PREDICTING INTENTIONS TO PHYSICAL ACTIVITY IN JORDANIAN PATIENTS WITH CORONARY ARTERY DISEASE: IMPACT OF ATTITUDES, SUBJECTIVE NORMS, AND PERCEIVED BEHAVIORAL CONTROL

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PREDICTING INTENTIONS TO PHYSICAL ACTIVITY IN JORDANIAN PATIENTS WITH CORONARY ARTERY DISEASE: IMPACT OF ATTITUDES, SUBJECTIVE NORMS, AND PERCEIVED BEHAVIORAL CONTROL (123 pp.)

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Background: Coronary artery disease (CAD) is the leading cause of death worldwide and is responsible for over 7 million deaths yearly all over the world. In developing countries such as Jordan, the incidence of coronary arteries disease exceeds that of developed countries. More than 35% of total deaths are related to CAD in Jordan. Decreased physical activity is common among Jordanians and it is one factor that may lead to CAD in Jordan. There is sparse research, including theory-based research, examining the lack of physical activity among Jordanian patients. Additionally, cultural restrictions that fuel motivation and support may contribute to a lack of physical activity participation among Jordanian patients.

Purpose: The purpose of this study, utilizing the Theory of Planned Behavior (TPB) as the framework, was to understand the intentions of Jordanian CAD patients to engage in physical activity through the examination of attitudes, subjective norms, and perceived behavioral control.

Methods: A cross-sectional study examined whether attitudes, subjective norms, and perceived behavioral control predict Jordanian CAD patients' intentions to participate in physical activity by using an Arabic-translated instrument that is based on the TPB. Additionally, the study explored the barriers to participating in physical activity.

Results: Descriptive and Inferential statistics were used to analyze the sample characteristics and answer the research questions. A good Cronbach's alpha (0.87) was reported for the TPB

questionnaire of the physical activity. The results indicated that the TPB predictors (attitude, subjective norms, and perceived behavioral control) explained 11.2 % of the variance in physical activity intention after controlling age and gender. Perceived behavioral control was the only significant predictor of physical activity intention. For the open-ended questions, feelings of exhaustion, in addition to the lack of time, family support, and shortage of physical activity facilities, were the most common barriers to engage in physical activity among Jordanian CAD patients.

Conclusion: The study findings add new information to Jordanian literature in identifying the predictors of the CAD patients' intention toward physical activity. The results are useful to Jordanian nurses to determine underlying factors that might contribute to the lack of physical activity among CAD patients, such as the inability of those patients to control their engagement in physical activity. The predictive power of perceived behavioral control in the intention to engage in physical activity indicates that interventions promoting physical activity for Jordanian CAD patients should focus on fostering a sense of control over their environment. In practical terms, this implies making physical activity more desirable and convenient by addressing the barriers that ensure a safe and convenient space for physical activity. Future research should focus on mixed methods with a strong qualitative component to understand the weak association between attitude and subjective norms with Jordanian CAD patients' intention toward physical activity.

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Chapter 1

Introduction

Around 17.7 million people worldwide die annually from cardiovascular diseases (CVDs), representing 31% of all global deaths (World Health Organization [WHO], 2017). Cardiovascular diseases are a group of disorders that affect both the heart and blood vessels and mainly include coronary artery disease (CAD), heart failure, congenital heart disease, cerebrovascular disease, peripheral arterial disease, deep vein thrombosis, and pulmonary embolism (WHO, 2017a). CAD, the narrowing of the coronary arteries sufficiently to prevent adequate blood flow to the heart, is responsible for over 7 million deaths worldwide each year (Tousoulis, 2018 & WHO, 2017a). Moreover, the incidence rate of CAD has become a costly burden to societies and developing countries. Recent statistics have shown incidence rates of CAD in developing Arabian countries have exceeded the incidence rates of CAD in more developed countries (Rahmati-Najarkolaei, Tavafian, Gholami, Fesharaki, & Jafari, 2015). Furthermore, the WHO (2017a) indicated that developing countries spent more than $3.7 trillion between 2011 and 2015 due to CVD.

Over the past few decades, evidence has identified the vital role of physical activity in preventing and treating coronary artery disease (WHO, 2013). The findings consistently show people with low physical activity levels have a higher risk of developing or dying from CAD compared with those who are more physically active (Centers for Disease Control and Prevention [CDC], 2014). Physical activity has an essential role in the secondary prevention of CAD, and it is therefore considered an essential component in cardiac rehabilitation programs (Bruning & Sturek, 2015; Press, Freestone & George, 2003). A report from the WHO (2011) has

revealed that approximately 80% of CAD disease-related morbidities and mortalities relate to modifiable behaviors, such as low physical activity level (WHO, 2011).

The decisive role of physical activity in preventing CAD has been well documented. Despite the positive impact of physical activity on CAD patients, the rates of physical inactivity for those patients remain quite high. Less than 20% of patients with self-reported coronary artery disease perform the recommended levels of physical activity (Darden, Richardson, & Jackson, 2013; Tang, Patao, Chuang, & Wong, 2013). As such, it is necessary to understand the determinants that limit or motivate such patients' intent to take part in regular physical activity. Certainly, an understanding of these determinants will serve as the first step in the development of future strategies to facilitate and increase physical activity rates among these patients. This investigation focused on the understanding of Jordanian CAD patients' intentions to participate in regular physical activity.

Empirical literature discussed different models such as the Social Cognitive Model, the Theory of Reason Action (TRA), the Theory of Planned Behavior (TPB), and the Transtheoretical Model to predict intentions and behaviors. One of the theoretical frameworks that have received clear support in the literature on physical activity is Ajzen's (1985) TPB (Bauman, Sallis, Dzewaltowski, & Owen, 2002). This theory has been used for decades as a method to understand and predict people's behaviors and intentions to perform behaviors (Ajzen & Fishbein, 2005), and it has been demonstrated to be useful in the prediction of behaviors and intentions in many contexts. Ajzen's theory postulates that one set of factors, namely attitudes, subjective norms, and perceived behavioral control, can be used to predict behavioral intentions across multiple domains (Ajzen & Fishbein, 1980, 2005).

This model has successfully been applied to predict physical activity and exercise intentions among diverse populations in Western culture (Armitage & Connor, 2001; Blanchard et al., 2003; De Vivo et al., 2016; Gholamnia Shirvani, Ghofranipour, Gharakhanlou & Kazemnejad, 2014; White et al., 2012). Currently, no studies have made use of this model to predict physical activity intention among the Jordanian population. The objective of the current study is to apply the TPB to expand the understanding of Jordanian CAD patients' intentions of practicing physical activity behavior. The TPB suggests an individual's intention to engage in a behavior is a proximal predictor of the behavior. The intention is conceived as the summary motivation to perform a certain behavior (Ajzen, 1991).

Significance

The American Heart Association (AHA, 2009) mentioned nine major modifiable and non-modifiable risk factors for the development of CAD. These factors consist of age, sex, heredity, smoking, physical activity level, hypercholesteremia, hypertension, obesity, and diabetes mellitus. Risk factors defined as attributes or exposures of an individual are significantly associated with the occurrence of a disease (WHO, 2017b). Most of these modifiable risk factors can be minimized, as approximately 75% of risk factors are attributable to lifestyle choices (WHO, 2017b), such as increasing physical activity level, decreasing smoking, and following a low-fat diet (AHA, 2009). Engaging in regular physical activity behavior and improving physical fitness are also clearly associated with a decreased risk for CAD, stroke, and related mortality (Dickins & Braun, 2017).

Several studies suggested a direct relationship between low physical activity and increased cardiovascular events and premature death (Agarwal, 2012; Bruning, & Sturek, 2015; Press, Freestone, & George, 2003). The epidemiology studies conducted at the beginning of the

1940s demonstrated that people who engaged in high levels of occupational physical activity were less likely to develop cardiovascular disease (Carnethon, 2009; Darden, Richardson, & Jackson, 2013). Since that time, the literature and clinical evidence strongly indicated the incidence of CAD, in addition to the morbidities and mortalities from CAD, can be significantly reduced by adopting healthy behaviors such as practicing regular physical activity (Arija et al., 2017; Bruning & Sturek, 2015; Darden, Richardson, & Jackson, 2013).

Prevalence of CAD

The mortality rate for Americans from CAD is 600,000 each year, and it is the leading cause of death in the United States (U.S.) (CDC, 2016). Moreover, health care expenses due to CAD costs of more than $200 billion per year in the U.S. (CDC, 2016). The AHA recently reported that every 42 seconds, an adult American suffers from CAD (AHA, 2014). The United Nations (UN) formally recognized that CVD diseases, including CAD, as a significant concern for global health all over the world, and there are substantial variations in the epidemic of CAD among countries (Alwan, 2009).

Cardiac diseases are major causes of death in Middle Eastern and Arab countries. The proportion of deaths from CAD range from 25% to 40% among these countries (WHO, 2009). In Jordan, more than 35% of total deaths are related to cardiac disease (CDC, 2013), and around 60% of these deaths are related to CAD (CDC, 2013).

Physical activity and CAD

Exercise and physical activity are considered a major modifiable risk factor for CAD and contribute to the prevention and management of CAD (Arija et al., 2017). These benefits range from reduced risk for additional chronic diseases to enhanced physical and mental health as well

as improved quality of life (Alkerwi et al., 2015). Hence, adherence to physical activity has become a worldwide concern (WHO, 2013).

Despite the importance of physical activity for CAD patients, global rates of physical activity engagement among those patients are reported as less than the recommended levels (AHA, 2014; Alkerwi et al., 2015; Arija et al., 2017). A retrospective cohort study conducted in the Netherlands to assess the physical activity levels among 3382 patients. (van Laar, TImman, & Noyez, 2017). The results showed that physical activity levels had significantly declined after hospital discharge among 1367 patients (40%). Therefore, it is necessary to understand the motives and intentions of CAD patients before developing physical activity programs for them.

CAD in Jordan

The major risk factors of CAD play a crucial role in the development of the disease among the Jordanian population. These include age, sex, smoking, obesity, and decreased physical activity (Alsaleh, Windle, & Blake, 2016; Elhneiti & Al-Hussami, 2017).). Obesity, in the last few decades, has dramatically increased among Jordanian communities as well as the other Arab communities; in fact, the Middle East region accounts for one of the world's highest rates of obesity (WHO, 2017b). More than one-third of the Middle East population is obese (WHO, 2017b). In Jordan, precisely, greater than 70% of adults are overweight or obese (WHO, 2013).

Physical inactivity is significantly high among Jordanians. Several studies from different regions in Middle East countries indicated the majority of adults are physically inactive (Al Subhi, Al Ani, & Bose, 2015; Barghouti, Jaghbir, Abu Rmaileh, Jallad, & Abd-Qudah, 2015; Sharara, Akik, Ghattas, & Obermeyer, 2018; Uysal & Ozcan, 2015). One source revealed that more than 40% of Middle East adults are physically inactive (Sharara et al., 2018). Another

study of ten Middle Eastern countries, including Jordan, revealed more than 80% of adolescents and young adults from both sexes do not engage in any kind of physical activity regularly (Al Subhi, Bose, & Al Ani, 2015).

Although the extensive benefits of physical activity are known, the CAD Jordanian patients, as well as other Jordanian patients, engage in much less activity than desired (Alsaleh, Windle, & Blake, 2016; Elhneiti & Al-Hussami, 2017). Moreover, the majority of those patients do not achieve the recommended level of physical activity (Alsaleh, Windle, & Blake, 2016; Al Subhi, Bose, & Al Ani, 2015; Shishani, 2010). A survey conducted among Jordanian adults reported only 12.5 % of participants participated in regular physical activity, and physical inactivity increased with age and in the female gender. Additionally, Jordanian females spend less time practicing vigorous physical activity than males (Barghouti et al., 2015). More than 65% of Jordanian women did not practice any regular physical activity (Al-Nsour et al., 2011).

Gender norms, including a conservative dress not suitable for physical activity, cultural values, and social pressures, prohibit exercising and encourage inactivity (Sharara et al., 2018). These are the most important determinants that influence physical activity in Jordan. Moreover, practicing physical activity is still not accepted among Jordanian people, particularly with the elderly and women due to social and cultural factors. The prevalence of physical activities among Jordanians is low, and the majority of adult patients in Jordan are not willing to practice physical activity, particularly outdoor activities such as running or swimming, due to cultural norms and social responsibilities. Barghouti et al., 2015).

Problem Statement

Lack of awareness and knowledge about the disease, poor social support, and low self-control or motivation to adhere to physical activity are the major factors that influence CAD

patients to practice physical activity (Alkerwi et al., 2015; Smith et al., 2017; Tak, Uffelen, Paw, Mechelen, & Hopman-Rock, 2012). Nevertheless, the impact of these factors differs from one community to another. Even though a growing body of literature identifying determinants that affect patient decisions to practice physical activity among CAD patients exists, limited studies have investigated those determinants among the CAD Jordanian population.

The lack of theory-based research among the Jordanian CAD patient community has led to limited knowledge about their intentions to practice physical activity, which in turn constrains our understanding about factors that influence CAD patients' ability to practice physical activity. Theories help to systematically build knowledge to understand better how and why people might be motivated or unmotivated to adopt and/or maintain a specific behavior, such as physical activity. One widely-used theory in research is the TPB, which proposes that persons might intend to perform a specific behavior, but some determinants decrease their readiness to complete that action (Ajzen, 1991; Hagger, Chatzisarantis, & Biddle, 2002).

According to the TPB, the determinants of intention to adopt or not to adopt a behavior are attitude, subjective norms, and perceived behavioral control with respect to adopting the behavior. Therefore, it is crucial to understand the effect of these determinants on Jordanian CAD patients' intentions to adopt physical activity behavior.

Purpose

The purpose of this cross-sectional study was to examine whether attitudes, subjective norms, and perceived behavioral control predict Jordanian CAD patients' intentions to practice physical activity. Additionally, this study measured the impact of these determinants on CAD patients' intentions by using an Arabic-translated instrument that is based on the TPB.

Theoretical framework

The TPB provided the framework for this study (Ajzen, 1991; Armitage, 2005). This theory was used to predict why people make decisions, and it has become one of the most influential conceptual frameworks in the study of human behavior and action (Ajzen, 2001). Intention plays a critical role in this theory and is identified as the most significant predictor of whether someone will complete a specific behavior (Ajzen & Fishbein, 1977).

The TPB is an extension of the TRA (Fishbein & Ajzen, 1975). The TRA suggests that behavioral intention is the main predictor for the behavioral change, and intentions are a function of two determinants: attitude and subjective norm (Montano & Kasprzyk, 2002). As in the original TRA, the TPB proposes that an individual's intention to perform a behavior is a central determinant of the behavior, but TPB postulates the intention is a function of three determinants, attitude, subjective norms, and perceived behavioral control.

Theory of Planned Behavior Variables

The TPB assumes an individual's behavior can be predicted by the strength of the intention of an individual, which helps researchers to understand the link between attitudes toward the behavior, the subjective norms (or social pressures), and perceived behavioral control (Ajzen, 2002; Courneya, 1995). Ajzen (1991) defined intention as an individual's readiness to perform a given behavior or action. Furthermore, the intention is the immediate antecedent of behavior, and it is based on attitude toward behavior, subjective norms, and perceived behavioral control. Therefore, the more positive the attitude and subjective norms regarding behavior, and the higher the perceived behavioral control, the more intention exists to perform the behavior (Ajzen, 1991). Additionally, these three determinants provide a comprehensive method of predicting intention and can be measured utilizing the questionnaire based on the TBP (Ajzen, 1991).

TPB is guided by three kinds of beliefs; behavioral beliefs that are assumed to influence attitudes toward the behavior, normative beliefs that constitute the underlying determinants of subjective norms, and control beliefs that provide the basis for perceptions of behavioral control. Figure 1 illustrates the schematic representation of the TPB.

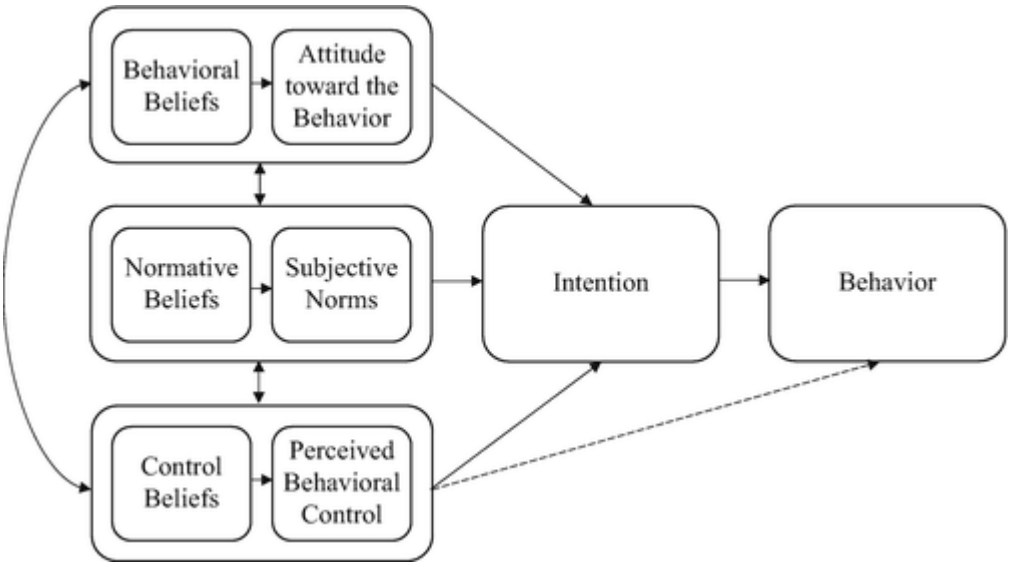

Figure 1. Schematic Representation of the TPB.

Attitudes toward behavior are a function of behavioral beliefs (Fishbein & Ajzen, 1975). Behavioral beliefs are based on personal experience and information sources. Behavioral beliefs are a subjective judgment that a particular action will lead to a certain outcome (Ajzen, 2005). For example, CAD patients' previous knowledge and experience with physical activity will positively or negatively influence their future decisions to engage in physical activity behavior.

Subjective norms are determined by normative beliefs (Ajzen & Driver, 1992; Ajzen & Fishbein, 1980). Normative beliefs are individuals' beliefs about the extent to which other people who are important to the individual think they should or should not perform particular behavior (Ajzen, 1991). For example, normative beliefs are concerned with the likelihood that important people for CAD patients approve or disapprove of performing physical activity.

