated in volleyball, almost 10% (13.6%) of the adolescents from the high schools engaged in the same activity. A higher percentage of adolescents from the high school
(47.1%) than middle schools (33.2%) met the physical activity recommendations for adolescents (i.e., 60 minutes or more) (Figure 4.74). Among adolescents from the middle schools, 68.3% participated in personal physical activities, but only 14.5% engaged in organized sports. However, 17.2% of them performed physical activities in their physical education classes. For high school adolescents, 53.8% engaged in personal physical activities and 21.5% participated in physical activities during physical education classes (Figures 4.75 and 4.76). Moreover, 23.7% of them participated in organized sports.

For this Thursday, the data was also analyzed by regions, which showed that the Metropolitan region had the highest percentage (97%) of the adolescents participating in moderate physical activities (Figure 4.78). However, 89.3% and 83.3% of the adolescents from the Northeast and the South Central regions respectively engaged in moderate physical activities as well. In terms of vigorous physical activity, 26.8% and 18.4% of the adolescents from the North and Southeast regions engaged in these activities that were classified as vigorous (Figure 4.78). GLM factorial ANOVA results confirmed that there were significant differences between adolescents from different regions on their participation in moderate and vigorous physical activities, $F(6) = 2.74, p = .01$. Adolescents from the Southeast more so than adolescents from the Southwest and Metropolitan regions participated in vigorous physical activities. However, 50% or more of the adolescents from the North (51.2%) and the South Central (50%) regions participated in physical activities for 60 minutes or more on Thursday (Figure 4.79). The Northwest region reported the lowest percentage (25.5%) of adolescents meeting the physical activity recommendations. However, the adolescents from the Northwest reported the highest percentage (76.5%) participating in personal physical activities. Also 63% of the adolescents from the South Central and the Southeast regions participated in personal physical activities (Figure 4.80). But, 45.5% of the adolescents from
the Northeast region participated in physical activities while taking physical education classes. The results also showed that 42.9% of the adolescents from the Metropolitan region participated in physical activities during physical education classes, but 37.5% from the North region engaged in organized sports (Figures 4.81 and 4.82).

Second Physical Activity for Thursday

For the second physical activities reported by the adolescents on Thursday, only 26.3% of the total population engaged in a second activity. However, among those who participated, 56% performed moderate physical activities, while 35.6% of them engaged in vigorous physical activities. Volleyball was the second activity most practiced on Thursday. In fact, 41% engaged in this type of physical activity. Basketball resulted to be the second activity in which 17% of them engaged. Only 26% of the total sample engaged in 60 minutes or more on physical activity. Moreover, 58.5% participated in personal physical activity, but 23% participated in physical activity during their physical education classes. Merely, 18.6% of the adolescents participated in organized sports.

The data by gender showed that 68.4% of the female adolescents participated in moderate physical activities, while only, 21.5% engaged in vigorous physical activities. Among the male population, 44.8% performed moderate physical activities and 48.3% engaged in vigorous physical activities. While volleyball was the activity most practiced by females (55.7%), basketball was the physical activity most practiced by the male adolescents (28.7%). In terms of minutes of physical activity, only 27.9% and 24.1% of the males and females respectively engaged in 60 minutes or more on physical activities. For the female adolescents, 70% participate in personal physical activities, while only 14% performed physical activities during the physical education classes. The male data showed that 47.5%
and 31.1% engaged in personal physical activities and in physical activities during the physical education classes respectively. Only 15.8% of the females and 21.3% of the males did participate in organized sports.

Among the secondary school adolescents, 61% of the adolescents from the middle school engaged in moderate physical activities, while less than half (46.7%) of the adolescents from the high schools did so. In terms of vigorous physical activity, 42.2% and 31.3% of the high and middle school adolescents engaged in physical activities classified as vigorous. For both middle (46.1%) and high (28.9%) school adolescents, volleyball was the second physical activity most practiced during Thursday. However, only 25.2% and 27.3% of the adolescents from the middle and high schools respectively engaged in 60 minutes or more on physical activities. Moreover, a higher percentage of middle (63.3%) and high (48.6%) school adolescents participated in personal physical activities, while almost one quarter (24.1%) of the middle school adolescents participated in physical activities as part of their physical education classes. However, 34.3% of the high school adolescents participated in organized sports.

The North region of Puerto Rico had the highest percentage (71.5%) of adolescents who engaged in moderate physical activity when performing a second physical activity on Thursday. In addition, 59.1% of the adolescents from the Metropolitan region engaged in moderate physical activities as well. But, 52.3% and 50% of the adolescents from the Northeast and South Central regions respectively engaged in vigorous physical activities. Volleyball was the physical activity most practiced (59.1%) by the adolescents in the Metropolitan region, but baseball was highly practiced (43%) by the adolescents from the North region. In addition, 33.3% of the adolescents from the Northeast region engaged in basketball. The data from the North region showed that 43% of their participants engaged in
60 minutes or more on physical activities, while 40% of the adolescents from the Southeast region did so as well. However, only 10% of the adolescents from the Northeast region spent the same amount of minutes on physical activities. In fact, 75% and 74.1% of the adolescents from the Southeast and Northwest regions respectively participated in personal physical activities, while 66.7% of the adolescents from the North region participated in physical activities during their physical education classes. Moreover, 33.3% of the adolescents from the South Central and North regions participated in organized sports.

**Friday**

During the previous Friday of the data collection, 51.4% of the adolescents reported that they were physically active, while 48.1% performed physical activities. Among those adolescents who performed physical activities, 76.6% engaged in moderate physical activities, but 16% participated in vigorous physical activities (Figure 4.63). Walking (53%), volleyball (15.7%), and basketball (10.5%) were the physical activities commonly practiced by the adolescents on Friday. Moreover, 33.6% of the adolescents from Puerto Rico spent 60 minutes or more on physical activities, while another 31.2% of them spent between 30 and 59 minutes (Figure 4.64). However, most of the adolescents (68.5%) participated in physical activities for personal purposes. Another 17.4% of them participated in physical activities during their physical education class, while 14.1% engaged in organized sports (Figure 4.65). The data showed that 83.7% and 68.8% of the female and male adolescents engaged in moderate physical activities. Yet only, 25.4% of the males participated in vigorous physical activities, while only 7.5% of the females did so (Figure 4.67). For both female and male adolescents, walking was the most practiced activity on Friday. In fact, 63.2% and 41.6% of the females and males respectively engaged in this type of physical activity. However, 19.5%
of the males participated in basketball, while 17% of the female engaged in volleyball. GLM factorial ANOVA results confirmed that there were significant differences between male and female adolescents on their participation in moderate and vigorous physical activities, $F(1) = 6.71, p = .01$. Male tended to participate more often in vigorous physical activities than females. In terms of minutes spent in physical activities, 32.1% and 35.3% of the female and male adolescents respectively participated in physical activities for 60 minutes or more (Figure 4.68). Moreover, more female (74.8%) than male (61.4%) adolescents participated in personal physical activities. But, 13.4% of the females engaged in physical activities during their physical education classes, and 11.8% as part of organized sports (Figures 4.69 and 4.70). Among the male population, 16.7% participated in organized sports and 22% engaged in physical activities during their physical education classes.

Among adolescents from the middle schools, 79.6% of the adolescents engaged in moderate physical activities, while 16.4% of them participated in vigorous physical activities. Only 16.9% of the adolescents from the high schools engaged in vigorous physical activities, but 69% participated in moderate physical activities (Figures 4.72 and 4.73). In fact, 53.7% and 51.3% of the middle and high school adolescents respectively participated in walking activities. However, 19% of the adolescents from the middle schools participated in volleyball, while 11.5% from the high schools engaged in basketball. A higher percentage of high (41.1%) than middle (30.3%) school adolescents participated in 60 minutes or more on physical activities on Friday (Figure 4.74). Mostly, the adolescents from the middle and high schools participated in physical activities for personal purposes. In fact, 71.5% and 64% of the middle and high school adolescents respectively engaged in personal physical activities. Moreover, 20.2% of the adolescents from the high schools participated in physical activities as part of the physical education classes, while 15.7% engaged in organized sports (Figure 160.
Among middle school adolescents, 13.9% of them participated in organized sports and 14.6% performed physical activities in the physical education classes.

When data were analyzed across regions, the results showed that 82% of the adolescents from the Northeast and South Central regions engaged in moderate physical activities, but 93.3% from the Metropolitan region did participate in moderate physical activity as well (Figure 4.77). Less so, 30.7% of the adolescents from the North region participated in vigorous physical activities. As well, 18.2% of the adolescents from the South Central region engaged in vigorous physical activities (Figure 4.78). Walking was the physical activity most practiced across the regions, but the Southeast (56.7%) and Southwest (57.7%) regions reported the highest percentage of adolescents participating in this type of activity. But 36.7% of the adolescents from the Metropolitan region engaged in volleyball, while 20.5% from the North region participated in basketball. Among adolescents from the Northeast region, 14.3% participated in physical activities that involved weight training. The South Central region was the only region in which more than half (54.5%) of the participants did engage in 60 minutes or more on physical activity on Friday (Figure 4.79). However, 41% of the adolescents from the North region engaged in 60 minutes or more on physical activity as well. The data showed that 70% or more of the participants from the Northwest (78.8%), South Central (70%), and Southeast (76%) participated in personal physical activities. Moreover, 47.6% and 40% of the adolescents from the Northeast and Metropolitan regions respectively participated in physical activity during their physical education classes. Among participants from the North region, 37.5% of them did engage in organized sports (Figures 4.80, 4.81, and 4.82).
Second Physical Activity for Friday

For the second activity performed on Friday, only 25.5% of the participants engaged in an additional activity during Friday. Among those who participated, 53.4% engaged in moderate physical activities, while 35.4% performed vigorous physical activities. Volleyball (38.5%) and basketball (17.4%) were the second physical activities most practiced on Friday. Some 24.8% of the adolescents engaged in 60 minutes or more on physical activities. In fact, 64% of them participated in personal physical activities, but 21% participated in physical activity during their physical education classes. However, 14.4% of them engaged in physical activity as part of the participation in organized sports.

Among female adolescents, 61.6% and 19.2% of them participated in moderate and vigorous physical activities respectively. The data on male adolescents, regarding the participation in a second physical activity, showed that 45.7% engaged in moderate physical activity. Moreover, 50% of them participated in vigorous physical activities on Friday. Specifically, 50% of the females engaged in volleyball, but 30% of the male adolescents participated in basketball. In terms of minutes spent in physical activity, 26.2% of the males and 23.4% of the females spent 60 minutes or more on a second physical activity during Friday. In fact more than half of the females (68.5%) and males (59.6%) engaged in personal physical activities. However, 29.8% of the male adolescents participated in physical activities during physical education and 18.5% of the females engaged in organized sports.

When the data was analyzed by educational level, 61.5% of the adolescents from the middle schools performed moderate physical activities, but 32% from the high schools participated in activities of the same intensity. However, 50% of the adolescents from the high schools engaged in vigorous physical activities compared to 30% from the middle schools. Among adolescents from the middle schools, 44.6% participated in volleyball, while
22.7% of the adolescents from the high schools engaged in basketball. Moreover, only 28.2% and 16.7% of the adolescents from the middle and high schools respectively engaged in 60 minutes or more while performing a second physical activity. In fact, most of the adolescents from both the middle (67.1%) and high (61.3%) schools participated in personal physical activities. However, 19.4% of the adolescents from the high schools participated in physical activity as members of organized sports. In addition, 21.1% of the adolescents from the middle school and 19.4% from high schools engaged in physical activities during physical education classes.

The data from different regions in Puerto Rico regarding the participation in a second activity showed that 66.7% of the adolescents from the North and South Central regions engaged in moderate physical activities. However, 57.1% and 40.7% of the adolescents from the Northeast and Southeast regions participated in vigorous physical activity. Approximately, 40% of the adolescents from the Northwest and North regions participated in a second physical activity for at least 60 minutes or more on Friday. Less so, only 5.3% of the adolescents from the Northeast met the physical activity recommendations for adolescents. For the second physical activity performed on Friday, 50% participated in physical activity as part of organized sports, while 75% of the adolescents from the North region engaged in physical activity during their physical education classes. Furthermore, 87% of the adolescents from the Southeast region engaged in personal physical activities.

Saturday

The Saturday previous to the data collection, almost 50% (49%) of the adolescents reported they engaged in physical activities (Figure 4.62). Specifically, 74.3% of them did participate in moderate physical activities, while 20% performed vigorous physical activities.
In fact, 53.7% of the adolescents engaged in walking activities during Saturday. However, 13% and 11% of them engaged in basketball and volleyball respectively on the Saturday prior to the data collection. Regarding the minutes spent on physical activities, approximately 39% (38.7%) of the adolescents who were physically active spent 60 minutes or more performing those activities (Figure 4.64). The physical activity recommendations of 60 minutes or more of physical activity were not met by 61% of the participants. For most of the adolescents (75.3%), personal purposes were the primary reason for performing physical activities. However, 14% of the adolescents participated in physical activities during organized sports, and 10.3% participated as part of their physical education classes (Figure 4.65).

Among female adolescents, 83.3% of them engaged in moderate physical activities, while only 11.5% participated in vigorous physical activities. However, 65.1% of the male adolescents reported that they participated in moderate physical activities, but another 30.3% asserted that they engaged in vigorous physical activities (Figure 4.67). Primarily, female (63.9%) and male (43%) adolescents participated in walking activities. But, while 15.5% of the females participated in volleyball, 22% of the males engaged in basketball. GLM factorial ANOVA results confirmed that there were significant differences between male and female adolescents on their participation in moderate and vigorous physical activities, $F(1) = 4.56, p = .03$. Males tended to participate more often in vigorous physical activities than females. Almost half (46.4%) of the male adolescents reported that they engaged in 60 minutes or more on physical activities (Figure 4.68). Less so, 31.4% of the female reported they spent the same amount of time on physical activities. GLM factorial ANOVA results confirmed that there were significant differences between male and female adolescents on the amount of minutes they engaged in physical activities, $F(1) = 6.31, p = .01$. Male adolescents tended to
spend more time in physical activities compared to females. In fact, most of the males (70%) and females (80.4%) engaged in personal physical activities, but only 10.7% of the females participated in physical activities related to organized sports. However, a higher percentage (16.4%) of male adolescents participated in physical activities as part of organized sports (Figures 4.69 and 4.70). Less numbers of females (8%) and males (12.7%) engaged in physical activities as part of their physical education classes.

Regarding the level of education, 74% of both middle and high school adolescents engaged in moderate physical activities (Figure 4.72). However, more middle (22%) than high (19%) school adolescents engaged in vigorous physical activities (Figure 4.73). In terms of the mode of physical activities, more than half of the middle (54.7%) and high (52.6%) school adolescents engaged in walking activities. However, only 12.4% of the adolescents from the middle schools participated in volleyball, while 13.7% of the high school adolescents participated in basketball. A higher percentage of high school (48.4%) adolescents spent 60 minutes or more on physical activities (Figure 4.74). Less so, 34.2% of the middle school adolescents participated for 60 minutes or more on physical activities. In fact, most of the adolescents from both the middle (78.6%) and high (68.6%) schools engaged in personal physical activities. Regarding the participation in physical activities as part of organized sports, 17.1% and 13.1% of the adolescents from the middle and high schools respectively participated in this type of physical activities. Moreover, 13% of the adolescents from the high schools and 8.3% of the adolescents from the middle schools engaged in physical activities as part of their physical education classes (Figures 4.75 and 4.76).

In terms of the physical activity behavior patterns of adolescents from different regions, the Northwest and the South Central regions showed the highest percentage of adolescents
engaging in moderate physical activities. Among adolescents from the South Central region, 87.5% participated in moderate physical activities, while 82% from the Northwest region reported participation on the same intensity of physical activities (Figure 4.78). Less so, 68% of the adolescents from the Southeast region participated in moderate physical activities. Moreover, 31.7% and 22.5% of the adolescents from the North and the Metropolitan regions respectively participated in vigorous physical activities. For all the regions, walking was the activity most performed on Saturday. For instance, 75% of the adolescents from the South Central and 60% from the Northwest and Southwest regions engaged in walking activities. Among adolescents from the Metropolitan region, 19.4% participated in volleyball, while 23.1% of the participants from the Northeast reported they engaged in basketball. Moreover, running was performed by 18% of the adolescents from the Southwest region. The South Central region showed to have the highest percentage (62.5%) of the adolescents performed 60 minutes or more of physical activities. In addition, 43% and 42.3% of the adolescents from the Southeast and the Northeast regions engaged in 60 minutes or more on physical activities. However, only 25% of the adolescents from the Northwest region participated for the same amount of minutes on physical activities (Figure 4.79). For the North region, one third of the adolescents reported they performed physical activities as part of organized sports. However, 29% of the adolescents from the Northeast region engaged in physical activity as part of their physical education classes, but 85.7% and 94% of the participants from the South Central and the Northwest regions engaged in personal physical activities.
Second Physical Activity for Saturday

For a second activity reported on Sunday by the adolescents, almost one quarter (24.5%) of them engaged in a second physical activity. Specifically, among those who participated in physical activities, 42% engaged in moderate physical activity. However, 43.2% of the adolescents engaged in vigorous physical activities. The adolescents reported that they engaged in volleyball (33%), aquatic sports (17.4%), and basketball (16.1%). Among those adolescents physically active on more than one activity during Saturday, only 25% performed another activity for 60 minutes or more. Two thirds of the adolescents engaged in personal physical activities. But 21.1% participated in physical activities as part of their physical education classes and 11.4% participated in organized sports.

Between male and female adolescents, the results showed that 33% and 42.1% of the male and female adolescents respectively engaged in moderate physical activities during a second physical activity performed on Saturday. However, more than half of the male (56.6%) and 40% of the female engaged in vigorous physical activities. While 29% of the males engaged in basketball, 41% of the females participated in volleyball. In fact, 24.4% of the females engaged in aquatic sports, but also 25% of the males performed volleyball. However, only 20% of the females engaged for 60 minutes or more on physical activities. Among males, 31.6% of them reported they engaged in 60 minutes or more on physical activities. More than half of the males (58.5%) engaged in physical activities for personal purposes. However, more than three quarter (76.7%) of the females performed personal physical activities. More male (26.4%) than female (16.7%) adolescents participated in physical education as part of their physical education classes. Only 15.1% of the male and 6.7% of the female participated in organized sports.
The results of the middle and high schools demonstrated that 48.7% of the middle school adolescents engaged in moderate physical activities, but 36.3% of them participated in vigorous physical activities. Less so, 21.6% of the adolescents from high school participated in moderate physical activities. However, 62.2% of them performed vigorous physical activities. More than one third of the middle school adolescents engaged in volleyball, while 24.3% of the adolescents from the high schools participated in basketball. In terms of minutes spent on physical activities, more than one quarter of both middle (26.5%) and almost one quarter (24.3%) of the high school adolescents participated for 60 minutes or more on a second physical activity on Saturday. In fact, most of the adolescents from the middle (68%) and high (69.2%) schools participated in personal physical activities. Similar percentage of adolescents from the middle (20.2%) and high (19.2%) schools participated in physical activities related to physical education classes. Less so, 12% of the adolescents from both the middle and high schools participated in organized sports.

Across regions, the Metropolitan region had the highest percentage (54.5%) of the adolescents engaged in moderate physical activities. However, 50% of the adolescents from the Southwest region reported that they engage in moderate physical activities. In terms of vigorous physical activity, the data from different regions showed that 58% of the adolescents engaged in vigorous physical activities. In addition, 48.35 and 40% of the adolescents from the Northwest and Northeast regions respectively engaged in vigorous physical activities. The analysis of the data also showed that 66.7% of the adolescents from the South Central region spent 60 minutes or more on physical activities. Less so, 30% of the adolescents from the North region engaged in 60 minutes or more on physical activities as well. Only, 18.2% of the students from the Metropolitan region engaged in the same amount of minutes on physical activities when performing a second activity during Saturday.
Most of the adolescents from the Southeast (89%) and the Northwest (79.3%) regions reported that they engaged in personal physical activities. Moreover, 50% of the adolescents from the South Central and the North regions reported they participate in physical activities as part of their physical education classes. As well, 50% of the adolescents from the South Central engaged in organized sports.

*Body Composition*

Body composition indices of adolescents in Puerto Rico included body weight and height, body mass index (BMI), and the BMI categories. In all, the mean ($M$) and the standard deviation ($SD$) for the adolescents’ body weight was $59\text{kg} \pm 16.22\text{kg}$. Analyzing body weight by gender, the mean of the females body weight was $57.2 \text{kg}$ ($SD = \pm 15.15\text{kg}$), while the mean of the males body weight was $61.12\text{kg}$ ($SD = \pm 17.18\text{kg}$) (Figure 4.83). GLM factorial ANOVA results showed that body weight was significantly different between male and female adolescents, $F (1) = 16.31, p = .00$. Male adolescents tended to have higher body weights than female adolescents.

![Figure 4.83. Distribution of body weight (kg) by gender.](image)
The data analysis showed that high school adolescents tended to have higher body weights than middle school students. The average of high school adolescents was 64.7kg ($SD=±16.47kg$), while the mean of body weight among middle school adolescents was 54.7kg ($SD = ± 14.62kg$) (Figure 4.84). GLM factorial ANOVA results showed that body weight was significantly different between middle and high school adolescents, $F (1) = 8.26$, $p = .00$. High school adolescents tended to have higher body weight totals compared to middle school adolescents.

![Bar chart showing body weight distribution by school level](image)

Figure 4.84. Distribution of body weight (kg) by school level

The analysis of body weight per region showed that the SouthCentral and Northeastreregions of Puerto Rico had the highest mean of body weight totals across Puerto Rico (Figure 4.85). The SouthCentral region had a body weight mean of 67.58 kg ($SD=±15.7kg$) and the body weight mean of the adolescents in the Northeast was 65.3 kg ($SD=±15.1kg$). The North region showed the lowest body weight mean with 50.45 kg ($SD=±15.47kg$). The other seven
regions reported a mean of body weight between 55.8kg and 61.2 kg. GLM factorial ANOVA results showed that body weight was significantly different between participants from several regions in Puerto Rico, $F(6)=2.89, p=.01$. The participants from the North region tended to have lower body weight than participants from other regions, except for those in the Northwest region.

![Figure 4.85. Distribution of body weight (kg) by regions.](image)

The adolescents’ height was measured using a stadiometer on meters. The height mean of adolescents was 1.6m ($SD=\pm.98m$). Data analysis revealed that the height average for the male adolescents was 1.63m ($SD=\pm.11m$), while the height average of female adolescents was 1.58m ($SD=\pm.077m$) (Figure 4.86). GLM factorial ANOVA showed that there were significant differences between male and female adolescents living in Puerto Rico, $F(1)=35.77, p=0.00$. Male adolescents tend to be taller than female adolescents.
The height average of middle school adolescents was 1.57 meters ($SD=0.09m$), while high school adolescents’ height average was 1.64 meters ($SD=.089$) (Figure 4.87). GLM factorial ANOVA confirmed that there were significant differences between adolescents from middle and high schools living in Puerto Rico, $F(1)=73.82, p=0.00$. High school adolescents tended to be taller than middle school students.
When height was compared across different regions, the adolescents from SouthCentral (1.66m, $SD=\pm.089$) and Northeast (1.66m, $SD=\pm.093$) regions were typically taller than adolescents the other six regions (Figure 4.88). The results also showed that the North region of Puerto Rico had the lowest average (1.53m, $SD=\pm1.08$) for height. GLM factorial ANOVA showed that there were significant differences among adolescents from the different regions, $F(6)=16.49, p=.00$. The participants from the North region tended to be shorter than participants from the other regions.

![Figure 4.88. Distribution of body height (kg) by regions.](image)

In general, the mean of the BMI among adolescents living in Puerto Rico was 22.75kg/m$^2$ ($SD=5.6$kg/m$^2$). As shown in Figure 4.89, the BMI average of male adolescents in Puerto Rico was 22.9kg/m$^2$ ($SD=5.3$kg/m$^2$), while for female adolescents it was 22.6kg/m$^2$($SD=5.8$kg/m$^2$). GLM factorial ANOVA showed that there were no significant differences between female and male adolescents on their BMI, $F(1) =.62, p=.43$. 

173
The BMI mean of middle school ($M = 21.77\, \text{kg/m}^2$, $SD = 4.8\, \text{kg/m}^2$) adolescents was less than that of high school students ($M = 23.92\, \text{kg/m}^2$, $SD = 6.0\, \text{kg/m}^2$) (Figure 4.90). GLM factorial ANOVA indicated that there were no significant differences among adolescents from middle and high schools on their BMI, $F(1) = 2.44, p = .12$.

The BMI data by regions (Figure 4.91) showed that adolescents from the South Central had the highest BMI average ($24.5\, \text{kg/m}^2$, $SD = 5.4$). However, the Southeast, Southwest, and
Metropolitan regions had a BMI average of 23 kg/m\(^2\). The lowest BMI average (21.3 kg/m\(^2\)) was found on the North region. GLM factorial ANOVA indicated that there were no significant differences between adolescents from different regions on their BMI, \( F(6) = .92, p = .48 \).

