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ABSTRACT

There is a positive trend for obesity and chronic disease in the U.S. that have placed a significant strain on the current health system. Currently, Primary Care Physicians (PCPs) are the main health care providers for patients with chronic diseases. The aim of this study is to gain a better understanding of self-efficacy and common barriers among PCPs providing nutrition counseling to patients, as well as, likelihood that PCPs will refer patients to an on-site RD if additional cost accrues to the patients. A sample of 28 Ohio PCPs completed an on-line questionnaire investigating self-efficacy, common barriers to providing nutrition counseling, and likelihood that PCPs will refer patient to an on-site dietitian. PCPs discussed dietary habits with half (53%) of their patients, and spend about 2-3 minutes discussing dietary habits with patients.

Less than 50% of PCPs reported 100% confidence to provide effective nutrition counseling for various diseases. The greatest barrier to providing effective nutrition counseling reported by PCPs is lack of time. Most of PCPs reported to “mostly likely” refer their patients to an RD for chronic diseases. The proportion of patients and time spent on nutrition counseling by PCPs may not be adequate for intervention, treatment and prevention of obesity and chronic diseases. PCPs are further lacking time, knowledge and confidence to provide effective nutrition
counseling. The high likelihood of PCPs to refer patient to RDs for nutrition counseling of chronic diseases provides opportunity to engage and embed RDs in health care structure to improve health outcomes of patients, as well as reduce the national health care costs associated with obesity and chronic diseases.
DEDICATION

This thesis is dedicated to my husband; for his understanding, endless love and support throughout this long and what sometimes seemed like a never ending journey, and to my son; for helping me find a balance in my life and for giving me so much joy and happiness in life.

I also dedicate this thesis to parents, who sacrificed their lives to make a better future for my sisters and me.
ACKNOWLEDGMENTS

I owe my deepest gratitude to Dr. Taylor, I can honestly say that it would have been next to impossible to write this thesis without his help and guidance. I am grateful for all of his time, effort and expertise he devoted to my thesis.

I would also like to thank my thesis committee members Dr. Nahikian-Nelms, Dr. Wolf and Dr. Wexler for their time and guidance. Their knowledge and expertise have greatly contributed to my overall thesis.

Lastly, I would like to thank the entire faculty of Medical Dietetics for their endless support and invaluable knowledge.
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Major Field: Allied Medical Professions
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CHAPTER 1: INTRODUCTION

Background

There has been a dramatic increase in obesity rates over the past 25 years, making obesity the second leading preventable cause of disease and death in the United States (1). Obesity is also a leading cause of chronic diseases such as type 2 diabetes mellitus (DM), hypertension, cardiovascular diseases (CVD), hyperlipidemia, and some cancers (1); however, clinical inertia, “failure of health care providers to initiate or intensify therapy when indicated” (2) is a major factor contributing to inadequate chronic disease care by Primary Care Physicians (PCPs) among patients in the U.S. (3).

It was estimated in 2005 that one out of two adults had at least one chronic disease (4), and that 70% of all deaths in the U.S. are caused by chronic diseases (5). Furthermore, recent research suggests that poor management of chronic diseases such as diabetes, hypertension, and hyperlipidemia due to clinical inertia may contribute to up to 80% of heart attacks and strokes (3).

The cost of chronic diseases to the U.S. government is enormous. In 2010, direct and indirect costs of CVDs were reported to be 445 billion dollars, and are projected to reach more than one trillion dollars by 2030 (6). Furthermore, in 2007, the national health care cost of diabetes was estimated to be 174 billion dollars (7). Obesity, chronic diseases caused by obesity, as well as clinical inertia are major problems.
contributors to excessive medical care costs in the U.S. as well as the leading causes of preventable disability and death.

Poor dietary habits and sedentary lifestyles are major contributors to chronic disease development in the U.S. (8). Research suggests that PCPs realize and agree on the importance of promoting nutrition education in primary care settings in an effort to reduce the prevalence of chronic diseases (9). However, a review of the literature indicates that PCPs’ self-efficacy, as well as nutrition knowledge pertaining to chronic diseases treatment, is lacking (10–17). Furthermore, nutrition counseling by PCPs is reported to be initiated in less than 40% of patients (10). Most common barriers to initiating nutrition counseling by PCPs are lack of time, poor patient compliance, lack of counseling skills, nutrition knowledge deficit, and lack of reimbursements (10,18–21).