Perceived behavioral control consists of a set of beliefs that deal with the "presence or absence of requisite resources and opportunities" (Ajzen, 1991, p. 196). Perceived behavioral control emerges from or is determined by control beliefs (Ajzen, 2002). Control beliefs refer to perceived factors that could facilitate or inhibit a specific behavior (Ajzen, 2002). For example, with respect to physical activity behavior, if CAD patients believe they have the required knowledge, ability, and skills for practicing physical activity, then they would likely perceive high control over this behavior.

Study Model

Theories- in general- provide an explanation about how and why variables are related together. Therefore, confidence in understanding the relationship between variables is strengthened by a theoretical framework that provides a model for organizing the research questions and data collection (Creswell, 2012). The TPB is an empirically supported theoretical framework (Ajzen, 1991; Armitage & Conner, 2001; Armitage, 2005). The effectiveness of the TPB to predict the intentions towards physical activity has also been well-established (Linder, Harper, Jung, & Woodson-Smith, 2017; Esposito, van Bavel, Baranowski, & Duch-Brown, 2016; Newham, Allan, Leahy-Warren, Carrick-Sen, & Alderdice, 2016; Reuter, Ziegelmann, Lippke, & Schwarzer, 2009; Scholz, Keller and Perren, 2009). The TPB has been used as a theoretical framework for understanding the physical activity intentions for cardiac patients within several Western cultures (Blanchard et al., 2003; Johnston, Johnston, Pollard, Kimonth, Mant, 2004; Oliveira, Silva, Alves & Domingues, 2014). Despite this, the need remains to expand the TPB's utility for adopting healthy behaviors among the Jordanian population, such as physical activity. In this study, TPB was used to support the theoretical framework.

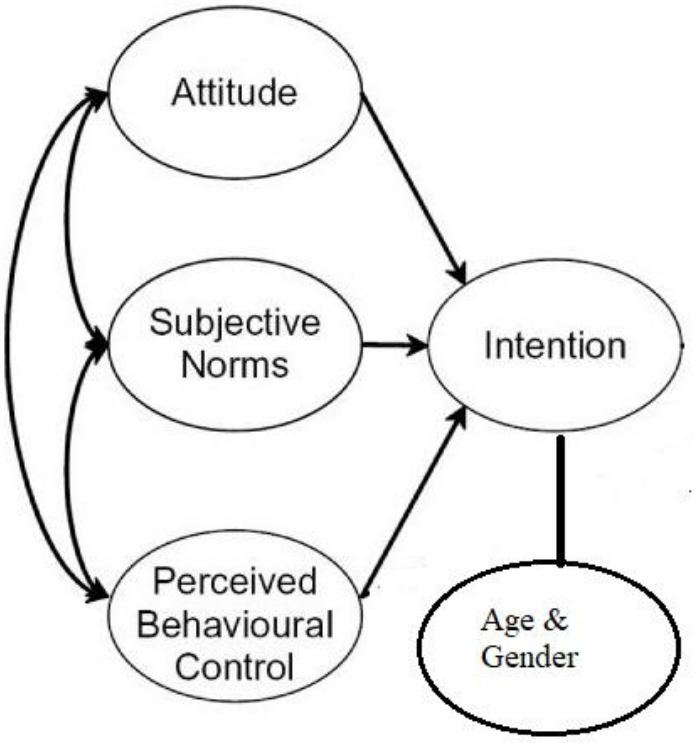

Figure 2. Schematic Representation of Concepts of the Study Model.

The study model posits the following variables: attitude addressed CAD patients' positive or negative evaluation of self-performance of physical activity behavior. As to subjective norms of physical activity, Ajzen defined subjective norms as social pressure from others such as family members or professional health teams to perform or not to perform an action such as physical activity (Ajzen, 1991). Perceived behavioral control referred to participants' perceived ease or difficulty of engaging in physical activity (Ajzen, 1991). Physical activity intention is defined as participant readiness to engage in practicing physical activity (Ajzen, 1991). These variables were directly measured by incorporating an existing reliable questionnaire that was developed to assess physical activity among the adult population and was based on the TPB (Armitage, 2005). *See Figure 2*.

The independent variables of this study are the attitude of physical activity, subjective norms of physical activity, and perceived behavioral control of physical activity. The dependent variable in the proposed study is the intention toward physical activity. In previous research, age and gender presented themselves as confounding variables that affected physical activity intention and behavior in different populations (Piña et al., 2014; Santaularia, & Jaarsma, 2013; Wyer, Joseph, & Earll, 2001). Other studies supported that age and gender, in general, have a direct impact on physical activity behavior (Cafiero & Matarasso, 2013; Schnall & Bakken, 2011; Sharara et al., 2018).

Research Questions

The present study answered the following questions:

1. What are the beliefs toward physical activity among Jordanian CAD patients? Four open-ended questions were asked.
2. What are the correlations among CAD patients' attitudes, subjective norms, perceived behavioral controls, and intention toward physical activity?
3. Do attitudes, subjective norms, and perceived behavioral controls predict Jordanian CAD patients' intention to engage in physical activity behavior?
4. Do attitudes, subjective norms, and perceived behavioral control predict Jordanian CAD patients' intention to engage in physical activity behavior after controlling covariates of age and gender?

Chapter 2

Literature Review

This chapter presents an overview of the existing literature regarding the phenomena under study, which is the intention to practice physical activity among Jordanian CAD patients. This review of the literature identifies what is known about intention, and factors related to engaging in physical activity among CAD patients to substantiate the gap in knowledge. The contribution that this study will make to the body of knowledge that already exists. The organization of this literature review was conducted by identifying the major categories of investigation; this consisted of reviewing the literature that was both current and integrated as well as identifying the major works and dissertations completed in the major categories.

This chapter organized in the following manner: physiology of Coronary Circulation, definition and prevalence of CAD; pathophysiology of CAD, causes and symptoms of CAD; complications of CAD; physical activity roles; recommended level of physical activity; physical activity barriers among CAD patients; Jordanian Culture; Jordanian CAD patients; and intention toward physical activity. Finally, this chapter included a discussion of the theoretical framework for conducting this quantitative study. Specifically, the literature in the field of the constructs of the theory of planned behavior that provides the framework for this investigation.

Physiology of Coronary Circulation

The primary function of coronary circulation is to supply the heart's metabolic needs. One of the unique characteristics of coronary circulation is the close relationship between the level of myocardial metabolic activity and the magnitude of coronary blood flow (Pappano & Wier, 2013). During physical exertion, coronary arteries can increase blood flow up to six-fold than normal in response to myocardial oxygen and metabolic demand (Seiler, 2019). In case of

failure in the coronary circulation, the heart fails to pump blood to the whole body (Seiler, 2019). Coronary circulation, therefore, assumes a vital role in maintaining physiological function in all organs, and any blockage in coronary arteries leads to a partial or complete cessation of blood flow through these arteries.

Definition of CAD

Coronary artery disease is the most common type of heart disease, and it happens when the major blood arteries that supply the heart with blood, become occluded or damaged (Tousoulis, 2018). Coronary arteries are the heart's network of blood vessels that exist on the surface of the heart.

Prevalence of CAD

CAD is the leading cause of death in the United States for males and females. Approximately 25% of all deaths in the U.S. are attributable to heart disease (CDC, 2017). Most cardiovascular diseases can be prevented by addressing behavioral risk factors such as physical inactivity, unhealthy diet, and smoking habits (WHO, 2017a)

In most Middle Eastern countries, the prevalence of CAD and its risk factors are high and still rising in most Middle Eastern countries. Further, the mortality rate from CAD is still the highest all over the world (Rahmati-Najarkolae et al., 2015; Ramahi, 2010). Cardiovascular diseases are responsible for more than 45% of all deaths among these countries (WHO, 2019). The data from Middle East countries pointed out that a projected increase in CVD death rates will double from 1990 to 2020 (Almahmeed et al., 2012).

The reasons for increasing CAD prevalence and mortality rates in Middle Eastern countries are attributed to socioeconomically changes and rapid urbanization and its consequences including change in daily lifestyles such as physical inactivity and eating habits

(Goyal et al., 2017; Rahmati-Najarkolae et al., 2015; Shafieinia, Hidarnia, Kazemnejad, & Rajabi, 2016). Over the past three decades, the Middle East countries, particularly Arab countries, have undergone rapid modernization and socioeconomic development. This unplanned urbanization has led to unhealthy lifestyle choices such as low physical activity, unhealthy diet, and smoking consumption among people in these countries. Jordanian adults living in rural areas were more likely to be physically active than those who live in urban areas (Barghouti et al., 2015). These unhealthy habits are strongly associated with common modifiable risk factors for CAD (WHO, 2017b).

Pathophysiology of CAD

The coronary artery walls consist of three layers; the inside (intima), the middle layer (media), and the outside layer (adventitia). The intima layer is made up of the endothelial surface, the basement membrane, and the internal elastic lamina (Seiler, 2019). CAD occurs when the endothelial surface encounters certain bacterial products or risk factors as diverse as dyslipidemia, vasoconstriction hormones, or excess adipose tissue that build up cholesterol-rich deposits or plaque on the endothelial surface (Tousoulis, 2018). Plaque, also called atheroma, causes a thickening of the arterial wall and a narrowing of the arterial space through which blood flows to reach the heart.

Plaque happens as a result of the injury of the endothelial surface. Damaging of this surface leads to accumulating cholesterol, fats, lipoproteins, and other substances in the blood at the site of injury in the wall or intima of the artery. Plaque develops from deposits of these substances in the coronary artery; consequently, this leads to narrowing the blood vessels (atherosclerosis) and blocking the blood flow to cardiac tissues (Sharma, Chang, & Red-Horse, 2017). The atherosclerosis process involves primarily pathologic changes in the intima with

reactive changes in the media and adventitia. Atherosclerosis is caused by lesion or fatty deposits or plaque, which is the asymmetric focal thickening of the intimal layer of the artery (Tousoulis, 2018). *See figure 3*

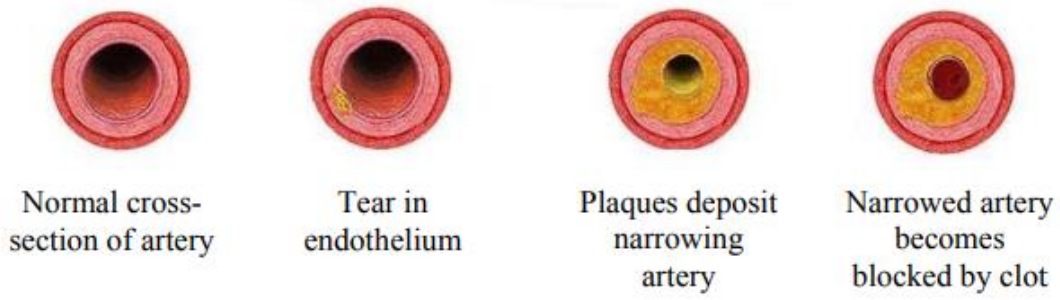

Figure 3. Process of Atherosclerosis

Symptoms of CAD

Cardiac tissues depend on coronary vessels to get the required oxygen and nutrients. CAD happens when changes in coronary artery walls lead to plaque formation in the arteries (Tousoulis, 2018). The main symptom of CAD is chest pain (angina) that occurs when the blood supply decreases or ceases to the myocardium. Angina is enhanced with the emotional and physical stress of CAD (CDC, 2017; Mayoclinic, 2018). The coronary artery blockages lead to weakness of the heart muscle and its efficiency to pump blood to the rest of the body, which deprives organs of needed oxygen, such as lungs, the brain, and kidneys. The diminished blood supply causes other symptoms, such as shortness of breath, sweating, dizziness, pain in the arms and shoulders, and general fatigue (CDC, 2017).

Complications of CAD

CAD has several complications including, serious ischemia, which is called an infarction (death of the heart muscle), thereby weakening the heart and reducing its efficiency. Complete occlusion of the coronary artery from atherosclerotic lesions causes myocardial infarction (MI),

or fatal cardiac arrest (McCance, Huether, Brashers, & Rote, 2010). CAD can also initiate an arrhythmia (abnormal heartbeats or rhythm); ventricular fibrillation and ventricular tachycardia are the most types of this arrhythmia (CDC, 2017). These types of arrhythmias are known to be the most common pathology underlying sudden cardiac death (SCD) or otherwise known as cardiac arrest (Hayashi, Shimizu, & Albert, 2015). Over time, the prolonged and inadequate blood supply to the heart muscle or chronic ischemia can lead to heart failure or congestive heart failure (CDC, 2017).

The impact of these complications is not limited to the financial aspects, such as the health cost of hospital readmissions and cardiac rehab programs. However, these complications will severely impact all dimensions of health quality of life, such as the physical, psychological, social, emotional, sexual, and mental well-being of those patients. However, the occurrence of these complications can be significantly reduced by adopting healthy lifestyle choices, such as regular physical activity, a healthy diet, and smoking cessation for cardiac patients (CDC, 2017).

Physical Activity

Development of CADs among adult populations is associated with lifestyle behaviors, such as a sedentary lifestyle, low physical activity level, high-fat diet, and smoking. Generally, several evidence-based studies have consistently indicated a positive correlation between practicing physical activity and wellness (WHO, 2017). Physical activity, defined as anybody movements by skeletal muscles that result in energy expenditure and calorie burning, has been a very significant issue in research about health among cardiac patients in general for the last three decades (WHO, 2017). Engaging in physical activity is one of the most essential factors in the prevention and treatment of CAD (Alkerwi et al., 2015; Arija et al., 2017; Pozehl et al., 2014). A plethora of scientific organizations such as the WHO (2013), the American Heart Association

(AHA, 2014), and the CDC (2014) have reinforced the role of physical activity in mitigating cardiovascular health at various levels. Regular exercise has a favorable effect on the risk factors for cardiovascular disease; in addition, the mortality rate is reduced by 25% for CAD patients who adhere to physical activity for more than six months after hospital discharge (Peixoto et al., 2015). Several clinical studies found that the chance of reoccurrence of CAD or another cardiac event, such as coronary restenosis, sharply decreases among physically active participants (Darden et al., 2013; Ghisi et al., 2015; Peixoto et al., 2015). It is also clear that the prevalence of CAD is significantly higher among physically inactive people compared with active persons (AHA, 2014; CDC, 2014).

A systematic review and meta-analysis, among 9853 participants, were conducted to assess the impact of cardiac rehabilitation (CR) of patients with heart disease. (Dibben et al., 2017). The results significantly showed that physical activity was associated with a marked decrease in cardiovascular and all-cause mortality in both sexes among cardiac rehabilitation groups (Dibben et al., 2017).

Well-known benefits for engaging in regular physical activity have been supported, such as weight reduction and obesity prevention (Dibben et al., 2017; Ghisi et al., 2015; Peixoto et al., 2015). It also can reduce blood pressure, low-density lipoprotein (LDL), and cholesterol levels in the blood, which in turn can help raise the High-Density Lipoprotein Level (HDL) (Wang, & Xu, 2017). Furthermore, regular physical activity plays a role in improving the circulatory system's ability to consume and transport oxygen that leads to improving blood transfusion to the body's organs as well as the heart (Agarwal, 2012; Wang, & Xu, 2017).

Not only does physical activity have physical benefits on cardiac health, but it also bears an effect on psychological and emotional aspects among others. Significantly, patients with

coronary heart disease who practice regular physical activity are able to return to work sooner after a heart attack and have improved quality of life, high self-confidence, lower stress, and less anxiety compared with physically inactive patients (Slimani et al., 2018). Strong evidence indicates that physical activity relieves mild to moderate depression and regulates and promotes sleep (Huang, Webb, Zourdos, & Acevedo, 2013).

Recommended Physical Activity Level

Physical activity is routinely recommended to obtain optimal cardiovascular health. Physical inactivity and inactive lifestyle have been linked to significant increases in CAD. Regular physical activity is an important component of the treatment regimen for CAD (Darden et al., 2013; Ghisi et al., 2015; Lanier, Bury & Richardson, 2016). To achieve the benefits of physical activity, the AHA (2014) recommends at least 150 minutes per week of moderate exercise, or 75 minutes per week of vigorous exercise, alternatively, thirty minutes a day, five times a week.

Studies demonstrate that most participants benefit from regular physical activity whether they are participating in vigorous activity pattern or a more moderate pattern of physical activity (AHA, 2014; Wang, & Xu, 2017). However, for additional health benefits, the Physical Activity Guidelines for Americans (2018) recommended that adults should increase their adherence to physical activity up to 300 minutes per week of moderate exercise, or 150 minutes per week of vigorous exercise. This level of physical activity should also include muscle-strengthening activities two or more days a week that work all major muscle groups including arms, legs, hips, abdomen, chest, and shoulders, Additional health benefits are gained by increasing physical activity above this amount.

A meta-analysis study conducted by Sattlemair and others (2011) quantified the specific amounts of physical activity required to lower the risk of coronary heart disease. The results showed that participants who engaged in 150 minutes per week of moderate physical activity had a 14% lower coronary heart disease risk compared to those who participated in no physical activity. Additionally, participants who engaged in 300 minutes per week of moderate physical activity had a 20% lower risk. However, participants who engaged in higher levels of physical activity had modestly lower relative risks, and even those who did not meet the minimum recommended levels of physical activity also had a lower risk of coronary heart disease. These findings also confirmed that any amount of physical activity is better than inactivity (Sattelmair et al., 2011).

Patterns of physical activity. There are three different patterns of physical activity according to intensity levels that include low, moderate, and vigorous levels (Sattelmair et al., 2011; WHO, 2014). A low level of physical activity is achieved when the heart rate does not rise much above the resting level. Walking slowly, fishing, and using a computer are examples of mild levels. The second pattern of physical activity (moderate level) can be achieved through practicing activities where the breathing rate is somewhat harder and faster than normal. Examples of moderate activity include walking quickly, cleaning heavily, and mowing the lawn. The last pattern is the vigorous one, and it can be achieved when practicing activities that make breathing much harder than normal and heart rate above the normal level. Hiking, fast bicycling, and running are examples of these vigorous activities (WHO, 2014).

Generally, all patients with CAD can benefit from moderate physical activity. A regular physical activity using large muscle groups like walking, swimming, and cycling is an important regimen for treating CAD (Al-Zoughool, Al-Ahmari, & Khan, 2018). It can improve symptoms

and functional capacity, and reduce cardiovascular risk by lowering blood pressure, reducing insulin resistance, managing unhealthy body weight, and improving lipid profiles (Al-Zoughool, Al-Ahmari, & Khan, 2018). Therefore, regular moderate physical activity should be an essential part of CAD treatment plans.