Figure 4.91. Distribution of BMI (kg/m\(^2\)) by regions.

The categories used to determine the BMI classification among adolescents were: (a) underweight, (b) normal weight, (c) at risk of overweight, and (d) overweight. In all, 57% of the adolescents were classified at normal weight (Figure 4.92). Only 1.9% of the adolescents in Puerto Rico were underweight. However, 41% of the adolescents were either at risk of overweight or overweight. Specifically 18.3% of them were at risk of overweight, while 22.6% were overweight.
Between male and female adolescents, the data analysis revealed that 58.5% and 55.6% of the female and male adolescents had a normal weight (Figure 4.93). However, more males (2.4%) than females (1.5%) were underweight. In terms of at risk of overweight, 20.7% of the female and 15.6% of the male adolescents belong to this BMI category. Moreover, 26.4% of the males were classified as overweight, while 19.2% of the female were overweight as well. GLM factorial ANOVA indicated that there were no significant differences between males and females on their BMI classifications, $F(1) = 1.52, p = .22$. 

Figure 4.92. Distribution of BMI categories among adolescents in Puerto Rico.

Figure 4.93. Distribution of BMI categories by gender.
The data of the adolescents from the middle schools showed that 2.3% and 58.2% of them were underweight and at normal weight, respectively. Moreover, only 1.6% of the adolescents from the high schools were underweight and 57.2% were at normal weight. However, 17.6% of the middle school and 19.4% of the high school adolescents were at risk of overweight (Figure 4.94). But, 23% and 21% of the middle and high school adolescents respectively were overweight. GLM factorial ANOVA indicated that there were no significant differences between middle and high school adolescents on their BMI classifications, $F(1) = .00, p = .95$.

![Distribution of BMI categories by educational level.](image)

Figure 4.94: Distribution of BMI categories by educational level.

Among adolescents from different regions in Puerto Rico, 3% of the adolescents from the North and the South Central regions were classified as underweight, but 60.5% and 59.1% of the adolescents from the Northeast and Southeast respectively were classified as under normal weight. In terms of at risk of overweight, 24.4% of the adolescents from the Northwest region and 27.5% from the South Central region belong to this category. Moreover, 30.1% of the adolescents from the Southwest region were overweight. As well,
25.4% from the North region were overweight (Figure 4.95). GLM factorial ANOVA indicated that there were no significant differences between adolescents from different regions on their BMI, $F(6) = .63, p=.71$.

Figure 4.95: Distribution of BMI categories by regions.
Due to the steady ascending trend over the past 25 years or more in the prevalence of overweight and obesity, and health-related risk conditions of Puerto Rico’s residents, more research is needed in this area for this population. The purpose of this study was to determine and describe the food behavior considerations, physical activity behavior patterns, and body composition indices of adolescents in Puerto Rico. Furthermore, this study examined if there were significant differences on those variables (e.g., food behavior considerations, physical activity behavior patterns, and body composition indices) between school age males and females, and between middle and high school students. This chapter includes a discussion of the results, implications, and recommendations for future studies in this area. Lastly, the researcher articulates specific strategies recommendations to counter overweight, obesity, and health-risk behaviors of school-age adolescents in Puerto Rico. The prevalence of obesity in US is impacting the population’s health (Crespo et al., 2002; Flegal et al., 2002). For instance, obesity has been strongly associated with health-related diseases such as cardiovascular diseases, diabetes, and cancer (Garcia-Palmieri, 2004). Of serious concern, the Hispanic population is in higher risk of being overweight and overweight
compared to other ethnic groups (CDC, 2006). In short, there is a serious concern about the rates of overweight among Hispanic adolescents (Bumtje et al., 2005; Ogden et al., 2002). Clearly, dietary habits and physical activity factors are contributing to the incidence and prevalence of overweight. The food behaviors of Hispanic adolescents (Sweeney et al., 2007) and the high prevalence of sedentary lifestyles among Hispanic adolescents compared to other ethnic groups tend to increase the risk of being overweight with this particular population (USDHHS, 2003). Even though, there are strong associations between body composition indices, food behaviors, and physical activity behavior patterns, these factors have not been studied comprehensively targeting adolescents living in Puerto Rico.

Discussion

In this section, the results of the study were used to answer each research question and sub questions for each of the variables (e.g., food behavior considerations, physical activity behavior patterns, and body composition indices).

*Answers to research Question One: What were the food behavior considerations of students in Puerto Rico?*

The dietary habits of adolescents in Puerto Rico are challenging their opportunity to accomplish a healthy lifestyle. In general, the school age sampled reported a: (a) limited consumption of fruits and vegetables during a week period, (b) low consumption of fish; but (c) high sodas and sweetened drinks intake, and (d) high consumptions of fried foods and baked sweets. These food behaviors may compromise adolescents overall wellness and weight management for a healthy lifestyle.

A concern regarding the dietary habits of adolescents is the number of servings of fruits and vegetables this population consume during the course of a week. More specifically, this
population did not consume the minimum daily servings of fruits and vegetables established by the USDA (2005) to achieve a healthy diet. In fact, only a small proportion of the adolescents in Puerto Rico consume seven servings of fruits and vegetables per week, yet the USDA (2005) recommend approximately two to four servings of fruits and vegetables per day, depending on individual characteristics (USDA, 2005). The results are similar to those found with adolescents in the US regarding their food behaviors in fruit consumption. Muñoz et al. (1997) found that adolescents in the US, especially Hispanic adolescents, do not achieve the recommended servings of fruits per week. In addition, Muñoz et al. (1997) stated that the food behaviors of adolescents in the US have been affected by their low consumption of vegetables. Findings in this current study of adolescents in Puerto Rico revealed that female adolescents consume fruits and vegetables more often than male adolescents, which is consistent with other studies (Boumtje et al., 2005; Muñoz et al., 1997). However, students’ school level does not seem to influence the consumption of fruits and vegetables. It is more likely that the lack of consumption of fruits and vegetables among Puerto Rican adolescents leads to less intake of vitamins, mineral, and fiber that are essential nutrients of fruits and vegetables, especially for males who have a lower consumption of these food groups. Moreover, these less than ideal food behaviors may increase the risk of developing cardiovascular conditions, diabetes, and/or cancer and a potential change in their body composition. Boumtje et al. (2005) stated that adolescents who eat more fruits and vegetables tend to have lower BMI estimates than those who usually do not eat enough fruit on a regular basis.

In this current study, it was found that a significant proportion of adolescents consume milk. Contrary to this, other researchers have found that adolescents do not reach the recommended servings for dairy intake per day (Muñoz et al., 1997; Nielsen et al., 2002).
What is more, no significant differences between males and females or between middle and high school adolescents were found in this study. Further, Nielsen et al. (2002) found that the milk consumption among adolescents has decreased since 1977. However, in this study, the type of milk adolescents consume was not assessed, which limited the researcher’s ability to determine whether the adolescents were consuming whole, low-fat, or fat-free milk. For those adolescents consuming whole milk, there is a high risk of increasing their daily calories intake and contributing to the increased body weight. It is well known that adequate consumption of milk increases calcium intake (Townsend et al., 2003) and reduces the risk of lower bone density and some types of cancer. Consequently, it stands to reason that those adolescents who consume milk on a regular basis would be less likely to develop such health-related conditions as cardiovascular diseases, diabetes, and cancer compared to those who have a lower consumption of milk.

In this study, it was also revealed that five percent of the adolescents in Puerto Rico tend to adhere to a vegetarian diet. But, no significant differences were found between females and males, and between middle and high school adolescents in their adherence to such a diet. Research evidence suggests that adolescents who are engaged in a vegetarian diet may have healthier dietary habits than those adolescents who are meat-diet followers (Fahey et al., 2009). Specifically, Fahey et al. (2009) stated that following a vegetarian diet decrease the saturated fat intake and cholesterol, but increase the intake of some other vitamins and minerals. Although, adolescents have some benefits by following a vegetarian diet, they should include strategies to obtain other nutrients such as vitamin B-12 and D, calcium, iron, and zinc. Therefore, it is imperative to ensure the intake of other vitamins and minerals that could be missing on a regular vegetarian diet (Dunham & Kollar, 2006).
According to Townsend et al. (2003), taking the skin off cooked chicken decreases the intake of saturate fat when eating chicken. Almost all the adolescents surveyed did eat chicken on a regular basis. In this study, there were no significant differences between males and females or between middle and high school adolescents in their food behavior regarding eating chicken skinless. In fact, a low consumption of saturated fats is associated with a lower risk of cardiovascular diseases. Of importance, more than half of the adolescents surveyed were reducing their saturated fat intake by taking off the skin from their chicken. Even more, those who exhibited these food behaviors were in fact decreasing the consumption of cholesterol, which in-turn, decreases the risk of heart diseases.

In addition, the consumption of eggs is a source of fats and cholesterol and almost all of the adolescents studied in Puerto Rico eat eggs on a regular basis, but they only eat between one and two eggs per week. According to the USDA (2005), specifically, there is a high concentration of cholesterol in egg yolks. Therefore, eggs are categorized as discretionary calories and should be consumed sporadically. The current study’s results indicate that the consumption of eggs among adolescents may not be a serious concern regarding their fat intake and the potential of a high cholesterol diet. In fact, Monteiro, Mondini and Costa (2000) have stated that the number of servings of eggs per week may explain how healthy food behavior is among adolescents.

Findings in this study indicate that the food behaviors of adolescents in Puerto Rico place them at serious risk of developing health related conditions when considering the high consumption of soft and sweetened drinks. The findings revealed that almost all the adolescents consume soft drinks on a regular basis. Further, there is a risk of higher daily calories and body weight increases among adolescents due to the high number of soft drinks consumed during the week. The high consumption of regular sodas among adolescents is
increasing the added sugar and calories intake per day (Fahey et al, 2009). Harnack et al. (1999) found that older adolescents usually drink more soft drinks than younger adolescents. But, those previous findings were not supported with this study’s findings. The findings of this study demonstrated that there were no significant differences between middle and high schools adolescents in their consumption of soft drinks. In fact, most of the adolescents were exceeding the recommended calories intake per day, because one bottle of soda contains more grams of added sugar (38g or more) than the amount recommended (36g/day) by the USDA (2005). Critically, these findings doubled data on previous findings of soft drinks consumption among adolescents in US and Hispanic adolescents. As Nielsen et al. (2002) stated the high consumption of soft drinks impact the consumption of other healthier food groups such as fruits, vegetables, and milk intake. Still, this was not the case for milk consumption with adolescents studied here. The consumption of soft drinks among adolescents is strongly associated with high consumptions of daily calories and increases in body weight and BMI. Sweeney et al (2007) has identified a positive correlation between the consumption of sweetened drinks and adolescents’ BMI (CDC, 2007). Harnack, Stang, and Story (1999) said that adolescents who usually drink more than nine ounces of soft drink daily are in higher risk of being overweight.

Moreover, it was found that a high proportion of the Puerto Rican adolescents drink sweetened juices on a regular basis. The findings of this study revealed that there is a high consumption of sweetened drinks since most of the adolescents consumed sweetened juices during the previous week to the data collection. Still, these results are higher than those reported by the CDC (2007) regarding the consumption of sweetened drinks among US adolescents and they are almost reaching the percentages of Hispanic adolescents who drink sweetened drinks on a regular basis. A high consumption of sweetened drinks may impact
the consumption of fruits (Mrdjenovic & Levistky, 2003). One of the consequences of the high consumption of sweetened juices is the decrease in the vitamins, minerals, and fiber intake that can be obtain from fresh fruits and vegetables. Further, due to such food behaviors, there is a tendency to consume more calories and the daily intake of added sugar, thus adolescents in Puerto Rico increase their risk of being overweight or overweight. Likewise, Casey et al. (1997) found that the consumption of sweetened drinks may increase the risk of being overweight among adolescents.

In general, most of the adolescents studied in Puerto Rico usually eat food from restaurants. Additionally, more than one quarter of the adolescents eat food from restaurants at least three times or more during the week. Previous studies on adolescents reported that eating at restaurants can increase the risk of being overweight and is a serious concern for adolescents’ health (Jeffery & Simone, 1998). What is more, there is a high potential to increase saturated fat, Trans fat, cholesterol, and added sugar intake when eating food from restaurants (Fahey, 2009). Consequently, eating food at restaurants would increase adolescents’ daily calories intake and the risk of being overweight. Moreover, the adolescents studied reported a high consumption of fried food, which is a food behavior that is highly correlated with high levels of cholesterol and trans fats. More than one third of the adolescents in Puerto Rico eat fried food at least one or more times per week and at least one quarter of the adolescents eat baked sweets such as cakes, donuts, pies, and cookies at least five or more times per week. These are foods that comprise the daily calories intake and it has been found by Wang et al. (2007) that high consumption of fried food increases the risk of cardiovascular diseases such as arteriosclerosis. It is a concern that, due to such food behaviors as eating at restaurants, high consumptions of fried foods, and baked sweets, a high proportion of adolescents in Puerto Rico were exposing themselves to high saturated
fat, cholesterol, added sugar, and Trans fats which are found in these types of foods (Thomas & Kotechi, 2007).

Reading the nutritional facts labeled on the products can help adolescents to choose healthier foods. But, a very low proportion of the adolescents studied always read the nutritional facts. As a consequence, adolescents in Puerto Rico may not be aware of the amount of calories, servings sizes, saturated fats, Trans fats, cholesterol, vitamin, and mineral they are consuming with each serving. Increasing their knowledge and understanding of the nutritional facts will assist adolescents in making better decisions regarding the serving sizes and how much calories and nutrients they would be getting from a particular product. In previous research, it has been demonstrated that people who read the nutritional facts tend to make healthy choices than those who do not read the nutritional facts (Blitstein & Evans, 2006).

In the case of the Puerto Rican adolescents, most do not run out of food but two thirds of the adolescents do worry that their families would run out of food. The middle school adolescents tend to run out of food more often than adolescents from the high schools. According to Casey et al. (2006), adolescents who exhibit food insecurity tend to eat a particular type of food and also are inclined to eat more calories during the day. Thus, those adolescents who worry about running out of food may not be eating healthier foods, which challenge the opportunity to accomplish healthy lifestyles. Specifically, Townsend et al. (2003) found an association between the degree of food insecurity and the servings of fruits and fat consumption among adolescents. Those adolescents who exhibit higher food insecurity have reported fewer servings of fruits during a week period. Moreover, there is a higher risk of being overweight when there is food insecurity among adolescents (Adams et al., 2003; Casey, 2006; Dietz, 1995).
Recently, studies in the area of food behaviors have demonstrated that there may be a positive correlation between food insecurity. Specifically, those adolescents who are at risk of being overweight or are overweight tend to be much worry about running out of food than those who exhibit a normal body weight. Among adolescents in Puerto Rico, there were significant differences between middle and school adolescents. The findings revealed that adolescents form high school were much worry about running out of food than adolescents from middle school. In the US, the food insecurity has also been correlated with socioeconomic status of the adolescents. In fact, adolescents from low socioeconomic status tend to be much worry about this particular issue than adolescents from other socioeconomic status. However, there is not sufficient evidence to establish a particular correlation between food insecurity and body composition and/or socioeconomic status on adolescents in Puerto Rico. More research need to be done in this area to determine whether or not those adolescents who show food insecurity tend to have higher body weight or are from a particular socioeconomic status.

Researchers have found that adolescents who perceive their food behaviors as healthy tend to have higher consumptions of fruits and vitamin C (Townsend et al, 2003). Among the adolescents studied in this investigation, more than half of them reported that their food behaviors were either good or very good. It seems that even thought there was a high consumption of unhealthy foods such as fried foods, soft drinks, and baked sweets, the adolescents did not perceive these food behaviors as threats to their health. However, there was a significant different between the middle and high school adolescents. Findings of this study showed that high school adolescents were more inclined to perceive a less healthy eating habit than those at the middle schools. It gives the impression that the high school adolescents were more aware and knowledgeable about the quality of the food they ate on a
regular basis than the middle school adolescents. As a consequence, the middle school adolescents confront challenges to achieve healthier food choices. But, no significant differences were found between female and male adolescents regarding the perceptions of their diet quality.

Answers to research Question Two: What were the physical activity behavior patterns of middle and high school students in Puerto Rico?

Regarding physical activity behavior patterns, it is well known that physical activity plays a significant role in adolescents’ body weight and health related conditions (Bijnen et al., 1994; Crespo et al., 2002; Fletcher et al., 1996). In the US, Hispanic adolescents tend to have lower physical activity behaviors than adolescents of other ethnic groups (CDC, 2005b). Related to this, the CDC (2005b) reported that the prevalence of sedentary lifestyles has increased in Puerto Rico. In this current study, it was found that more than half of the adolescents in Puerto Rico engage in some sort of physical activity during the course of a week. Still, the physical activity levels of adolescents in Puerto Rico are lower compared to adolescents in the US where almost three quarters of them engage in physical activities on a regular basis (CDC, 2005a). It was also found that the physical activity behavior patterns of the adolescents in Puerto Rico decrease from Sunday to Saturday. Thus, it appears that adolescents in Puerto Rico are in high risk of developing health-related conditions and being overweight when their low participation level in physical activity is taken into count. The low proportion of adolescents engaging in physical activities on a regular basis reduce the opportunity to prevent or decrease high blood pressure, heart diseases, type 2 diabetes, and cancer. Also, the lack of physical activity among these adolescents has some implications in terms of emotional wellness as stated by Buckworth and Dishman (2002). Specifically these
adolescents are missing opportunities from physical activities to receive psychological and emotional benefits such as higher levels of self-confidence, self-image, and self-esteem, which would improve their total wellness and healthy lifestyles.

One of the characteristics (i.e., intrapersonal factor) of the adolescents’ behavior is the significant proportion of them who were not reaching the recommend amount of minutes for physical activity established in the Healthy People 2010 (USDHH, 2000). The Healthy People 2010 (USDHH, 200) establishes that adolescents should engage in 60 minutes or more of physical activity most days of the week. In this study, it was determined that even when the adolescents were participating in physical activities, most of them were not reaching at least 60 minutes in duration. Therefore, those physical, emotional, and intellectual benefits that can be obtained from physical activities may be reduced because of the limited amount of time adolescents spend physical activities. Of note, health can be improved by increasing the total minutes adolescents usually engage in physical activities. This study’s findings showed that male adolescents tend to be physically active more often than females. Compared to US adolescents, similar low proportions of male and female Puerto Rican adolescents reach the recommended physical activity guidelines of 60 minutes or more. However, the proportion of adolescents living in Puerto Rico who meet the recommend minutes of physical activity is higher than those percentages reported on Hispanic adolescents living in US (CDC, 2007). It appears that adolescents living in Puerto Rico are similarly physically active compared to non-Hispanic adolescents in US, but more physically active than Hispanic adolescents. It was also found that the physical activities of adolescents in Puerto Rico were performed mostly for personal purposes rather than as part of organized sports and/or physical education classes. The school settings (e.g., physical education classes) contributed little to the physical activity engagement of adolescents. This
finding suggests that either adolescents are not enrolled in physical education classes in significant numbers or more plausibly they do not perceive that they are physically active during the physical education classes. Therefore, physical education teachers should ensure that adolescents are getting a significant amount of physical activity during classes and that they are aware of their level of engagement and the importance of physical activity participation. Most the adolescents who participated in physical activities were driven by personal purposes to participate in such activities. It appears that these adolescents are taking responsibility in regard to their physical activity behavior patterns by engaging in physical activities on their own rather than from engagement in organized sports. These results must imply that public and private agencies should ensure that participation in physical activity must be based on their preferences, safe, and motivating, but in fact more work is needed to increase the number of adolescents who engage in physical activities in organized sports and physical education classes. For some adolescents, the motivation to participate in physical activities may come from the interactions they have with others and/or leaderships someone else rather than in their own accord. Therefore, there should be more non-competitive organized physical activities with others that increase the support to adolescents to become more physically active.

In terms of gender and physical activity, this study’s findings support by what is wellknown and that is there are differences in physical activity behavior patterns between male and female adolescents (CDC, 2005). The male adolescents from Puerto Rico were physically active more often than their female peers. Moreover, males engaged more often in vigorous physical activities, while females tended to engage more often in moderate physical activities compared to one another. Among adolescents from the middle and high schools, the findings are comparable to those reported on US and Hispanic adolescents
The physical activity levels were lower on high school adolescents than adolescents from the middle schools. These results imply that female and high school adolescents may be less likely to achieve those benefits obtained when adolescents are physically active more often. There is a need to increase the opportunities to female high school adolescents to engage in physical activities more often by developing programs and a diversity of alternatives that motivate them to engage in physical activities. However, among those middle and high school adolescents who engage in physical activities, adolescents from the high schools tend to meet the recommended minutes for physical activities more often than adolescents from the middle schools. Rather than within the physical education classes or organized sports, most of the adolescents in Puerto Rico from the middle and high schools engaged in personal physical activities. Clearly, more efforts are needed to increase the number of students enrolled in physical education classes who are physically active from the middle and high schools during their physical education classes.

**Answers to Research Question Three: What were the body composition indices of middle and high school students in Puerto Rico?**

The prevalence of overweight among adolescents in the US has reached alarming levels and has led some government agencies to develop strategies and programs to fight this threaten health-related trend. Specifically, more than one third of the adolescents in Puerto Rico were either at risk of being overweight or were overweight. However, no significant differences were found between females and males, or between middle and high school adolescents on their BMI estimates which is contrary to previous study findings (Tudor-Locke, Ainsworth & Popkin, 2008), which have demonstrated significant differences on BMI estimates between male and female adolescents.
The food behavior considerations and physical activity behavior patterns of the adolescents studied here have implications for their body composition and health. The proportion of adolescents who were at risk of being overweight or were overweight imply that they were in high risk of develop health related conditions associated with being overweight. Of concern, premature death may result due to the overweight and obesity (Fahey et al., 2009). Moreover, it is more likely that those adolescents who are overweight or obese will develop health related conditions such as cardiovascular diseases, specifically blood pressure, arteriosclerosis, strokes, and heart attacks during their adolescent stage or later during their adulthood. There is a higher possibility that those adolescents who are at risk of being overweight or who are overweight become obese during their adult life stage. In addition, there is a higher risk of developing diabetes and certain types of cancer. A collective effort is need to discontinue the increasing trends of adolescents who are at risk of being overweight or are overweight. The issue is even more complicated because the proportion of adolescents who are overweight is higher than those who are at risk of being overweight.

Moreover, school setting plays an important role on adolescents’ body composition, food behavior, and physical activity behavior patterns since adolescents spend a significant amount of time at the school where breakfast, lunch, and/or snacks are available to the adolescent population. Further, the proportion of adolescents in Puerto Rico reaching the overweight category should be a serious public health concern for the government and the general population. The prevalence of overweight among adolescents in Puerto Rico also increases the medical expenditures due to others health related conditions associated with obesity.
Recommendations

The findings of this study suggest that interventions are needed to significantly reduce the proportion of adolescents in Puerto Rico who are at risk of being overweight and are overweight.

To that end, interventions developed to reduce the overweight rates of adolescents in Puerto Rico should focus on three main areas: (a) school setting, (b) family, and (c) community. At the school level there is a need to put together wellness and physical activity programs that contribute to the overall health of the adolescents. A well-developed wellness program should include modifications to physical education classes, more opportunities to become physically active outside of physical education classes, and changes in school policies that impact the eating habits of adolescents. It is imperative, due to the level of adolescents in Puerto Rico who are at risk of being overweight and those who are overweight, that mandatory enrollment in physical education classes of all students in Puerto Rico is an educational policy on requirement. According to the CDC (2005c), schools should provide quality physical education classes to adolescents from kindergarten to 12th grade in order to help combating the low physical activity levels of adolescents and the overweight rates. Physical education classes help adolescents to develop necessary physical activity skills to increase their competence and self-confidence to become more physically active.

Furthermore, the allocated time in physical activity must be increased to allow students to engage in a more comprehensive physical education class in which the physical education teachers have the opportunity to cover all the areas required to build physically educated adolescents. At the same time, the physical education teacher must develop some sort of assessment strategies that help adolescents to monitor and receive feedback on their physical activity progress.
However, these recommendations for the school setting have implications for the school community, in-service teachers, and physical education teacher preparation programs must consider. The school community must provide allocated time to allow students to fully participate in such wellness/physical activity programs. Particularly, after school or before school programs can be designed in coordination with most teachers and parent to guarantee the success of the programs and the safety of the participants. In addition, professional development in the area of physical activity and wellness program development courses may be needed for in-services teachers. Those professional development courses can be focused on physical activity assessment, increasing physical activity levels in physical educations, and the use of theoretical frameworks to develop wellness/physical activity interventions. For physical education teacher preparation programs, more emphasis on physical activity components is needed to bring pre-service teachers the adequate training that allow them to develop their future physical education classes with higher level of physical activity for their students. Specifically, pre-service teachers should learn how to manage their allocate time that would results in greater amount of minutes being physically active rather than in transition and behavior management aspects. Because several physical education teacher preparation programs are sport-oriented, pre-service teachers should be able to develop activities that may be sport-related that can increase the physical activity level of adolescents during their physical education classes.