Medical Nutrition Therapy (MNT) provided by Registered Dietitians (RDs) is an essential component of comprehensive health care that can improve patient outcomes and reduce health care costs. Compared to PCPs, nurses, and nurse practitioners, RDs have experienced better end results in terms of weight loss, blood cholesterol, blood sugar, and hypertension, as reported in studies conducted both within and outside the U.S. (22–26). However, patient referrals by PCPs to RDs are low. Limited research indicates that low referral rates are mainly due to financial barriers and PCPs’ pessimistic belief in patients’ ability to change (27–29). Furthermore, the majority of interventions provided by RDs are not covered by insurance companies. Therefore, patients have to pay out of pocket, which may be the cause of low patient attendance rates.
One out of two adults in the U.S. suffers from at least one chronic disease. Chronic diseases have negative consequences on patients’ quality of life, and also have a tremendous effect on the economy. The goal of this thesis is to gain a better understanding of attitudes and self-efficacy among PCPs providing nutrition counseling to patients in the Primary Care network, with special attention to common barriers to nutrition counseling. The secondary goal of this thesis is to investigate the likelihood that PCPs will refer patients to an on-site RD if additional cost accrues to the patients.

**Research Questions**

1. What proportion of time do PCPs spend on nutrition counseling with patients?
   a. Does the time spent on nutrition counseling differ by years in practice?
   b. Does the time spent on nutrition counseling differ by patient population?
2. What is the confidence of PCPs to provide effective nutrition counseling for various diseases?
3. What are the most common barriers to providing effective nutrition counseling by PCPs?
4. What is the history of referrals by PCPs to RDs for nutrition counseling?
   a. Does the referral history to an RD differ by years in practice?
   b. Does the referral history to an RD differ by patient population?
5. What is the likelihood a PCP would refer to an RD for various diseases?
a. Does the likelihood of referral to an RD differ by years in practice?

b. Does the likelihood of referral to an RD differ by patient population?

6. What is the relationship between the confidence of a PCP to provide counseling and his/her likelihood to refer a patient to an RD?
List of Definitions

**Clinical Inertia (CI):** Recognition of the problem by physicians, but failure to act and intensify therapy of patients that are not at evidence-based goals.

**Medical Nutrition Therapy (MNT):** An essential component of comprehensive health care. Individuals with a variety of conditions and illnesses can improve their health and quality of life by receiving MNT. During an MNT intervention, RDs counsel clients on behavioral and lifestyle changes required to impact long-term eating habits and health. MNT consists of three elements: 1. Performing a comprehensive nutrition assessment to determine a nutrition diagnosis; 2. Planning and implementing a nutrition intervention using evidence-based nutrition practice guidelines; and 3. Monitoring and evaluating an individual’s progress over subsequent visits with the RD.

**Obesity:** Ranges of weight that are greater than what is generally considered healthy for a given height.

**Obese:** An adult who has a BMI of 30 or higher.

**Overweight:** An adult who has a BMI between 25 and 29.9.

**Self-efficacy (SE):** People’s beliefs about their capabilities to produce designated levels of performance that exercise influence over events that affect their lives.
**Therapeutic Lifestyle Change (TLC):** TLC is a comprehensive lifestyle approach that includes specific dietary recommendations (TLC diet), weight management, and increased physical activity in effort to reduce risk factors associated with coronary heart disease, type 2 diabetes, and metabolic syndrome.
List of Abbreviations

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<td>Body Mass Index</td>
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<td>DM</td>
<td>Diabetes Mellitus Type II</td>
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<td>CD</td>
<td>Cardiac Rehabilitation</td>
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<td>CCD</td>
<td>Center for Chronic Disease Prevention and Health Promotion</td>
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<td>CHD</td>
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<td>CI</td>
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<td>MIT</td>
<td>Motivational Interview Techniques</td>
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<td>MNT</td>
<td>Medical Nutrition Therapy</td>
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<td>PCP</td>
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<td>TLC</td>
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<td>United States Preventive Task Force</td>
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CHAPTER 2: REVIEW OF LITERATURE

Background

Obesity does not affect only the United States, but other countries as well, hence the emerging new word “globesity” (30,31). Today, around the globe, 937 million people are overweight and 396 million are obese (32). More than 2 billion people are expected to become overweight, with another one billion becoming obese worldwide unless drastic measures take place by 2030 (32). Obesity remains the second leading cause of disease and death in the U.S. (33), thus the significant rise in numbers of chronic diseases such as diabetes, hypertension, hyperlipidemia, and some cancers (33,34).

In 2005, the Center for Chronic Disease Prevention and Health Promotion (CCD) reported that 133 million Americans currently live with at least one chronic disease. The number of people living with chronic diseases will continue to grow unless significant changes transpire. Furthermore, in 2008, overall medical costs for chronically-ill American adults peaked at $147 billion (35). Medical costs for obese patients are approximately $1,500 more than for individuals with normal body weight (35), due to increase in chronic disease prevalence. Obesity is further linked to reduced work productivity and chronic work absences (35).
Therapeutic Lifestyle changes (TLC) have shown promise as an effective approach against globesity and prevention of chronic diseases implicated by obesity (22,24–26). However, promotion of TLC for chronic diseases by Primary Care Physicians (PCPs) remains well below the goal of 75%, recommended by Healthy People 2010(36). Most common barriers to nutritional interventions reported by PCP's include lack of time, self-efficacy, nutritional knowledge, and patient compliance (10–17,37). Furthermore, research has shown that health care providers fail to initiate or intensify pharmacological therapy when indicated (2,3).