Physical Activity in Primary Prevention of CAD

Engaging in physical activity decreases the likelihood of developing CAD and its consequences. Regular activity also plays an essential role in preventing weight gains and the development of hypertension, hypercholesterolemia, and diabetes, all of which are essential CAD risk factors (Lee et al., 2012; Wang, & Xu, 2017). Studies conducted on the elderly confirmed that physical activity reduces mortality risk significantly in older adults without pre-existing CAD (Alves et al., 2016; Llamas-Velasco et al., 2016).

During the past a few decades, research has found that physical activity studies consistently find cause-and-effect evidence that regular physical activity protects against heart disease and averts premature mortality (Alves et al., 2016; Anderson et al., 2016). Research has been conducted on both sexes (Minges et al., 2017; Sattelmair et al., 2011), in different ethnic groups, in broad age classes (Alley, Schoeppe, Rebar, Hayman, & Vandelanotte, 2018; Alves et al., 2016), in a variety of social groups (Dibben et al., 2017; Lee et al., 2012), and among different countries of the world (Barghouti et al., 2015; Sharara et al., 2018). All of these studies consistently supported the impressive role of physical activity in both primary and secondary prevention of CAD.

A systematic review was conducted to support the U.S. Preventive Services Task Force (USPSTF) in updating its 2012 recommendation on behavioral counseling to promote a healthful diet and physical activity for the primary prevention of cardiovascular disease in adults without

known CVD risk factor (Viswanathan et al., 2018). The results showed consistent physical activity benefits across a variety of important intermediate health outcomes, including blood pressure, low-density lipoprotein, and total cholesterol levels as well as adiposity (Viswanathan et al., 2018).

Physical Activity in Secondary Prevention in CAD

Physical activity reduces the occurrence of coronary artery disease among people at high risk for cardiac disease, and it affects the secondary prevention among patients who already have coronary heart disease (Alves et al., 2016; Anderson et al., 2016). Most of the cardiovascular health organizations such as AHA, the European Society of Cardiology, and the American College of Cardiology confirm that exercise and physical activity are core elements in any cardiac rehabilitation program. Moreover, they reinforce physical activity behavior among both cardiovascular patients and healthy persons (Darden, Richardson, & Jackson, 2013).

During the past few decades, research has found that physical activity reduces the mortality and morbidity among CAD patients (Darden et al., 2013). Seeing this, the financial burden of CAD can be reduced in CAD patients by increasing their physical activity levels (Alves et al., 2016; Winzer, Woitek, & Linke, 2018).

A systematic review and meta-analysis reviewed 63 studies with a total sample of 14,486 coronary heart disease patients who joined an exercise-based cardiac rehabilitation program. (Anderson et al., 2016). The results showed a significant reduction between exercise-based cardiac rehabilitation participants as compared with no-exercise program participants, on both cardiovascular mortality from 10.4% to 7.6% and hospital readmission from 30.7% to 26.1%. Additionally, this review revealed improvement that levels of health-related quality of life were

elevated for participants in the exercise-based cardiac rehabilitation intervention groups compared to the control - participants with no-exercise programs (Anderson et al., 2016).

Physical activity also influences the cardiac tissues at the cellular level. The literature supports the effect of physical activity on coronary artery vessels. Clinical studies showed that physical activity plays a vital role in the attribution of phosphorylation of the endothelial isoform of Nitric Oxide (NO) synthase that results in rejuvenation of the endothelium by circulating progenitor cells (CPCs) and growth of preexisting coronary vessels by angiogenesis (Linke, Erbs, & Hambrecht, 2008; Moraga, Lao, & Zeng, 2017; Winzer et al., 2018).

Despite evidence and recommendations of the beneficial effects of physical activity on secondary prevention for CAD patients, patients remain who are less likely to engage in physical activity. Besides, many people fail to maintain optimal levels of physical activity after discharge from the hospital. Several studies revealed that physical activity decreases after cardiac events despite known benefits (Anderson et al., 2016; Ghisi et al., 2015; Pozehl et al., 2014). Therefore, it is paramount to understand the barriers to physical activity in CAD patients.

Physical Activity Barriers among CAD Patients

Numerous researchers have examined the existence of barriers associated with CAD patients to participate in physical activity including; age, sex, knowledge, level of awareness (Ghisi et al., 2015; Pozehl et al., 2014), attitudes and beliefs about the important of physical activity on health (Quicke, Foster, Ogollah, Croft, & Holden, 2017), and lack of energy after cardiac disease (Smith, Banting, Eime, O'Sullivan, & Uffelen, 2017).

Studies worldwide have identified barriers to physical activity among adults. They found that lack of time, fear of injury, lack of motivation and knowledge, shortage of facilities, cost, safety, and lack of family or friend support are the most common barriers ((Smith et al., 2017;

Tak et al., 2012; Moschny, Platen, Klaaßen-Mielke, Trampisch, & Hinrichs, 2011). Other studies in cardiac patients revealed that the common physical activity barriers are lack of energy after heart attack, fear of physical exertion (Mosleh & Darawad, 2015; Pozehl et al., 2014), lack of awareness and motivation (Alkerwi et al., 2015; Pozehl et al., 2014), and lack of time and social support (Smith et al., 2017). Still, a large segment of cardiac patients reported that the physical activity regimen is more complicated and difficult compared with other types of regimens such as diet or medication adherence (Mosleh & Darawad, 2015; Pozehl et al., 2014). The difficulty of physical activity commitment was attributed to several factors such as feeling of exertion, being tired, and more sweating while practicing an activity, in addition to loss of motivation and of interest, lack of social support, and insufficient knowledge about the importance of regular activity for cardiac patients (Mosleh & Darawad, 2015; Pozehl et al., 2014).

Age and Physical Activity

Several studies examined the effect of age on enrollment in physical activity programs among CAD patients (Liew & Teo, 2018; Grace et al., 2009; Matata & Williamson, 2017). The results indicated that younger patients with age less than 45 years were more likely to enroll in physical activity programs than patients 60 years and more (Grace et al., 2009; Liew & Teo, 2018; Matata & Williamson, 2017). Importantly, age is a determinant of physical activity, and there is a positive relationship between age and the desire and amount of exercise (Piña et al., 2014; Santaularia & Jaarsma, 2013). People spend less time in exercises as they age (Liew & Teo, 2018; Matata & Williamson, 2017). A survey was conducted by the Department for Culture among 92,000 people in England that showed that exercise participation and desire decline progressively throughout adult life (Keech, 2011). Nevertheless, some findings are incongruent and have shown that older adults' intentions were more consistent with behavior compared with

younger adults in several studies (Johannsen et al., 2008; Hagger et al., 2002; Sheeran & Orbell, 1998). Older adults with strong physical activity intentions engaged in more physical activity overall compared with younger adults (Hoppmann et al., 2018).

One study conducted recently in Australia concerning age differences in physical activity intentions used multiple regression analysis to compare intentions between three age groups: older than 65 years; middle age between 45 and 64; and younger adults with ages under 45-years (Alley et al., 2018). The results showed that both older and middle-aged adults were more likely to prefer a moderate physical activity compared to younger adults who preferred vigorous activity (Alley et al., 2018). A survey was conducted among Jordanian adults that showed physical activity was higher in 65-years old of age and above compared with younger adults (OR 2.1, 95% CI 1.49-3), and women were less active than men (OR 0.5, 95% CI 0.4-0.63) (Barghouti et al., 2015).

Gender and Physical Activity

Women, as well as, older adults are known to be less active and less engaged in physical activity than men (CDC, 2012), particularly in vigorous physical activity (Sharara et al., 2018). Gomes and Capelão (2013) reported that exercise practice is less motivating and gratifying for women. In 2013, Biddle, Mutrie, and Gorely significantly supported that women had less desire to practice physical exercise compared to men. Minges and others (2017) conducted a prospective study to examine gender differences in physical activity following acute myocardial infarction in adults. Result showed that men were more active (≥150 min/week moderate or ≥75 min/week vigorous activity) than women at baseline (42% vs 34%), one month after infarction (45% vs 34%), and 12 months after infarction (48% vs 36%) ($p < 0.0001$). Additionally, men engaged in a significantly longer duration of activity at each time point (Minges et al., 2017).

A systemic review of 150 studies conducted in several Arab countries, including Jordan, found the prevalence of physical activity was significantly lower among women and the elderly compared with men and young (Sharara et al., 2018). Similar results can also be seen in a systematic review and meta-analysis study to describe cardiac rehabilitation enrolment among people of both sexes (Samayoa, 2014). The review found that women are less practicing physical activity compared to men, and t only 38% of females were enrolled in physical activity programs compared to 45% of male participants. (Samayoa, 2014).

Generally, women often need to be accompanied by a male family member when going outdoors, in addition to the need to wear traditional dress, and women's roles and domestic responsibilities are the common barriers to practice physical activity among Arabic women (Donnelly et al., 2018). Although men engage in more vigorous physical activity than females, there appears to be no difference between the sexes in moderate physical activity such as walking (George et al., 2012; Samayoa, 2014; Sharara et al., 2018). A number of studies have investigated gender within using the TPB and physical activity among the adult population. One study that investigated the effect of age and gender on physical activity based on TPB (Rhodes, Blanchard, & Blacklock, 2008). The results reported that gender and age showed a weak relationship with physical activity behavior or intention (Rhodes, Blanchard, & Blacklock, 2012). A study conducted by Van Uffelen, Khan, and Burton (2017) aimed to identify motivating factors and gender differences for physical activity among people aged between 60-69 years. The results showed that women were more likely than men to engage in moderate physical activity.

Jordanian Culture

The Hashemite Kingdom of Jordan is located in the Middle East; it shares boundaries with Syria to the north, Iraq to the northeast, Saudi Arabia to the east and south, the Red Sea to the south, and the West Bank in the Palestinian National Authority and Israel to the west. Jordan covers a diversity of landscapes over an area of 89,213 square kilometers, with a desert region that spans over approximately 75% of that area. Amman is Jordan's capital, and it is located in the northwest; Al-Zarqa and Irbid are two major northern cities. *See figure 4.*

Figure 4. Jordan Map (WHO, 2014).

According to the World Factbook (2015) report, Jordan currently has a population of approximately 9.5 million inhabitants, and the majority of them are Arab (98%), Muslim (97.2%), urban (82.7%), and young with more than 55% of the population are under 25 years of age. Significantly, balanced economic growth during the last few decades in the Jordanian community resulted in significant improvements in the average Jordanian's life expectancy. The life expectancy increased from 50 years in 1965 to 72 years in 2016 (WHO, 2018).

Jordan CAD Patients

Cardiovascular diseases, and CAD, in particular, are identified as the primary cause of death and the second leading cause of hospitalization among the Jordanian population (CDC,

2013). Increasing the burden of CAD is inevitable due to the high prevalence of CVD risk factors, such as low physical activity and a sedentary lifestyle, as well as inadequate health awareness.

Jordanian CAD patients, as well as other patients, are much less active than desired (Alsaleh, Windle, & Blake, 2016; Elhneiti & Al-Hussami, 2017). The majority of Jordanian CAD patients do not achieve the recommended AHA physical activity (Alsaleh, Windle, & Blake, 2016; Al Subhi, Bose, & Al Ani, 2015; Shishani, 2010). More than 55% of CAD patients are not meeting physical activity recommendations (AHA, 2014). A survey conducted to assess physical activity awareness among more than 3,000 Jordanian participants from all different regions reported that around 50% of Jordanians were not aware of the recommended physical activity required to remain healthy (Barghouti et al., 2015).

The lack of participation in physical activity among Jordanian patients may be attributed to several factors. Lack of motivation and support of physical activity serve as the major ones (Barghouti et al., 2015; Darawad et al., 2016). A literature review aimed to understand the barriers to physical activity among Arabic adults revealed that factors impeding physical activity consisted of lack of time, cultural restrictions, awareness for the physical activity role, traditional roles for women, and lack of social support (Benjamin & Donnelly, 2013).

Generally, lack of social support from others like families, friends, and partners play a negative role in physical activity motivation (Alkerwi, 2015; Shafieinia et al., 2016). A meta-analysis study was conducted to examine the association between social support and physical activity in older adults (Lindsay Smith, Banting, Eime, O'Sullivan, & van Uffelen, 2017). The results found that there is a positive association between social support and motivation to physical activity in older adults, especially in family members' support.

Lack of positive attitudes and beliefs about the importance of physical activity negatively influence motivation to practice physical activity (Santaularia & Jaarsma, 2013; Sassen et sl., 2010). Highly motivated individuals intend their behavior based on their attitudes and beliefs (Poobalan, Aucott, Clarke, & Smith, 2012). Ajzen (1991) defined intention as a summary of motivation, and intention considers a person's motivation, willingness to exert effort, and willingness to try hard to enact the behavior. High levels of positive behavioral intention are associated with greater effort and persistence to achieve the behavior. Further, implementation intentions have received support as a post-motivational construct across many behavioral, such as physical activity (Ajzen, 1991).

Studying intentions toward a particular behavior in a specific population helps to understand the motivational factors for changing this behavior. Understanding the determinants that predict intention of physical activity in CAD patients can be understood by using theoretical models of human motivation (Santaularia & Jaarsma, 2013). One popular psychological model that has received wide attention in health behavior research is the TPB (Ajzen, 1991).

Theory of Planned Behavior

The TPB developed by Ajzen (1985) is used to explain a variety of human behaviors in different cases or environments. The theory has been widely investigated and has survived to explain the relationship between behavioral intention and its determinants, namely attitude, subjective norm, and perceived behavioral control in a number of health conditions. The TPB has successfully focused on the intention by separating these three determinants to provide a comprehensive method of predicting intention (Ajzen, 1991).

An exhaustive number of studies supported the notion that prediction of intention can be achieved through the three determinants: attitudes toward the behavior, subjective norm, and

perceived behavioral control (McEachan et al., 2011). These three determinants have a direct influence on behavioral intentions (Ajzen, 1991). Studies also found that behavioral intention is the most significant predictor of behavior (Ajzen, 1991; Chevance et al., 2018). Behavioral intention is defined as a person's readiness to engage in a certain behavior (Ajzen, 2005). People are much more likely to intend to have healthy behaviors if they have positive attitudes about the behaviors, positive subjective norms, and higher perceived control toward the behaviors (Ajzen, 1991).

According to the TPB, intention is determined by three conceptual predictors. The first predictor is the attitude. Attitude focuses on a positive or negative evaluation of performing the behavior. Attitude toward behavior considers both the favorable and unfavorable aspects of the targeted behavior (Ajzen, 1991). The second predictor is subjective norms, which is intended to reflect the perceived social pressure that individuals might feel to perform or not perform the behavior. This social pressure can come from significant others, such as family members, colleagues, or health team workers.

The third predictor, perceived behavioral control, indicates the perceived ease or difficulty of performing the behavior (Ajzen, 1991). Perceived behavioral control includes both self-efficacy, which refers to how difficult a person believes it is to perform a behavior, and controllability (Mulero-Portela, Colón, Santaella, & Cruz Gómez, 2013). This predictor not only predicts the intention, but it also moderates the influence of intention in predicting behavior (Ajzen, 1991).

Although attitudes, subjective norms, and perceived behavioral control have been supported to be the best predictors of intention toward physical activity behavior, the impact of these constructs can vary across populations and behavior domains (Ajzen & Fieshbien, 1980).

In some studies, attitude was a strong predictor for intention toward physical activity (Chevance et al., 2018; Sassen, Kok, Schaalma, Kiers, & Vanhees, 2010), while other studies found that subjective norms and perceived behavioral control were strong predictors for physical activity intention (Oliveira, Silva, Alves, & Domingues, 2014; Prapavessis, Gaston & DeJesus, 2015). Another study found that perceived behavioral control was the strongest predictor for intention (Psouni, Chasandra, & Theodorakis, 2016). The relative degree of impact of attitude, subjective norms, and perceived behavioral control on intention could vary by different populations and behaviors (Ajzen & Fishbein, 2005). This variance makes it vital to reassess each population's proclivity towards a specific behavior prior to understanding and establishing any intervention program.

Measure

To assess the impact of intention of physical activity determinants among Jordanian CAD patients, the Principal Investigator (PI) will use an identical replication of the physical activity designed TPB Questionnaire used by Armitage (2005) to measure the following variables on 7-point scales: attitudes, subjective norm, perceived behavioral control, and behavioral intention. Guidelines in TPB construction were also noted by Ajzen (Ajzen, 2006). According to Armitage, Cronbach's alpha indicated good internal reliability ($\alpha = .90$) on each of the scale measurements among adult population. The validity of Armitage (2005) Questionnaire to predict physical activity intention was also supported in healthy adult people (O'Shea & Frazer, 2018).

Intention and Physical Activity Behavior

Physical activity is a very complicated behavior influenced by different aspects. Some studies in the literature were conducted to determine the essential aspects associated with physical activity behavior, such as social, demographic, environmental, and personal aspects

(Sassen et al., 2010; Torres et al., 2018). Studies also supported that in the personal aspect, intention has been found to be the strongest and most consistent predictors of physical activity behavior (Arnautovska, Fleig, Ocallaghan, & Hamilton, 2018; Schüz et al., 2017). Most social cognitive theories, including the TPB, consider behavioral intention as the motivational factor that influences actual health behavior. Furthermore, behavioral intention not only explains the motivation for the actual behavior according to TPB, but it also explains the readiness to engage in the actual behavior (Arnautovska et al., 2018). Intentions represent the motivation and the attitude behind our actions. Intentions have an extreme influence on persons' decisions on whether to adhere to specific behaviors (Arnautovska et al., 2018).

The intention of practicing physical activity can successfully explain the person's readiness to engage in the actual behavior. A meta-analytic review of physical activity behavior among adults found a positive correlation between intention to perform physical activity and actual physical activity behavior ($\beta = .42$, mean $\rho = .48$, $k = 103$) (McEachan et al., 2011). Similar results can be seen in a systematic review that explored the moderation effect of socioeconomic status on the relationship between intention and physical activity (Schüz et al., 2017). The review supported that intention, as conceptualized in the model of the TPB, was a strong and reliable predictor of physical activity (Schüz et al., 2017). Additionally, all studies reviewed in this systematic review revealed positive correlations between intention and physical activity; higher levels of intention were associated with higher participation of physical activity, while lower levels of intentions were associated with lower levels of physical activity.

The relationship between physical activity intention and behavior was also strongly supported in a cross-sectional study using the TPB to predict physical activity behavior and physical fitness in 1,298 participants with a high risk of cardiovascular diseases (Sassen et al.,

2010). The study revealed a significant association between physical activity behavior and intention ($\beta = .47$, $p < .001$). The significant correlates of intention to engage in physical activity were attitude ($\beta = .23$, $p < .001$), perceived behavioral control ($\beta = .27$, $p < .001$), and subjective norms ($\beta = .17$, $p < .001$).