Although physical education is a main component to encourage a healthy lifestyle, schools need to developed wellness interventions that increase the knowledge and the physical activity levels of adolescents. According to the Academy of Pediatrics (2003), cognitive approaches should be used with interventions to address the overweight prevalence. It was determined in this study that even when adolescents were not exhibiting healthy food
behaviors, they perceive that there dietary habits were good or excellent. Therefore, school wellness interventions should teach adolescents about the importance of proper serving sizes, nutritional facts of the products, and the role of the carbohydrates, fats, and proteins. Additionally, school wellness programs should incorporate elements that allow students to judge what they are eating at home, at school, and even when they eat at restaurants. This will help them to make better choices that would favorably impact their overall lifestyles. Such programs would be an excellent opportunity to engage parents into their adolescents’ lifestyles. It is imperative that parents and school personnel develop a better understanding on what constitute healthy food choices. In doing so, they can support and stimulate adolescents to pursue a healthy lifestyle through their food behaviors.

Schools also should design food environments that strength the opportunity to pursue healthy eating habits. This means that policies and regulations are needed to change what is sold in school vending machines and what is served during breakfast and lunch at the school. Vending machines should include fresh, canned, and dry fruits; some types of vegetables; and low calories and added sugar drinks. Other kinds of drinks such as regular soft drinks and fruit juices, and candies (e.g, chocolate bars, and high calories snacks) should be dramatically reduced or eliminated. Moreover, the government in Puerto Rico ought to develop policies that impact the high calorie food such as fried foods, and should promote healthy food choices at schools setting. Specific regulations should be established to encourage healthy food menus at fast food and other restaurants in communities. More healthy choices, banning Trans fats, posting the meal calories, and reduced servings sizes can be some of the strategies to develop healthier food choices both in schools and local communities.
The physical activity levels of adolescents in Puerto Rico can be increased by developing appropriate programs wherein they can be physically active before the school day starts in the morning, during recess time, and after school. Programs such as walking, bicycling, and/or rollerblading to school can be effective to combat the overweight rates if school community designs a community support and routes in which adolescents feel safe and motivated to use these physical activities as alternative transportation to go to school. As well, the school community should develop short physical activity games and activities that impact the school recess time. Additionally, more diversity of physical activity opportunity would be needed to motivate and encourage participation of adolescents after the school day is over. Adolescents’ low physical activity level can be address by increasing their opportunity to participate in physical activities based on their physical activity preferences.

Buckworth and Dishman (2002) stated that people tend to participate in physical activities that they enjoy, have fun, and feel competent participating in. Therefore, intentions to increase adolescents’ physical activity behavior patterns must take in consideration the importance of allowing adolescent to enjoy their participation in physical activities. For instance, fitness, walking, non-competitive games, and dance programs can be offer as after school programs.

While adolescents are being physically educated, school and community programs are needed to engage and encourage the integration of parents and families. It is well known that parents have a significant role and influence on adolescents’ behaviors including dietary habits and physical activities. Many times, the only choice adolescents have regarding food and physical activity participation is what their parents offer. Therefore, school wellness programs must impact the knowledge and motivation of parents to serve as role models for
their children and provide appropriate food choices and the necessary amount of time for physical activities.

Moreover, the community, government, and private entities responsible to promote healthy lifestyles among adolescents should ensure that they have enough access to local physical activity facilities. In addition, the community and the local government agencies should ensure that physical activity facilities are appropriately designed and maintained to motivate adolescents to become more physically active. As it was determined in this study, most of the adolescents tended to perform personal physical activities, specially walking. Therefore, it is imperative that physical activity facilities and walking trails are safe and clean, and with adequate illumination. Also, diversity of physical activity programs such as aerobics, social dance, walking, jogging, and cycling can be developed in the local communities. Any environmental and/or social barriers adolescents face could decrease their motivation and opportunity to become more physically active (Bouchard, 2000), specially for Puerto Rican adolescents in the mainland who are facing a higher risk of health-related conditions associated with overweight and obesity than other groups.

Future Research

Since 1975 (Fernández, 1975), no comprehensive reports have been published that describe and determine the food behaviors, physical activity behavior patterns, and body composition indices of Puerto Ricans. To that voice, this current study was focused on the aforementioned variables using the microsystem level of the Social Ecology Model for understanding and interpreting the study’s findings. Still, additional research is needed using this or other theoretical frameworks to determine and describe other essential aspects of Puerto Rican adolescents’ health risk behaviors such as physical activity preferences,
knowledge, and enjoyment, which may contribute to a higher physical activity engagement. For instance, the findings in this current study suggests that, even though there is strong evidence that the overweight rates in Puerto Rico are causes for concern, more research is needed to determine those factors that correlate with the incidence and prevalence of overweight among adolescents in Puerto Rico. In future research, it is necessary to test the Social Ecology Model more comprehensively, which would include all tenets of this theoretical framework (i.e., microsystem, mesosystem, exosystem, and macrosystem). Within the mesosystem level, there is a need to establish the interaction and impact of several health related factors and overweight prevalence among adolescents in Puerto Rico. Specifically, research is needed to correlate adolescents’ body composition indices and their dietary habits such the consumption of soft drinks, fruit juices, fried foods, baked sweets, fish consumption, and milk types. Moreover, research on the influence of parents and peers must be addressed in order to understand the effect of these variables on the health risk behaviors of Puerto Rican adolescents.

In terms of the exosystem, a more comprehensive research study should focus on school and community aspects that may impact the behaviors of adolescents in Puerto Rico. Particularly, it is imperative to establish the contribution and impact of school settings in terms of physical activity and food behaviors with this population. As another example, experimental research using the exosystem might be conducted to study the effects of interventions that are implemented in physical education classes, recesses time, and after school programs. For instance, in physical education settings, researchers can determine the type of physical activity and amount of time adolescents engage in MVPA. At community settings, it is important to measure the effects of several organized physical activity
programs, access to physical activity facilities, and the appropriate designs of communities that should contribute to healthier lifestyles of adolescents.

Using the exosystem, more work is needed to study the effects and influence of policies developed by governmental and non-governmental agencies that might affect adolescents’ behaviors, especially on food behaviors, physical activity levels, and body composition measures. Governmental and non-governmental agencies create wellness interventions that may contribute or not to the overall healthy lifestyles of adolescents. The effect of such wellness interventions should be studied using the exosystem, which would allow researchers to determine the effectiveness of the wellness programs.

Today, there have been major changes in the national economy; therefore there is a need to study the effects of inflations on adolescents’ health risks behaviors from the macrosystem perspective. National and local economics and politics are impacting the daily living styles of residents in the US and Puerto Rico. In particular, there is a serious concern about the increased prices of foods, gas, and memberships at physical activity facilities (e.g., gym and health clubs) and how they are severely impacting people behaviors (e.g., food behaviors, physical activity levels, and the body composition). Researchers can conduct studies focusing on the impact of one or more these variables on those health risk factors (e.g. food behaviors and physical activities) associated with being overweight.

As well, other theoretical frameworks such as social cognitive theory and health belief model can be used in understanding adolescents’ behavior. For instance, the use of social cognitive theory can include aspects such as the influence of physical activity behavior patterns of physical education teachers on adolescents as an observational learning process. Moreover, the impact of physical activity and healthy lifestyles knowledge on adolescents in Puerto Rico can be study as a component of cognitive factor within the personal level of the
social cognitive theory. Furthermore, using the health belief model, researchers can focus on study students’ perception of the benefits of following healthy lifestyles and if they perceive that following healthy lifestyles will decrease the risk of developing health related conditions such as cardiovascular diseases, diabetes, and cancer. Also, the perception of physical activity barriers can be studied as a component of the health belief model.

Conclusions
In conclusion, the adolescents studied in this secondary data analysis reported their food behavior considerations, physical activity behavior patterns, body composition indices that contribute could influence their healthy lifestyles and the development of health related diseases such as cardiovascular diseases, diabetes, and cancer. A significant proportion of adolescents in Puerto Rico were engaging in unhealthy food behaviors such as limited consumption fruits and vegetables. To the contrary, adolescents in Puerto Rico were consuming high servings of fried food and baked sweets, and there was a high consumption soft and sweetened drinks on a regular basis. These Puerto Rican adolescents were increasing their risk of cardiovascular diseases through their high consumption of high cholesterol food, Trans fats, and having unhealthy food choices at restaurants. Although, male adolescents engage more in physical activities, neither the females nor males were reaching the recommended amount of minutes for physical activity. In fact, most adolescents that were physically active spend their time performing personal physical activities. Clearly, more interventions are needed to increase the number of students who engage in physical activities during their physical education classes and as part of organized sports. More effort and interventions are also needed to provide adolescents in Puerto Rico with the necessary amount of physical activity necessary to achieve healthy lifestyles.
The overweight rates in Puerto Rico have reached higher levels than those reported on adolescents in the US (Hedley et al., 2004). A significant proportion of the adolescents in Puerto Rico were either at risk of being overweight or overweight. To fight the continued increase in overweight rates in Puerto Rico, school personnel and government agencies need to develop effective strategies, policies, and interventions at schools and within local communities that can impact, not only adolescents’ behaviors, but their parents, families, and communities as well.
References


Lum, J. K. (2003). *Establishing validity and reliability of the visual 7-day physical activity recall instrument: A pilot study*. Unpublished Master’s Thesis. The Ohio State University, Columbus, OH.


APPENDIX A

INSTITUTIONAL BOARD REVIEW EXEMPTION
<table>
<thead>
<tr>
<th><strong>Principal Investigator</strong></th>
<th>Name: Samuel Hodge, Ph.D.</th>
<th>Department or College: PAES Department</th>
</tr>
</thead>
<tbody>
<tr>
<td>University Title:</td>
<td></td>
<td>E-mail: <a href="mailto:hodge.14@osu.edu">hodge.14@osu.edu</a></td>
</tr>
<tr>
<td></td>
<td>Professor</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Associate Professor</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Assistant Professor</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Instructor</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Other. Please specify.</td>
<td></td>
</tr>
<tr>
<td>(May require prior approval.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Campus Address (room, building, street address):</td>
<td>A-254 PAES Building, 305 West 17th Avenue Columbus, OH 43210</td>
<td></td>
</tr>
<tr>
<td>Signature:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Date:</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Co-Investigator</strong></th>
<th>Name: Alexander Vigo-Valentin</th>
<th>Phone: 787-484-3921</th>
</tr>
</thead>
<tbody>
<tr>
<td>University Status:</td>
<td>Faculty, Staff, Graduate Student, Undergraduate Student</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Other. Please specify.</td>
<td></td>
</tr>
<tr>
<td>Campus Address (room, building, street address) or Mailing Address:</td>
<td>A-028 PAES Building, 305 West 17th Avenue Columbus, OH 43210</td>
<td></td>
</tr>
<tr>
<td>Signature:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Date:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fax:</td>
<td>n/a</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Co-Investigator</strong></th>
<th>Name:</th>
<th>Phone:</th>
</tr>
</thead>
<tbody>
<tr>
<td>University Status:</td>
<td>Faculty, Staff, Graduate Student, Undergraduate Student</td>
<td>Other. Please specify.</td>
</tr>
<tr>
<td>Campus Address (room, building, street address) or Mailing Address:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Signature:</td>
<td>Date:</td>
<td>Fax:</td>
</tr>
</tbody>
</table>

| **Protocol Title** | The Food Behaviors, Physical Activity Patterns, and Body Compositions of School-Age Adolescents in Puerto Rico. |

| **Source of Funding** | Not applicable |

---

**For Office Use Only**

- **Approved.** Research has been determined to be exempt under these categories:  
  - Research may begin as of the date of determination listed below.
- **Disapproved.** The proposed research does not fall within the categories of exemption. Submit an application to the appropriate Institutional Review Board for review.

Date of determination: 12/07/07

Signature: [Signature]

RSE-1.0
APPENDIX B

LETTER OF SUPPORT DEPARTMENT OF RECREATION AND SPORTS
December 6, 2007

From: Reynaldo Soler, Director, Research & Statistics, Department of Recreation & Sports
P.O. Box 9023207, San Juan, Puerto Rico 00902-3207

To: Mr. Alexander Vigo-Valentin, School of Physical Activity & Educational Services
A-020 PAES Building, 305 West 17th Avenue, Columbus, Ohio 43210

Greetings Mr. Vigo-Valentin:

Please know that our department recognizes the importance of your proposed dissertation research and will therefore promptly ensure that you receive the data per your request to conduct a secondary data analysis of data originally collected for the Puerto Rico en forma Program in order to support your study titled: The Food Behaviors, Physical Activity Patterns, and Body Compositions of School-Age Adolescents in Puerto Rico.

This letter is intended to confirm our permission to you and your advisory committee (academic advisor: Dr. Samuel R. Hodge) to access and use the data base originally collected for the department’s Puerto Rico en forma Project.

Please let us know of additional ways we might support your research

Lastly, we ask that you (and your Committee) would share your study’s results with the Department of Recreation and Sports of Puerto Rico at the conclusion of the research project.

Sincerely,

Reynaldo Soler
Research and Statistics Director
APPENDIX C

SPANISH AND ENGLISH VERSIONS OF DATA COLLECTION INSTRUMENTS
Hoja de Evaluación Demográfica
(Demographic Evaluation Form)

1. Vives en Puerto Rico? [Are you a Puerto Rico resident?] ____ Si   _____ No

2. Edad [age]: ______ años [years] ______ meses [month]

3. Nivel de educación [level of education]: __ escuela intermedia    __ escuela superior
   ___ grado asociado    ___ barchillerato    ___ maestría    ___ doctorado
   ___ post doctorado

4. Sexo [sex]: _____Femenino (female)    _______ Masculino (male)

5. Tienes alguna(s) condición(es) de discapacidad(es)? Marque (X) la categoría
   [Do you have any disabilities?, Mark (X) the category]
   ___ No    ___ Sensorial (Visual o auditivo)    ___ Motriz    ___ Mental
   ___ Aprendizaje    ___ Habla o lenguaje    ___ Emocional    ___ Autismo    ___ Múltiples
   ___ otros: _____________________

6. Tienes alguna condición(es) de salud? [Do you have any health-related conditions?]
   ___ No    ___ Diabetes    ___ Cardiovascular (e.g., alta presión, coronarios, etc.)
   ___ Asma    ___ Osteoporosis    ___ otros: _______________

7. Tienes conocimiento sobre el programa Puerto Rico en forma? [Do you know about the
   Puerto Rico in Shape Project?]    ____ Si_____ No

8. Participas de algún programa de Puerto Rico en Forma [Do you participate in any of the
   Puerto Rico in Shape Programs]    ____ Si_____ No

9. Participas de algún otro programa de actividad física en este momento? [Are you participating in any other physical activity program?]    ____ Si _____ No

Para uso oficial solamente [For official use only]
Región [region]:    ___1 Northwest (Anasco)    ___2 North (Arecibo)
   ___3 Central (Aibonito)    ___4 South Central (Caguas)
   ___5 Northeast (Canovanas)    ___6 Southeast (Humacao)
   ___7 Southwest (Mayagüez)    ___8 South (Ponce)
   ___9 Metropolitan (Río Piedras)    ___10 North Central (El Toa)
### Cuestionario Conducta Alimenticia

**Por favor, circule la letra que mejor represente tus hábitos alimenticios.**

1. Tú comes frutas?
   - a. Sí
   - b. No (*Pasa a la pregunta #4*)

2. Usualmente, cuántas porciones de frutas comes durante la semana?
   - a. 1-2
   - b. 3-4
   - c. 5-6
   - d. 7 o más

3. Durante la pasada semana, cuántas porciones de frutas comiste?
   - a. ninguna
   - b. 1-2
   - c. 3-4
   - d. 5-6
   - e. 7 o más

4. Tú comes vegetales?
   - a. Sí
   - b. No (*Pasa a la pregunta #8*)

5. Usualmente, cuántas porciones de vegetales comes durante la semana?
   - a. 1-2
   - b. 3-4
   - c. 5-6
   - d. 7 o más

6. Durante la pasada semana, cuántas porciones de vegetales comiste?
   - a. ninguna
   - b. 1-2
   - c. 3-4
   - d. 5-6
   - e. 7 o más

7. Tú comes vegetales crudos?
   - a. Sí
   - b. No

8. Tú tomas leche?
   - a. Sí
   - b. No (*Pasa a la pregunta #10*)

9. Durante la pasada semana, tú tomaste leche como con cereal o como bebida?
   - a. Sí
   - b. No

10. Eres vegetariana(o)?
    - a. Sí
    - b. No

11. Tú comes pescado?
    - a. Sí
    - b. No (*Pasa a la pregunta #13*)

12. Durante la pasada semana, cuántas porciones de pescado comiste?
    - a. ninguna
    - b. 1-2
    - c. 3-4
    - d. 5-6
    - e. 7 o más

13. Tú comes pollo?
    - a. Sí
    - b. No (*Pasa a la pregunta #16*)

14. Durante la pasada semana, cuántas porciones de pollo comiste?
    - a. ninguna
    - b. 1-2
    - c. 3-4
    - d. 5-6
    - e. 7 o más

15. Cuando comes pollo, le quitas la piel?
    - a. Sí
    - b. No

16. Tú comes huevos?
    - a. Sí
    - b. No (*Pasa a la pregunta #18*)
17. Durante la pasada semana, cuántas porciones de huevos comiste?
   a. ninguna
   b. 1-2
   c. 3-4
   d. 5-6
   e. 7 o más

18. Tú tomas refrescos (e.g., regular o dieta)?
   a. Sí
   b. No (Pasa a la pregunta #21)

19. Qué tipo de refresco tomas usualmente?
   a. regular
   b. dieta
   c. ambos

20. Durante la pasada semana, cuántos refrescos tomaste?
   a. ninguno
   b. 1-2
   c. 3-4
   d. 5-6
   e. 7 o más

21. Tú tomas kool-aid, Gatorade, Hawaiian Punch u otras bebidas azucaradas?
   a. Sí
   b. No (Pasa a la pregunta #23)

22. Durante la pasada semana, cuántos vasos de 8 oz de jugos con azúcar tomaste?
   a. ninguno
   b. 1-2
   c. 3-4
   d. 5-6
   e. 7 o más

23. Tú comes comida de restaurantes?
   a. Sí
   b. No (Pasa a la pregunta #25)

24. Durante la pasada semana, cuántas veces comiste comida de algún restaurante?
   a. ninguno
   b. 1-2
   c. 3-4
   d. 5-6
   e. 7 o más

25. Tú comes comida frita?
   a. Sí
   b. No (Pasa a la pregunta #27)

26. Durante la pasada semana, cuántas veces comiste comida frita?
   a. 1-2
   b. 3-4
   c. 5-6
   d. 7 o más

27. Cuando compras o ingieres comida o bebida, Tú lees la tabla nutricional de la etiqueta del producto?
   a. Sí, siempre
   b. Sí, en ocasiones pero no siempre
   c. Sí, a veces (solo en algunas ocasiones)
   d. No, nunca

28. Tú familia se queda sin comida en la alacena?
   a. Sí, siempre
   b. Sí, casi siempre
   c. Sí, solo una que otra vez
   d. No, nunca

29. Te preocupa que tu familia se quede sin comida en la alacena?
   a. Sí, siempre
   b. Sí, casi siempre
   c. Sí, solo una que otra vez
   d. No, nunca

30. Con cuanta frecuencia comes alimentos dulces o postres horneados como bizcochos, donas, galletas, etc?
   a. nunca
   b. 1-2 veces por semana
   c. 3-4 veces por semana
   d. 5-6 veces por semana
   e. 7 o más veces por semana

31. Cómo describes tus hábitos alimenticios?
   a. Excelente (bien saludable)
   b. Muy buenos
   c. Buenos
   d. Regular
   e. Pobre (No saludable)
Food Behavior Check List

Please circle the letter that best indicates your eating or drinking habits.

1. Do you eat fruit?
   a. yes
   b. no (if no skip to #4)

2. How many pieces or servings of fruit do you usually eat per week?
   a. 1-2
   b. 3-4
   c. 5-6
   d. 7 or more

3. During the past week, how many pieces or servings of fruit did you eat?
   a. none
   b. 1-2
   c. 3-4
   d. 5-6
   e. 7 or more

4. Do you eat vegetables?
   a. yes
   b. no (if no skip to #8)

5. How many servings of vegetables do you usually eat per week?
   a. 1-2
   b. 3-4
   c. 5-6
   d. 7 or more

6. During the past week, how many pieces or servings of vegetables did you eat?
   a. none
   b. 1-2
   c. 3-4
   d. 5-6
   e. 7 or more

7. Do you ever eat raw vegetables?
   a. yes
   b. no

8. Do you drink milk?
   a. yes
   b. no (if no skip to #10)

9. During the past week, did you have milk with cereal or as a beverage?
   a. yes
   b. no

10. Are you a vegetarian?
    a. yes
    b. no

11. Do you eat fish?
    a. yes
    b. no (if no skip to #13)

12. During the past week, how many pieces or servings of fish did you eat?
    a. none
    b. 1-2
    c. 3-4
    d. 5-6
    e. 7 or more

13. Do you eat chicken?
    a. yes
    b. no (if no skip to #16)

14. During the past week, how many pieces or servings of chicken did you eat?
    a. none
    b. 1-2
    c. 3-4
    d. 5-6
    e. 7 or more

15. When you eat chicken, do you usually eat it skinless?
    a. yes
    b. no

16. Do you eat eggs?
    a. yes
    b. no (if no skip to #18)

223
17. During the past week, how many eggs did you eat?
   a. none
   b. 1-2
   c. 3-4
   d. 5-6
   e. 7 or more

18. Do you drink soft drinks (e.g., regular or diet)?
   a. yes
   b. no (if no skip to #21)

19. What kind of soft drinks do you usually drink?
   a. regular
   b. diet
   c. both

20. During the past week, how many soft drinks did you drink?
   a. none
   b. 1-2
   c. 3-4
   d. 5-6
   e. 7 or more

21. Do you drink kool-aid, Gatorade, Hawaiian Punch or other sweetened juices?
   a. yes
   b. no (if no skip to #23)

22. During the past week, how many 8 oz glasses of sweetened juices did you drink?
   a. none
   b. 1-2
   c. 3-4
   d. 5-6
   e. 7 or more

23. Do you eat food from restaurants?
   a. yes
   b. no (if no skip to #25)

24. During the past week, how many times did you eat food from a restaurant?
   a. none
   b. 1-2
   c. 3-4
   d. 5-6
   e. 7 or more

25. Do you eat fried foods?
   a. yes
   b. no (if no skip to #27)

26. During the past week, how many times did you eat fried foods?
   a. none
   b. 1-2
   c. 3-4
   d. 5-6
   e. 7 or more

27. When buying or eating food or drinks, do you read the nutrition facts on the food label?
   a. yes, always
   b. yes, very often but not always
   c. yes, sometimes (every now and then)
   d. no, never

28. Does your family ever run out of food?
   a. yes, often
   b. yes, sometimes
   c. yes, only once
   d. no, never

29. Do you ever worry that your family will run out of food?
   a. yes, often
   b. yes, sometimes
   c. yes, only once
   d. no, never

30. How often do you eat baked sweets (e.g., cakes, donuts, pies, cookies, etc)?
   a. never
   b. 1-2 times a week
   c. 3-4 times a week
   d. 5-6 times a week
   e. 7 or more times a week

31. How would you describe your eating habits?
   a. Excellent (very healthy)
   b. Very good
   c. Good
   d. Fair
   e. Poor (very unhealthy)
### Cuestionario de Actividad Física

Instrucciones: Si realizaste actividades físicas durante la pasada semana, completa la siguiente información:
1. Si alguna, identifica la actividad física que realizaste durante ese día en particular.
2. Marca (X) en el periodo de Minutos que mejor represente la cantidad de tiempo realizado.
3. Marca (X) si la actividad fue realizada como Deporte Organizado (Org) [equipo de baloncesto, beisbol, etc.], Educación Física (EF), o Actividad Física personal (APP) [caminar solo o con amigos, correr bicicleta, levantamiento de pesas, etc].
4. Escribe en el espacio provisto para "otros" cualquier actividad física no mencionada, sigue pasos 2 y 3.

<table>
<thead>
<tr>
<th>Realizaste Actividad Física</th>
<th>Domingo</th>
<th></th>
<th>Lunes</th>
<th></th>
<th>Martes</th>
<th></th>
<th>Miércoles</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Minutos</td>
<td>Tipo</td>
<td>Minutos</td>
<td>Tipo</td>
<td>Minutos</td>
<td>Tipo</td>
<td>Minutos</td>
<td>Tipo</td>
</tr>
<tr>
<td></td>
<td>Si</td>
<td>No</td>
<td>Si</td>
<td>No</td>
<td>Si</td>
<td>No</td>
<td>Si</td>
<td>No</td>
</tr>
<tr>
<td><strong>Actividad</strong></td>
<td><strong>Si</strong></td>
<td><strong>No</strong></td>
<td><strong>Si</strong></td>
<td><strong>No</strong></td>
<td><strong>Si</strong></td>
<td><strong>No</strong></td>
<td><strong>Si</strong></td>
<td><strong>No</strong></td>
</tr>
<tr>
<td>Caminar</td>
<td>1-19</td>
<td>Org</td>
<td>1-19</td>
<td>Org</td>
<td>1-19</td>
<td>Org</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>&gt; 60</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Voleibol</td>
<td>1-19</td>
<td>Org</td>
<td>1-19</td>
<td>Org</td>
<td>1-19</td>
<td>Org</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>&gt; 60</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beisbol</td>
<td>1-19</td>
<td>Org</td>
<td>1-19</td>
<td>Org</td>
<td>1-19</td>
<td>Org</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>&gt; 60</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Levantamiento pesas</td>
<td>1-19</td>
<td>Org</td>
<td>1-19</td>
<td>Org</td>
<td>1-19</td>
<td>Org</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>&gt; 60</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baloncesto</td>
<td>1-19</td>
<td>Org</td>
<td>1-19</td>
<td>Org</td>
<td>1-19</td>
<td>Org</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>&gt; 60</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Correr/Trotar</td>
<td>1-19</td>
<td>Org</td>
<td>1-19</td>
<td>Org</td>
<td>1-19</td>
<td>Org</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>&gt; 60</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nadar/ Actividades acuáticas</td>
<td>1-19</td>
<td>Org</td>
<td>1-19</td>
<td>Org</td>
<td>1-19</td>
<td>Org</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>&gt; 60</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ciclismo/correr bicicletas</td>
<td>1-19</td>
<td>Org</td>
<td>1-19</td>
<td>Org</td>
<td>1-19</td>
<td>Org</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>&gt; 60</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>otros</strong></td>
<td>1-19</td>
<td>Org</td>
<td>1-19</td>
<td>Org</td>
<td>1-19</td>
<td>Org</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>&gt; 60</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

continúa
### Seven-Day Physical Activity Recall

Instructions: Please, mark (X) whether or not you have performed physical activities on each day of last week.

1. If Yes, select one or more of the physical activities you performed on each particular day.
2. Mark (X) the range of minutes that better represent the time you have spent performing physical activities.
3. Mark (X) if you have performed those activities as part of an Organized Sport [Org] [e.g. Basketball or Baseball team, etc.], Physical Education [PE], or Personal Physical Activity [PPA] [e.g., Walking by yourself or with friends, bicycling, weight training, etc].
4. Uses the space provided in "others" to identify additional physical activities that may not listed and follow steps 2 and 3.

<table>
<thead>
<tr>
<th>Performed Physical Activity</th>
<th>Sunday Yes</th>
<th>No</th>
<th>Monday Yes</th>
<th>No</th>
<th>Tuesday Yes</th>
<th>No</th>
<th>Wednesday Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Activities</td>
<td>Minutes</td>
<td>Type</td>
<td>Minutes</td>
<td>Type</td>
<td>Minutes</td>
<td>Type</td>
<td>Minutes</td>
<td>Type</td>
</tr>
<tr>
<td>Baseball</td>
<td>1-19 Org</td>
<td>PE</td>
<td>1-19 PE</td>
<td>PPA</td>
<td>1-19 Org</td>
<td>PE</td>
<td>1-19 Org</td>
<td>PE</td>
</tr>
<tr>
<td></td>
<td>20-29 PE</td>
<td>PPA</td>
<td>30-59 PPA</td>
<td>&gt;60</td>
<td>20-29 PE</td>
<td>PPA</td>
<td>30-59 PPA</td>
<td>&gt;60</td>
</tr>
<tr>
<td></td>
<td>&gt;60</td>
<td></td>
<td>&gt;60</td>
<td></td>
<td>&gt;60</td>
<td></td>
<td>&gt;60</td>
<td></td>
</tr>
<tr>
<td>Weightlifting</td>
<td>1-19 Org</td>
<td>PE</td>
<td>1-19 PE</td>
<td>PPA</td>
<td>1-19 Org</td>
<td>PE</td>
<td>1-19 Org</td>
<td>PE</td>
</tr>
<tr>
<td></td>
<td>20-29 PE</td>
<td>PPA</td>
<td>30-59 PPA</td>
<td>&gt;60</td>
<td>20-29 PE</td>
<td>PPA</td>
<td>30-59 PPA</td>
<td>&gt;60</td>
</tr>
<tr>
<td></td>
<td>&gt;60</td>
<td></td>
<td>&gt;60</td>
<td></td>
<td>&gt;60</td>
<td></td>
<td>&gt;60</td>
<td></td>
</tr>
<tr>
<td>Basketball</td>
<td>1-19 Org</td>
<td>PE</td>
<td>1-19 PE</td>
<td>PPA</td>
<td>1-19 Org</td>
<td>PE</td>
<td>1-19 Org</td>
<td>PE</td>
</tr>
<tr>
<td></td>
<td>20-29 PE</td>
<td>PPA</td>
<td>30-59 PPA</td>
<td>&gt;60</td>
<td>20-29 PE</td>
<td>PPA</td>
<td>30-59 PPA</td>
<td>&gt;60</td>
</tr>
<tr>
<td></td>
<td>&gt;60</td>
<td></td>
<td>&gt;60</td>
<td></td>
<td>&gt;60</td>
<td></td>
<td>&gt;60</td>
<td></td>
</tr>
<tr>
<td>Running/jogging</td>
<td>1-19 Org</td>
<td>PE</td>
<td>1-19 PE</td>
<td>PPA</td>
<td>1-19 Org</td>
<td>PE</td>
<td>1-19 Org</td>
<td>PE</td>
</tr>
<tr>
<td></td>
<td>20-29 PE</td>
<td>PPA</td>
<td>30-59 PPA</td>
<td>&gt;60</td>
<td>20-29 PE</td>
<td>PPA</td>
<td>30-59 PPA</td>
<td>&gt;60</td>
</tr>
<tr>
<td></td>
<td>&gt;60</td>
<td></td>
<td>&gt;60</td>
<td></td>
<td>&gt;60</td>
<td></td>
<td>&gt;60</td>
<td></td>
</tr>
<tr>
<td>Swimming/aquatic activities</td>
<td>1-19 Org</td>
<td>PE</td>
<td>1-19 PE</td>
<td>PPA</td>
<td>1-19 Org</td>
<td>PE</td>
<td>1-19 Org</td>
<td>PE</td>
</tr>
<tr>
<td></td>
<td>20-29 PE</td>
<td>PPA</td>
<td>30-59 PPA</td>
<td>&gt;60</td>
<td>20-29 PE</td>
<td>PPA</td>
<td>30-59 PPA</td>
<td>&gt;60</td>
</tr>
<tr>
<td></td>
<td>&gt;60</td>
<td></td>
<td>&gt;60</td>
<td></td>
<td>&gt;60</td>
<td></td>
<td>&gt;60</td>
<td></td>
</tr>
<tr>
<td>Others</td>
<td>1-19 Org</td>
<td>PE</td>
<td>1-19 PE</td>
<td>PPA</td>
<td>1-19 Org</td>
<td>PE</td>
<td>1-19 Org</td>
<td>PE</td>
</tr>
<tr>
<td></td>
<td>20-29 PE</td>
<td>PPA</td>
<td>30-59 PPA</td>
<td>&gt;60</td>
<td>20-29 PE</td>
<td>PPA</td>
<td>30-59 PPA</td>
<td>&gt;60</td>
</tr>
<tr>
<td></td>
<td>&gt;60</td>
<td></td>
<td>&gt;60</td>
<td></td>
<td>&gt;60</td>
<td></td>
<td>&gt;60</td>
<td></td>
</tr>
<tr>
<td>Performed Physical Activity</td>
<td>Thursday</td>
<td></td>
<td></td>
<td></td>
<td>Friday</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-----------------------------</td>
<td>----------</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>----------</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Activities</td>
<td>Minutes</td>
<td>Type</td>
<td></td>
<td></td>
<td>Minutes</td>
<td>Type</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Walking</td>
<td>1-19</td>
<td>Org</td>
<td></td>
<td></td>
<td>1-19</td>
<td>Org</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>20-29</td>
<td>PE</td>
<td></td>
<td></td>
<td>20-29</td>
<td>PE</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>30-59</td>
<td>PPA</td>
<td></td>
<td></td>
<td>30-59</td>
<td>PPA</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>&gt; 60</td>
<td></td>
<td></td>
<td></td>
<td>&gt; 60</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Volleyball</td>
<td>1-19</td>
<td>Org</td>
<td></td>
<td></td>
<td>1-19</td>
<td>Org</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>20-29</td>
<td>PE</td>
<td></td>
<td></td>
<td>20-29</td>
<td>PE</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>30-59</td>
<td>PPA</td>
<td></td>
<td></td>
<td>30-59</td>
<td>PPA</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>&gt; 60</td>
<td></td>
<td></td>
<td></td>
<td>&gt; 60</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baseball</td>
<td>1-19</td>
<td>Org</td>
<td></td>
<td></td>
<td>1-19</td>
<td>Org</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>20-29</td>
<td>PE</td>
<td></td>
<td></td>
<td>20-29</td>
<td>PE</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>30-59</td>
<td>PPA</td>
<td></td>
<td></td>
<td>30-59</td>
<td>PPA</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>&gt; 60</td>
<td></td>
<td></td>
<td></td>
<td>&gt; 60</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight Lifting</td>
<td>1-19</td>
<td>Org</td>
<td></td>
<td></td>
<td>1-19</td>
<td>Org</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>20-29</td>
<td>PE</td>
<td></td>
<td></td>
<td>20-29</td>
<td>PE</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>30-59</td>
<td>PPA</td>
<td></td>
<td></td>
<td>30-59</td>
<td>PPA</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>&gt; 60</td>
<td></td>
<td></td>
<td></td>
<td>&gt; 60</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Basketball</td>
<td>1-19</td>
<td>Org</td>
<td></td>
<td></td>
<td>1-19</td>
<td>Org</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>20-29</td>
<td>PE</td>
<td></td>
<td></td>
<td>20-29</td>
<td>PE</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>30-59</td>
<td>PPA</td>
<td></td>
<td></td>
<td>30-59</td>
<td>PPA</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>&gt; 60</td>
<td></td>
<td></td>
<td></td>
<td>&gt; 60</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Running/jogging</td>
<td>1-19</td>
<td>Org</td>
<td></td>
<td></td>
<td>1-19</td>
<td>Org</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>20-29</td>
<td>PE</td>
<td></td>
<td></td>
<td>20-29</td>
<td>PE</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>30-59</td>
<td>PPA</td>
<td></td>
<td></td>
<td>30-59</td>
<td>PPA</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>&gt; 60</td>
<td></td>
<td></td>
<td></td>
<td>&gt; 60</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Swimming/aquatic activities</td>
<td>1-19</td>
<td>Org</td>
<td></td>
<td></td>
<td>1-19</td>
<td>Org</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>20-29</td>
<td>PE</td>
<td></td>
<td></td>
<td>20-29</td>
<td>PE</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>30-59</td>
<td>PPA</td>
<td></td>
<td></td>
<td>30-59</td>
<td>PPA</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>&gt; 60</td>
<td></td>
<td></td>
<td></td>
<td>&gt; 60</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bicycling</td>
<td>1-19</td>
<td>Org</td>
<td></td>
<td></td>
<td>1-19</td>
<td>Org</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>20-29</td>
<td>PE</td>
<td></td>
<td></td>
<td>20-29</td>
<td>PE</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>30-59</td>
<td>PPA</td>
<td></td>
<td></td>
<td>30-59</td>
<td>PPA</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>&gt; 60</td>
<td></td>
<td></td>
<td></td>
<td>&gt; 60</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Others</td>
<td>1-19</td>
<td>Org</td>
<td></td>
<td></td>
<td>1-19</td>
<td>Org</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>20-29</td>
<td>PE</td>
<td></td>
<td></td>
<td>20-29</td>
<td>PE</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>30-59</td>
<td>PPA</td>
<td></td>
<td></td>
<td>30-59</td>
<td>PPA</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>&gt; 60</td>
<td></td>
<td></td>
<td></td>
<td>&gt; 60</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Indice de Masa Corporal
[BODY MASS INDEX]

Niñas (Girls) [2–20 años]

Edad (age): _______
Peso (weight): _______  Estatura (height): _______

Categoría (category):
___ < 5th—bajo peso [underweight]
___ 5th–84th peso normal [normal weight]
___ 85th–94th en riesgo de sobre peso [at risk of overweight]
___ > 95th sobre peso [overweight]

Niños (boys) [2–20 años]

Edad (age): _______
Peso (weight): _______  Estatura (height): _______

Categoría (category):
___ < 5th—bajo peso [underweight]
___ 5th–84th peso normal [normal weight]
___ 85th–94th en riesgo de sobre peso [at risk of overweight]
___ > 95th sobre peso [overweight]

Adultos (Adults) [21 años o más]

Edad (age): _______
Peso (weight): _______  Estatura (height): _______

Categoría (category):
___ <18kg/m² —bajo peso [underweight]
___ 18–24.9kg/m² peso normal [normal weight]
___ 25–29.9kg/m² sobrepeso [overweight]
___ 30–34.9kg/m² obesidad 1 [obese 1]
___ 35–39.9kg/m² obesidad 2 [obese 2]
___ > 40kg/m² obesidad 3 [obese 3]
Puerto Rico en Forma Evaluation Report

Submitted to:
David Bernier, D.D.S., Secretary
Departamento de Recreacion y Deportes

Reynaldo Soler, Director Research
Departamento de Recreacion y Deportes

+Submitted by
Samuel R. Hodge, Ph.D., Evaluation Project Director
The Ohio State University

Luis Del Rio, Ph.D., Project Co-Director
University of Puerto Rico, Mayagüez Campus

and

Alexander Vigo-Valentin, Project Co-Director
The Ohio State University.

+This report was developed by Samuel R. Hodge with input from a team of faculty and students: Robert A. Bennett, Carlos M. Cervantes-Olivares, Frankie G. Collins, Kelly Dreibelbis, Maria L. Gies, Bethany L. Hersman, Jessica L. Stevens, Jacquelyn Monroe, Esther M. Ortiz-Castillo, and Alexander Vigo-Valentin at The Ohio State University.
# Table of Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Table of Contents</td>
<td>1</td>
</tr>
<tr>
<td>List of Tables</td>
<td>2</td>
</tr>
<tr>
<td>List of Graphs</td>
<td>2</td>
</tr>
<tr>
<td>Introduction</td>
<td>4</td>
</tr>
<tr>
<td>Executive Summary</td>
<td>4</td>
</tr>
<tr>
<td>Puerto Rico en forma and Purpose of the Evaluation</td>
<td>8</td>
</tr>
<tr>
<td>Design and Evaluation Methods</td>
<td></td>
</tr>
<tr>
<td>Instrumentation</td>
<td></td>
</tr>
<tr>
<td>Data Collection</td>
<td></td>
</tr>
<tr>
<td>Results</td>
<td></td>
</tr>
<tr>
<td><strong>PART 1—STUDENTS</strong></td>
<td></td>
</tr>
<tr>
<td>Student Demographic Data Regions 1 through 10</td>
<td></td>
</tr>
<tr>
<td>Student Demographic Data Summary</td>
<td></td>
</tr>
<tr>
<td>Student Food Behavior Checklist Findings</td>
<td></td>
</tr>
<tr>
<td>Student Food Behaviors Summary</td>
<td></td>
</tr>
<tr>
<td>Student Physical Activity Patterns</td>
<td></td>
</tr>
<tr>
<td>Student Physical Activity Behavior Summary</td>
<td></td>
</tr>
<tr>
<td>Student Body Composition: Body Mass Index (BMI)</td>
<td></td>
</tr>
<tr>
<td>Student Body Composition Summary</td>
<td></td>
</tr>
<tr>
<td><strong>PART 2—ADULTS</strong></td>
<td></td>
</tr>
<tr>
<td>Adults’ Demographic Data</td>
<td></td>
</tr>
<tr>
<td>Adult Food Behavior Checklist Findings</td>
<td></td>
</tr>
<tr>
<td>Adult Food Behavior Summary</td>
<td></td>
</tr>
<tr>
<td>Adult Physical Activity Patterns</td>
<td></td>
</tr>
<tr>
<td>Adult Physical Activity Behavior Summary</td>
<td></td>
</tr>
<tr>
<td>Adult Body Composition: Body Mass Index (BMI)</td>
<td></td>
</tr>
<tr>
<td>Adult Body Composition Summary</td>
<td></td>
</tr>
<tr>
<td>General Summary: Parts 1 and 2</td>
<td></td>
</tr>
<tr>
<td>Implications and Recommendations</td>
<td></td>
</tr>
<tr>
<td>References</td>
<td></td>
</tr>
<tr>
<td>Appendices</td>
<td></td>
</tr>
</tbody>
</table>
List of Tables

<table>
<thead>
<tr>
<th>Table</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Table 1</td>
<td>Puerto Rico’s Evaluation Regions</td>
<td></td>
</tr>
<tr>
<td>Table 2</td>
<td>Number and Percentage of Students Sampled Across Regions (N = 719)</td>
<td></td>
</tr>
<tr>
<td>Table 3</td>
<td>Descriptive Data on Gender and Age</td>
<td></td>
</tr>
<tr>
<td>Table 4</td>
<td>Student Body Composition Measures (n = 541)</td>
<td></td>
</tr>
<tr>
<td>Table 5</td>
<td>Number and Percentage of Adults Sampled Across Regions (N = 432)</td>
<td></td>
</tr>
<tr>
<td>Table 6</td>
<td>Descriptive Data on Gender and Age</td>
<td></td>
</tr>
<tr>
<td>Table 7</td>
<td>Adult Body Composition Measures (N = 432)</td>
<td></td>
</tr>
</tbody>
</table>

List of Graphs

<table>
<thead>
<tr>
<th>Graph</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>Graph 1</td>
<td>Student Distribution Across Regions</td>
</tr>
<tr>
<td>Graph 2</td>
<td>Student Gender Distribution</td>
</tr>
<tr>
<td>Graph 3</td>
<td>Medical Condition/Disability Status</td>
</tr>
<tr>
<td>Graph 4</td>
<td>Responses [Yes] to FBC Items 1 - 3: Fruit and Vegetables</td>
</tr>
<tr>
<td>Graph 5</td>
<td>FBC Item 4: Daily Servings of Vegetables</td>
</tr>
<tr>
<td>Graph 6</td>
<td>Responses [Yes] to FBC Items 5 and 6: Vegetables</td>
</tr>
<tr>
<td>Graph 7</td>
<td>FBC Item 7: Daily Servings of Fruit</td>
</tr>
<tr>
<td>Graph 8</td>
<td>FBC Item 8: Raw Vegetables</td>
</tr>
<tr>
<td>Graph 9</td>
<td>Responses [Yes] to FBC Items 9 and 10: Milk Consumption</td>
</tr>
<tr>
<td>Graph 10</td>
<td>Responses [Yes] to FBC Items 11 and 12: Fish and Chicken</td>
</tr>
<tr>
<td>Graph 11</td>
<td>FBC Item 13: Eat at Fast Food Restaurants</td>
</tr>
<tr>
<td>Graph 12</td>
<td>FBC Item 14: Consumption of Eggs</td>
</tr>
<tr>
<td>Graph 13</td>
<td>FBC Item 15: Servings of Eggs Per Week</td>
</tr>
<tr>
<td>Graph 14</td>
<td>FBC Item 16: Low Fat versus High Fat Foods</td>
</tr>
<tr>
<td>Graph 15</td>
<td>FBC Item 17: Use Nutritional Facts</td>
</tr>
<tr>
<td>Graph 16</td>
<td>Responses [Yes] to FBC Items 18 and 19: Beverages</td>
</tr>
</tbody>
</table>
Graph 17. FBC Item 20: Description of Diet
Graph 18. Responses [Yes] to FBC Items 21 and 22: Food Security
Graph 19. Physical Activity Program Participation
Graph 20. Knowledge of Puerto Rico en forma
Graph 21. Engage in Moderate Physical Activity
Graph 22. Vigorous Physical Activity
Graph 23. Students' MVPA Patterns
Graph 24. Students' Body Mass Index
Graph 25. Students' BMI Categorization
Graph 26. Adult Distribution Across Regions
Graph 27. Adult Gender Distribution
Graph 28. Medical Condition/Disability Status
Graph 29. Responses [Yes] to FBC Items 1-3: Fruit and Vegetables
Graph 30. FBC Item 4: Daily Servings of Vegetables
Graph 31. Responses [Yes] to FBC Items 5 and 6: Vegetables
Graph 32. FBC Item 7: Daily Servings of Fruit
Graph 33. FBC Item 8: Raw Vegetables
Graph 34. Responses [Yes] to FBC Items 9 and 10: Milk Consumption
Graph 35. Responses [Yes] to FBC Items 11 and 12: Fish and Chicken
Graph 36. FBC Item 13: Eat at Fast Food Restaurants
Graph 37. FBC Item 14: Consumption of Eggs
Graph 38. FBC Item 15: Servings of Eggs Per Week
Graph 39. FBC Item 16: Low Fat versus High Fat Foods
Graph 40. FBC Item 17: Use Nutritional Facts
Graph 41. Responses [Yes] to FBC Items 18 and 19: Beverages
Graph 42. FBC Item 20: Description of Diet
Graph 43. Responses [Yes] to FBC Items 21 and 22: Food Security
Graph 44. Physical Activity Program Participation
Graph 45. Knowledge of Puerto Rico en forma
Graph 46. Engage in Moderate Physical Activity
Graph 47. Vigorous Physical Activity
Graph 48. Adults' Physical Activity Patterns
Graph 49. Adults' Body Mass Index
Graph 50. Adults' BMI Categorization
Introduction

In the United States (US) of America and worldwide, regular moderate to vigorous physical activity (MVPA) behaviors have been identified as important for health and disease prevention. This is because regular MVPA behaviors can decrease the risk of various illnesses and diseases such as cardiovascular diseases, diabetes, obesity and the like (Bouchard & Shepard, 1994; National Heart Lung and Blood Institute—Obesity Education Initiative, 2006a, NHLBI, 2006b). According to the Centers for Disease Control and Prevention (CDCP, 2000), regardless of age, most people benefit from daily physical activity. Yet, many children, youth, and adults do not regularly engage in MVPA, which contributes to the rise in obesity and chronic disease risk factors.

It is estimated that nearly 65% of adults in the US are overweight or obese (NIDDK; National Institute of Diabetes and Digestive and Kidney Diseases, 2004). Research shows that adult and childhood obesity has reached epidemic levels and its prevalence is increasing both within the US and the US Commonwealth of Puerto Rico (Bastida, 2002; Hedley et al., 2004; Ogden, Flegal, Carroll, & Johnson, 2002; Troiano & Flegal, 1998). Of particular relevance to this evaluation project, Centers for Disease Control and Prevention (CDC, 2000, 2006c) data indicate that a high proportion of residents in Puerto Rico are overweight and/or are physically inactive with poor nutritional habits. Recent CDC (2006c) data indicate that nearly 40% and 25% of Puerto Rico’s residents are overweight or obese, respectively.

In response to concerns regarding the health and wellness of Puerto Rico’s residents, the Governor of Puerto Rico has charged the Departamento de Recreacion y Deportes (DRD) to undertake leadership in a major project, Puerto Rico en forma, which is designed to promote higher levels of regular MVPA and increased awareness of the benefits associated with proper nutrition and regular MVPA such as reduced susceptibility to illness and disease; enhanced muscular and cardiovascular functioning; and an overall better quality of life.

To this charge, a team of evaluators were assembled, collected baseline data, and this evaluation was developed. More specifically, a team of evaluators were assembled from faculty and students at The Ohio State University, University of Puerto Rico at Bayamon, and University of Puerto Rico at Mayagüez in collaboration with personnel from the DRD and collected data from across ten regions in Puerto Rico during March 19 to 24, 2007. Findings from these data are presented in this report.

Executive Summary

This evaluation (pilot study) was conducted using a descriptive cross sectional survey approach (Fraenkel & Wallen, 1990). This methodological approach enabled the data collectors to sample: (a) students from middle and high schools [Part 1]; and (b) adults from the general population in their local communities and at public venues [Part 2] across Puerto Rico’s ten geographical regions. In total, 1,151 residents (719 students and 432 adults) of Puerto Rico were evaluated on measures of dietary habits, physical activity patterns, and body composition. Data were analyzed using descriptive statistics and inferential procedures (Levin, 1983; MINITAB, 1996; Shavelson, 1988).
Part 1—Students. There were 719 middle and high school students (377 females, 52% and 342 males, 48%) sampled from ten geographical regions in Puerto Rico. These students mean age was 14 years. Most (64%) student participants indicated that they had no medical conditions or disabilities. But nearly 36% of the students reported having a medical condition and/or disability.