A cross-sectional study investigated the relation between intention and physical activity behavior, an elderly resident of a nursing home in Iran (Ghahremani, Niknami, & Nazari, 2012). The result showed that a strong correlation between intention and physical activity behavior, and intention explained 16% of the variance in physical activity behavior (Ghahremani, Niknami, & Nazari, 2012). The relation between intention to perform physical activity and the actual physical activity has been exhaustively supported in different populations and ages, conditions, and groups. All these studies confirm the vital role of intentions to predict physical activity behavior.

Use of the TPB to Predict Behavioral Intention

The usefulness of the TPB in predicting behavioral intention and the actual behavior has been supported by several theoretical and meta-analytic reviews. Several meta-analyses and systematic reviews consistently supported its good predictive utility and applicability in various health behaviors including, physical activity and exercise, smoking cessation, sexual behavior, and food consumption. (Chevance et al., 2018; De Vivo, Hulbert, Mills, & Uphill, 2016; Cooke, Dahdah, Norman, & French, 2014; Rhodes et al., 2007). One of the seminal works for Ajzen (1999) was a systematic review study. He reviewed 16 studies to examine the prediction of intention in the TPB, and he found that a considerable amount of the variance in intention could be accounted for by using the three predictors in the TPB (attitude, subjective norm, and perceived behavioral control). This variance was between 18 to 88% from different behaviors, such as physical activity (Ajzen, 1991).

A systematic literature review and meta-analysis was conducted to quantify the relationship between intentions and dietary behaviors. This analysis reviewed 34 articles, including three intervention studies. The result showed that intention was the most common predictor of behavior performance (mean $r = 0.38$; $p < 0.001$) (Rieb et al., 2015).

Another study conducted in the food consumption area, and it focused on the attitudes and intentions of seniors to consume more local fruits and vegetables. The results showed a significant relationship between seniors' intentions and more of purchasing local fruits and vegetables (Middleton & Smith, 2011). Additionally, the results showed that attitude was the strongest predictor of intentions to purchase more local fruits and vegetables. Subjective norms and perceived behavior control also played a significant role in seniors' intentions (Middleton & Smith, 2011).

Use of the TPB to Predict Intention of Physical Activity

The theory of planned behavior has been used extensively as a theoretical basis to predict the relationship between intention and physical activity behavior across different populations and health conditions. The impact of attitude, subjective norms, and perceived behavioral control on a prediction of physical activity intention have also been supported in the literature (De Vivo et al., 2016; Gholamnia et al., 2014; Vallance et al., 2011). For example, the TPB has been used to predict physical activity intentions in pregnant women (Lee, Chiang, Hwang, Chi, & Lin, 2016; Newham et al., 2015), the elderly population (Arnautovska, Fleig, Ocallaghan, & Hamilton, 2018; Ghahremani, Niknami, & Nazari, 2012), youth (Abraham & Graham-Rowe, 2009), athletic people (Poobalan, Aucott, Clarke, & Smith, 2012), children (Isa, Ueda, Nakamura, Misu, & Ono, 2018), and among college students (Kwan, Bray, & Ginis, 2009; Poobalan et al., 2012). The findings support the ability of the theory to predict physical activity intentions and behavior

among different populations, and they also supported the variance of the attitude, subjective norms, and perceived control constructs in individuals' intention predictions.

Seminal work-study conducted by Blanchard and others (2003) sought to understand activity adherence during Phase II Cardiac Rehabilitation. The researchers found that attitude, subjective norm, and perceived behavioral control significantly explained 30% of the variance in activity intention; attitude ($\beta = .16$, $p < .05$), subjective norm ($\beta = .32$, $p < .001$), perceived control ($\beta = .24$, $p < .001$). Besides, 12% of the variance in actual behavior (adherence to activity) was explained by intention (Blanchard et al., 2003). These findings remained consistent with a randomized controlled trial study that aimed to evaluate the effectiveness of a 4-week extended theory of planned behavior (TPB) intervention to promote regular physical activity and healthy eating among older adults diagnosed with cardiovascular disease or Type 2 diabetes (White et al., 2012). The results indicate that TPB-based interventions encouraged physical activity among older people with cardiovascular disease and diabetes (White et al., 2012).

This extensive research has demonstrated the utility of the TPB determinants to predict intentions toward physical activity among different populations. These determinants are suggested to exert their effects upon a behavior through their influence on one's intentions, and according to Ajzen (2004), intentions cannot be assumed to be universal across cultures and communities. So, further investigation of the TPB utility to predict physical activity intention among CAD Jordanian patients is needed.

Attitude Subjective Norms, Perceived Behavioral Control, and Physical Activity Intention Relationship

Many studies in various domains have been conducted using the framework of the TPB to explain the correlation among TPB constructs (attitude, subjective norms, and perceived

behavioral control) and intention. In a meta-analysis for 185 independent studies, TPB constructs (attitude, subjective norms, and perceived behavioral control) were responsible for 39% of the variance of the intention and 27% of the variance of the behavior (Armitage & Conner, 2001). This review also revealed that attitude was the strongest predictor of intention, and the subjective norm was the weakest predictor of intention (Armitage & Conner, 2001). Attitude also served as a strong predictor in a cross-sectional study that used TPB concepts to predict physical activity intention among people with a high risk of cardiac diseases (Sassen et al., 2010). The weak relationship between subjective norms and intentions was also supported in two other studies (Chevance et al., 2018; Sassen et al., 2010). Still, the findings of this meta-analysis were not consistent with some studies that supported the strongest predictor of physical activity intention as perceived behavioral control in cardiac patients (Johnston, Johnston, Pollard, Kimonth, & Mant, 2004; Oliveira et al., 2014) and in healthy adults (Sas-Nowosielski, Grabara, & Hadzik, 2013).

Vallance and others (2011) conducted a study to measure the intention and physical activity behavior among post-menopausal women to practice physical activity. Using a cross-sectional survey design with 297 post-menopausal women, the results showed that 67% of the women intended to engage in physical activity. Multiple regression analysis indicated that the elements of TPB explained 44% of the variance in intention ($R_2 = 0.44$, $F = 37.6$, $df = 6,284$); attitude ($\beta = 0.33$), subjective norms ($\beta = 0.19$), and perceived behavioral control ($\beta = 0.24$). Physical activity intention ($\beta = 0.30$) explained 23% of the variance in physical activity behavior ($R_2 = 0.23$, $F = 86.68$, $df = 1,294$) (Vallance et al. 2011).

Despite several studies finding subjective norms as a weaker predictor for intention, White and others (2012) recognized subjective norms as the strongest predictor of intention to

exercise in the elderly with cardiovascular diseases. In contrast, a study conducted to explore the constructs of TPB that better predicts exercise and healthy eating among overweight and obese adults found that the strongest predictor of intention to exercise was perceived behavioral control (Psouni, Chasandra, & Theodorakis, 2016).

As a demonstration of the versatility of the TPB, one particular study by Sniehotta (2009) conducted with 579 participants found perceived behavioral control was only predictive of intention, and neither attitude nor subjective norms were predictive of intention (Sniehotta, 2009). These variances in the attitudes and subjective norms and perceived behavioral control undoubtedly support the TPB ability for the prediction of physical activity intention and physical activity behavior among different populations and cultures.

Summary

Despite the variance of TPB determinants in explaining behavioral intention, the utility of the TPB has been supported to explain and predict intentions and behaviors. The TPB has been successfully used to predict physical activity intention and behavior in comparable populations and different cultures such as youth, older adults, or cardiac patients in Western cultures. This theory can be used in understanding the impact of determinants; attitudes, subjective norms, and perceived behavioral control; on intention prediction. TPB has not yet been used to predict physical activity intention among Jordanian CAD patients. Consequently, this study will be conducted to fill the gap in the Jordanian literature through examining the effectiveness of TPB in predicting intention of physical activity in Jordanian CAD patients.

Chapter 3

Methodology

This study was designed to determine the influencing factors on Jordanian CAD patients' intentions to engage in a physical activity utilizing the Theory of Planned behavior (TPB) and likewise explain the process of translation for the TPB Questionnaire for physical activity (Armitage, 2005). Research methodology for this study, which consists of the study design, rationale, sampling, instrument, and measurements, questionnaires uploading to Qualtrics software, protection of human subjects, data collection, and data analysis, are explained in this chapter.

Study Design and Rational

A correlational and cross-sectional design has been used to examine the relationships between the factors that influence Jordanian CAD patients' intention to participate in regular physical activity. This study also predicted the intentions to physical activity in Jordanian patients afflicted with CAD. The study variables under investigation were attitude of physical activity, subjective norms of physical activity, and perceived behavioral control of physical activity.

According to Creswell (2014), a quantitative approach is "an approach for testing objective theories by examining relationships among variables" (p. 4). This type of research involves measurement of variables to produce numerical data that is analyzed through statistical methods. Statistical sampling procedures provide essential information that facilitates the generalizability of the data. The study depended on observable empirical data that examine the hypotheses of the relationships between the study variables, it is guided by theory, and it uses

statistical methods to examine the phenomena under investigation (intention toward physical activity). For those reasons, this study is classified as a quantitative study.

Non-experimental research designs are used to describe the phenomena and examination of existing relationships between variables without any manipulation of the variables (McMillan & Schumacher, 2010). One of the categories of non-experimental research, according to Grajales (2013), is correlational research that is conducted to "look for and describe relationships that may exist among naturally occurring phenomena, without trying in any way to alter these phenomena" (p. 127). In the proposed study, no conditions were manipulated or changed, and the study only tested relationships the variables. In addition, four open-ended explored beliefs toward physical activity.

A cross-sectional research survey was translated to address the relationship between the dependent variable Jordanian CAD patients' intention and the independent variables: (a) attitude of physical activity; (b) subjective norms of physical activity; and (c) perceived behavioral control of physical activity. Questionnaires enable researchers to survey accessible populations and collect data such as behaviors, beliefs, intentions, attitudes, and other relevant characteristics of participants (Thom, 2007). In this study, a questionnaire collected data from CAD patients.

Sampling Methods

A convenient, nonprobability sample, including all CAD patients at the Prince Muna Al Hussin Cardiac Center at King Abdullah University Hospital (KAUH) who met the inclusion/exclusion criteria, comprise this study's subjects. The subjects were recruited from one setting, KUAH, in Irbid City, Jordan. KAUH is the largest medical complex in northern Jordan. It currently serves more than one million inhabitants from four governorates (counties) in northern Jordan (KAUH, 2016). Nurse receptionists at this cardiac center were responsible for

identifying eligible subjects for this study. During the data collection period, printed lists of the eligible patients, which included their room numbers without any other identifier, were provided to the research assistant.

Prince Muna Al Hussin Cardiac Center has 60 beds in different special cardiac units, such as the Coronary Cardiac Unit (CCU), Cardiac Intensive Care Unit (CICU), Intermediate CCU, and the Center also has specialized cardiac clinics for both adults and children (KAUH, 2016). Patients with a majority of CAD such as myocardial infarction, unstable angina, angina pectoris (stable angina), and ischemia are referred to this cardiac center for emergency admission and management since such services are not available in the peripheral hospitals of the district. Most patients are male and female Jordanian residents of the northern region Jordan and are native-Arabic speakers.

Inclusion/exclusion. The inclusion criteria included all adult CAD inpatients, at least 18 years of age, male and female who had the ability to read and write Arabic and had no physical disability that prevented them from performing regular physical activities. Subjects who had distress, chest pain, and signs of discomfort were excluded since those manifestations probably affect patients' current intention of physical activity, which might alter patients' responses to the study.

Determination of sample size. The sample size was estimated based on G*power 3.1 software (Faul, Erdfelde, Buchner, & Lang, 2009) for multiple regression of five predictors that include: attitude; subjective norms; perceived behavior control; and two confounding variables, namely age and gender. Generally, sample size is detected by three determinants: power; alpha level; and effect size (ES) (Campelo & Takahashi, 2018). The power analysis for this study is

based on power of .8, a medium ES of .15, and alpha level of .05, and the estimated sample size for this study is 92 subjects.

The power value of .8 is the acceptable value in the social sciences (Morgan & Voorhis, 2007). Then, the probability of type II error was .2, which is the minimum acceptable probability in this study. A medium effect size was based on a previous study that used multiple regression statistical analysis to predict intention of physical activity among black adults in Indiana (Doss, 2014). Additionally, the alpha value of the statistical level of significance was fixed at .05, because it is not an intervention study; thus, a probability of errors in 5 out of 100 is acceptable for reducing type I error.

Tabachnick and Fidell (2013) propose another way to estimate sample size with multiple regression. Multiple regression is often used to examine the relationship between a single outcome measure and several predictor variables (Jaccard, Guilamo-Ramos, Johansson, & Bouris, 2006). A sample size was calculated based on the regression formula of (sample size) = 50 + (8 * the number of independent variables). Based on these criteria, the sample should equal 90 subjects for 5 predictors [(50 + (8*5)]. The principal investigator (PI) used the largest estimated sample size (92 subjects) to maintain the study power. In cross-sectional studies, participants can refuse to participate in the entire study (non-response rate) or skip some questions in the survey (missing data) (Fowler, 2014). Missing data were managed in the data analysis and is discussed below.

Measures

Even though several instruments have been developed in the English language to measure patients' intentions and readiness for physical activity, limited instruments have been translated into the Arabic language. The TPB questionnaire for physical activity (Armitage, 2005) has been

constructed under the TPB concepts and focused on the development of items for appropriately measuring patients' intention toward physical activity. Further, the analysis of psychometric properties of the TPB physical activity questionnaire (Armitage, 2005) has shown that this instrument is a reliable and valid tool for measuring patients' intentions, attitude, subjective norms, and perceived control. As such, this instrument was selected to translate to Arabic language and adapted as the needed in order to reflect the aims of the proposed study.

TPB Questionnaire of Physical Activity

The 15-item TPB questionnaire (Armitage, 2005) scale has been translated into Arabic (discussed below) and evaluated in this study. This scale measures the following variables at baseline on a 7-point Likert scale, namely attitudes of physical activity, subjective norms of physical activity, perceived behavioral control of physical activity, and physical activity intention. In previous studies, the overall scale has good internal reliability $\alpha = .90$ at baseline and $\alpha = .81$ at follow-up in the elderly adult population (Armitage, 2005). Additionally, the predictive validity of the overall scale was supported in adult populations (Armitage, 2005; O'Shea & Frazer, 2018).

Independent Variables

Attitude toward physical activity was assessed positively and negatively by asking participants to rate the following stem: "For me, participating in regular physical activity would be," anchored by the adjective choices of *dull–interesting, unpleasant–pleasant, boring–stimulating, unhealthy–healthy, bad–good,* and *useless–useful.* These adjectives were rated on a 6-item subscale. The mean of the six responses was used as a measure of attitude. Scores can range from 6 to 42. Higher scores indicate a positive attitude toward practicing physical activity behavior, while lower scores indicate a negative attitude toward practicing physical activity. For

this subscale, Cronbach's alpha indicated that α = .90 at baseline and α = .81 at follow-up (Armitage, 2005). *See Figure 5.*

For me, participating in regular physical activity would be:

dull: 1: 2: 3 : 4 : 5 : 6 : 7: *interesting*

Figure 5: TPB for Physical Activity (Armitage, 2005)/ Attitude

Subjective norms of physical activity was operationalized using three items. Responses to subjective norms items was on a unipolar (1 to 7) scale. Participants were asked to rate the following items: (1) People close to me think I should participate in regular physical activity… (disagree/agree); (2) People who are important to me would . . . (approve/ disapprove) of my participating in regular physical activity; (3) People close to me think I. . . (should/should not) participate in regular physical activity. The mean of the three responses were used. Scores can range from 3 to 21. Higher scores indicate a positive social influence from others for practicing physical activity. Lower scores indicate negative influence from others about physical activity. The subscale possessed good internal reliability with α = .85 at baseline and α = .96 at follow-up (Armitage, 2005). *See Figure 6.*

People close to me think I :

"should not participate in regular physical activity: 1: 2: 3: 4: 5: 6: 7: *should participate in regular physical activity."*

Figure 6: TPB for Physical Activity (Armitage, 2005)/ Subjective Norms

Perceived behavioral control of physical activity was measured using a 4-item subscale. Responses to perceived control items were on a unipolar (1 to 7) scale. Participants were asked to rate the following items: To what extent do you see yourself as being capable of

participating in regular physical activity? (*incapable–capable*); How confident are you that you will be able to participate in regular physical activity*?* (*not very confident–very confident*); I believe I have the ability to participate in regular physical activity (*definitely do not–definitely do*); and How much personal control do you feel you have over participating in regular physical activity*?* (*no control–complete control*). The mean average of the four responses was used as a measure of perceived behavioral control. Scores ranged from 4 to 28. Higher scores indicate more confidence and control in self as being capable of participating in physical activity. Lower scores indicate low confidence of self in practicing physical activity. This subscale also has good internal reliability α = .85 at baseline and α =.95 at follow-up (Armitage, 2005). *See Figure 7.*

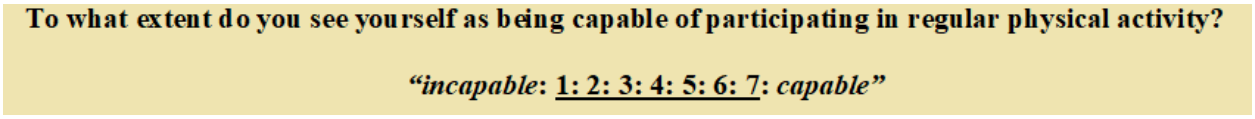

Figure 7: TPB for Physical Activity (Armitage, 2005)/PBC

Dependent Variables

Intention toward physical activity was measured by using two unipolar (1-7) subscales. Responses to intention items were on a unipolar (1 to 7) scale. Participants were asked to rate the following items: How often do you intend to take part in regular physical activity? (never–*frequently*); and (I want to exercise regularly… (*definitely do not–definitely do*). The mean average of the two responses was used. Scores ranged from 2 to 14. Higher scores indicate a positive intention for practicing physical activity, while low scores mean a weak intention to practicing physical activity. Cronbach's α =.72 at baseline, and α = .76 at follow-up (Armitage, 2005). *See Figure 8.*

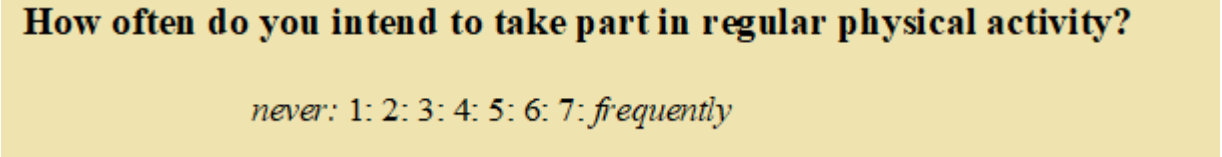

Figure8: TPB for Physical Activity (Armitage, 2005)/Intention

Demographic Variables

Demographic data information, including age, sex, marital status, education level, monthly income, and number of hospital admissions for cardiac reasons, were collected by using demographic datasheet. In the proposed study, age and sex serve as covariate variables, since the literature supports the relationships between these variables and intention toward physical activity (Piña et al., 2014; Suaya et al., 2009; Santaularia & Jaarsma, 2013; Wyer et al., 2001; Luszczynska, 2006). Age was measured using a numeric scale, whereas sex, marital status, educational level, and income were measured using a categorical scale.