Across the ten regions, sampled were 541 students (241 males, 300 females) on their diets using a 22-item Food Behavior Checklist (Murphy et al., 2001) to assess behaviors in the categories of: (a) fruit and vegetables, (b) milk consumption, (c) fat and cholesterol, (d) diet quality, and (e) food security. Most (64%) students claimed to eat more than one kind of fruit daily. Male students were more likely to consume more than one kind of fruit daily than their female peers. Nearly 87% of the students had citrus juice or citrus fruit during the previous week. But most students (58%) do not eat more than one kind of vegetable on a daily basis. Nearly, 43% of the students indicated that they consumed only one kind of vegetable daily. Most of the students (69%) tend not to eat two or more servings of vegetables at their main meal. Over half of the students (55%) tend not to eat fruit or vegetables as a snack. But, some 45% of the students do eat fruit or vegetables as snacks. In fact, most students (86.5%) claimed to eat at least one or more servings of fruit daily.

Nearly, 70% of the students drink milk daily. But, male students were more likely to drink milk on a daily basis than their female peers. Both (82%) female and male students had consumed milk as a beverage or on cereal the previous week.

Most students (70%) surveyed indicated that during the previous week, they had not eaten fish. What’s more, 52.7% of the students do not take the skin off chicken before eating. Almost 88% of the students surveyed ate food from fast food restaurants at least one or more times a week. Only 12% of the students do not eat food from fast food restaurants on a weekly basis. More than half (55.3%) of the students indicated that during the previous week, they had eaten eggs. Typically, students (81%) had at least one or more servings of eggs weekly. Less than half (45%) of the students surveyed tended to eat low fat foods instead of high fat foods. In contrast, 55% of the students tended to eat high fat foods instead of low fat foods.

Nearly 84% of the students typically do not use the nutrition facts on food labels to choose foods when shopping. Eighty-five percent of the male and 86.7% of the female students typically drink regular soft drinks. Although, most students (85%) typically buy Kool-aid, Gatorade, Sunny Delight, or other imitation fruit drink or punch, female students were less likely to buy these products than male students. Over 62% of the male and 58% of the female students described their diets as good to excellent. But, female students had an overall lower rating (41.7% fair or poor) of their diets than their male peers (37.8% fair or poor).

Most students (64.5%) surveyed typically do not run out of food by the end of the month. But, nearly 36% of the students do run out of food by the end of the month. More than half (56%) of the students tend to worry about whether or not their food would run out before they could buy more.
Data on physical activity program participation were collected from 671 students across the ten regions and showed that 43% of students currently participate in a physical activity program. But, more than half of the students (56.8%) sampled do not participate in a physical activity program. Females (37%) were much less likely to participate in a physical activity program than their male peers (50%). Prior to this evaluation, most students (74%) had no knowledge of the Puerto Rico en forma Project. But, males were more likely to have knowledge of the project than female students.

Physical activity patterns were assessed using a visual 7-Day Physical Activity Recall survey (Lum, 2003), which was administered to 541 students across the ten regions. During the previous week, nearly 60% of the male and 50% of the female students participated in moderate physical activity. Students were less inclined to participate in vigorous physical activities. Some 40% of the male and only 24% of the female students participated in vigorous physical activity. A much higher proportion of students participated in moderate physical activity over 7 days than did in vigorous physical activity. What’s more, higher proportions of male students participated in moderate and vigorous physical activity than female students did during the previous week.

Typically, male students were taller and weighted more than their female peers. On average, the students’ estimated BMI was 23.5 kg/m². Female students’ average BMI estimate was 22.4 kg/m² and male students’ average BMI estimate was 23.9 kg/m². Most (63%) students’ BMI was within normal range. But, 26% of the female and 36% of the male students were either at-risk of overweight or were overweight. Moreover, a higher proportion of male students were either at-risk of overweight or were overweight compared to their female peers. In contrast, a higher proportion of females were underweight compared to their male peers.

Part 2—Adults. More than 400 adults (n = 432) across eight geographical regions in Puerto Rico were evaluated on measures of dietary habits, physical activity patterns, and body composition. Region 9 (n = 116) and Region 10 (n = 116) yielded the most adult participants. In contrast, Regions 5 (n = 21), 7 and 8 (no data) yielded the least number of adult participants. Over all 43% of the sample were men (n = 186) and 57% of the sample were women (n = 246). The age range of adults was 18 to 95 years. The mean age of men was 43.5 and 45.5 of women. In all, 249 (58%) adults indicated they had no medical or disability conditions; however 183 (42%) adults reported having a medical and/or disability condition. Women were more likely to report a medical condition or disability than men in the general population.

Adults (n = 432) were assessed using a 22-item Food Behavior Checklist (Murphy et al., 2001) to determine their dietary behaviors in the following categories: (a) fruit and vegetables, (b) milk consumption, (c) fat and cholesterol, (d) diet quality, and (e) food security.

Most (52%) adults claimed to eat more than one kind of fruit on a daily basis. Men were more likely to eat more than one kind of fruit daily than women. Nearly 91% of the adults had citrus juice or citrus fruit during the previous week. On a daily basis, 60% of the adults would eat more than one kind of vegetable and 44% of adults would eat only one kind of
vegetable. But most adults (57%) tend not to eat two or more servings of vegetables at their main meal. Slightly more than half of the adults (50.5%) tend not to eat fruit or vegetables as a snack. This means that almost 50% of the adults do eat fruit or vegetables as snacks. In fact, 79% of the adults claimed to eat at least one or more servings of fruit daily. Further, nearly half (49%) of the adults had eaten raw vegetables.

Nearly, 60% of the adults drink milk daily. Both men (61%) and women (59%) were likely to drink milk on a daily basis. Both (78%) women and men had consumed milk as a beverage or on cereal the previous week.

Most adults (54.6%) surveyed indicated that during the previous week, they had eaten fish. In comparison, a higher proportion of men had eaten fish than women during the previous week. What’s more, 70% of the adults remove the skin off chicken before eating. But, a higher proportion of women do this than men. Seventy-two percent of the adults surveyed eat food from fast food restaurants at least one or more times a week. Only 28% of the adults do not eat food from fast food restaurants on a weekly basis. More than 61% of the adults indicated that during the previous week, they had eaten eggs. Typically, adults (84%) had at least one or more servings of eggs weekly. Nearly 68% of the adults surveyed tend to eat low fat foods instead of high fat foods. In contrast, 32% of the adults tend to eat high fat foods instead of low fat foods. A higher proportion of women tend to eat low fat foods rather than high fat foods compared to men; and men were more likely to eat high fat foods than women.

Nearly 67% of the adults typically do not use the nutrition facts on food labels to choose foods when shopping. Sixty percent of the men and 55% of the women typically drink regular soft drinks. Although, most adults (60%) typically buy Kool-aid, Gatorade, Sunny Delight, or other imitation fruit drink or punch, women were less likely to buy these products than men. Some 58% of the men and 47% of the women described their diets as good to excellent. But, women had an overall lower rating (53% fair or poor) of their diets than their men (42% fair or poor).

Most adults (56%) surveyed typically do not run out of food by the end of the month. However of concern, nearly 44% of the adults do run out of food by the end of the month. Nearly 60% of the adults tend to worry about whether or not their food would run out before they could buy more.

It is well-established that adults who regularly participate in physical activity reduce their risk of cardiovascular disease and its complications and reduce their risk of encountering overweight and obesity-related conditions (CDC, 2004). Data on physical activity program participation revealed that 42% of the adults sampled currently participate in a physical activity program. But, more than half (58%) of the adults do not regularly participate in a physical activity program. Only 32% of the women but more than half (55%) of the men participate in a physical activity program. It was determined that a higher proportion of men tend to participate in physical activity programs than women. Most adults (72%) had no knowledge of the Puerto Rico en forma Project. However, men were more likely to have knowledge of the project than women surveyed.
Physical activity patterns were assessed using a 7-Day Physical Activity Recall (Weston et al., 1997) survey, which was administered to adult ($n = 432$) participants. These data were analyzed for work-related, moderate, and vigorous physical activity over the previous seven days. On average, nearly 56% of the women and 51% of the men participated in work-related physical activity. Less so, only 33.5% of the men and 28% of the women participated in moderate physical activity. Men (21%) and women (12%) were even less inclined to participate in vigorous physical activities. Women and men engaged in work-related physical activity more so than they did in MVPA. Moreover, higher proportions of men participated in vigorous physical activity than women.

Typically, men were taller at an average height of 5 feet and 7 inches (1.7 m) than women at an average height of 5 feet and 2 inches (1.58 m). Men’s average body weight of 179.7 lbs ($81.7^kgs$) was also more than women’s average body weight of 153.8 lbs ($69.9^kgs$). Adults’ average BMI was $27.8^kg/m^2$. The average BMI for women was $27.9^kg/m^2$ and $27.75^kg/m^2$ for men. Some 30% of the adults were at normal weight. But, most (68%) adult men and women were either overweight or obese. In contrast, one man and a small proportion of women (3%) were classified as underweight.

Results of this initial evaluation (pretest) establishes baseline information on students and adult residents of Puerto Rico for comparison with data to be collected in additional testing (posttests) to eventually demonstrate the effectiveness of the Puerto Rico en Forma project. Importantly, findings from this initial evaluation will inform future data collection and analysis procedures. To date, for example, we have used our initial experiences and findings to guide the revision of data collection instruments for use in future (posttests) data collection.

Ultimately, the results of the evaluation will be used to help determine the effectiveness of the Puerto Rico en forma project in aspects of weight reduction; increased levels and types of moderate and vigorous physical activity (MVPA) behaviors leading to better fitness; and increased awareness of appropriate physical activity and nutritional behaviors of Puerto Rico’s residents. Moreover, this evaluation may validate the importance of physical activity and health programs for children, youth, and adults with potential risk of becoming overweight and having health-related conditions because of lack of healthy lifestyles.

**Puerto Rico en forma and Purpose of the Evaluation**

**Part 1—Students.** The purpose of this preliminary evaluation was to establish baseline data on Puerto Rico’s residents’ nutritional tendencies, physical activity behaviors, and body composition [body mass index]. To that end, the following questions guided Part 1 of this evaluation on middle and high school students [male and female] across the Island of Puerto Rico:

1. What was the total sample size for students at middle and high schools across the 10 regions?

2. How many regions in Puerto Rico where student data collected from?

3. Which of the regions yielded the most student participants? Which region yielded the least number of student participants?
4. How many and what percentage of the sample were female students? How many and what percentage of the sample were male students?

5. How many and what percentage of the students had medical conditions and/or disabilities? Was the prevalence of medical conditions or disabilities for female and male students significantly different?

6. How many and what percentage of the students regularly eat fruits and vegetables?

7. How many and what percentage of the students drink milk and eat dairy products weekly?

8. How many and what percentage of the students consume fat and cholesterol in their weekly diets?

9. How many and what percentage of students rated their dietary quality as either: poor, reasonable, good, very good, or excellent?

10. How many and what percentage of students were afraid that they would run out of food by the end of the month?

11. How many and what percentage of students had knowledge of the Puerto Rico en forma project?

12. How many and what percentage of students were active in a physical activity program at the time data were collected for this preliminary evaluation?

13. What were the physical activity participation patterns of students? Did female and male students differ significantly in their responses to questions about their moderate to vigorous physical activity behaviors?

14. What was the average height (m) for male students? What was the average height (m) for female students? Did female and male students differ significantly in their height?

15. What was the average weight for female students? What was the average weight for male students? Did male and female students differ significantly in their weight?

16. What was the average Body Mass Index (BMI) for male and female students combined? What was the average BMI for female students? What was the average BMI for male students? Did female and male students differ significantly in their BMI?

17. What was the average BMI category for female students? What was the average BMI category for male students? Did male and female students differ significantly in their BMI categorization?

**Part 2—Adults.** The purpose of this preliminary evaluation was to establish baseline data on nutritional tendencies, physical activity patterns, and body measurements for adult residents across the Island of Puerto Rico. To that purpose, the following questions guided Part 2 of this evaluation:

18. What was the total sample size for adults in the general population across the 10 regions?

19. How many regions in Puerto Rico where adult men and women data collected from?
20. Which of the regions yielded the most adult participants? Which region yielded the least number of adult participants?

21. How many and what percentage of the adults sampled were women? How many and what percentage of the adults sampled were men?

22. How many and what percentage of the adults had medical conditions and/or disabilities? Was the prevalence of medical conditions or disabilities for women and men significantly different?

23. How many and what percentage of the adults regularly eat fruits and vegetables?

24. How many and what percentage of the adults drink milk and eat dairy products weekly?

25. How many and what percentage of the adults regularly consume fat and cholesterol in their weekly diets?

26. How many and what percentage of adults rated their dietary quality as either: poor, reasonable, good, very good, or excellent?

27. How many and what percentage of adults were afraid they would run out of food by the end of the month?

28. How many and what percentage of adults had knowledge of the Puerto Rico en forma project?

29. How many and what percentage of adults were active in a physical activity program at the time data were collected for this preliminary evaluation?

30. What were the physical activity patterns of adults? Did women and men differ significantly in their responses to questions about their work-related, moderate, and vigorous physical activity behaviors?

31. What was the average height (m) for men? What was the average height (m) for women? Did women and men differ significantly in their height?

32. What was the average weight for women? What was the average weight for men? Did men and women differ significantly in their weight?

33. What was the average Body Mass Index (BMI) for men and women combined? What was the average BMI for women? What was the average BMI for men? Did women and men differ in their BMI?

34. What was the average BMI category for women? What was the average BMI category for men? Did men and women differ significantly in their BMI categorization?

**Design and Evaluation Methods**

This preliminary evaluation was conducted using a descriptive cross sectional survey approach (Fraenkel & Wallen, 1990). This methodology allowed the data collectors to access and sample:(a) numerous middle and high school students attending multiple schools; and
(b) adults from the general population in their local communities and at public venues across Puerto Rico’s ten geographical regions.

<table>
<thead>
<tr>
<th>Region 1 Northwest (Anasco)</th>
<th>Region 6 Southeast (Humacao)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Region 2 North (Arecibo)</td>
<td>Region 7 Southwest (Mayaguez)</td>
</tr>
<tr>
<td>Region 3 Central (Aibonito)</td>
<td>Region 8 South (Ponce)</td>
</tr>
<tr>
<td>Region 4 South Central (Caguas)</td>
<td>Region 9 Metropolitan (Rio Piedras)</td>
</tr>
<tr>
<td>Region 5 Northeast (Canovanas)</td>
<td>Region 10 North Central (El Toa)</td>
</tr>
</tbody>
</table>

The 2005 estimate for the total population of Puerto Rico was 3,912,054 residents (U.S. Census Bureau, 2005). Of these residents, there were over 2 million female and 1.8 million male residents. There were an estimated 525,000 adults with a disability, some 228,000 men and 298,000 women with a disability, according to the Centers for Disease Control and Prevention (2006c). There are an estimated 609,555 school-age children and youth in Puerto Rico (Welcome to Puerto Rico, 2006). Plus, some 87,125 children and students with disabilities ages 3 to 17 receive special education or related services under the IDEA (1997) in Puerto Rico (US Department of Education, 2006).

Sample size estimates for this evaluation were determined by Raosoft (2006) on-line sample size calculator (http://www.raosoft.com/samplesize.html). The sample size estimate for the total population of 3.9 million Puerto Rican residents at 95% confidence level with a 5% margin of error was 385 residents. Using this formula, 385 residents was the minimum recommended sample size for data collection and analysis purposes.
Instrumentation

Several instruments were used to collect demographic data and data on participants’ nutritional habits, physical activity behaviors, and body composition [body mass index; BMI].

Participants’ demographic data (e.g., age, gender, disability/medical status, region of residence) were obtained using a questionnaire [Hoja de evaluación demográfica] designed specifically for this evaluation.

The Food Behavior Checklist (Murphy et al., 2001) was used to collect data on participants’ dietary habits. This 22-item checklist was easy to administer to children, youth, and adults.

The 7-Day Physical Activity Recall (Weston et al., 1997) survey was administered to adults; and the Visual 7-Day Physical Activity Recall survey (Lum, 2003) was administered to students. These surveys allowed the participants to self-report on consecutive previous days’ types and intensity of physical activity for 7 days starting with Sunday through Saturday.

Body weight and height were measured using a dial weighing scale and height stadiometer; and body mass index [BMI] was estimated and categorized (NHLBI, 2006a).

Data Collection and Analysis

All preliminary data were gathered over a 4-day period in March 2007. In collaboration with personnel from the Departamento de Recreación y Deportes [DRD], the following teams were assembled from faculty and students at The Ohio State University¹, University of Puerto Rico at Bayamon², and the University of Puerto Rico at Mayaguez³ and these teams collected data for this evaluation during the week of March 19 to 24, 2007 across ten regions in Puerto Rico:

Team 1: Region 1 Northwest and Region 2 North: Carlos Cervantes-Olivares¹ (Team Leader) and Kelly Dreibelbis¹

Team 2: Region 3 Central and Region 4 South Central: Esther Ortiz-Castillo¹ (Team Leader) and Frankie G. Collins¹

Team 3: Region 5 Northeast and Region 6 Southeast: Iris Arleen Figueroa², Samuel R. Hodge¹ (Project Director), Alex Vigo-Valentin¹ (Project Co-Director), Robert A. Bennett¹, and Juan C. Camacho²

Team 4: Region 7 Southwest and Region 8 South: Luis Del Rio³ (Project Co-Director)

Team 5: Region 9 Metropolitan and Region 10 North Central: Beth L. Hersman (Team Leader), Jacquelyn Monroe, and Emilio Almonte²

Survey procedures were designed to protect the privacy of all participants by allowing for anonymous and voluntary participation. For school-age students, local parental consent
procedures were followed before survey administration. Adult participants voluntarily gave consent.

The following students enrolled in an independent study, *Quantitative Research: Collecting, Entering, Analyzing, and Interpreting Data* to enter, analyze, and interpret data collected for the *Puerto Rico en forma* Project during spring quarter 2007 at The Ohio State University. These working groups presented their findings and submitted regional reports from their work to the course instructor [Dr. S. R. Hodge], which helped inform this current report. These regional reports are available via email attachment by request from Dr. Hodge at: <hodge.14@osu.edu>.

- Carlos Cervantes-Olivares and Kelly Dreibelbis: Reported on Region 1 Northwest and Region 2 North.
- Esther Ortiz-Castillo and Frankie G. Collins: Reported on Region 3 Central and Region 4 South Central.
- Alexander Vigo-Valentin and Robert A. Bennett: Reported on Region 5 Northeast and Region 6 Southeast.
- Jessica L. Stevens: Reported on Region 7 Southwest and Region 8 South.
- Bethany L. Hersman and Maria L. Gies: Reported on Region 9 Metropolitan and Region 10 North Central.

Descriptive statistics (e.g., frequencies, percentages, central tendencies, and standard deviations) and inferential procedures (analysis of variance and Kruskal-Wallis) were used for analyzing data collected across groups and regions (Gravetter & Wallnau, 1992; Shavelson, 1988).

An analysis of variance (ANOVA) parametric test requires interval level data and assumes an underlying continuous distribution, and is computed with an $F$ statistic (Levin, 1983; Thomas & Nelson, 2001). General Linear Model (GLM) factorial ANOVA designs tests were used for analyzing group differences; for example, on food behaviors, height, weight, and BMI data.

The Kruskal-Wallis test is a non-parametric version of the parametric ANOVA for comparing two or more samples (Gravette & Wallnau, 1992; Levin, 1983). For Kruskal-Wallis tests the level of measurement is ordinal [analyze median scores] and was used for analyzing group differences.

MINITAB statistical software (1996) was used for all data analyses.

**RESULTS**

This report presents the results from our initial evaluation of 1,151 residents (i.e., $n = 719$ students, $n = 432$ adults) of Puerto Rico on the following variables:

1. Demographic variables: age, gender, region of residence, and disability/medical status.
2. Nutritional behaviors as measured by a Food Behavior Checklist.

3. Physical activity participation patterns, knowledge of the Puerto Rico en Forma project, and moderate to vigorous physical activity behaviors as measured by a 7-Day Physical Activity Recall (adults) and a Visual 7-Day Physical Activity Recall (students).


PART 1—STUDENTS

Part 1 of this report presents the findings on data from middle and high school students ($n = 719$) across 10 regions in Puerto Rico.

Student Demographic Data Regions 1 through 10

**Part 1. Regions 1 through 10 Combined**

Middle and high school students ($n = 719$; 377 females, 342 males) were sampled from all ten regions in Puerto Rico (Table 2). Region 8 ($n = 130$) followed by Region 1 ($n = 117$) yielded the most student participants. In contrast, Region 10 ($n = 23$) and Region 2 ($n = 26$) yielded the least number of student participants (Graph 1).

<table>
<thead>
<tr>
<th>Region 1 Northwest ($n = 117$, 16.3%)</th>
<th>Region 6 Southeast ($n = 45$, 6.3%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Region 2 North ($n = 26$, 3.6%)</td>
<td>Region 7 Southwest ($n = 48$, 6.7%)</td>
</tr>
<tr>
<td>Region 3 Central ($n = 59$, 8.2%)</td>
<td>Region 8 South ($n = 130$, 18.1%)</td>
</tr>
<tr>
<td>Region 4 South Central ($n = 78$, 10.9%)</td>
<td>Region 9 Metropolitan ($n = 103$, 14.3%)</td>
</tr>
<tr>
<td>Region 5 Northeast ($n = 90$, 12.5%)</td>
<td>Region 10 North Central ($n = 23$, 3.2%)</td>
</tr>
</tbody>
</table>

Across regions, the gender composition of students sampled was 47.6% male ($n = 342$) and 52.4% ($n = 377$) female students (Graph 2).
These students were from 10 to 20 years ($M = 14.1, SD = 1.3$) of age. For males, the mean age was 14.8 and the mean age of females was 14.4 years (Table 3). An ANOVA test revealed significant differences in the mean ages of female and male students [$F(1) = 10.82$, $p = 0.001$]; where males tended to be older than female students.

Table 3. Descriptive Data on Gender and Age

<table>
<thead>
<tr>
<th>Gender</th>
<th>Sample (%)</th>
<th>Age (mean)</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>377 (52.4%)</td>
<td>14.4</td>
<td>1.7</td>
</tr>
<tr>
<td>Male</td>
<td>342 (47.6%)</td>
<td>14.8</td>
<td>1.6</td>
</tr>
<tr>
<td>Total</td>
<td>719 (100%)</td>
<td>22.2</td>
<td>1.6</td>
</tr>
</tbody>
</table>

Data on medical condition and/or disability status were collected from 671 students across 10 regions on the Island of Puerto Rico. Of these, 432 (64.4%) participants indicated (no response) they had no medical conditions or disabilities; but 239 (35.6%) students reported (yes) having a medical condition and/or disability (Graph 3). Of the female ($n = 349$) and male ($n = 322$) students, 33.8% and 37.6%, respectively indicated (yes response) that they had a medical condition or disability. However, a Kruskal-Wallis ANOVA test revealed no significant differences between male and female students on medical condition/disability status, $H(1) = 0.71$, $p = 0.39$. 

Graph 3. Medical Condition/Disability Status
Student Demographic Data Summary

From ten geographical regions across the U.S. Commonwealth of Puerto Rico, 719 middle and high school students were sampled. Nearly 48% of the sample were male (n = 342) students and 52% (n = 377) of the sample were female students. The mean age of these students was 14 years. Male students tended to be older than female students. Data on medical condition and/or disability status were collected from 671 students (349 females, 322 males) across the ten regions. Of these, 432 (64%) students indicated they had no medical or disability conditions; but 239 (36%) students reported having a medical and/or disability condition.

Food Behavior Checklist

Across the ten geographical regions, sampled were 541 students (241 males, 300 females) on their diets using a Food Behavior Checklist (FBC; Murphy et al., 2001). The FBC data are reported descriptively and group differences were analyzed inferentially using a general linear model (GLM) factorial ANOVA design (MINITAB, 1996) on gender for the 22-item FBC across the following categories.

- Items 1-8: Fruit and Vegetables
- Items 9-10: Milk
- Items 11-16: Fat and Cholesterol
- Items 17-20: Diet Quality
- Items 21-22: Food Security

**Items 1-8: Fruit and Vegetables**

**Item 1—Do You Eat More Than 1 Kind of Fruit Daily?** Most students (n = 346, 64%) surveyed on this question indicated that they eat more than one kind of fruit on a daily basis. But, 36% of the students (n = 195) do not eat more than one kind of fruit daily. Of the female (n = 300) students, 60% tended to eat more than 1 kind of fruit daily. Even more so, male (n = 241, 68.9%) students tended to eat more than 1 kind of fruit per day (Graph 4). GLM factorial ANOVA results indicate that females and males differ significantly on daily fruit consumption, F(1) = 4.59, p = 0.03. Male students were more likely to consume more than one kind of fruit daily than their female peers.

**Item 2—During the Past Week, Did You Have Citrus Fruit or Citrus Juice?** Most students surveyed on this question (n = 468, 86.5%) indicated that they had consumed citrus juice or citrus fruit during the previous week prior to their responding to the Food Behavior Checklist [FBC]. Most female (84%) and male (89%) students had consumed citrus juice or citrus fruit during the previous week prior to their responding to the FBC. Only 13.5% of the students (n = 73) had not consumed citrus juice or citrus fruit in the previous week. Of the female students, 15.7% (n = 47) had no citrus juice or fruit and only 26 male (10.8%) students had none during the previous week (Graph 4). GLM factorial ANOVA results
indicate that males and females did not differ on their consumption of citrus juice or fruit in the previous week, $F(1) = 2.73, p = 0.09$.

**Item 3—Do You Eat More Than 1 Kind of Vegetable a Day?** Most students surveyed ($n = 313, 57.9\%) on this question indicated that they do not eat more than one kind of vegetable on a daily basis. In contrast, 42\% of the students ($n = 228$) do eat more than one kind of vegetable daily. Nearly 40\% of the female ($n = 118$) and 45\% of the male ($n = 110$) students tended to eat more than 1 kind of vegetable daily (Graph 4). GLM factorial ANOVA results indicate that male and female students did not differ on their daily consumption of vegetables, $F(1) = 2.18, p = 0.14$.

**Item 4—How Many Servings of Vegetables Do You Eat Each Day?** The most frequent response by 42.5\% of the students ($n = 541$) surveyed on this question was that they consumed one kind of vegetable on a daily basis. In contrast, less than 1\% of the students ($n = 5$) consumed four or more servings of vegetables daily [not depicted in Graph 5 due to floor effect]. Nearly 29\% of the male ($n = 69$) and 33\% of the female ($n = 99$) students do not eat at least 1 kind of vegetable daily (Graph 5). GLM factorial ANOVA results indicated that male and female students did not differ on their daily consumption of vegetables, $F(1) = 3.00, p = 0.08$.

![Graph 5. FBC Item 4: Daily Servings of Vegetables](image)

**Item 5—Do You Eat 2 or More Servings of Vegetables at Your Main Meal?** Most of the students ($n = 374, 69\%) surveyed on this question tend not to eat two or more servings of vegetables at their main meal. In contrast, only 31\% of the students ($n = 167$) do eat two or more servings of vegetable during their main meals. Specifically, slightly less than 35\% of the male ($n = 84$) and 28\% of the female ($n = 83$) students tend to eat two or more servings of vegetables at their main meals (Graph 6). GLM factorial ANOVA results indicate that male and female students did not differ on their daily consumption of vegetables, $F(1) = 3.24, p = 0.07$.

**Item 6—Do You Eat Fruit or Vegetables as Snacks?** More than half of the students ($n = 296, 54.7\%) surveyed on this question tend not to eat fruit or vegetables as a snack. However, some 45\% of the students ($n = 245$) surveyed do eat fruit or vegetables as


snacks. That is, some 43% of the male \((n = 104)\) and 47% of the female \((n = 141)\) students tend to eat fruit or vegetables as snacks (Graph 6). Results of the GLM factorial ANOVA procedure indicate that female and male students did not differ on their consumption of fruits and vegetables as snacks, \(F(1) = 0.80, p = 0.37\).

**Item 7—How Many Servings of Fruit Do You Eat Each Day?** Most students \((n = 468, 86.5\%)\) surveyed on this question consumed at least one or more servings of fruit daily. The most frequent response (40.9%) by students \((n = 221)\) surveyed was they consumed one serving of fruit on a daily basis. But less than 6% of the students \((n = 31)\) consumed four or more servings of fruits daily [not depicted in Graph 6 due to floor effect]. In contrast, only 12% of the male \((n = 28)\) and 15% of the female \((n = 45)\) students do not eat at least one serving of fruit daily (Graph 7). GLM factorial ANOVA results indicate that male and female students did not differ on their daily consumption of fruits, \(F(1) = 3.01, p = 0.08\).

**Graph 7. FBC Item 7: Daily Servings of Fruit**

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>11.6</td>
<td>40.7</td>
</tr>
<tr>
<td>20</td>
<td>24</td>
<td>16.6</td>
</tr>
<tr>
<td>40</td>
<td>15</td>
<td>41</td>
</tr>
<tr>
<td>60</td>
<td>11</td>
<td>28.3</td>
</tr>
</tbody>
</table>

- None
- 1 Serving
- 2 Servings
- 3 Servings

**Item 8—During the Past Week, Did You Have Raw Vegetables?** Most students \((n = 399, 73.9\%)\) surveyed on Item 8 indicated that, during the previous week, they did not have raw vegetables. In contrast, 26% of the students \((n = 142)\) had eaten raw vegetables during the previous week. Most male \((75.5\%, n = 182)\) and female \((72\%, n = 217)\) students had no raw vegetables in their diets the previous week (Graph 8). GLM factorial ANOVA results indicate that female and male students did not differ on their consumption of raw vegetables, \(F(1) = 0.70, p = 0.40\).

**Items 9-10: Milk and Dairy**

**Item 9—Do You Drink Milk Daily?** Most students surveyed on Item 9 \((n = 374, 69.1\%)\) expressed that they drink milk daily. Most female \((62.3\%)\) and male \((77.6\%)\) students drink milk on a daily basis (Graph 9). Yet, nearly 31% of the students \((n = 167)\) do not drink milk daily. More female \((n = 113, 37.7\%)\) than male \((n = 54, 22.4\%)\) students do not drink milk on a daily basis. GLM factorial ANOVA results indicate that, \(F(1) = 14.9, p = 0.000\), female
and male students were significantly different in their milk consumption. Specifically, male
students were more likely to drink milk on a daily basis than their female peers.

**Item 10—During the Past Week, Did You Have Milk as a Beverage or on Cereal?** Most students \((n = 443, 82\%)\) surveyed revealed that, during the previous week, they had consumed milk as a beverage or on cereal. Most male \((84.7\%)\) and female \((79.7\%)\) students had consumed milk as a beverage or on cereal (**Graph 9**). Less so, 18% of the students \((n = 98)\) had not consumed milk as a beverage or on cereal in the previous week. More female \((n = 61, 20.3\%)\) than male \((n = 37, 15.4\%)\) students had not consumed milk as a beverage or on their cereal in the previous week. Statistically however, GLM factorial ANOVA results indicate that, \(F(1) = 2.24, p = 0.14\), male and female students did not differ significantly in their consumption of milk as a beverage or on cereal.

**Graph 9. Responses [Yes] to FBC Items 9 and 10: Milk Consumption**

![Graph 9](image)

**Items 11-16: Fat and Cholesterol**

**Item 11—During the Past Week, Did You Have Fish?** Most students \((n = 378, 70\%)\) surveyed on this question [Item 11] indicated that during the previous week, they had not eaten fish. Only 30% of the students \((n = 163)\) had eaten fish. Specifically, 29.9% of the male and 30.3% of the female students had eaten fish (**Graph 10**). But most male \((n = 169, 70.1\%)\) and female \((n = 209, 69.7\%)\) students had not eaten fish. GLM factorial ANOVA results, \(F(1) = 0.01, p = 0.91\), reveal that female and male students did not differ in their consumption of fish over the previous week.

**Item 12—Do You Take the Skin Off the Chicken?** Less than half of the students \((n = 256, 47\%)\) indicated that they take the skin off chicken before eating. This was the case for female \((n = 144, 48\%)\) and male \((n = 112, 46.5\%)\) students at similar proportions (**Graph 10**). However more than half \((53\%)\) of the students \((n = 285)\) do not take the skin off chicken before eating. Over half of the female \((52\%)\) and male \((53.5\%)\) students did not take the skin off chicken before eating it. GLM factorial ANOVA results confirms that, \(F(1) = 0.12, p = 0.72\), female and male students do not differ in this behavior.

**Item 13—How Many Times a Week Do You Usually Eat Food from a Fast Food Restaurant?** Most students \((n = 474, 87.6\%)\) surveyed on this question usually eat food from fast food restaurants at least one or more times a week. The highest response\((42\%)\)
bystudents \((n = 227)\) was that they eat food from fast food restaurants at least once each week (Graph 11). While 12% of the students \((n = 67)\) do not eat food from fast food restaurants on a weekly basis. Only 10.8% of the male \((n = 26)\) and 13.7% of the female \((n = 41)\) students do not eat food from fast food restaurants on a weekly basis. GLM factorial ANOVA results indicate that male and female students did not differ in their weekly consumption of food from fast food restaurants, \(F(1) = 1.98, p = 0.16\).

**Graph 11. FBC Item 13: Eat at Fast Food Restaurants**

Item 14—During the Past Week, Did You Have Eggs? More than half (55.3%) of the students surveyed on this question [Item 14] indicated that during the previous week, they had eaten eggs. Specifically, 52.7% of the female \((n = 158)\) and 58.5% of the male \((n = 141)\) students had eaten eggs the previous week (Graph 12). According to GLM factorial ANOVA results, \(F(1) = 1.84, p = 0.17\), indicate that male and female students did not differ in their consumption of eggs.

Item 15—If You Eat Eggs, About How Many Eggs Do You Usually Eat in a Week? Most students \((n = 439, 81\%)\) surveyed on this question consumed at least one or more servings of eggs weekly. The two most frequent responses (40.3% and 31%, respectively) by students were they consumed one or two servings of eggs on a weekly basis. Less than 10% of the students \((n = 52)\) consumed three or more servings of eggs weekly [not depicted in Graph 13 due to flooring effect]. In contrast, 19% of the male \((n = 46)\) and 18.7% of the female \((n = 56)\) students do not eat eggs on a weekly basis (Graph 13). GLM factorial ANOVA results indicate that male and female students did not differ on their weekly consumption of eggs, \(F(1) = 1.18, p = 0.28\).
**Item 16—Do You Eat Low-Fat Instead of High Fat Foods?** Less than half (44.7%) of the students \((n = 242)\) surveyed on this question [Item 16] tend to eat low fat foods instead of high fat foods. This was the case for 43.7% of the female \((n = 131)\) and 46% of the male \((n = 111)\) students (Graph 14). But more than half (55.3%) of the students \((n = 299)\) tend to eat high fat foods instead of low fat foods. Over half of the female (53.9%) and male (56.3%) students tend to eat high fat foods instead of low fat foods. GLM factorial ANOVA results confirms that, \(F(1) = 0.31, p = 0.58\), female and male students do not differ in their consumption of fatty foods.

**Graph 14. FBC Item 16: Low Fat versus High Fat Foods**

- **Items 17-20: Diet Quality**

**Item 17—When Shopping, Do You Use the Nutrition Facts on the Food Label to Choose Foods?** Nearly 84% of the students \((n = 453)\) surveyed on this question [Item 17] typically do not use the nutrition facts on food labels to choose foods when shopping. Of the 541 surveyed on this FBC item, only 16% of the students \((n = 88)\) typically use the nutrition facts on food labels to choose foods when shopping. But most (82.6%) male \((n = 199)\) and female \((n = 254, 84.7%)\) students typically do not use nutritional facts on food labels to choose foods when shopping (Graph 15). GLM factorial ANOVA results, \(F(1) = 0.43, p = 0.51\), indicate that female and male students do not differ in this behavior.
**Item 18—Do You Drink Regular Soft Drinks?** Most students \((n = 465, 86\%)\) surveyed on this question [Item 18] typically drink regular soft drinks. Eighty-five percent of the male \((n = 205)\) and 86.7% of the female \((n = 260)\) students typically drink regular soft drinks ([Graph 16]). Only 14% of the students \((n = 76)\) do not drink regular soft drinks. According to GLM factorial ANOVA results, \(F(1) = 0.28, p = 0.59\), female and male students did not differ in their consumption of soft drinks.

**Item 19—Do You Buy Kool-Aid, Gatorade, Sunny Delight, or Other Fruit Drink/Punch?** Most students \((n = 462, 85\%)\) surveyed on this question [Item 19] typically buy Kool-aid, Gatorade, Sunny Delight, or other imitation fruit drink or punch. Eighty-two percent of the female \((n = 248)\) and nearly 89% of the male \((n = 214)\) students typically buy these products ([Graph 16]). Only 14.6% of the students \((n = 79)\) do not buy Kool-aid, Gatorade, Sunny Delight, or other imitation fruit drink/punch. GLM factorial ANOVA results indicate that, \(F(1) = 4.04, p = 0.04\), female and male students differ significantly in their purchasing of Kool-aid, Gatorade, Sunny Delight, or other imitation fruit drink/punch. Female students were less likely to buy these products.

**Item 20—Would You Describe Your Diet As...** Nearly 88% of the students \((n = 476)\) surveyed on this question described their diet as fair to excellent ([Graph 17]). The two most frequent responses (33.3% and 27.9%) were students described their diets as good and fair, respectively. Some 12% of the students \((n = 65)\) described their diets as poor. In contrast, 62.3% of the male \((n = 150)\) and 58.3% of the female \((n = 175)\) students described their diets as good to excellent. GLM factorial ANOVA results indicate that male and female students were significantly different in their dietary ratings, \(F(1) = 4.47, p = 0.03\). This suggests that female students had an overall lower rating (42% fair or poor) of their diets than their male peers (37.8% fair or poor).

**Graph 17. FBC Item 20: Description of Diet**

![Graph 17. FBC Item 20: Description of Diet](image)

**Food Security**
Item 21—Do You Run Out of Food Before the End of the Month? Most students \((n = 349, 64.5\%)\) surveyed on this question [Item 21] typically do not run out of food by the end of the month. Sixty-one percent of the male \((n = 147)\) and 67\% of the female \((n = 202)\) students typically do not run out of food by the end of the month. However, nearly 36\% of the students \((n = 192)\) do run out of food by the end of the month. This was the case for 33\% of the female \((n = 98)\) and 39\% of the male \((n = 94)\) students who typically run out of food by the end of the month \((\text{Graph 18})\). GLM factorial ANOVA results, \(F(1) = 2.35, p = 0.13\), indicate that female and male students do not differ in their likelihood of running out of food by the end of the month.

Item 22—Do You Worry Whether Your Food will Run Out Before You Can Buy More? More than half \((56.4\%)\) of the students \((n = 305)\) surveyed on this question [Item 22] tend to worry about whether or not their food would run out before they could buy more. Fifty-eight percent of the male \((n = 141)\) and 54.7\% of the female \((n = 164)\) students tend to have this worry \((\text{Graph 18})\). But, nearly 44\% of the students \((n = 236)\) do not worry whether their food would run out before they could buy more. This was the case for 45\% of the female \((n = 136)\) and 41\% of the male \((n = 100)\) students. GLM factorial ANOVA results, \(F(1) = 0.80, p = 0.37\), indicate that female and male students do not differ in their tendency to worry about whether or not their food would run out before they could buy more.

Student Food Behaviors Summary

Across the ten geographical regions, sampled were 541 students \((241\ males, 300\ females)\) on their diets using a 22-item Food Behavior Checklist \((\text{Murphy et al.}, 2001)\) to assess behaviors in the following categories: (a) fruit and vegetables, (b) milk consumption, (c) fat and cholesterol, (d) diet quality, and (e) food security.

Most \((64\%)\) students claimed to eat more than one kind of fruit on a daily basis. Male students were more likely to consume more than one kind of fruit daily than their female peers. Nearly 87\% of the students had citrus juice or citrus fruit during the previous week. But most students \((58\%)\) do not eat more than one kind of vegetable on a daily basis. Nearly, 43\% of the students indicated that they consumed only one kind of vegetable daily. Most students \((69\%)\) tend not to eat two or more servings of vegetables at their main meal. More than half of the students \((54.7\%)\) surveyed tend not to eat fruit or vegetables as a snack. However, some 45\% of the students do eat fruit or vegetables as snacks. In fact, most students \((86.5\%)\) claimed to eat at least one or more servings of fruit daily.

Nearly, 70\% of the students drink milk daily. But, male students were more likely to drink milk on a daily basis than their female peers. Both \((82\%)\) female and male students had consumed milk as a beverage or on cereal the previous week.

Most students \((70\%)\) surveyed indicated that during the previous week, they had not eaten fish. What’s more, 52.7\% of the students do not take the skin off chicken before eating. Almost 88\% of the students surveyed eat food from fast food restaurants at least one or more times a week. Only 12\% of the students do not eat food from fast food restaurants on a weekly basis. More than half \((55.3\%)\) of the students indicated that during the previous
week, they had eaten eggs. Typically, students (81%) had at least one or more servings of eggs weekly. Less than half (45%) of the students surveyed tended to eat low fat foods instead of high fat foods. In contrast, 55% of the students tended to eat high fat foods instead of low fat foods.

Nearly 84% of the students typically do not use the nutrition facts on food labels to choose foods when shopping. Eighty-five percent of the male and 86.7% of the female students typically drink regular soft drinks. Although, most students (85%) typically buy Kool-aid, Gatorade, Sunny Delight, or other imitation fruit drink or punch, female students were less likely to buy these products. Over 62% of the male and 58% of the female students described their diets as good to excellent. But, female students had an overall lower rating (41.7% fair or poor) of their diets than their male peers (37.8% fair or poor).

Most students (64.5%) surveyed typically do not run out of food by the end of the month. But, nearly 36% of the students do run out of food by the end of the month. More than half (56%) of the students tend to worry about whether or not their food would run out before they could buy more.

**Student Physical Activity Patterns**

It has been well-established that regularly engaging in physical activity reduces the risk of cardiovascular disease and its complications and reduces the risk for overweight/obesity-related conditions (CDC, 2004).

To determine physical activity participation among students, participants were asked whether or not they participated in a physical activity program (PAP) and they answered either yes if they were participating in a physical activity program or no if they were not participating in a physical activity program (Graph 19). Data on PAP were collected from 671 students (349 females, 322 males) across the 10 regions and revealed that 43.2% \( (n = 290) \) of these students currently participated in a physical activity program.

Of concern, more than half (56.8%) of the students \( (n = 381) \) did not participate in a PAP. Specific to female students, only 37% \( (n = 129) \) of them participated in a physical activity program while 63% \( (n = 220) \) of the female students reported not participating in a PAP. Fifty percent of the male students \( (n = 161) \) participated in a physical activity program and 50% \( (n = 161) \) did not. A Kruskal-Wallis test revealed that male and female students differed significantly on PAP participation, \( H(1) = 11.6, p = 0.001 \) (adjusted for ties). That is, male students tended to participate in physical activity programs more so than female students.
Participants’ knowledge of the *Puerto Rico en forma* project was also assessed among the student sample. Most students \((n = 494, 73.6\%)\) had no knowledge of the project (Graph 20). Of the male \((n = 220)\) and female \((n = 274)\) students, 68\% and 78.5\%, respectively had no knowledge of the Puerto Rico en forma Project. However, there were 177 students (26.4\%) out of the 671 sampled on this question who had knowledge (yes) of the project. In all, 32\% \((n = 102)\) of the male and 21.5\% \((n = 75)\) of the female students had knowledge of the project. A Kruskal-Wallis test revealed that female and male students differed significantly in their knowledge of the project, \(H(1) = 8.94, p = .003\); indicating that males were more likely to have knowledge of the *Puerto Rico en forma* Project than female students.

To provide a baseline assessment of physical activity patterns, a visual 7-Day Physical Activity Recall (Lum, 2003) survey was administered to 541 student participants across the ten geographical regions. These data were analyzed as yes (participated) or no (did not participate) in moderate and/or vigorous physical activity (MVPA) over the previous seven days. Responses (yes versus no) were compared to determine significant differences between male and female students sampled.

**Student Moderate Physical Activity Patterns**

Frequencies and percentages were used to describe the proportion of student participants who responded yes if they participated in moderate physical activity (MPA) during the previous seven days. Nearly 58\% of the male and 50\% of the female students engaged in MPA. These participants mostly engaged in MPA during week days (Graph 21); that is, Monday through Friday. They engaged in MPA less so on the weekend (i.e., Saturday and Sunday). On Sunday, 48\% of male and 40\% of female students participated in MPA. On Monday, 62\% of female and 64\% of male students did so. On Tuesday, 64\% of male and 53\% of female students engaged in MPA. On Wednesday, 65\% of males and 56\% of females did so. On Thursday, 49\% of female and 61\% of male students participated in MPA. On Friday, 57\% of males and 49\% of females participated in MPA. Lastly, 41\% of female and 45\% of male students participated in MPA on Saturday.

A Kruskal-Wallis ANOVA test revealed significant differences in median responses across the previous 7 days for moderate physical activity between females and males, \(H (1) = 19.20\), \(p = .000\) (adjusted for ties). A higher proportion of male students engaged in
Student Vigorous Physical Activity Patterns

During the previous seven days, less than 40% of the male and only 24% of the female students engaged in vigorous physical activity (VPA). For those participants who did, they mostly engaged in VPA on Monday through Friday (Graph 22). Students did less VPA on the weekend (i.e., Saturday and Sunday). On Sunday, nearly 33% of male and only 19% of female students engaged in VPA. On Monday, 26.7% of female and slightly more than 42% of male students engaged in VPA. On Tuesday, 42% of male and 30% of female students engaged in VPA. Likewise on Wednesday, 46% of males and 27% of females did. On Thursday, 27% of female and 41% of male students participated in VPA. On Friday, nearly 39% of males and 20% of females did so. Lastly on Saturday, only 20% of female and 34% of male students engaged in vigorous physical activity.

A Kruskal-Wallis ANOVA test revealed significant differences in median responses across the previous 7 days for VPA between females and males, $H (1) = 13.28, p = .000$ (adjusted for ties). A higher proportion of male students engaged in VPA than their female peers. Graph 22 depicts the percentage of students who participated in VPA during the previous seven days.
On average, nearly 60% of the male and 50% of the female students participated in moderate physical activity the previous week. Students were less inclined to participate in vigorous physical activities. Less than 40% of the males and only 24% of the females engaged in vigorous physical activity during the previous week (Graph 23). Kruskal-Wallis test results, $H(1) = 19.20, p = .000$ (adjusted for ties) indicate that students were significantly different in their moderate to vigorous physical activity behaviors. A higher proportion of both female and male students participated in moderate physical activity than did in vigorous physical activity (Graph 23). Moreover, a higher proportion of male students participated in MVPA than female students during the previous week.

Student Physical Activity Behavior Summary

Data on physical activity program participation were collected from 671 students across the ten regions and revealed that 43% ($n = 290$) of students sampled currently participate in a physical activity program. But, more than half of these students ($n = 381, 56.8\%$) do not participate in a physical activity program. Female students ($n = 129, 37\%$) were much less likely to participate in a physical activity program than their male peers ($n = 161, 50\%$). Prior to this evaluation, most students ($n = 494, 73.6\%$) had no knowledge of the *Puerto Rico en forma* Project. But, males were more likely to have knowledge of the project than female students.

Physical activity patterns were assessed using a visual 7-Day Physical Activity Recall survey, which was administered to 541 students across the ten geographical regions of Puerto Rico. These data were analyzed as yes (participated) or no (did not participate) in moderate to vigorous physical activity (MVPA) over the previous seven days. On average, nearly 60% of the male and 50% of the female students participated in moderate physical activity.
activity. Students were much less inclined to participate in vigorous physical activities. Less than 40% of the male and only 24% of the female students participated in vigorous physical activity during the previous week. A significantly higher proportion of both female and male students participated in moderate physical activity than did in vigorous physical activity. Moreover, higher proportions of male students participated in moderate and vigorous physical activity than female students did during the previous week.

**Student Body Composition: Body Mass Index (BMI)**

*Body Mass Index*

Body mass index (BMI) was obtained through measuring students’ height without shoes (measured to the nearest .1 cm) using a stadiometer and weight was measured using a portable scale which was calibrated using a standard step-up test. School-age participants were classified as underweight if their BMI was less than the 5th percentile, normal weight at the 5th to 84th percentile, at risk of overweight 85th to 95th percentile, and overweight > 95th percentile. No obese category was used to avoid social issues as suggested by Boumtte, Huang, Lee, and Lin (2005). Descriptive statistics for height (m), weight (kg), BMI and BMIC are presented in Table 4.