Open-ended Questions

Four open-ended questions were asked to explore the beliefs toward physical activity among Jordanian CAD patients. Understanding the beliefs towards physical activity would identify critical information to understand barriers to physical activity. Furthermore, these questions allow participants to include more information that actually reflects their real feelings and attitudes regarding practicing physical activity. Consequently, this vital information would be essential background for future physical activity intervention studies and programs. Participants were asked: (1) What do you believe are the advantages of participating in physical activity as a CAD patient?; (2) Are there any individuals or groups of individuals who are important to you that would disapprove of your participating in regular physical activity? In what ways would they show disapproval?; (3) What makes it easy for you to participate in regular

physical activity?; and (4) What makes it difficult or impossible for you to participate in regular physical activity?

Instrument Translation and Adaptation

Permission for translation the TPB questionnaire into Arabic was received in an e-mail from the tool developer of the questionnaire, Christopher J. Armitage. The PI of this study translated the TPB questionnaire into the Arabic language since Arabic is the dominant language in Jordanian society. The translation and the back-translation were based on Brislin's model (1970). This model is a well-known method of preparing valid and reliable tools for cross-cultural research (Jones, Lee, Phillips, Zhang, & Jaceldo, 2001). The psychometric properties for the translated Arabic version had been accomplished through several procedures, including forward translation, back translation, the test of translation equivalence, content validation, cultural adaptation, and psychometric evaluation (Brislin, 1970). *See Figure 9.*

Two independent translators were asked to complete the translation and back-translation process. An English version of the TPB Questionnaire (Armitage, 2005) was sent via e-mail to one bilingual expert to translate it into Arabic. Next, the Arabic translated version was blindly provided to another bilingual expert (without having access to any English versions), and he/she was asked to do back-translation for the English language for the questionnaire. In case of error between the two versions (original copy and back-translated copy), the term in question was retranslated and again blindly back-translated by another expert. This process was repeated until no errors in meaning were found.

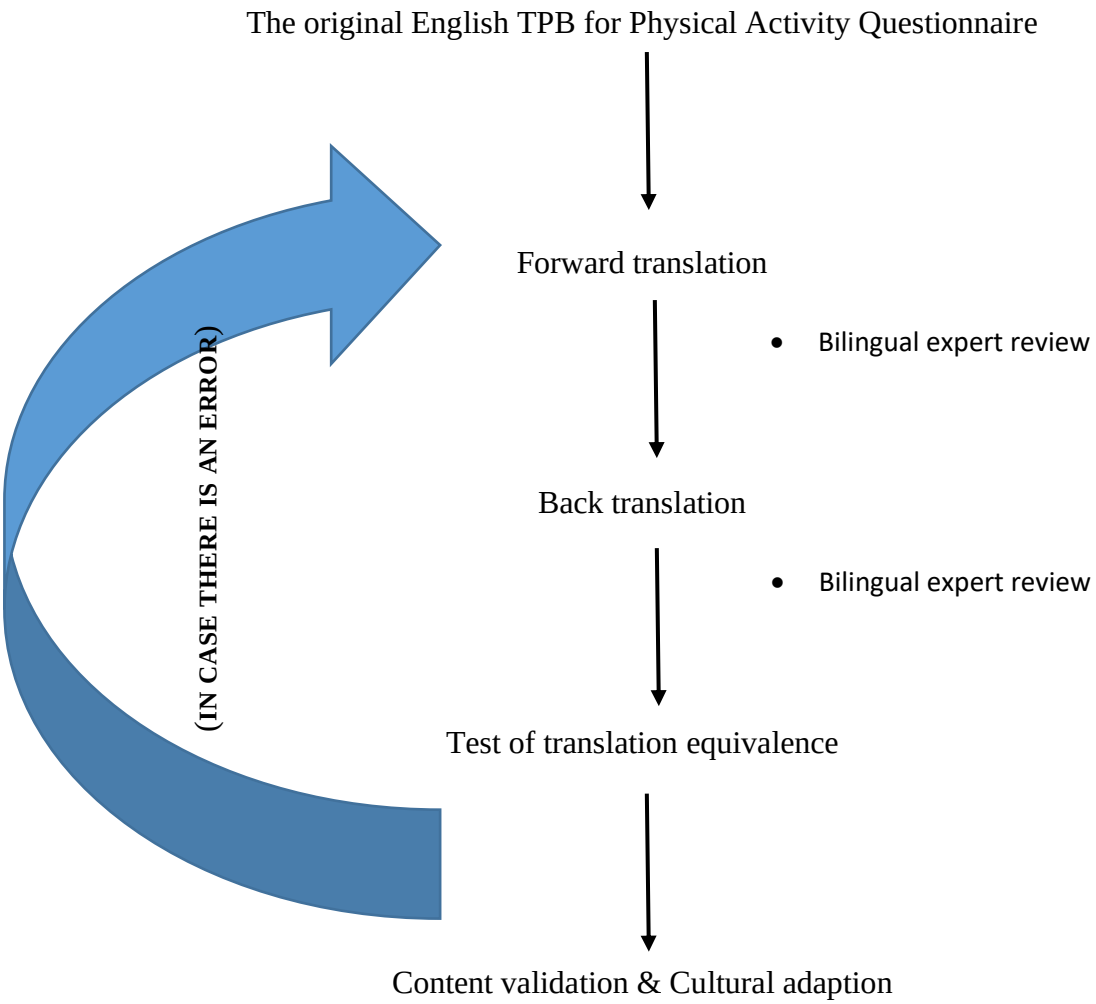

Figure 9. Procedures of Establishing Psychometric Properties.

Content Validation and Cultural Adaption

Using an instrument with strong psychometric properties influences the quality of data and decreases the chance of bias (Larkin et al., 2007). For this reason, content validity and

equivalence were established by a group of experts. The construct of interest determines which items are written and/or selected in the questionnaire translation phase.

Content validity is an estimation of how the instrument's items are representative of the content or subject matter that instrument seeks to measure (Newman, Newman, Brown, & McNeely, 2006). The content validity of the questionnaire should be evaluated after the initial form of the questionnaire is translated (Crocker & Algina, 2008). The final version was validated by bicultural and bilingual experts to check for consistency of meanings between the English and Arabic versions.

A panel of experts familiar with the physical activity constructs and Jordanian culture were asked to evaluate the content validity as well as the content equivalence of this questionnaire. Content equivalence refers to whether the content of each item is relevant to each cultural group or population under study (Kristjansson, Desrochers, & Zumbo, 2003). As a panel, the experts determined if the questionnaire items adequately measured the construct that it was intended to measure and if the items proved relevant to Jordanian culture. Three field bilingual experts in content and survey development were chosen from Jordan University of Science & Technology and KAUH to assess and evaluate the content of the translated questionnaire.

The 15 items in this questionnaire were assessed by the Item-Content Validity Index (I-CVI) (Polit, Beck, & Owen, 2007). This technique used to estimate the usefulness of the questionnaire items in terms of the index of relevance, representativeness, clarity, and readability and comprehensiveness of the translated Arabic version. In order to calculate the (I-CVI) for the 15-item, a sheet with a 4-point Likert scale to assess the translation equivalence questionnaire. Using the formula described by Lynn (1986), each of items was placed on a 4-point Likert scale

of 1 (totally different), 2 (the item needs major revision to be equivalent), 3 (the item needs minor revision to be equivalent), and 4 (equivalent for participants' responses).

Human Subjects

Human subject protection was obtained from the Ethics Committee of KAUH and the Internal Review Board (IRB) at Kent State University. In addition to the consent form agreement to participate being signed, ethical principles were maintained during the study.

The respect of the human dignity principle. This was achieved by obtaining informed consent from each participant. The researcher assistant also provided a verbal explanation of the aim and purpose of the study and assurances of participant's privacy, anonymity, and confidentiality as well as voluntary participation in the study, the participant's right to refuse to give information, the ability to withdraw from the study at any time without any consequence, and the statement of the research study approved by IRB at Kent State University and Ethics Committee of KAUH

Anonymity and confidentiality rights. Each participant's anonymity and confidentiality have been strictly protected via the following methods: (1) The electronic tablet that was used to collect the study data was encrypted, and only the research assistant had the password; (2) the tablet was stored inside a locked cabinet in the research assistant`s office at Jordan University of Science and Technology; (3) the research assistant and the PI were the only people with access to the Qulatrics account; (4) all data were collected in patients' private rooms or at a private office in the cardiac center; (5) all surveys were completed as an anonymous response, so no identifying information such as patient's name or patient's room number; and (6) the data from this study will be published in the aggregate without identification of personal attributes.

Data Collection

Online Survey Platform

After the final copy of the translated TPB questionnaire gained approval, the PI uploaded a consent form, the demographic questionnaire, the TPB questionnaire, and the four open-ended questions, respectively, to Qualtrics software. Qualtrics is computer software used for collecting and analyzing data by creating online surveys (Scott & Martin, 2012). The Qualtrics survey was uploaded to a specific tablet. This device was used to collect surveys from all participants.

Recruitment Procedure

After gaining study approval from both the ethical committee at KAUH and Kent State University IRB, an official letter sent to the director of nursing at the cardiac center and every unit at the cardiac center. The research assistant was the primary data collector, and she has a Ph.D. degree in nursing. This research assistant is also currently working as an assistant professor in the College of Nursing at Jordan University of Science and Technology. Additionally, she has extensive experience and skills in data collection as well as participant interviewing.

The PI conducted two training sessions to the research assistant about data collection from participants. To ensure reliability and minimize bias, the training sessions were provided to the research assistant through Skype software. This session focused on the nature of the research, interviewing methods, communication skills, and steps to ensure meeting the inclusion/exclusion criteria. Moreover, none of the cardiac nurses participated in data collection in order to avoid bias while collecting data from participants.

The research assistant then held a training session with the nurse receptionists who are responsible for identifying the eligible subject. The training sessions included information about the study purpose, anonymity, and confidentiality of study participants, and how to achieve this

in the current study. They were also informed not to provide any patients' identifiers to the research assistant and the PI. Furthermore, the nurse receptionists were informed about the inclusion and exclusion criteria to help identify the potential subject to this study. During data collection, nurse receptionists were responsible for calling the research assistant when a new potential patient was admitted to their departments. Each eligible participant was asked to participate in the study. The research assistant explained the purpose and the significance of the study to willing participants, gave them assurance for anonymity and confidentiality, and explained each patient's right to refuse or withdraw from the study at any time or not to answer any questions. Verbal agreements from the eligible participants were taken thereafter.

Data Collection Procedure

The uploaded electronic questionnaires were handed to the participants on the tablet. The first page of the Qualtrics survey contained the consent form. No personal information such as patient name or room number had been asked. Then, Qualtrics survey requested that participants press either "I agree" or "I do not agree" to proceed to the next page after reading the consent form.

Demographic data section included age, sex, marital status, education level, monthly income, and the number of hospital admissions. After completing demographic questions, the software directed participants to the 15- item TPB questionnaire. Thereafter, the software moved participants to the page containing the four open-ended questions. In case any question had not been answered by a participant, the software informed that participant about the unanswered question before proceeding to the next page. Still, the software did not force the participants to answer any question. Upon completing the survey, every participant was asked to submit their responses online through the survey platform.

The first 15 surveys served as a pilot study. The pilot study provided useful feedback and insight into how participants would interpret the questionnaire and the period of time required to complete the instruments. The recommended participant number for a pilot study is between 10 and 30 participants (Isaac & Michael, 1995; Moore, Carter, Nietert, & Stewart, 2011). The purpose of conducting a pilot study is to see the feasibility of the proposed study, check to see if study instructions and processes are correct, identify whether the wording of the instrument makes sense to the participants, and check the results' reliability and validity (Leon, Davis, & Kraemer, 2011). The results of the pilot study supported the viability of recruitment, a patient's ability to understand the questions, and feasibility of uploading the survey to Qualtrics without problems. Data collection was then continued until reaching the estimated sample size. No technical issues or unexpected events were reported during the data collection period.

Data Management

All data were examined for coding errors, systemic missing data, outliers, and marked skewness by computing descriptive statistics. Data from surveys was then entered into the SPSS software version 25, and all variables were checked for coding errors by comparing their minimum and maximum value with the value for label.

Missing data were found in two cases, and both cases have more than 50% of data missing from their scale. Kline (2005) recommended that the entire case should be deleted if at least 50% of the indicators for a particular construct were missing. the multiple imputation technique was used to fill the missing data. Multiple imputation is a powerful statistical tool that can be employed in a wide variety of settings with missing data (Liu, Graubard, Troiano, & Schenker, 2016). Mahalanobis distance statistical procedure was used to identify the outliers.

Mahalanobis distance can aid in identifying both univariate and multivariate outliers (Tabachnick & Fidell, 2013).

Testing Statistical Assumptions

Multiple regression assumptions were conducted before performing the analysis. The assumptions of the multiple regression analysis are normality, linearity, homoscedasticity, and collinearity (Tabachnick & Fidell, 2013). Normality means that variables have a normal distribution. Data normality were tested using a histogram, the Shapiro-Wilks test, and the Kolmogorov-Smirnova test (Tabachnick & Fidell, 2013). Linearity means that the dependent variables appear in a linear relationship with the independent variables (Tabachnick & Fidell, 2013). Residual plots show whether the linearity assumption has been violated (Tabachnick & Fidell, 2013).

Homoscedasticity, the variance of errors is the same across each value of independent variables, was also tested using a visual examination of the standardized residuals plot (Keith, 2006). Finally, collinearity was examined by tolerance and the use of the Variance Inflation Factor (VIF) (Munro, 2013). Most commonly, tolerance is ≥ 0.1, and VIF is ≤ 10 in un-violated collinearity cases (Munro, 2013). Violation of collinearity assumption is called multicollinearity. Multicollinearity usually occurs in the event that the tolerance is less than or equal to 0.1, and if VIF is equal to or more than 10 (Tabachnick & Fidell, 2013).

Statistical Analysis

Descriptive statistics such as mean, mode, median, and standard deviation were computed for continuous demographic data, such as age and item responses for the TPB questionnaire. Frequency counts and percentages were computed for categorical demographic data such as sex, marital status, and level of education.

Relevant statistical analyses were performed to answer the study's questions. Four open-ended questions were asked for the first question, "What are the beliefs toward physical activity among Jordanian CAD patients?": (1) What do you believe are the advantages of participating in physical activity as CAD patients?; (2) Are there any individuals or groups that are important to you who would disapprove of your participating in regular physical activity? In what ways would they show disapproval?; (3) What makes it easy for you to participate in regular physical activity?; and (4) What makes it difficult or impossible for you to participate in regular physical activity? Content analysis was used to analyze the responses from these four open-ended questions (Karen, Ross, & Kim, 2013; Sandelowski, 2000).

Next came the second research question, "What are the correlations among CAD patients' attitudes, subjective norms, and perceived behavioral controls?" Pearson correlation coefficients were calculated to determine the bivariate correlation between these variables.

After that, participants answered the third question, "Do attitudes, subjective norms, and perceived behavioral controls predict Jordanian CAD patients' intention to engage in physical activity behavior?" A stepwise multiple regression analysis was conducted to predict the effect of study predictors on physical activity intention

In the last question, participants were asked, "Do attitudes, subjective norms, and perceived behavioral control predict Jordanian CAD patients' intention to engage in physical activity behavior after controlling covariates of age and gender?" A hierarchical multiple regression test was used to answer this question. Hierarchical multiple regression is a way to show if variables of your interest explain a statistically significant amount of variance in a dependent variable after accounting for all other variables (Lankau & Scandura, 2002). Two stages of hierarchical multiple regression were used. Age and gender variables were entered at

the first stage as covariates variables. Next, attitudes, subjective norms, and perceived behavioral were entered at the second stage. The percentage of variation of intention when adding attitudes, subjective norms, and perceived behavioral control to the multiple regression model was measured in order to see if these variables were statistically significant in predicting intention among Jordanian CAD patients. Standardized Beta (β) was compared among ariables (attitudes, subjective norms, and perceived behavioral) to determine which variable contributed more to predicting the intention.

Summary

A correlational and cross-sectional design was used for this study to examine the relationship between the study variables and to predict the intention of physical activity by attitude, subjective norms, and perceived behavioral control of the TPB in Jordanian CAD patients. The cross-sectional design is used in describing the study variables at a certain, fixed point of time. Also, this design proves suitable for estimating the prevalence of behavior and ease of use (Sedgwick Philip, 2014).

All CAD patients admitted to the cardiac center at KAUH during the time of data collection were invited to participate in this study. The PI used a TPB questionnaire for physical activity, as developed by Armitage (2005). This questionnaire was translated into Arabic to collect the data related to the participants. After the data were collected, all data was entered into the SPSS software. This chapter also described the statistical technique for data analysis undertaken for this study.

Chapter 4

Results

The purpose of this cross-sectional study was to examine whether attitudes, subjective norms, and perceived behavioral control can predict Jordanian coronary artery disease (CAD) patients' intentions to practice physical activity. In addition, this study measured the impact of these determinants on CAD patients' intentions by using an Arabic-translated instrument based on the theory of planned behavior (TPB). All analyses were performed using the SPSS, version 25, statistical software package.

This study was accomplished in two parts. The first part includes instrument translation and adaptation: (a) producing an accurate translation of the TPB questionnaire, written in Arabic; and (b) validating the translated Arabic version of the TPB questionnaire. The second part addresses the study research questions. This part includes descriptive statistics of demographic factors of the study sample, preliminary data analysis, tests of statistical assumptions, and analysis of research questions. This chapter also includes the responses of participants to four open-ended questions posed to explore the beliefs toward physical activity among Jordanian CAD patients.

Instrument Translation and Adaptation

Questionnaire Translation

The translation of the TPB questionnaire was based on Brislin's model (1970). This questionnaire contained three parts. The first section covered the demographic variables, including age, gender, level of education, income, and the number of hospitalization admissions for cardiac reasons. The second part includes 15 questions to quantify the direct measures of the TPB components; more specifically, there are six questions for measuring the attitudes toward

physical activity, three questions for measuring subjective norms, four questions for measuring perceived behavioral control (PBC), and two questions for measuring CAD patients' intention toward physical activity. The last part consists of four open-ended questions aimed at assessing the beliefs of Jordanian CAD patients toward practicing physical activity.

Content Validity of the Questionnaire

Validation is offering evidence that participants who answer the survey understood what the items asked in a manner that was reasonably the same as the questionnaire developer (Beauford, Nagashima, & Wu, 2009). Content validity of the translated questionnaire was conducted after the translation process. An expert panel was created to make quantitative and qualitative judgments on the questionnaire items. The panel members were asked to judge on the content validity index. The final Arabic version was validated by three bilingual experts to check for consistency of meanings. The qualifications of bilingual experts matched the following criteria: (a) fluent in reading, speaking, and writing in both English and Arabic; (b) having experience in Jordanian culture; and (c) having at least a bachelor's in nursing science. A cover letter described the purpose of the study, scoring method, theoretical definition for constructs, and required instructions, in addition to the questionnaire, were sent via e-mail to expert members. *See Appendix A.*

The 15-item TPB questionnaire were assessed by the Item-Content Validity Index (I-CVI) and the Scale Level Content Validity Index (S-CVI). This assessment occurred by responding on a 4-point Likert scale, where 1 (totally different), 2 (the item needs major revision to be equivalent), 3 (the item needs minor revision to be equivalent), and 4 (equivalent) were used, as suggested by Lynn (1986). The panel experts were asked to use the original English

version of the TPB Scale as the gold standard to evaluate the equivalence of the translated variables. Each item was scored based on the understandability of the Arabic translated version.

In order to compute the I-CVI, the proportion of agreement of the 15 items among the three panel members was calculated. The results indicated that 11 of the 15 items were rated "4" ′out of "4" by all reviewers. Only four of the 15 items were rated on score "3" out of "4" by one reviewer, which are items with numbers (12, 13, 14, 15), and this reviewer suggested adding a question mark at the end of these items. Nevertheless, those items were rated "4" out of "4" by the other two reviewers.

To obtain the content validity index for each item (I-CVI), the number of those judging the item as relevant was divided by the number of panel experts (N = 3). In the current study, the I-CVIs of 11 of the 15 items were 1.0. The other four items had an I-CVI of 0.91. The scale-level index of an instrument (S-CVI) was then calculated by dividing the sum of I-CVIs on the number of items (Kovacic, 2018; Patra & Guha, 2018; Yusoff, 2019). In the current study, S-CVI was 0.97. The results indicated that the15-item translated Arabic version had excellent content validity. Researchers recommend that a scale with excellent content validity should be composed of I-CVIs of 0.78 or higher and S-CVI of 0.8 or higher (Kovacic, 2018; Shi, Mo, & Sun,2012; Yusoff, 2019). The instrument thus possesses a high content validity after translation.

Pilot Testing of the Questionnaire

The Arabic-translated questionnaire of physical activity was initially piloted to assess the comprehension and relevance of the questionnaire content. A sample of 15 Jordanian CAD patients (eight male and seven female) at King Abdullah University Hospital (KAUH) took part in this pilot study, and their ages ranged from 25 to 70 with a mean of 51 (SD = 13.3). The majority of respondents (67%) were married, and their monthly income was less than 500 JD

($705). Twelve out of 15 participants were admitted to the hospital more than once for a cardiac reason.

The average completion time of the questionnaire was nine minutes, and no comments have been reported about the questionnaire content. There was no reported difficulty encountered during survey data collection. The results of the pilot study supported the readiness for constructing a psychometric evaluation.

Data Management

Data Entry and Coding

Data were entered into statistical social package SPSS 25. According to the standard questionnaire guidelines of Armitage (2005), it is recommended that responses to items be obtained on a TPB scale, rating from 7 to 1. All TPB variables, attitude, subjective norms, perceived behavioral control, and intention items were coded in the SPSS software analysis on the scale of 7 to 1.

All data were screened to check for any errors, including the coding process, missing values, and outliers. As Kline (2005) recommended, it is critical to make certain that no scale has missing data more than 50% and that the data are clean of any outliers that can influence the study results.

Missing Data

The frequency test was used to screen the missing values. Here, the number of missing values was small. Missing data were found in two cases, 1 and 51. Both cases have more than 50% of data missing from their scales. According to Kline (2005), the entire case should be deleted if at least 50% of the indicators for a particular construct were missing.

The PI then tested whether the missing data were random or not among those two cases. Little's MCAR test was conducted to test whether the missing data were completely at random or not. Little's MCAR test assumes the data are missing completely at random if the test is nonsignificant ($p > 0.05$) (Li, 2013). The researcher found that Little's MCAR result was not significant, which indicates that data were missing completely at random. MCAR is defined when the data are missing is not related to either the specific value that is supposed to be obtained or the set of observed responses (Kang, 2013). As such, the two cases in question have been deleted from the dataset.

Outliers

Linear regression was used to test Mahalanobis distance to detect the multivariate outliers. As Tabachnick and Fidell (2007) noted, when the calculated chi-square values are bigger than the critical chi-square value at an alpha order of $p < 0.001$ with a given degree of freedom, the cases would be considered outliers and should be deleted. In this study, the critical chi-square value at an alpha order of $p < 0.001$ with a 3 degree of freedom, which is also called the cutoff value, was about 13.574. The Mahalanobis distance was 13.085. Seeing this, no outliers appeared in the multivariate.

Univariate outliers were also detected using Box plotting in the independent variables: attitude toward physical activity, subjective norms of physical activity, and perceived behavioral control of physical activity. Variables with a value higher or lower than three standard deviations away from mean were considered to have an outlier (Munro, 2013). The results indicated that two outliers' cases were detected in the attitude toward physical activity variable, and no outliers were detected in either subjective norms of physical activity or perceived behavioral control of physical.

Both outlier values were checked to see whether or not they fell within the respective score values. These two scores were found to be as illegitimately within the score values. For example, although both cases scored extremely low in attitude and intention scores, they had values extremely high in both subjective norms and perceived behavioral scores, thereby indicating that they might respond to attitude items in a socially desirable way. Moreover, two data analyses were conducted, one with these two outliers and one without the outliers, and the results showed that the presence or absence of these two outliers did not change in the final regression analysis. As a result, the two outliers' cases, numbers 106 and 110, were excluded from the final analysis. *See Figure 10.*

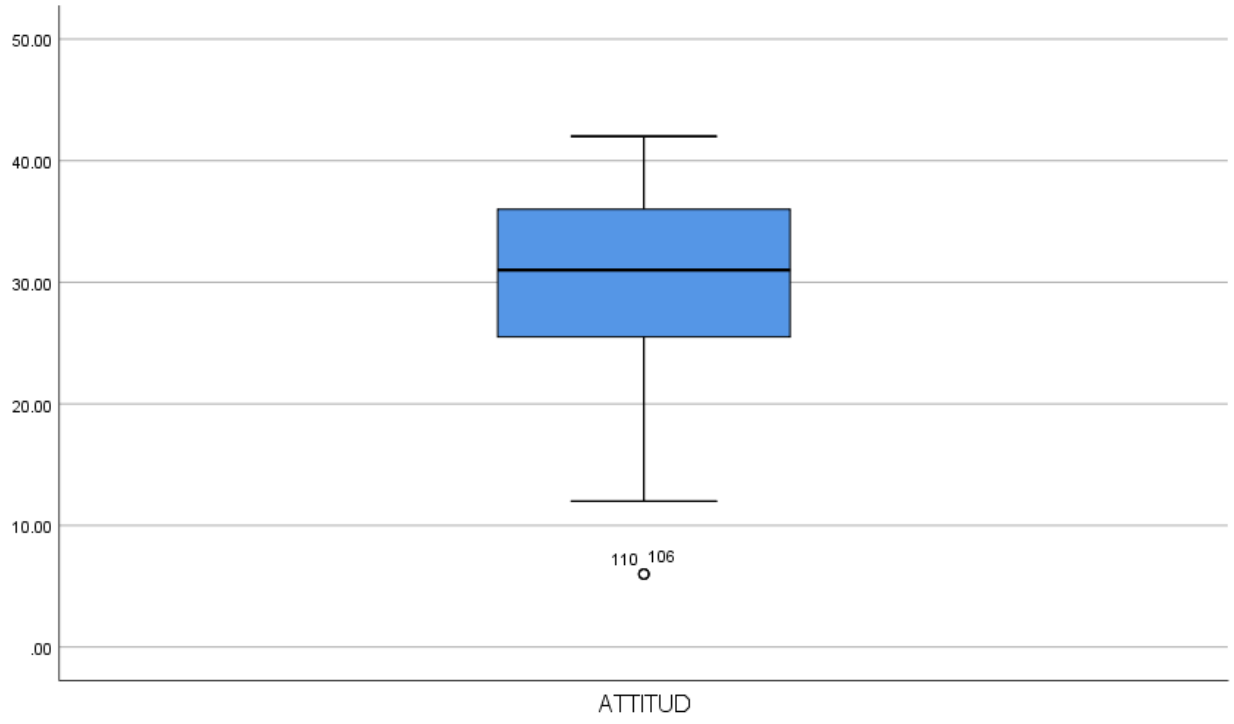

*Figure 10:*Attitude toward physical activity outliers.

Demographic Characteristics

After data screening, the sample was 109 subjects.Ages of subjects ranged from 24 to 81 years (M = 54.09, SD = 13.5). The majority of subjects were male, n = 64, (58.7%) and married,

n=79 (71.2.4%). The participants had different educational degrees, approximately 39% of participants had only a high school or less, whereas about 42% had completed a bachelor's degree. The vast majority of the participants (90%) reported that their monthly income was less than 1000 JD ($1410). Greater than one-third of the sample (35.8 %) were being admitted to hospital as the first time due to CAD, while 37.6 % of the participants reported this instance as the second hospital admission for diseases related to coronary arteries only. Table 1 describes the sample characteristics.

Table 1.

Subjects' Demographic Characteristics (N=109)

Characteristics	*n* %	*M* (*SD*)	Min	Max
Age	109	54 (13.5)	24	81
Gender				
Male	64 (59%)			
Female	45 (41%)			
Marital Status				
Single	11 (10%)			
Married	79 (72.5%)			
Divorced, or Widowed	19 (17.5%)			
Education				
High School or less	43 (39.4%)			
Diploma	20 (18.3%)			
Bachelor's degree or more	46 (42.2%)			
Monthly Income				
500 JD ($705.00) or less	48 (44%)			
5001- 1000 JD ($705.00-1410.00)	50 (46%)			
More than 1000JD ($1410.00)	11 (10%)			
Number of Admissions				
Once	39 (36%)			
Twice	41 (37.6%)			
Three time or more	19 (26.4%)			

Note: *n*: Number of participants; *M*: Mean, *SD*: Standard Deviation; Min: Minimum; Max: Maximum.

Study Variables Description

Descriptive statistics of intention reported a mean of 7.77 (SD = 2.83), and the scores ranged from 2 to 14. For independent variables, the mean of attitude was 30.74 (SD = 7.14), and the attitude's scores ranged from 12 to 42. Subjective norms scores ranged 4 to 21 (M = 14.92, SD = 4.22), while the scores of the perceived behavioral control ranged from 4 to 28 (M = 15.91, SD = 6.52). Descriptive statistics of variables appear in Table 2.

Table 2.

Variables Characteristics (109)

Variables	M(SD)	Min	Max
Intention	7.77 (2.83)	2	14
Attitude	30.74 (7.14)	12	42
Subjective Norms	14.92(4.22)	4	21
PBC	15.91(6.52)	4	28

Note: M: Mean; SD: Standard Deviation; Min: Minimum; Max: Maximum.

Assumptions

Normality

Sharipo-Wilk test and skewness and kurtosis statistic values were used as indicators of normality. Tabachnick and Fidell (2013) related that these tests of normality are preferable for small to moderate sample sizes. Continuous variables were considered as not normally distributed if their skewness or kurtosis statistic divided by their standard error was greater than z + 3.29 and their Shapiro-Wilk test was statistically significant ($p < .01$) (Tabachnick & Fidell, 2007). On this basis, preliminary analyses ensured that all relevant study variables (attitude, subjective norms, perceived behavioral control, and intention) in each condition were approximately normally distributed. The Shapiro Wilks test and the Kolmogorov-Smirnova test

results were not significant (Shapiro -Wilk = 0.980, df = 110, p = .090) suggesting that the unstandardized residuals were normally distributed.

Homogeneity of Variance

The assumption of homogeneity of variance was tested using graphics from regression and simple scatterplots of studentized deleted residuals versus standardized predicted scores. The results provided that the residuals were randomly scattered around the zero lines. This result suggests no evidence of the non-constant error. *See Figure 11*

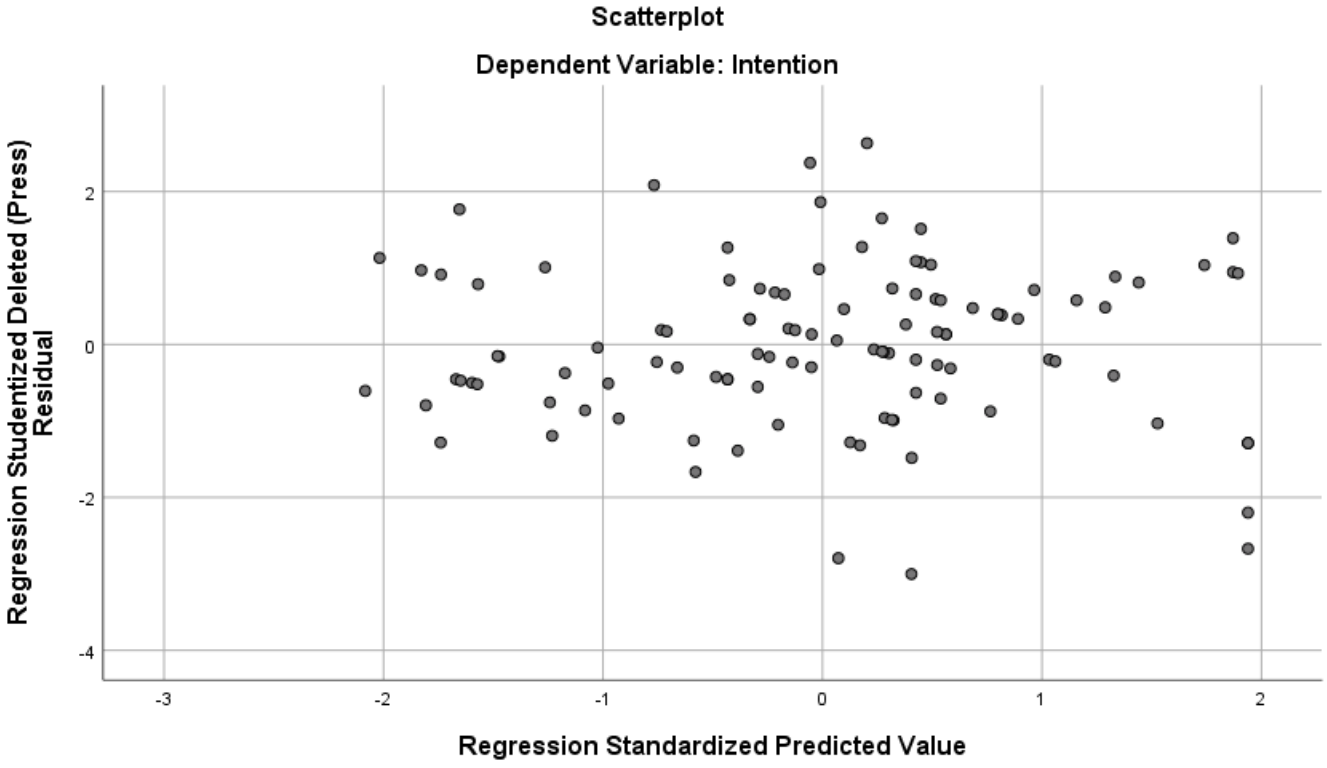

Figure 11. Assumption of homogeneity of variance

Multicollinearity

Multicollinearity was detected between the variables. Collinearity was tested by tolerance and use of the Variance Inflation Factor (VIF). Most commonly, tolerance is ≥ 0.1, and VIF is ≤ 10 in un-violated collinearity cases (Munro, 2013). Tolerance of all variables ranged from .379

to .597(greater than 0.1), and all of the variances of inflation factors were less than 10. Because of this, no evidence of multicollinearity between variables exists.

Psychometric Properties (Reliability)

In order to arrive at an internal consistency reliability in this study, Chronbach's alpha was calculated to determine the reliability of four subscales of TBP variables. Internal consistency measures the relationships between items in a specific instrument (Waltz, Strickland, & Lenz, 2010). All of the study subscales displayed favorable Cronbach's alpha values. The Chronbach's alpha for the attitude scale was .87, while the Cronbach's alpha values for subjective norms, perceived behavioral control, and intention subscales the were each above .90. Several studies agreed that a value of Cronbach's alpha equals .7 or more is considered as an acceptable value (Griethuijsen et al., 2014; Pallant, 2007; Waltz Strickland, & Lenz, 2010). See Table 3.

Table 3.

Chronbach's Alpha for of TPB Sub-Scales

Scales	*N*	Cronbach's Alpha
Attitude	109	.87
Subjective Norms	109	.97
PBC	109	.97
Intention	109	.92

Note: *N*: Number of participants.

Research Questions

Research Question (1). *What are the correlations among CAD patients' attitudes, subjective norms, perceived behavioral controls, and intention toward physical activity?*

Pearson correlation coefficients were measured to estimate the relationships between the CAD's patients' attitudes, subjective norms, perceived behavioral control, and intention toward

physical activity variables. The test showed moderate and significant relationships between predictor variables and intention, intention and perceived behavioral control, (***r*** = 0.548, p < 0.01), intention and subjective norms (***r*** **=** 0.478, p < 0.01), and intention and attitude (***r*** = 0.403, p < 0.01). The subjective norms factor was highly correlated to attitude and perceived behavioral control (r = 0.708, p < 0.01; r = 0.633, p < 0.01, respectively). Perceived behavioral control was also moderately correlated to attitude (r = 0.487, p < 0.01). Table 4 displays Pearson ***r*** correlations between the study variables.

Table 4.