**Table 4. Student Body Composition Measures (n = 541)**

<table>
<thead>
<tr>
<th>Measure</th>
<th>Mean</th>
<th>Median</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height (inches)</td>
<td>63.5</td>
<td>63</td>
<td>1.5</td>
</tr>
<tr>
<td>Height (meters)</td>
<td>1.62</td>
<td>1.61</td>
<td>0.09</td>
</tr>
<tr>
<td>Weight (lbs)</td>
<td>132.5</td>
<td>126.0</td>
<td>37.7</td>
</tr>
<tr>
<td>Weight (kg)</td>
<td>60.2</td>
<td>57.3</td>
<td>17.5</td>
</tr>
<tr>
<td>Body Mass Index</td>
<td>23.1</td>
<td>21.8</td>
<td>5.8</td>
</tr>
<tr>
<td>BMI Category</td>
<td>2.4</td>
<td>2.0</td>
<td>0.8</td>
</tr>
</tbody>
</table>

The average height of male students was 5 feet and 5 ½ inches or 1.66 meters. The average height of female students was 5 feet and 2 inches or 1.57 meters. On average, female students’ body weight was 121.7 pounds or 55.8 kg, and male students’ body weight was 146 pounds or 66.2 kg. According to GLM ANOVA test results, male and female students were significantly different in their height, \(F(1) = 136.6, p = 0.000\), and weight, \(F(1) = 44.54, p = 0.000\), measurements. On average, male students were taller and weighed more than their female peers.
The BMI categories (BMIC) of underweight, normal, at risk of overweight, and overweight were determined by students’ age, height (meters), and weight (kg) as established by Centers for Disease Control and Prevention (CDC, 2000). Data on BMI were collected from 541 students (300 females, 241 males) across the 10 regions and revealed that 63.4% (n = 343) of these students’ BMI was categorized as within normal weight range. Combined male and female students’ average BMI was 23 kg/m². Female students’ average BMI estimate was 22.4 kg/m² and male students’ average BMI estimate was 23.9 kg/m² (Graph 24).

On average, male students’ BMI was categorized as 2.5 and although this falls within normal weight range, it is approaching at-risk of overweight status. On average, female students’ BMIC was 2.3 (normal weight). But, 30.7% of the students’ BMI categorizations indicated that they were either at-risk of overweight or overweight. Specifically, 26% of the female and 36.4% of the male students were either at-risk of overweight or were overweight. A higher proportion of males were classified as at-risk of overweight (19%) or overweight (17.4%) compared to their female peers (Graph 25). GLM ANOVA test results revealed significant differences between female and male students’ BMI, F(1) = 9.32, p = 0.002 and BMIC, F(1) = 10.95, p = 0.001. Male students’ BMI and BMIC were higher than their female peers. These results further confirm that a higher proportion of male students were classified as at-risk of overweight or overweight compared to their female peers.

Graph 25. Students’ BMI Categorization

Student Body Composition Summary

Typically, male students were taller at an average height of 5 feet and 7 inches (1.7 m) than their female peers, who stood erected at an average height of 5 feet and 3 inches (1.6 m). Likewise, male students’ average body weight of 145.9 pounds (65.6 kg) was more than female students’ average body weight of 121 pounds (55.9 kg). Data on BMI were collected from 541 students (300 females, 241 males) across the 10 regions and revealed that these students’ average BMI was 23 kg/m². Female students’ average BMI estimate was 22.4 kg/m² and male students’ average BMI estimate was 23.9 kg/m². For most students (63%), their BMI was within normal range. However, 26% of the female and 36% of the male students were either at-risk of overweight or were overweight. In fact, a higher proportion of males were classified as at-risk of overweight (19%) or overweight (17%) than their female peers. In contrast, a higher proportion of females (n = 28, 9%) were classified as underweight than were their male (n = 4, < 2%) peers.
PART 2—ADULTS

Part 2 of this report presents the findings of data on adults ($n = 432$) from eight regions across Puerto Rico. Due to organizational and logistical issues, no data were collected on adults in Regions 7 (Southwest) and 8 (South).

Adults’ Demographic Data

**Part 1. Regions 1-6 and 9-10**

Adults ($n = 432$; 246 women, 186 men) were sampled from the general population across eight regions in Puerto Rico (Table 5). Region 9 ($n = 116$) and Region 10 ($n = 116$) yielded the most adult participants. In contrast, Regions 5 ($n = 21$), 7 and 8 (no data) yielded the least number of adult participants (Graph 26).

<table>
<thead>
<tr>
<th>Region 1 Northwest ($n = 24$, 5.6%)</th>
<th>Region 6 Southeast ($n = 27$, 6.3%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Region 2 North ($n = 25$, 5.8%)</td>
<td>Region 7 Southwest (no data, 0.0%)</td>
</tr>
<tr>
<td>Region 3 Central ($n = 62$, 14.4%)</td>
<td>Region 8 South (no data, 0.0%)</td>
</tr>
<tr>
<td>Region 4 South Central ($n = 41$, 9.5%)</td>
<td>Region 9 Metropolitan ($n = 116$, 26.9%)</td>
</tr>
<tr>
<td>Region 5 Northeast ($n = 21$, 4.9%)</td>
<td>Region 10 North Central ($n = 116$, 26.9%)</td>
</tr>
</tbody>
</table>

Across regions sampled, the gender distribution of adults sampled was 43% men ($n = 186$) and 57% ($n = 246$) women (Graph 27).
The age range of adults was 18 to 95 years ($M = 44.6, SD = 18.9$). The mean age (years) of men was 43.5 and 45.5 of women (Table 6). An ANOVA test revealed no significant differences in the mean ages of women and men [$F (1) = 1.26, p = 0.26$].

<table>
<thead>
<tr>
<th>Gender</th>
<th>Sample (%)</th>
<th>Age (mean)</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Women</td>
<td>246 (57%)</td>
<td>45.5</td>
<td>18.6</td>
</tr>
<tr>
<td>Men</td>
<td>186 (43%)</td>
<td>43.5</td>
<td>19.4</td>
</tr>
<tr>
<td>Total</td>
<td>432 (100%)</td>
<td>44.6</td>
<td>18.9</td>
</tr>
</tbody>
</table>
Data on medical condition and/or disability status were collected from 432 adults across eight regions on the Island of Puerto Rico. Of these, 249 (57.6%) adult participants claimed (no response) they had no medical conditions or disabilities; but 183 (42.4%) adults reported (yes) having a medical condition and/or disability (Graph 28). Of the women (n = 119) and men (n = 64), 48.4% and 34.4%, respectively indicated (yes response) that they had a medical condition or disability. Kruskal-Wallis ANOVA test results indicated that men and women were significantly different in their medical condition/disability status, $H(1) = 8.44, p = 0.004$. Women were more likely to report a medical condition or disability than men in the general population.

**Adult Demographic Data Summary**

From eight geographical regions on the Island of Puerto Rico, 432 adults were sampled from the general population. Overall, 43% of the sample were men (n = 186) and 57% of the sample were women (n = 246). The mean age of these adults was 44.6 years. Though not statistically significant, women sampled tended to be older than men sampled. In all, 249 (57.6%) adults indicated they had no medical or disability conditions; however, 183 (42.4%) adults reported having a medical and/or disability condition.

**Food Behavior Checklist**

Across eight geographical regions, sampled (n = 432) were 186 men and 246 women on their dietary behaviors using a Food Behavior Checklist (Murphy et al., 2001). FBC data are reported descriptively and group differences were analyzed inferentially using a GLM factorial ANOVA design (MINITAB, 1996) on gender for the 22-item FBC across the following categories.

- Items 1-8: Fruit and Vegetables
- Items 9-10: Milk
- Items 11-16: Fat and Cholesterol
- Items 17-20: Diet Quality
- Items 21-22: Food Security
Items 1-8: Fruit and Vegetables

Item 1—Do You Eat More Than 1 Kind of Fruit Daily? More than half of the adults ($n = 226, \text{52.3\%}$) surveyed indicated that they eat more than one kind of fruit on a daily basis. But, 47.7\% of the adults ($n = 206$) do not eat more than one kind of fruit daily. Of the female ($n = 114$) adults, 46\% tended to eat more than 1 kind of fruit daily. Even more so, male ($n = 112, \text{60\%}$) adults tended to eat more than 1 kind of fruit per day (Graph 29). GLM factorial ANOVA results indicate that women and men differed significantly on daily fruit consumption, $F(1) = 8.29, p = 0.004$. Men were more likely to consume more than one kind of fruit daily than were women.

Graph 29. Responses [Yes] to FBC Items 1-3: Fruit and Vegetables

Item 2—During the Past Week, Did You Have Citrus Fruit or Citrus Juice? Most adults surveyed (90.7\%) indicated that they had consumed citrus juice or citrus fruit during the previous week prior to their responding to the FBC. Most women (88.6\%) and men (93.5\%) had consumed citrus juice or citrus fruit during the previous week. Only 9.3\% of the adults ($n = 40$) had not consumed citrus juice or citrus fruit. Of the women, 11.4\% ($n = 28$) had no citrus juice or fruit and only 12 men (6.5\%) had none during the previous week (Graph 29). GLM factorial ANOVA results indicate that men and women did not differ on their consumption of citrus juice or fruit in the previous week, $F(1) = 3.07, p = 0.08$.

Item 3—Do You Eat More Than 1 Kind of Vegetable a Day? Most adults ($n = 261, \text{60.4\%}$) indicated that they had eaten more than one kind of vegetable on a daily basis. In contrast, 39.5\% of the adults ($n = 171$) had not eaten more than one kind of vegetable daily. Slightly more than 56\% of the women ($n = 138$) and 66\% of the men ($n = 123$) tended to eat more than 1 kind of vegetable daily (Graph 29). GLM factorial ANOVA results indicate that men and women were significantly different in their daily consumption of vegetables, $F(1) = 4.48, p = 0.03$. A higher proportion of men had eaten vegetables on a daily basis compared to women.

Item 4—How Many Servings of Vegetables Do You Eat Each Day? The most frequent response by 44\% of the adults ($n = 191$) surveyed was that they had consumed one kind of vegetable on a daily basis. In contrast, less than 7\% of the adults ($n = 7$) consumed four or more servings of vegetables daily [not depicted in Graph 32 due to flooring effect]. Nearly 16\% of
the men \((n = 29)\) and 20.7\% of the women \((n = 51)\) had not eaten at least 1 kind of vegetable daily (Graph 30). GLM factorial ANOVA results indicated that men and women did not differ on their daily consumption of vegetables, \(F(1) = 1.45, p = 0.23\).

**Item 5—Do You Eat 2 or More Servings of Vegetables at Your Main Meal?** Over half of the adults \((n = 244, 56.5\%)\) surveyed tend not to eat two or more servings of vegetables at their main meal. In contrast, 43.5\% of the adults \((n = 188)\) do eat two or more servings of vegetable during their main meals. Specifically, slightly more than 45\% of the men \((n = 84)\) and 42\% of the women \((n = 104)\) tend to eat two or more servings of vegetables at their main meals (Graph 31). GLM factorial ANOVA results indicate that men and women were not different in their daily consumption of vegetables, \(F(1) = 0.36, p = 0.55\).

**Item 6—Do You Eat Fruit or Vegetables as Snacks?** Slightly more than half (50.5\%) of the adults \((n = 218)\) surveyed tend not to eat fruit or vegetables as a snack. However, 49.5\% of the adults \((n = 214)\) surveyed do eat fruit or vegetables as snacks. That is, some 52\% of the men \((n = 97)\) and 47.6\% of the women \((n = 117)\) tend to eat fruit or vegetables as snacks (Graph 31). Results of the GLM factorial ANOVA procedure indicate that women and men did not differ in their consumption of fruits and vegetables as snacks, \(F(1) = 0.89, p = 0.35\).

**Item 7—How Many Servings of Fruit Do You Eat Each Day?** Most adults \((n = 341, 79\%)\) surveyed eat at least one or more servings of fruit daily. The most frequent response (43\%) by adults \((n = 186)\) surveyed was they eat one serving of fruit on a daily basis. But less than 2\% of the adults \((n = 6)\) eat four or more servings of fruit daily [not depicted in Graph 32 due to flooring effect]. In contrast, only 17.7\% of the men \((n = 33)\) and 23.6\% of the women \((n = 58)\) do not eat at least one serving of fruit daily (Graph 32). GLM factorial ANOVA results indicate that men and women did not differ in their daily consumption of fruits, \(F(1) = 2.87, p = 0.09\).

**Item 8—During the Past Week, Did You Have Raw Vegetables?** Over half (51\%) of the adults \((n = 220)\) surveyed indicated that, during the previous week, they did not have raw vegetables. In contrast, 49\% of the adults \((n = 212)\) had eaten raw vegetables during the previous week. Most men \((48.4\%, n = 90)\) and women \((49.6\%, n = 122)\) had no raw vegetables in their diets the previous week (Graph 33). GLM factorial ANOVA results
indicate that women and men did not differ in their consumption of raw vegetables, $F(1) = 0.06, p = 0.80$.

![Graph 33. FBC Item 8: Raw Vegetables](chart)

**Items 9-10: Milk and Dairy**

**Item 9—Do You Drink Milk Daily?** Most adults surveyed ($n = 257, 59.5\%$) drink milk daily. Most women (58.5\%) and men (60.8\%) drink milk on a daily basis (Graph 34). But over 40\% of the adults ($n = 175$) do not drink milk daily. Slightly more women ($n = 102, 41.57\%$) than men ($n = 73, 39.3\%$) do not drink milk on a daily basis. GLM factorial ANOVA results indicate that, $F(1) = 0.21, p = 0.64$, women and men do not differ in their milk consumption.

**Item 10—During the Past Week, Did You Have Milk as a Beverage or on Cereal?** Most adults ($n = 337, 78\%$) surveyed revealed that, during the previous week, they had consumed milk as a beverage or on cereal. Most (78\%) men and women had consumed milk as a beverage or on cereal (Graph 34). Less so, 22\% of the adults ($n = 95$) had not consumed milk as a beverage or on cereal in the previous week. GLM factorial ANOVA results indicate that, $F(1) = 0.00, p = 0.98$, men and women did not differ significantly in their consumption of milk as a beverage or on cereal.

**Items 11-16: Fat and Cholesterol**

**Item 11—During the Past Week, Did You Have Fish?** Most adults ($n = 236, 54.6\%$) surveyed indicated that during the previous week, they had eaten fish. Sixty-three percent of the men and 48\% of the women had eaten fish (Graph 35). Yet 45\% of the adults ($n = 196$) had not eaten fish. Nearly, 37\% of the men and 52\% of the women had not eaten fish. GLM factorial ANOVA results, $F(1) = 10.43, p = 0.001$, reveal that women and men were different in their consumption of fish. A higher proportion of men had eaten fish during the previous week than women.

**Item 12—Do You Take the Skin Off the Chicken?** Nearly 70\% of the adults ($n = 301$) indicated that they take the skin off chicken before eating (Graph 35). This occurs more so with women ($n = 181, 73.6\%$) than men ($n = 120, 64.5\%$). On the other hand, 30\% of the
adults (n = 131) do not take the skin off chicken before eating. Just over a fourth of the women (26.4%) and more than a third of the men (35.5%) did not take the skin off chicken before eating it. GLM factorial ANOVA results confirms that, F (1) = 4.14, p = 0.43, women and men were significantly different in their likelihood of removing the skin from chicken before eating. A higher proportion of women removed the skin from chicken before eating it than men.

**Item 13—How Many Times a Week Do You Usually Eat Food from a Fast Food Restaurant?** Most adults (n = 312, 72%) surveyed usually eat food from fast food restaurants at least one or more times a week. The highest response (32.9%) was that adults (n = 142) indicated they eat food from fast food restaurants at least once each week (Graph 36). More than 25% of the adults indicated that they eat food from fast food restaurants three or more times a week. In contrast, 27.8% of the adults (n = 120) do not eat food from fast food restaurants on a weekly basis. Specifically, 25% of the men (n = 47) and 29.7% of the women (n = 73) do not eat food from fast food restaurants on a weekly basis. GLM factorial ANOVA results indicate that men and women did not differ in their weekly consumption of food from fast food restaurants, F (1) = 0.12, p = 0.73.

**Item 14—During the Past Week, Did You Have Eggs?** More than 61% of the adults surveyed indicated that, during the previous week, they had eaten eggs. Specifically, 58.9% of the women (n = 145) and 65.6% of the men (n = 122) had eaten eggs the previous week (Graph 37). According to GLM factorial ANOVA results, F(1) 1.98, p = 0.16, indicate that men and women did not differ in their consumption of eggs.
Item 15—If You Eat Eggs, About How Many Eggs Do You Usually Eat in a Week?
Most adults (n = 361, 83.6%) surveyed consumed at least one or more servings of eggs weekly. The two most frequent responses (42% and 25.7%, respectively) by adults were they consumed one or two servings of eggs on a weekly basis. More than 15% of the adults (n = 68) consumed three or more servings of eggs weekly. In contrast, 13.4% of the men (n = 25) and 18.7% of the women (n = 46) do not eat eggs on a weekly basis (Graph 38). GLM factorial ANOVA results indicate that men and women were significantly different in their consumption of eggs, F (1) = 14.65, p = 0.000. Women were less likely to eat eggs than men from the general population.

Item 16—Do You Eat Low-Fat Instead of High Fat Foods? Nearly 68% of the adults (n = 292) surveyed tend to eat low fat foods instead of high fat foods. This was the case for 71.5% of the women (n = 176) and 62.4% of the men (n = 116) surveyed (Graph 39). But more than 32% of the adults (n = 140) tend to eat high fat foods instead of low fat foods. Less than a third of the women (28.5%) and more than a third of the men (37.6%) tend to eat high fat foods instead of low fat foods. GLM factorial ANOVA results confirm that, F (1) = 4.09, p = 0.04, women and men were significantly different in their consumption of fatty foods. A higher proportion of women tend to eat low fat foods rather than high fat foods compared to men; and men were more likely to eat high fat foods than women.
Item 17—When Shopping, Do You Use the Nutrition Facts on the Food Label to Choose Foods? Some 67% of the adults (n = 290) surveyed typically do not use the nutrition facts on food labels to choose foods when shopping. Only 32.9% of the adults (n = 142) typically use the nutrition facts on food labels to choose foods when shopping. But most (66.7%) men (n = 124) and women (n = 166, 67.5%) typically do not use nutritional facts on food labels to choose foods when shopping (Graph 40). GLM factorial ANOVA results, $F(1) = 0.03, p = 0.86$, indicate that women and men do not differ in this behavior.

Item 18—Do You Drink Regular Soft Drinks? Most adults (n = 251, 58%) from the general population typically drink regular soft drinks. Sixty-two percent of the men (n = 116) and 54.9% of the women (n = 135) typically drink regular soft drinks (Graph 41). However, nearly 42% of the adults (n = 181) do not drink regular soft drinks. More women (n = 111, 45%) than men (n = 70, 37.6%) do not drink regular soft drinks. According to GLM factorial ANOVA results, $F(1) = 2.44, p = 0.12$, women and men did not differ in their consumption of soft drinks.

Item 19—Do You Buy Kool-Aid, Gatorade, Sunny Delight, or Other Fruit Drink/Punch? Most adults (n = 258, 59.7%) surveyed typically buy Kool-aid, Gatorade, Sunny Delight, or other imitation fruit drink or punch. Nearly 55% of the women (n = 134) and 67% of the men (n = 124) typically buy these products (Graph 41). But 40% of the adults (n = 174) do not buy these products. GLM factorial ANOVA results indicate that, $F(1) = 6.62, p = 0.01$, women and men were significantly different in their purchasing of Kool-aid, Gatorade, Sunny Delight, or other imitation fruit drink/punch. Women were less likely to buy these products.
Item 20—Would You Describe Your Diet As... Nearly 85% of the adults (n = 366) surveyed described their diet as fair to excellent (Graph 42). The two most frequent responses (32.6% and 32.9%) were adults described their diets as good and fair, respectively. Some 15% of the adults (n = 47) described their diets as poor. In contrast, 58% of the men and 47% of the women described their diets as good to excellent. GLM factorial ANOVA results indicate that men and women were significantly different in their dietary ratings, $F(1) = 9.17, p = 0.003$. Women had an overall lower rating (53% fair or poor) of their diets than men (42% fair or poor) from the general population.

Food Security

Item 21—Do You Run Out of Food Before the End of the Month? Most adults (n = 240, 56%) surveyed typically do not run out of food by the end of the month. Fifty-three percent of the men and 57% of the women typically do not run out of food by the end of the month. However, nearly 44% of the adults (n = 192) do run out of food by the end of the month. This was the case for 42.7% of the women (n = 105) and 46.8% of the men (n = 87) who typically run out of food by the end of the month (Graph 43). GLM factorial ANOVA results, $F(1) = 0.72, p = 0.39$, indicate that women and men do not differ in their likelihood of running out of food by the end of the month.

Item 22—Do You Worry Whether Your Food will Run Out Before You Can Buy More? Nearly 60% of the adults (n = 254) surveyed tend to worry about whether or not their food would run out before they could buy more. Fifty-seven percent of the men (n = 106) and 60% of the women (n = 148) tend to have this worry (Graph 43). But, 41% of the adults (n = 178) do not worry whether their food would run out before they could buy more. This was the case for 40% of the women (n = 98) and 43% of the men (n = 80). GLM factorial ANOVA results, $F(1) = 0.44, p = 0.51$, indicate that women and men do not differ in their tendency to worry about whether or not their food would run out before they could buy more.
Adult Food Behaviors Summary

Across eight regions, sampled were 432 adults (186 men, 246 women) using a 22-item Food Behavior Checklist (Murphy et al., 2001) to assess behaviors in the following categories: (a) fruit and vegetables, (b) milk consumption, (c) fat and cholesterol, (d) diet quality, and (e) food security.

Most (52%) adults claimed to eat more than one kind of fruit on a daily basis. Men were more likely to consume more than one kind of fruit daily than women. Nearly 91% of the adults had citrus juice or citrus fruit during the previous week. On a daily basis, most adults (60%) eat more than one kind of vegetable and 44% of adults eat only one kind of vegetable. But most adults (57%) tend not to eat two or more servings of vegetables at their main meal. Slightly more than half of the adults (50.5%) tend not to eat fruit or vegetables as a snack. This means that almost 50% of the adults do eat fruit or vegetables as snacks. In fact, 79% of the adults claimed to eat at least one or more servings of fruit daily. Further, nearly half (49%) of the adults had eaten raw vegetables.

Nearly, 60% of the adults drink milk daily. Both men (61%) and women (59%) were likely to drink milk on a daily basis. Both (78%) women and men had consumed milk as a beverage or on cereal the previous week.

Most adults (54.6%) surveyed indicated that during the previous week, they had eaten fish. In comparison, a higher proportion of men had eaten fish than women during the previous week. What’s more, 70% of the adults remove the skin off chicken before eating. But, a higher proportion of women do this than men. Seventy-two percent of the adults surveyed eat fast food from fast food restaurants at least one or more times a week. Only 28% of the adults do not eat food from fast food restaurants on a weekly basis. More than 61% of the adults indicated that during the previous week, they had eaten eggs. Typically, adults (84%) had at least one or more servings of eggs weekly. Nearly 68% of the adults surveyed tend to eat low fat foods instead of high fat foods. In contrast, 32% of the adults tend to eat high fat foods instead of low fat foods. A higher proportion of women tend to eat low fat foods rather than high fat foods compared to men; and men were more likely to eat high fat foods than women.
Nearly 67% of the adults typically do not use the nutrition facts on food labels to choose foods when shopping. Sixty-two percent of the men and 55% of the women typically drink regular soft drinks. Although, most adults (60%) typically buy Kool-aid, Gatorade, Sunny Delight, or other imitation fruit drink or punch, women were less likely to buy these products than men. Some 58% of the men and 47% of the women described their diets as good to excellent. But, women had an overall lower rating (53% fair or poor) of their diets than their men (42% fair or poor).

Most adults (56%) surveyed typically do not run out of food by the end of the month. However of concern, nearly 44% of the adults do run out of food by the end of the month. Nearly 60% of the adults tend to worry about whether or not their food would run out before they could buy more.

**Adult Physical Activity Patterns**

It has been well-established that adults who regularly participate in physical activity reduce their risk of cardiovascular disease and its complications and reduce their risk of experiencing overweight/obesity-related conditions (CDC, 2004).

To determine physical activity participation among adults, participants were asked whether or not they participated in a physical activity program (PAP) and they answered either yes if they were participating in a physical activity program or no if they were not participating in a physical activity program (Graph 44). Data on PAP were collected from 432 adults (245 women, 186 men) across eight regions and revealed that 42% (n = 181) of these adults currently participate in a physical activity program.

Of concern, more than half (58%) of the adults (n = 251) do not participate in a PAP. Specific to women, only 31.7% (n = 78) of them participate in a physical activity program while 68% (n = 168) of the women reported not participating in a PAP. Fifty-five percent of the men (n = 103) participate in a physical activity program but 45% of them (n = 83) do not. A Kruskal-Wallis test revealed that men and women were significantly different on PAP participation, $H(1) = 24.32, p = 0.000$ (adjusted for ties). A higher proportion of men tend to participate in physical activity programs than women.