Pearson r Correlations

	Attitude	Subjective Norms	PBC	Age	Gender	Intention
Attitude	1	.708**	.487**	-.438**	.103	.403**
Subjective Norms		1	.633**	-.638**	.238**	.478**
PBC			1	-.622**	.179*	.548**
Age				1	-.342**	-.491**
Gender					1	.176*
Intention						1

Notes: ***p* < .001, **p* < .05; *N* = 109.

As displayed, all the relations between attitude toward physical activity, subjective norms of physical activity, perceived behavioral control of physical activity, and the intentions toward physical activity were significantly and positively correlated.

Research question (2). *Do attitudes, subjective norms, and perceived behavioral controls predict Jordanian CAD patients' intention to engage in physical activity behavior?*

Multiple linear regression was conducted to answer this question by assessing if attitudes, subjective norms, and perceived behavioral controls predict CAD patients' intentions toward practicing physical activity. The multiple regression revealed that the overall model significantly

predicts CAD patients' behavioral intention. The regression model accounted for 33.4% of the variance in behavioral intention score (R_2 = .334, F (3, 105) = 17.534, p < .001). Tables 5 displays the full regression. Based on the results of the regression model, the ability of TPB constructs (attitude, subjective norms, and perceived behavioral control) predicted Jordanian CAD patients' intention toward practicing physical activity. Table 5 provides an overview summary of the model.

Table 5.

Regression Analysis output

R	R^2	R^2 adj.	FΔ	*df*1	*df*2	*p*
.578[a]	.334	.315	17.534	3	105	.000

[a]. Predictors (Constant), Attitude, Subjective norms, PBC

The results revealed that the perceived behavioral control has a large and significant prediction of the intention toward physical activity (β = .404, p = .000). In sum, this means that the CAD patients' intentions increased by .404 unit for every one unit increase in perceived behavioral control. Attitude and subjective norms were not significant predictors of intention (β = .095, p = .412; β = .155, p = .235). See Table 6.

Table 6.

Regressions output of Attitude, Subjective norms, and Perceived Behavioral Control in Predicting Intention.

	Unstandardized Coefficients		Standardized Coefficients		Sig.
	B	*SE B*	β	*t*	
Attitude	.037	.045	.095	.824	.412
Subjective norms	.104	.087	.155	1.195	.235
PBC	.175	.045	.404	3.924	.000

[a] Predictors; Attitude, Subjective norms, PBC

Research question (3). *Do attitudes, subjective norms, and perceived behavioral control predict Jordanian CAD patients' intention to engage in physical activity behavior after controlling covariates of age and gender?*

Hierarchical multiple regression was used to answer this question. The hierarchical multiple regression revealed that at stage one age and gender significantly contributed to the regression model ($R^2 = .241$, F (2,106) = 16.865, $p = .000$), and contributed to 24.1% of the variation in physical activity intention. Adding the predictors of TPB (attitude, subjective norms, and perceived behavioral control) to the regression on the stage 2 explained the 11.2% variation of intention, and the R^2 change was significant in this stage ($R^2 = .354$, F (3,103) = 5.974, p = .001). Table 7 displays an overview summary of the models.

Table 7.

Hierarchical Regression Analysis Output

Predictors	R^2	R^2 adj.	$R^2\Delta$	Unstandardized Coefficients		Standardized Coefficients	
				B	SE B	β	*t*
Step 1	. 241	.227	.241**				
Age				-.102	0.19	-.488**	-5.42
Gender				.054	.515	.009	.105
Step2	.354	.322	.112**				
Attitude				.044	.045	.111	.966
Subjective norms				.042	.093	.062	.449
PBC				.145	.045	335**	3.02

Note: *$p < .05$ **$p < .01$

At stage one of the regression model, age served as the significant predictor of the intention (β = -.488, t (2) = -5.42, ρ = .000), but no significance was found for the gender. In the

last stage of the regression model, among the TPB variables (attitude, subjective norms, and perceived behavioral control), only perceived behavioral control predicts the intention as to coefficient regression output. Perceived behavioral control showed a significant β weight (β = .335, t (5) = 3.02, ρ = .003), which means that the CAD patients' intentions increased by .335 unit for every one unit increase in perceived behavioral control after controlling the age and gender variables. Attitude and subjective norms did not serve as significant predictors of intention, even though the entire mode was significant.

Research question 4. *To explore the beliefs toward physical activity among Jordanian CAD patients.*

Four open-ended questions were asked to answer this question. The principal investigator used content analysis to analyze participants' responses about the advantages, social pressure, enabling factors, and barriers to practice physical activity among those patients. The majority of participants responded to these open-ended questions.

Open-ended question 1. What do you believe are the advantages of participating in physical activity as CAD patients?

Fifty-six participants (51%) answered this question. Thirty-one participants (55%) reported that the advantages of practicing physical activity as cardiac patients improves the cardiovascular system and strengthens the heart muscle. Thirteen participants (23%) believe that in the role of physical activity to prevent heart attacks, while 18 participants (31%) believe in the benefits of physical activity to reduce the risk factors that increase the CAD incidence such as high cholesterol, obesity, hypertension, and diabetes. Table 8 displays the advantages of practicing physical activity.

Table 8.

Advantage of Physical Activity

Advantages	Beliefs	No.	%
	improves cardiovascular and strengthens the heart muscles	31	55
	Prevent Heart attacks	13	23
	Reduce risk factors (e.g. DM, obesity&↑cholesterol)	18	31

Note: No.: Number of responses.

Open-ended question 2. Are there any individuals or groups of individuals who are important to you who would disapprove of your participating in regular physical activity? In what ways would they show disapproval?

Forty-eight participants (44%) answered question 2. Most who responded to this question (98%) replied that no individuals or people might oppose their practicing of physical activity. One participant said, “Yes, there is opposition and that because I’m a girl.”

Open-ended question 3. What makes it easy for you to participate in regular physical activity?

Thirty-two participants answered this question. Fifty percent of respondents reported that family and friends’ support play a crucial role in facilitating practicing physical activity among CAD patients. One-third of respondents reported psychological and emotional support as factors that facilitate engaging in physical activity, while more than 16% of respondents indicated the importance of having fitness club memberships.

Open-ended question 4. What makes it difficult or impossible for you to participate in regular physical activity?

Thirty-nine participants answered open-ended question 4. The most common obstacles for practicing physical activity were as follows having chronic diseases and feeling of exhaustion (n = 13, 33%); job tasks (n = 7, 18%); family and friend commitments (n = 8, 20%); and lack of time (5, 13%). Table 9 illustrates the factors that facilitate and complicate practicing physical activity.

Table 9.

Physical Activity Factors

Factors	Factors	No.	%
Enabling			
	The psychological and emotional support	10	13
	Family and friends support	16	50
	Fitness club memberships	5	16
Difficulty			
	Having chronic diseases and feeling of exhausted	13	33
	Job tasks	7	18
	Social pressure from family& Friends	8	20
	Lack of time	5	13

Summary

The results of this chapter were obtained from participants' responses to the TPB questionnaire of physical activity (Armitage, 2005) and four open-ended questions. The target population consisted of Jordanian CAD patients at KAUH. Descriptive statistics described the sample characteristics such as age, gender, income, level of education, and marital status. Cronbach's alpha was calculated to determine the reliability of TBP variables, indicating acceptable values of reliability.

In the first research question, Pearson ***r*** was used to measure the relationships between the study variables. The results indicated significant relationships between all the study variables (attitude, subjective norms, perceived behavioral control, and intention). In the second research question, standard multiple regression was used to answer it. The regression revealed that the overall model significantly predicts CAD patients' behavioral intention and explained 33.4% of the variance in behavioral intention.

In the third research question, hierarchical multiple regression was used to indicate the ability of attitude, subjective norms, and perceived behavioral control to predict the intention after controlling for age and gender. The regression showed that the TPB variables significantly predict the behavioral intention after controlling the age and gender, and the regression explained 11.2% of the variance of the behavioral intention. Further discussion of the results and implications of this study appear in the next chapter.

Chapter 5

Discussion

This chapter includes the discussion of this study's findings, strengths and limitations, implications, recommendations, dissemination, and conclusion. This study examined factors that influenced the intentions of Jordanian CAD patients to perform the physical activity by employing the theory of planned behavior (TPB) as a framework. The study determined whether the TPB constructs (attitude toward physical activity, subjective norms of physical activity, and perceived behavioral control of physical activity) predict the CAD patients' intention toward physical activity. Barriers to physical activity were also assessed to get a better understanding of the impact of various factors on the perceived ability of patients to achieve adequate levels of physical activity.

Psychometric Properties (Reliability)

Cronbach's alpha was used to assess the internal consistency of the measurement subscales in the survey instrument (attitude toward physical activity, subjective norms of physical activity, perceived behavioral control of physical activity, and intention toward physical activity). The findings in this study provided a strong level of reliability since the alpha coefficients were higher than .87. The reliability of this study was at least similar and sometimes stronger than reliability in previous, similar studies. reliability of this research remained consistent with the reliability's results of the original questionnaire from Armitage (2005);

where the Cronbach's alpha in the Armitage study were as follows: attitude α = .90 at baseline and α = .81 at follow-up; subjective norms α = .85 at baseline and α = .96 at follow-up; perceived behavioral control α = .85 at baseline and α =.95 at follow-up.

A study conducted in Saudi Arabia that used the TPB to investigate the antecedents of physical activity participation among Saudi adolescents reported that the reliability of attitude α = .91; for subjective norms α = .71; for perceived behavioral control α = .68; and for intention α = .83 (Alselaimi, 2010). Additionally, the reliability score for the current study to predict intention among Jordanian CAD patients (α = .87) was better than Godin's study, which aimed to predict intention to exercise of individuals who were having CAD (α = .81) (Godin et al., 1991).

Predict Intention of Physical Activity

The purpose of this study was to examine the utility of the theory of planned behavior (attitude toward physical activity, subjective norms of physical activity, and perceived behavioral control of physical activity) in predicting intentions toward physical activity in CAD patients. TPB is one of the most-tested theories in health psychology used to understand and predict health behavior outcomes among Western cultures (Ajzen, 1991, 2002; Norman & Conner, 2005). Studies suggest that TPB effectively predicts both intentions and behaviors in both general and culturally-diverse populations (Ajzen, 2006; Armitage & Connor, 2001; White et al., 2012). In the present study, correlation analysis and multiple regressions were employed to interpret the predictor variables' influence on the intention toward physical activity among Jordanian CAD patients.

Pearson's correlation coefficient was used to assess the correlations between the study variables. Here, each predictive variable (attitude, subjective norms, and perceived behavioral control) had a positive correlation with intention, intention and attitude (r = .43, $p < .01$),

intention and subjective norms (r = .48, $p < 0.01$), and intention and perceived behavioral control (r = .55, $p < 0.01$). In the population studied, the intention among CAD Jordanian patients toward physical activity positively increased as attitude, subjective norms, and perceived behavioral control increased.

The study results support the ability of the TPB variables (attitude, subjective norms, and perceived behavioral control) in the prediction of Jordanian CAD patients' intentions toward physical activity. The findings of this study remained consistent with the previous studies' findings in supporting the ability of the theory to predict physical activity intentions in cardiac patients (Blanchard et al., 2016 ; White et al., 2012), as well as different populations such pregnant women (Lee, Chiang, Hwang, Chi, & Lin, 2016; Newham et al., 2016), the elderly population (Arnautovska, Fleig, Ocallaghan, & Hamilton, 2018; Ghahremani, Niknami, & Nazari, 2012), youth (Abraham & Graham-Rowe, 2009), athletic people (Poobalan, Aucott, Clarke, & Smith, 2012), children (Isa, Ueda, Nakamura, Misu, & Ono, 2018), and college students (Kwan, Bray, & Ginis, 2009; Poobalan et al., 2012).

The study results also coincide with and support previous studies that found a considerable amount of the variance in the prediction of intention. In the current study, attitude, subjective norms, and perceived behavioral control accounted for nearly one-third (33.4%) of the variance in a patient's intention to change his or her behavior. The variance among attitude, subjective norms, and perceived behavioral control in previous research was between 11% and 76% in prediction of intention for physical activity (Blanchard et al., 2016; Rhodes, Macdonald, & McKay, 2006; Vallance et al., 2011;), and accounting for 18% to 81% of variance in intentions in different behavior change variables (Ajzen, 1991; Akbar, Anderson, & Gallegos, 2015; Middleton & Smith, 2011; White et al., 2012).

Covariates (Age and Gender)

The study results indicated that the TPB provided significant evidence of attitude, subjective norms, and perceived behavioral control in the prediction of Jordanian CAD patients' intentions toward engaging in physical activity after controlling for age and gender. Nonetheless, the results revealed that age served as a significant predictor of intention (β = -.488, t (2) = -5.42, ρ = .000), but no significance was found for gender. Intention toward physical activity decreases as age increases. Previous studies supported these results; as age increases, the intention to engage in physical activity decreases (Cooper et al., 2007; Grace et al., 2009; Matata & Williamson, 2017; Suaya et al., 2009).

Unlike previous studies, gender was not a significant covariate in the present study. In previous studies, men engaged in more vigorous and frequent physical activity than women (Donnelly et al., 2018; Minges et al., 2017; Sharara et al., 2018). But in some studies, no differences between genders were found in moderate physical activity such as walking or housework (George et al., 2012; Greaney et al., 2009; Rhodes, Blanchard, & Blacklock, 2008).

For the current study, the weak relationship between gender and willingness to practice moderate physical activity behavior corresponded to other, older studies (Azevedo et al., 2007; Rhodes, Blanchard, & Blacklock, 2008). Similarly, in a study aimed to examine the determinants of physical activity among Jordanian adults, age, but not gender, had a significant effect on physical activity participation among healthy Jordanian adults (Ammouri et al., 2007).

The weak relationship between gender and moderate physical activity behavior is possibly explained by a higher level of daily housework physical activity among females. Women were more likely than men to engage in moderate daily activities such as walking and

biking, while men were more likely to practice vigorous and competitive sports; interestingly, no significant gender differences have been shown in readiness to practice physical activity (Ghani, Rachele, Washington, & Turrell2016; van Uffelen, Khan, & Burton,2017).

CAD Patients' Attitude toward Physical Activity

Identifying and examining predictors of physical activity intention and behavior is a crucial consideration in developing more effective interventions to maximize both physical activity adoption and adherence (Alkerwi et al., 2015; Arija et al., 2017; Pozehl et al., 2014). The findings here provide support for the effectiveness of the TPB in predicting CAD patients' intention; however, the study established that the only predictor of intention was perceived behavioral control, while attitudes and subjective norms had no significant prediction for CAD patients' intentions. Ajzen and Fishbein argued that some of the TPB constructs might be non-significant predictors of intention, and this might depend on different factors such as characteristics of the sample or the behavior itself (Ajzen, 1991; Ajzen & Fishbein, 2010).

Remarkably, this study's findings contrast with the role of attitude for predicting physical activity intention in previous studies among groups of individuals with cardiac disease (Blanchard et al., 2003; Sassen et al., 2010) and healthy people (Abraham & Graham-Rowe, 2009; Ghahremani, Niknami, & Nazari, 2012; Kwan, Bray, & Ginis, 2009; Poobalan et al., 2012). What is more, Sassen (2010) found that attitude served as the strongest predictor of physical activity intention among cardiac patients, and perceived behavioral control was a weak predicter (Rhodes & Courneya, 2005).

The incongruity between the findings of the current study and previous studies regarding the non-significance prediction of attitudes toward physical activity intentions might be attributed to response bias and physical activity awareness. For example, participant might have

responded to the attitude scale with social desirability bias and hence failed to reflect their personal attitudes (Routledge, 2018). In one such instance, although Jordanian CAD patients reported overall positive attitudes toward the benefits of practicing physical activity, many negative attitudes were identified through the open-ended questions. Explanations for these behaviors can be gleaned from CAD participants who reported physical activity to disabling factors such as feeling exhausted and the undesirability of perceived risks of exercise. Resultantly, negative attitudes towards physical activity and risk of exhaustion that relate to an effort for conducting physical activity could persuade participants, such as cardiac patients, not to engage in physical activity. Further, those who had previously practiced physical activity could also seek to reduce practice of physical activity after diagnoses with a cardiac disease. This could explain the variability of attitudes in the current study.

Subjective Norms of Physical Activity

This study revealed that subjective norms did not significantly predict physical activity intention. This is in accordance with previous studies involving TPB (Hatefnia, Alizadeh, & Ghorbani, 2019; Ghahremani, Niknami, & Nazari, 2012; Norman, 2011). One of the seminal works by Armitage and Conner (2001) was a meta-analysis reviewed 185 studies showed that the ability of subjective norms to predict intentions has not been satisfactory, while perceived behavioral control accounts for most of the significant variance in behavior and intention. Ghahremani, Niknami, and Nazari (2012) also recognized that subjective norms had a weak prediction of physical activity intention among elderly people.

Ajzen (2002) argued that subjective norms might have a lower predictive value depending on the degree to which an individual respond to social influences and also to the type of behavior involved. The individual might feel that significant others want them to perform a

specific action or behavior (e.g., physical activity). Still, this individual is not obliged to comply with others' wishes. With this, cardiac patients could choose to engage in behaviors such as a physical activity that others who are important to them might neither approve of nor support.

Perceived Behavioral Control of Physical Activity

In the present study, perceived behavioral control was found to be the strongest and the only significant predictor of intention. A significant number of previous studies revealed that perceived behavioral control served as one of the most critical factors in physical activity intention and behavior (Behrens, & Harbour, 2014; Blanchard et al., 2011; Ghahremani, Niknami, & Nazar, 2012; Oliveira et al., 2014; Sas-Nowosielski, Grabara, & Hadzik, 2013; Shahroodi, et al., 2019; Vallance et al. 2011). The findings of the present study are consistent with Armitage's study (2005) for testing TPB's ability to predict physical activity intention and behavior in the adult population. The results here found that perceived behavioral control ranked as the main predictor of physical activity intention and behavior among adults.

Perceived behavioral control was also reported as a strong predictor of physical activity intention in previous studies among cardiac populations. For example, Blanchard (2008) examined the utility of TPB in explaining physical activity behavior during home-based cardiac rehabilitation. The results indicated that perceived behavioral control significantly predicted intention for six months of the program duration. In another instance, Blanchard and colleagues (2016) found that perceived behavior control was the key predictor of a three-month physical activity intervention of moderate-to-vigorous physical activity levels during a home-based cardiac rehabilitation program. On another front, the current findings are also congruent with a study aimed to examine the determinants of physical activity among Jordanian adults; there,

perceived behavioral control was the strongest predictor of physical activity (Ammouri et al., 2007).