Participants’ knowledge of the *Puerto Rico en forma* project [KPIS] was also assessed among the adult sample. Most adults (n = 309, 71.5%) had no knowledge of the Puerto Rico en forma Project (Graph 45). Of the men (n = 114) and women (n = 195) sampled, 61% and 79%, respectively had no knowledge of the *Puerto Rico en forma* Project. However, there were 123 adults (28.5%) out of the 432 sampled who had knowledge (yes) of the *Puerto Rico en forma* program (KPIS). In all, 38.7% (n = 72) of the men and 20.7% (n = 51) of the women reported having knowledge of the KPIS. A Kruskal-Wallis test revealed that women and men were significantly different in their KPIS, $H(1) = 16.77, p = 0.000$ (adjusted for ties); indicating that men were more likely to have knowledge of the *Puerto Rico en forma* Project than women surveyed.
To provide a baseline assessment of physical activity patterns, a visual 7-Day Physical Activity Recall (Weston et al., 1997) survey was administered to 432 adult participants across the eight geographical regions. These data were analyzed as yes (participated) or no (did not participate) in moderate and/or vigorous physical activity (MVPA) over the previous seven days. Responses (yes versus no) were compared to determine significant differences between men and women sampled.

**Adult Work-Related Physical Activity Patterns**

Frequencies and percentages were used to describe the proportion of adult participants who responded yes if they participated in work-related physical activities (WPA) as part of job chores during the previous seven days. Results show that more than half of the men (51.5%) and 55.5% of the women engaged in work-related physical activity. These participants mostly engaged in WPA during week days (Graph 46); that is, Monday through Friday. They engaged in WPA less so on the weekend (i.e., Saturday and Sunday). On Sunday, 38.7% of men and 44% of women engaged in WPA. On Monday, 66.3% of women and 57.5% of men participated in WPA. On Tuesday, 56.5% of men and 59.8% of women engaged in WPA. Similarly, on Wednesday, 58% of men and 59.8% of women engaged in WPA. On Thursday, 56.5% of women and 53.8% of men participated in WPA. Likewise on Friday, 51.6% of men and 52.9% of women engaged in WPA. Lastly, 49% of the women and 44% of the men sampled participated in WPA on Saturday.

Although, women consistently had higher percentages of work-related physical activity behaviors than men during the seven day period, a Kruskal-Wallis ANOVA test revealed no significant differences in median responses across the previous 7 days for work-related physical activity between women and men, $H (1) = 0.67, p = .41$ (adjusted for ties). Graph 46 depicts the percentage of adults who participated in work-related physical activity during the previous seven days (at the time these data were collected).
Adult Moderate Physical Activity Patterns

Specific to moderate physical activity (MPA) patterns, results show that only 33.5% of men and 28% of women sampled engaged in moderate physical activity during the previous week. These participants mostly engaged in MPA during week days (Graph 46); that is, Monday through Friday. They did MPA less so on the weekend (i.e., Saturday and Sunday). On Sunday, 22.6% of men and 18% of women participated in MPA. On Monday, 40% of women and 42% of men did. On Tuesday, 37.6% of men and 32% of women participated in MPA. Similarly on Wednesday, 37.6% of men and 32.9% of women did so. On Thursday, 30% of women and 38.7% of men participated in MPA. Likewise on Friday, 35% of men and 24.8% of women engaged in MPA. Only 19% of women and 21% of men participated in moderate physical activity on Saturday.

Although, men consistently had higher percentages of moderate physical activity behaviors than women, a Kruskal-Wallis ANOVA test revealed no significant differences in median responses across the previous 7 days for MPA between women and men, $H (1) = 1.81, p = 0.18$ (adjusted for ties). Graph 46 depicts the percentage of adults who participated in MPA during the previous seven days (at the time these data were collected).

Adult Vigorous Physical Activity Patterns

During the previous seven days, only 21% of the men and 12.4% of the women engaged in vigorous physical activity (VPA). For those participants who did, they mostly engaged in VPA on week days (i.e., Monday through Friday) (Graph 47). Adults participated in VPA less so on the weekend (i.e., Saturday and Sunday). On Sunday, only 12% of men and 9% of women participated in VPA. On Monday, 15.5% of women and nearly 30% of men did VPA. On Tuesday, 22% of men and 14% of women did so. Similarly on Wednesday, 26.9% of men and 13.4% of women did VPA. On Thursday, 13.8% of women and 22.6% of men did. On Friday, 21% of men and 11% of women engaged in VPA. On Saturday, only 9% of women and 14.5 of men did vigorous physical activity.
A Kruskal-Wallis ANOVA test revealed significant differences in median responses on VPA between women and men, $H (1) = 4.83, p = .03$ (adjusted for ties). A higher proportion of men engaged in VPA than women during the seven day period. Graph 47 depicts the percentage of adults who participated in vigorous physical activity from Sunday to Saturday.

Graph 47. Vigorous Physical Activity

![Graph showing percentage of adults participating in vigorous physical activity from Sunday to Saturday.

Overall results show that more than half of the men (52%) and 56% of the women engaged in work-related physical activity during the previous week. Less so, 33.5% of the men and 28% of the women participated in moderate physical activity the previous week. Adults even were less inclined to engage in vigorous physical activities. Less than a fourth (21%) of the men and only 12% of the women engaged in vigorous physical activity during the previous week (Graph 48).

Kruskal-Wallis test results, $H (1) = 32.78, p = .000$ (adjusted for ties) indicate that adults were significantly different in their types of physical activity behaviors (i.e., work-related, moderate, and vigorous). Both men and women did higher levels of work-related physical activity than either moderate or vigorous physical activity (MVPA) during the 7 days (Graph 48). Gender differences were not found between men and women participation in work-related versus MVPA behaviors.

Adult Physical Activity Behavior Summary

Data on physical activity program participation were collected from 432 adults and revealed that 42% ($n = 181$) of adults sampled currently participate in a physical activity program. But, more than half of the adults (58%) sampled do not participate in a physical activity program. Men (55%) were more likely to participate in a physical activity program than women (32%). Prior to this evaluation, most adults (71.5%) had no knowledge of the Puerto Rico en forma Project. But, men were more likely to have knowledge of the project than women.
Physical activity patterns were assessed using a 7-Day Physical Activity Recall (Weston et al., 1997) survey, which was administered to adult \((n = 432)\) participants. These data were analyzed for work-related, moderate, and vigorous physical activity over the previous seven days. On average, nearly 56% of the women and 51% of the men participated in work-related physical activity. Less so, only 33.5% of the men and 28% of the women participated in moderate physical activity. Adults were even less inclined to participate in vigorous physical activities. Only 21% of the men and just 12% of the women did vigorous physical activity during the previous week. A significantly higher proportion of women and men engaged in work-related physical activity than they did in MVPA. Moreover, higher proportions of men participated in vigorous physical activity than women.

**Adult Body Composition: Body Mass Index (BMI)**

*Body Mass Index*

BMI was estimated through measuring adults’ height without shoes (assessed to the nearest .1 cm) with a stadiometer and measuring weight with a portable scale, which was calibrated using a standard step-up test. Table 7 presents descriptive statistics on height, weight, BMI, and BMI categories (BMIC). Adults’ BMI were categorized as:

- *Category 0* = underweight for BMI of less than 18 kg/m\(^2\)
- *Category 1* = normal weight for BMI of 18 to 24.9 kg/m\(^2\)
- *Category 2* = overweight for BMI of 25 to 29.9 kg/m\(^2\)
- *Category 3* = obese level 1 for BMI of 30 to 34.9 kg/m\(^2\)
- *Category 4* = obese level 2 (moderate) for BMI of 35.0 to 39.9 kg/m\(^2\)
- *Category 5* = obese level 3 (morbid) for BMI of 40 kg/m\(^2\) or greater

**Table 7. Adult Body Composition Measures \((n = 432)\)**

<table>
<thead>
<tr>
<th>Measure</th>
<th>Mean</th>
<th>Median</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height (inches)</td>
<td>64.5</td>
<td>64</td>
<td>1.5</td>
</tr>
<tr>
<td>Height (meters)</td>
<td>1.64</td>
<td>1.63</td>
<td>0.1</td>
</tr>
<tr>
<td>Weight (lbs)</td>
<td>165</td>
<td>161</td>
<td>39.7</td>
</tr>
<tr>
<td>Weight (kg)</td>
<td>75</td>
<td>73</td>
<td>18</td>
</tr>
<tr>
<td>Body Mass Index</td>
<td>27.8</td>
<td>27.1</td>
<td>5.8</td>
</tr>
<tr>
<td>BMICategory</td>
<td>2.1</td>
<td>2.0</td>
<td>1.1</td>
</tr>
</tbody>
</table>

The average height of men was 5 feet and 7 inches or 1.7 meters. The average height of women was 5 feet and 2 inches or 1.58 meters. On average, women body weight was 153.8 pounds or 69.9\% of ideal weight, and men body weight was 179.7 pounds or 81.7\% of ideal weight. According to GLM ANOVA test results, men and women were significantly different in their height, \(F(1) =\)
306.7, \( p = 0.000 \), and weight, \( F(1) = 50.2, \ p = 0.000 \), measurements. On average, men were taller and weighed more than women.

The BMI categories (BMIC) of underweight, normal, overweight, obese level 1, obese level 2, and obese level 3 were determined by adults’ height (meters) and weight (kg) as established by Centers for Disease Control and Prevention (CDC, 2000). Data on BMI were collected from 432 adults (246 women, 186 men) across eight regions and revealed that 31.7\% (\( n = 78 \)) of these adults’ BMI was categorized as within normal weight range. However, 36\% of the adults (\( n = 156 \)) were overweight and 32\% of the adults were obese. Combined men and women average BMI was 27.8\( ^{kg}/m^{2} \). The average BMI for women was 27.9\( ^{kg}/m^{2} \) and men 27.75\( ^{kg}/m^{2} \) (Graph 49).

For both men and women, their BMI was at Category 2, which represents overweight status (Graph 50). Only one man (< 1\%) and 7 (2.9\%) women were underweight. Just over 30\% of the adults were at normal weight (Category 1). Most (\( n = 293, 68\% \)) adults were categorized as either overweight (\( n = 156, 36\% \)), obese at level 1 (\( n = 94, 21.8\% \)), obese at level 2 (\( n = 27, 6.3\% \)), or obese at level 3 (\( n = 16, 3.7\% \)). GLM ANOVA test results revealed no significant differences between women and men in terms of the BMI, \( F(1) = 0.08, p = 0.78 \), or their BMI classification, \( F(1) = 0.05, p = 0.82 \). These results further confirm that both women and men (68\%) tended to be overweight or obese compared to 30\% of the adults who were at normal weight.
Adult Body Composition Summary

Typically, men were taller at an average height of 5 feet and 7 inches (1.7 m) than women at an average height of 5 feet and 2 inches (1.58 m). Likewise, men’s average body weight of was 179.7 lbs (81.7 kg) was more than women’s average body weight of 153.8 lbs (69.9 kg).

We estimated BMI for school-age youth and adults differently. CDC (2006d) guidelines were used for estimating BMI for girls and boys. Specifically, we used percentile ranks and present the results with four categories {i.e., underweight, normal, risk of overweight, and overweight} for children and youth; and six categories for adults {underweight, normal, overweight, obesity I, obesity II, and obesity III}.

Descriptive and inferential analysis of data on BMI revealed that the adult’s average BMI was 27.8 kg/m². The average BMI for women was 27.9 kg/m² and 27.75 kg/m² for men. About 30% of the adults were at normal weight. Of concern, however, most (68%) adult men and women were either overweight or obese. In contrast, one man and a small proportion of women (3%) were classified as underweight.

General Summary: Parts 1 and 2

Today, Hispanics represent the fastest growing minority in the US comprising 12.5% of the US population (US Census Bureau, 2006a, 2006b). Bastida (2002) stated that “the Hispanic/Latino population of the United States represents a widely diverse group consisting of diverse nationalities and races” (p. 456). She continued:

The racial and sub-ethnic diversity of these groups is manifested in various indicators of health disparities that include not only epidemiological differences in the prevalence and incidence of disease but also accessibility and utilization of health care. For example, Puerto Ricans have higher rates of infant mortality than other Hispanic groups. A similar pattern of differences within Hispanic sub-groups is also evident for low birth weight, neonatal mortality, and post-neonatal mortality rates, with Puerto Ricans having higher rates than other sub-groups.

Puerto Rican death rates also exceed those of other Hispanic groups and non-Hispanic Whites for myocardial infarction and other forms of ischemic heart disease, pneumonia, asthma, chronic liver disease and cirrhosis, and homicide. Death rates for Puerto Ricans in these diseases and conditions are either similar to, or exceed, those of African Americans. Asthma is also much more common in Puerto Rican children than non-Hispanic White children and other Hispanic children. (Bastida, 2002, p. 456)

In response to concerns about the health and wellness of Puerto Rico’s residents, the DRD has undertaken leadership in the Puerto Rico en forma project, which is designed to increase awareness of the benefits associated with proper nutrition and regular moderate to vigorous physical activity (MVPA) and to change dietary and physical activity behaviors through school and community based programs. To this end, a team of evaluators were assembled, collected data, and developed this report.
This team of evaluator was assembled from faculty and students at The Ohio State University, University of Puerto Rico at Bayamón, and University of Puerto Rico at Mayagüez. In collaboration with personnel from the DRD, the team collected and analyzed data from across ten regions in Puerto Rico. This evaluation (pilot study) was conducted using a descriptive cross sectional survey approach (Fraenkel & Wallen, 1990). This methodological approach enabled the data collectors to sample: (a) students from middle and high schools; and (b) adults from the general population in their local communities and at public venues across regions on the Island of Puerto Rico. In total, 1,151 residents (719 students and 432 adults) of Puerto Rican were evaluated on measures of dietary habits, physical activity patterns, and body composition. Data were analyzed using descriptive statistics and inferential procedures (MINITAB, 1996).

**Part 1—Students.** There were 719 students sampled. Specifically, 377 female (52%) and 342 male (52%) middle and high school students were sampled from ten geographical regions in Puerto Rico. The mean age was 14 years. Most (64%) students had no medical conditions or disabilities. However, nearly 36% of the students reported having a medical condition and/or disability.

Across regions, 541 students (241 males, 300 females) responded to questions on their dietary habits. Most (64%) students claimed to eat more than one kind of fruit daily. Male students were more likely to eat more than one kind of fruit daily than female students. A majority (87%) of the students had citrus juice or citrus fruit during the previous week. But most students (58%) do not eat more than one kind of vegetable daily. Most students (69%) tend not to eat two or more servings of vegetables at their main meal. Over half of the students (55%) tend not to eat fruit or vegetables as a snack. However, most students (87%) claimed to eat at least one or more servings of fruit daily.

Nearly, 70% of the students drink milk daily. But, male students were more likely to drink milk on a daily basis than their female peers. Both (82%) female and male students had consumed milk as a beverage or on cereal the previous week.

Most students (70%), during the previous week, they had not eaten fish. Plus nearly, 53% of the students do not take the skin off chicken before eating. Almost 88% of the students eat food from fast food restaurants at least one or more times a week. More than half (55%) of the students had eaten eggs during the previous week. Typically, students (81%) had at least one or more servings of eggs weekly. Less than half (45%) of the students surveyed tended to eat low fat foods instead of high fat foods.

Nearly 84% of the students typically do not use the nutrition facts on food labels to choose foods when shopping. More than 85% of male and female students typically drink regular soft drinks. Although, most students (85%) typically buy Kool-aid, Gatorade, Sunny Delight, or other imitation fruit drink or punch, females were less likely to buy these products than males.

Over 62% of the male and 58% of the female students described their diets as good to excellent. But, females had an overall lower rating (41.7% fair or poor) of their diets than their male peers (37.8% fair or poor). In terms of food security, most students (64.5%)
surveyed typically do not run out of food by the end of the month. But, nearly 36% of the students do run out of food by the end of the month. More than half (56%) of the students tend to worry about whether or not their food would run out before they could buy more.

Data on physical activity program participation were collected from 671 students across the ten regions and showed that nearly 57% of students sampled do not participate in a physical activity program. Females (37%) were much less likely to do so than their male (50%) peers. Prior to this evaluation, most students (74%) had no knowledge of the Puerto Rico en forma Project. But, males were more likely to have knowledge of the project than female students.

Physical activity patterns were assessed on 541 students across the ten regions. During the previous week, nearly 60% of the male and 50% of the female students participated in moderate physical activity. Students were less inclined to participate in vigorous physical activities. Some 40% of the male and only 24% of the female students participated in vigorous physical activity. A much higher proportion of students participated in moderate physical activity over 7 days than did in vigorous physical activity. What’s more, higher proportions of male students participated in moderate and vigorous physical activity than female students did during the previous week.

Typically, male students were taller and weighted more than their female peers. Female students’ average BMI estimate was 22.4 kg/m² and male students’ average BMI estimate was 23.9 kg/m². Most (63%) students’ BMI was within normal range. But, 26% of the female and 36% of the male students were either at-risk of overweight or were overweight. Moreover, a higher proportion of male students were either at-risk of overweight or were overweight compared to their female peers. In contrast, a higher proportion of females were underweight compared to their male peers.

**Part 2—Adults.** More than 400 adults (n = 432) across eight regions in Puerto Rico were evaluated on dietary habits, physical activity patterns, and body composition. Regions 9 and 10 yielded the most adult participants. In contrast, Regions 5, 7, and 8 yielded the least number of adult participants. Over all 43% of the sample were men and 57% were women. The mean age of men was 43.5 and 45.5 of women. In all, 249 (58%) adults had no medical or disability conditions; but 183 (42%) adults reported having a medical and/or disability condition. Women were more likely to report a medical condition or disability than men from the sample.

Adults were assessed to determine their dietary behaviors. Most (52%) adults claimed to eat more than one kind of fruit on a daily basis. Men were more likely to do so than women. Nearly 91% of the adults had citrus juice or citrus fruit during the previous week. Daily 60% of the adults would eat more than one kind of vegetable and 44% of adults would eat only one kind of vegetable. But most adults (57%) tend not to eat two or more servings of vegetables at their main meal. Some 51% of the adults tend not to eat fruit or vegetables as a snack. But, 79% of the adults claimed to eat at least one or more servings of fruit daily and 49% of the adults had eaten raw vegetables.

Nearly, 60% of the adults drink milk daily and both (78%) women and men had consumed milk as a beverage or on cereal the previous week.
Most adults (54.6%) had eaten fish during the previous week with a higher proportion of men doing so than women. Seventy percent of the adults remove the skin off chicken before eating with a higher proportion of women doing this than men. Seventy-two percent of the adults surveyed eat food from fast food restaurants at least one or more times a week. More than 61% of the adults had eaten eggs during the previous week. Typically, adults (84%) had at least one or more servings of eggs weekly. Nearly 68% of the adults tend to eat low fat foods instead of high fat foods with a higher proportion of women doing so than men. That is, men were more likely to eat high fat foods than women.

About 67% of the adults typically do not use the nutrition facts on food labels to choose foods when shopping. Sixty-two percent of the men and 55% of the women typically drink regular soft drinks. Most adults (60%) typically buy imitation fruit drink or punch. However, women were less likely to buy such products than men. Some 58% of the men and 47% of the women described their diets as good to excellent. But, women had an overall lower rating (53% fair or poor) of their diets than their men (42% fair or poor). Of concern, nearly 44% of the adults tend to run out of food by the end of the month and most (60%) adults tend to worry about whether or not their food would run out before they could buy more.

Forty-two percent of the adults sampled currently participate in a physical activity program. But, 58% of the adults do not regularly participate in a physical activity program. Only 32% of the women while 55% of the men participate in a physical activity program with a higher proportion of men doing so than women. Most adults (72%) had no knowledge of the Puerto Rico en forma Project. However, men were more likely to have knowledge of the project than women surveyed.

Physical activity patterns were assessed for work-related, moderate, and vigorous physical activity over the previous seven days. On average, nearly 56% of the women and 51% of the men participated in work-related physical activity. Less so, about 34% of the men and 28% of the women participated in moderate physical activity. Both men and women were less inclined to participate in vigorous physical activities than either work-related or moderate. Yet, higher proportions of men participated in vigorous physical activity than women.

Typically, men were taller and weighted more than women. The average BMI for women was 27.98 kg/m² and 27.75 kg/m² for men. Some 30% of the adults were at normal weight. Of concern, however, most (68%) adult men and women were either overweight or obese. In contrast, one man and a small proportion of women (3%) were classified as underweight.

Implications and Recommendations

Results of this initial evaluation (pretest) establishes baseline information on students and adult residents of Puerto Rico for comparison with data to be collected in additional testing (posttests) to eventually demonstrate the effectiveness of the Puerto Rico en Forma project. Importantly, findings from this initial evaluation will inform future data collection and
analysis procedures. To date, for example, we have used our initial experiences and findings to guide the revision of data collection instruments for use in future (posttests) data collection.

Ultimately, the results of the evaluation will be used to help determine the effectiveness of the *Puerto Rico en forma project* in aspects of weight reduction; increased levels and types of moderate and vigorous physical activity (MVPA) behaviors leading to better fitness; and increased awareness of appropriate physical activity and nutritional behaviors of Puerto Rico’s residents. Moreover, this evaluation may validate the importance of physical activity and health programs for children, youth, and adults with potential risk of becoming overweight and having health-related conditions because of lack of healthy lifestyles.

There was a consistency of participants eating more than one kind of fruit per day and a high consumption of fruit juices and drinking regular sodas. These findings are similar to other studies that assessed the fruit and juice consumption and sodas intake with Hispanic and Puerto Rican samples. Tanasescu et al. (2000) found that Puerto Ricans have a high consumption of fruit juice, and drinking sodas regularly compared to other ethnic groups [e.g., White-Americans, Black-Americans]. Students, across regions, reported daily milk consumption. Moreover, we found that participants tend to have a high consumption of fatty foods. According to Sweeney et al. (2007), Hispanics have the highest consumption of fat, sodium, cholesterol, and total daily calories intake when they are compared with Black-Americans, Asian, and White-American children. The findings of this evaluation across regions in Puerto Rico support other findings related to food behavior among Hispanic and Puerto Rican samples.

The findings of this evaluation also support other studies that have measured physical activity among adolescents and adults. Bouchard, Shepard, and Stephens (1994) established that physical activity patterns decrease from childhood to adulthood. In other words, children and adolescents tend to be more physically active than adults. In the present evaluation, middle and high school students were more physically active than adults across regions. But, students’ participation in physical activity was lower than data reported by CDC (2005) for the same age population. Even though, the CDC (2005) reports that approximately 70% of adolescents are physically active, students in Puerto Rico were less physically active on a daily basis.

On body composition, BMI estimates among adolescents and adults have been the main topic of several studies (Bumtje, Huang, & Lin, 2005; Ogden, Carroll, & Johnson, 2002). Those studies have shown that a significant part of the population in United States and other countries are either overweight or obese. In this current evaluation, nearly 70% of the adults were overweight or obese with a large proportion of them falling into the obesity categories. Of concern also, 26% of the female and 36% of the male students were either at-risk of overweight or overweight. These results are higher than data reported by BRFSS (2006). According to the BRFSS report (2006), 60% of the residents in Puerto Rico were either overweight or obese. In this current evaluation, the proportion of participants classified as obese is higher than the BRFSS data [i.e., 24.7%].
In sum, participants across regions had a high consumption of juice, regular soda drinks, fatty foods, and cholesterol. These factors increase the risk of being overweight or obese. Plus there were high proportions of students and adults not physically active. Plausibly these variables contribute to the high percentage of people across the Island of Puerto Rico found to be overweight or obese.

Interventions in all geographical regions must focus on educational and behavioral factors that contribute to improved dietary habits and increased MVPA behaviors. Improving those life areas would help youth and adults better pursue and accomplish a healthy lifestyle. Findings in this evaluation also suggest that greater effort should be placed on creating alternatives to get Puerto Rican residents more physically active on a regular basis, especially adults. Adults need to be attracted to participate in regular MVPA in addition to continuing to engage in physical activity related to work and household chores. For example, getting involved in community fitness programs and/or programs organized under the Puerto Rico en forma project would be an excellent means to promote wellness in the various communities. Recreational, sports, and other physical activity programs should promote self-awareness and self-monitoring (e.g., progress, caloric consumption, weight), which can lead to developing intrinsic motivation to participate in physical activity on a more regular basis.

Lastly, findings from this initial evaluation will inform future data collection and analysis procedures. To date, for example, we have used our initial experiences and findings to guide the revision of data collection instruments for use in future (posttests) data collection. Specifically, we have revised the following instruments (Appendix A) for use in future data collection:

- Programa Puerto Rico en Forma [cover page]
- Demographic Questionnaire [Hoja de evaluación demográfica]
- Modified 7-Day Physical Activity Recall [2007].
- Modified Food Behavior Checklist (Murphy et al., 2001)
- Smoking Behavior Survey (Monroe, 2007)
- Data sheet for estimating BMI [Índice de Masa Corporal sheet].

References


Lum, J. K. F. K. (2003). Establishing validity and reliability of the visual 7-day physical activity recall instrument: A pilot study. Unpublished Master’s Thesis. The Ohio State University, Columbus, OH.


Nasser, H. (June 19, 2003) 39 million make Hispanics largest minority group Census numbers show jump from 2000 tally. *USA Today*, pp. 1A-2A.