The significant effect of the perceived behavioral control in predicting intentions might be explained by the role of physical activity barriers to limit an individual's ability and readiness to practice physical activity. For example, previous studies showed that participants who practice regular physical activity confirmed that the most common complicating factors that limit their abilities and control to engage in physical activity were time, work/family commitments, injury or illness, and inclement weather (Darker, French, Eves, & Sniehotta, 2010; Moschny, Platen, Klaaßen-Mielke, Trampisch, & Hinrichs, 2011 Tak et al., 2012). These factors remained consistent with the problematic factors' findings of the open-ended questions among Jordanian CAD patients in the current study. Lack of time, job responsibilities, and lack of resources (e.g., lack of fitness clubs) pose common physical activity barriers among those patients. As a result, CAD patients view these aspects as significant influences on their physical activity intention and behavior.

Barriers to Physical Activity among Jordanian CAD Patients

The findings of the open-ended questions showed that CAD patients endorsed several advantages to practicing regular physical activity, which concur with previous studies (Alkerwi et al., 2015, Arija et al., 2017, Bruning & Sturek, 2015; Darden, Richardson, & Jackson, 2013). For instance, participants noted that the advantages of participating in physical activity as CAD patients reflect their concerns about improving the cardiovascular system, reducing the incidence of heart attacks, and decreasing coronary arteries' risk factors, such as obesity and high cholesterol levels. The findings concur with studies finding that regular physical activity helps reduce several cardiovascular risk factors, including obesity (Agarwal., 2012; Alsaleh, Windle,

& Blake, 2016; Elhneiti & Al-Hussami, 2017), dyslipidemia (Agarwal, 2012; Viswanathan et al., 2018), hypertension (Agarwal, 2012; Lee et al., 2012), and diabetes mellitus (Lee et al., 2012; White et al.) among patients with established coronary disease. Additionally, regular physical activity helps in improving angina-free activity and preventing heart attacks (Alves et al., 2016; Anderson et al., 2016; Agarwal, 2012).

Despite all these benefits, Jordanian CAD patients believe that feelings of exhaustion, lack of time and family support, and a shortage of physical activity facilities were the most common barriers to preventing the practice of physical activity. These findings were consistent with other studies' findings. A semi-structured interview study conducted by Joussain and others sought to identify the barriers to physical activity in CAD patients; they found that fatigue, lack of time and work, overall state of health, lack of motivation from the family, fear of a new heart attack, and lack of specialized places and supervision were the most common barriers of practicing physical activity (Joussain et al., 2017). The results of the current study were likewise consistent with the finding of a previous study conducted in Jordan that aimed to investigate physical activity behaviors (frequency and duration) among Jordanian diabetic patients. The findings indicated that lack of time and poorly-designed communities in Jordan, where sidewalks and playgrounds are not available in every neighborhood, were the main two factors of physical activity barriers (Darawad et al., 2016).

In sum, the results here provided support to the efficacy of the theory of planned behavior model in predicting Jordanian CAD patients' intentions toward physical activity. Consistent with previous studies, perceived behavioral control is the only significant predictor of intention. Furthermore, significant associations appeared between attitude, subjective norms, and intention. These results can be explained in the magnitude of the three TPB predictors on intention might

be varied based on the characteristics of the population on the one hand and the nature of the behavior itself on the other. Overall, the results provide strong evidence for the theory of planned behavior's ability to use this framework to predict physical activity among Jordanians.

Strengths and Limitations

Strengths. There were several strengths of this research study that should be replicated in future studies. The first strength consisted of using a valid and reliable instrument for data collection. The TPB questionnaire of physical activity (Armitage, 2005) features strong reliability and validity (Armitage, 2005; O'Shea & Frazer, 2018). This questionnaire was formatted such that it made it straightforward and simple for Jordanian CAD patients to complete, and it directly engages them about their opinions. Further, internal consistency reliability in this study was established with excellent values (> .87) of the Cronbach's alpha coefficient for the different subscales measuring the study variables.

In addition to employing reliable instrumentation, the TPB, as the guiding framework, placed this research in the perspective of the participants and their social, cultural, and physical environments. Additionally, the questionnaire used here included open-ended questions regarding barriers that might prevent or impede patients from practicing physical activity. These responses could be useful in the future when developing physical activity intervention programs for Jordanian cardiac patients.

Lastly, this was the first Jordanian study to investigate physical activity intentions and barriers among Jordanian CAD patients. As such, this study provides a foundation of knowledge for this population. Results in this study could therefore help Jordanian policymakers in formulating future physical activity programs among this population.

Limitations. Despite the results of this study increasing our insight into factors explaining physical activity behaviors among Jordanian CAD patients based on the proposed theory, it still had some limitations. The results from this study are based on self-reported responses and could have included respondent bias. Social desirability bias can occur when participants adjust their stated behaviors to what they think the experimenters expect. Self-reported data can result in under- or over-reporting due to inaccurate recall of information. What is more, no participants were randomly selected, and they came from only one public hospital in Irbid City in the north of Jordan (King Abdullah University Hospital); thus, results might not be applicable to all Jordanian CAD patients from different regions or those admitted to private hospitals. The last limitation of this study was using a cross-sectional design. The nature of this design does not establish a cause and effect relationship, which limits the study's ability to establish causation among the study variables.

Nursing Implications

This study highlights several practical utilities for nurses as well as healthcare professionals. The research conducted for this study will make a significant contribution to Jordanian nursing knowledge about physical activity behavior. It will also offer a foundation for intervention and policy that encourages physical activity, particularly among Jordanian CAD patients. Currently, Jordanian adults—in general—neglect physical activity (Alsaleh, Windle, & Blake, 2016; Al Subhi, Bose, & Al Ani, 2015; Shishani, 2010), and Jordan is experiencing a rapid upward trend in obesity and weight gain (WHO, 2017b). Not surprisingly, cardiovascular disease is now the most significant cause of death in Jordan (CDC, 2013). Understanding the determinants of physical activity is considered one of the crucial elements in policy development, and this is causing a societal shift towards better health behaviors. Therefore,

nurses in Jordan need to emphasize and educate CAD patients regarding the importance of physical activity, and the positive effects of physical activity behavior on secondary prevention for CAD patients.

The present findings lend further support for TPB in predicting CAD patients' intentions toward physical activity. The results here have clinical implications in nursing practice by asserting that perceived behavioral control serves as the key influencer in forming physical activity intention among CAD patients. The predictive power of perceived behavioral control in intention would indicate interventions promoting physical activity for CAD patients' focus on fostering a sense of control over physical activity situations. In practical terms, this implies making physical activity more desirable and convenient. This infers addressing the barriers of availability and distance to facilities as well as health care access; researchers and policymakers could also examine the availability of relevant health information and promote the resources of physical activity to those patients.

Many implications can be derived from the results of qualitative questions regarding physical activity barriers among those patients. For instance, it is highly recommended to have tailored physical activity educational programs taking into consideration the physical activity resources available in addition to patients' needs and abilities. On the contrary, this presents an urgent task for policymakers to provide affordable physical activity resources for such patients. Moreover, nurses should be encouraged to advise CAD patients regarding a customized home-based physical activity program that might be beneficial in overcoming many of the physical activity barriers.

Recommendations for Future Research

Many future studies are recommended based on this study's limitations and findings. For instance, a qualitative study is recommended to profoundly understand the physical activity phenomenon among Jordanian CAD patients. The qualitative part is essential in addition to the quantitative section. Future qualitative studies that focus on understanding the weak association between attitude and subjective norms with intention toward physical activity are also recommended. Furthermore, conducting this study at an international level to compare different cultures would be beneficial to a better understanding of this phenomenon.

Practice

Future studies should take the research one step further. This study has focused on CAD patients' intention toward physical activity. Despite this, the extent to which intention relates to behavior, that is, CAD patients engaging in physical activity, needs to be further explored. Although Ajzen (1991) argued that intention predicts behavior, clinical pieces of evidence reveal mixed results when theories are applied to specific behavior such as physical activity (Carmack & Lewis-Moss, 2009). Consequently, longitudinal studies are recommended in future research. A longitudinal study would be used to confirm the causal relationship among the study variables, and it would be useful in understanding the physical activity intention and behavior among those patients. As an aside, future studies should attempt to replicate the results of the present study by relying on objective measures (e.g., observation techniques, pedometer) rather than a patient's self-reported tools.

The current study shows the effects of age on CAD patients' intention toward physical activity, which bears a striking similarity to findings from prior studies (Matata & Williamson, 2017; Sharara et al., 2018; Suaya et al., 2009). Nonetheless, this study did not consider all socio-demographic variables such as educational level, income, marital status, or the number of

previous hospital admissions when exploring patients' behavioral intentions, attitudes, subjective norms, and perceived behavioral control towards physical activity. Hence, future studies aimed at exploring the relationship between CAD patients' intentions and their demographic characteristics should be helpful in understanding this phenomenon.

Dissemination

The study results will be disseminated via poster presentation and oral presentations at nursing conferences. The Midwest Nursing Research Society (MNRS) is an annual nursing conference where this research can be showcased. The plan initially consists of making a poster presentation at the MNRS's 44th Annual Research Conference (April 1-4, 2020). The manuscript will be prepared for publication in scholarly nursing journals such as the *Western Journal of Research* or the *Journal of Cardiovascular Nursing*. Jordanian medical and health journals will likewise be contacted to explore the possibility of publishing the study in Jordan.

Conclusion

Understanding CAD patients' intention toward physical activity is considered one of the most crucial factors for the success of physical activity programs for those patients. The objective of this study was to examine whether attitudes, subjective norms, and perceived behavioral control predict Jordanian CAD patients' intentions to practice physical activity. Likewise, it endeavored to explore the barriers to participating in physical activity. The current study proves essential since no prior studies in Jordan have thus far focused on physical activity intention among CAD Jordanian patients.

This study addressed a gap by explicitly examining the correlations between TPB variables and intention toward physical activity among CAD patients. Remarkably, the results here emerged as mixed regarding consistency with prior studies. Consistent with some of the

results in the literature, perceived behavioral control was the only significant predictor of intention in the current study. Even so, no significant associations appeared between attitude and subjective norms with intention. This reveals that CAD patients who had a firm intention toward practicing physical activity are due to a high perceived behavioral control over practicing physical activity. Future research will build on the current study results by seeking to validate the findings reported here by replicating them in other geographic locations or among different cultures and to search for the strength of the effect on physical activity intentions based on perceived behavioral control.

APPENDICES

Appendix A

TPB questionnaire for physical activity (Armitage, 2005):

Section I: Demographic Data

1. What is your gender?
    a) Male
    b) Female

2. How old are you? (…….. Years)

3. What is your marital status?
    c) Single
    d) Married
    e) divorced
    f) Widowed

4. What is your highest level of education?
    g) High school
    h) Bachelor's degree
    i) Master's degree
    j) Doctoral degree

5. How many times have you been hospitalized for cardiac reasons?
    k) One time
    l) Two times
    m) Three times
    n) More than three times

SECTION II: TPB Questionnaire (Armitage, 2005)

Instructions:

- Please answer each of the following questions by choosing the answer that best describes your opinion.
- Some of the questions may appear to be similar, but they do address somewhat different issues.
- Please read each question carefully.

1. For me, participating in regular physical activity would be:

   dull: 1: 2: 3: 4: 5: 6: 7: *interesting*

2. For me, participating in regular physical activity would be:

   unpleasant: 1: 2: 3: 4: 5: 6: 7: pleasant

3. For me, participating in regular physical activity would be:

   boring: 1: 2: 3: 4: 5: 6: 7: *stimulating*

4. For me, participating in regular physical activity would be:

   unhealthy: 1: 2: 3: 4: 5: 6: 7: *healthy*

5. For me, participating in regular physical activity would be:

   bad: 1: 2: 3: 4: 5: 6: 7*: good*

6. For me, participating in regular physical activity would be:

   useless: 1: 2: 3: 4: 5: 6: 7: useful

7. People close to me think I should participate in regular physical activity.

   disagree: 1: 2: 3: 4: 5: 6: 7: agree

8. People who are important to me would:

"disapprove of my participating in regular physical activity: 1: 2: 3: 4: 5: 6: 7: *approve of my participating in regular physical activity"*

9. People close to me think I: "

"*should not participate in regular physical activity*: 1: 2: 3: 4: 5: 6: 7: *should participate in regular physical activity."*

10. To what extent do you see yourself as being capable of participating in regular physical activity?

incapable: 1: 2: 3: 4: 5: 6: 7: *capable*

11. How confident are you that you will be able to participate in regular physical activity?

not very confident: 1: 2: 3: 4: 5: 6: 7*: very confident*

12. I believe I have the ability to participate in regular physical activity.

definitely do not: 1: 2: 3: 4: 5: 6: 7: *definitely do*

13. How much personal control do you feel you have over participating in regular physical activity?

no control: 1: 2: 3: 4: 5: 6: 7: *complete control.*

14. How often do you intend to take part in regular physical activity?

never: 1: 2: 3: 4: 5: 6: 7: *frequently*

15. I want to exercise regularly.

definitely do not: 1: 2: 3: 4: 5: 6: 7: *definitely do*

SECTION III: Open-End Questions

Instructions:

- Please provide detailed responses for the following questions.

1. What do you believe are the advantages of participating of physical activity as CAD patients?

   ……

   ……

   ……

2. Are there any individuals or groups who important to you would disapprove of your participating in regular physical activity? In what ways would they show disapproval?

   ……

   ……

   ……

   ……

3. What makes it easy for you to participate in regular physical activity?

   ……

   ……

   ……

4. What makes it difficult or impossible for you to participate in regular physical activity

   ……

   ……

   ……

Thank you so much

Appendix B

Arabic Translated Version of TPB questionnaire for physical activity (Armitage, 2005):

إستبيان عن نيّة مرضى القلب لممارسة الرياضة

الجزء الأول: البيانات الشخصية:

1. الجنس: □ ذكر □ أنثى
2. العمر..... سنة
3. الحالة الأجتماعية: □ أعزب □ متزوج □ مطلق □أرمل
4. المستوى التعليمي: □ ثانوية عامة أو أقل □ دبلوم □ بكالوريوس □ ماجستير □ دكتوراه
5. معدل الدخل الشهري : □ أقل من 500 دينار شهري □ 500- 1000 دينار شهرى □ 1000-1500 دينار شهريا □ أكثر من 500 دينار شهري
6. عدد المرات التي تم أدخالك الى المستشفى لسبب يتعلق بمرض القلب : □ مرة واحدة □ مرتين □ ثلاث مرات □ أكثر من ثلاث مرات

الجزء الثاتي:

- التعليمات
- هذا الأستبيان يستخدم لقياس التصورات الخاصة بخصوص ممارسة الرياضة .
- سوف يتطلب منك إلأجابة علي الأسئلة باستخدام مقياس مكون من سبع نقاط للتقييم.

- قد تبدو بعض الأجابات متشابهة , لذا يرجى أختيار الأجابة التي تصف وجهة نظرك بشكل أفضل.

1. في رأيي، ممارسة الرياضة بأنتظام ستكون:

كأيبة __ :1__:__2__:__3__:__4__:__5__:__6__:__7__:مثيره للأهتمام

2. في رأيي، ممارسة الرياضة بأنتظام ستكون:

مزعجة__ :1__:__2__:__3__:__4__:__5__:__6__:__7__:ممتعة

3. في رأيي، ممارسة الرياضة بأنتظام ستكون:

مملة__ :1__:__2__:__3__:__4__:__5__:__6__:__7__: مسلية

4. في رأيي، ممارسة الرياضة بأنتظام ستكون:

غير صحية __ :1__:__2__:__3__:__4__:__5__:__6__:__7__: صحية

5. في رأيي، ممارسة الرياضة بأنتظام ستكون:

سيئة __ :1__:__2__:__3__:__4__:__5__:__6__:__7__: جيدة

6. في رأيي، ممارسة الرياضة بأنتظام ستكون:

غير مفيده__ :1__:__2__:__3__:__4__:__5__:__6__:__7__: مفيده

7. الناس المقربون مني مثل الأهل و الأصدقاء يعتقدون أنه يجب أن أمارس الرياضة بشكل منتظم:

لا أوافق__ :1__:__2__:__3__:__4__:__5__:__6__:__7__:أوافق بشدة

8. الناس المهمين بالنسبة لي و أحترم اراؤهم سيوافقون على ممارستي الرياضة بشكل منتظم

لا أوافق__ :1__:__2__:__3__:__4__:__5__:__6__:__7__: أوافق بشدة

9. الناس المقربون مني مثل الأهل و الصدقاء يعتقدون أنه يجب أن لا أمارس الرياضة بشكل منتظم:

لا أوافق__ :1__:__2__:__3__:__4__:__5__:__6__:__7__: أوافق بشدة

10. إلى أي مدى ترى نفسك قادر على ممارسة الرياضة بشكل منتظم

غير قادر __ :1__:__2__:__3__:__4__:__5__:__6__:__7: قادر

11. ما مدى ثقتك أنك ستتمكن من ممارسة الرياضة بشكل منتظم؟

غير واثق __ :1__:__2__:__3__:__4__:__5__:__6__:__7: واثق جدا

12. أعتقد أن لدي القدرة على ممارسة الرياضه بشكل منتظم.

أوافق__ :1__:__2__:__3__:__4__:__5__:__6__:__7__: أوافق بشدة

13. لدي السيطرة الكامله في اتخاذ قرار ممارسة الرياضه بشكل منتظم

أوافق__ :1__:__2__:__3__:__4__:__5__:__6__:__7__: أوافق بشدة

14. أنا أنوي ممارسة الرياضه بشكل منتظم

أوافق__ :1__:__2__:__3__:__4__:__5__:__6__:__7__: أوافق بشدة

15. انا اريد ممارسة الرياضه بشكل منتظم

أوافق__ :1__:__2__:__3__:__4__:__5__:__6__:__7__: أوافق بشدة

الجزءالثالث

يرجى الاجابة على الاسئلة التالية:

1. ماهي في رأيك مزايا و فوائد المشاركة في النشاط البدني كمريض قلب؟

……

……

……

2. هل هناك أي أحد من الأشخاص المقربين بالنسبة إليك كأحد أفراد العائلة على سبيل المثال قد لا يوافق على ممارستك للرياضة؟ وماهي الاسباب التي قد تدفعه لذلك؟

……

……

……

3. ما هي العوامل و الاسباب التي قد تساعدك على ممارسة الرياضة بشكل منتظم؟

……

……

……

4. ما هي العوامل و الاسباب التي قد تمنع أو تعيق ممارساتك للرياضة بشكل منتظم؟

……

……

شكرا جزيلا !!!

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