Studies have shown that care provided by Registered Dietitians (RDs) trained in MNT (Medical Nutrition Therapy) results in more effective outcomes for patients with chronic diseases in comparison to standard care without nutrition therapy (22–26). Typically, physician offices do not house RDs because they usually refer their services. Most patient interventions by RDs are not covered by insurance, thus patient attendance rates and follow up appointments remain extremely low.

This review of literature assesses the knowledge and expertise of PCPs with respect to nutrition therapy, specifically determining the extent of their capability to provide nutritional intervention for chronic disease treatment and prevention. Topics addressed in the review include frequency and extent of nutrition counseling to their patients, including duration of nutrition interventions. This review of literature examines major barriers to providing nutrition counseling to patients including clinical inertia, its effect on treatment and progress of prevention, and reduction of chronic disease among adults in the U.S. It addresses how likely are PCPs to refer their patient to RDs while understanding some of the factors driving
referrals. Finally, this review of literature summarizes the effectiveness of RDs in chronic disease treatment and prevention, as well as the cost effectiveness of RDs.

**Primary Care Physicians Nutrition Knowledge**

The literature indicates a steady gap in nutrition knowledge among PCPs for the past 30 years in the U.S., as well as the rest of the developing world. An inverse relationship between year of graduation from medical school and nutrition knowledge has been demonstrated, suggesting that the longer the physicians have been out of medical school, the less nutrition knowledge they appear to have (10). The following summary represents research data pertaining to nutrition knowledge among PCPs in and out of the U.S., organized in chronological order.

In 1975, third and fourth year medical students and practicing PCPs were surveyed in nutrition knowledge, their average test score was 58% on one exam and 50% on the other (11). Both medical students and practicing PCPs scored highest on knowledge questions that appeared in the media recently, suggesting that they are receiving their nutrition knowledge from nonprofessional sources (11). In 1977, another survey with nutrition-related questions was mailed to randomly selected PCPs in Nebraska, and their average test score was 65% (12). Surveyed physicians scored higher on basic nutrition questions than on questions relating to therapeutic nutrition (12).

In 1989, a survey was mailed to randomly selected PCPs and internists in the San Diego area. The survey consisted of 69 basic true and false nutrition-related questions. Questions included topics expected to be familiar to both PCPs and internists. Topics included nutritional benefits of milk, saturated fats, vitamins,
calcium, and iron, as well as questions about obesity, cancer, cholesterol, Coronary Heart Disease (CHD), Diabetes Mellitus (DM) and hypertension. The average test score was 69.2%, which was significantly better \( (p = .0065) \), compared to first and second year medical students, who scored 62.5% on the same exam \( (13) \). A survey conducted in 1995 among American PCPs revealed that 67% of them marked deficit of knowledge in nutrition as one of the barriers to providing nutrition counseling \( (10) \).

In 1997, a survey was conducted to assess nutrition knowledge, attitude, and practice among PCPs in Taiwan. The participants scored lower than the U.S. counterparts, with the average nutrition knowledge score at 59% \( (38) \). Another survey performed in 1997 in England asked PCPs basic nutrition questions pertaining to CVD. Their average test score was 65% \( (16) \). A survey conducted in 1999 among Canadian PCPs to determine nutrition knowledge showed similar results to the studies conducted in the U.S. The average test score was 63.1% \( (14) \).

When medical interns were surveyed anonymously in 2008 in order to evaluate their attitudes, self-perceived proficiency, and clinical nutrition knowledge, their average test score on the knowledge portion of the exam was 66% \( (39) \). Nutrition knowledge deficit was observed predominantly in areas of nutrition assessment and obesity, endocrine disease, and cardiovascular disease. Only 54% of medical students knew the amount of calories in one gram of protein, which is considered basic nutrition knowledge \( (39) \). Furthermore, only 46% felt proficient to calculate Body Mass Index (BMI) and waist and hip ratio, while only 33% felt capable of analyzing a food label \( (39) \).
The national survey of 290 PCPs conducted in 2009 found that 89% of PCPs believe it is their responsibility to help overweight and obese patients lose weight; however, 72% of them also stated that they have not been trained to deal with weight-related issues (20). Similar results were published among Australian PCPs, indicating that lack of nutrition knowledge is one of the key barriers in providing nutrition counseling (20).

Current literature supports progress in terms of nutrition knowledge among PCPs in the last 30 years; however, basic nutrition knowledge as well as nutrition knowledge pertaining to chronic disease still remains inadequate among PCPs globally.

**Frequency of Nutrition Interventions by Primary Care Physicians**

Patients see PCPs more than any other physician (40). PCPs represent a form of health gatekeepers in many countries in an effort to alleviate health care cost by reducing unnecessary visits to specialists. PCPs’ expertise and opinions remain a respected and trusted source of information to their patients. Support by organizations such as Healthy People 2020 and US Preventive Services Task Force (USPSTF) in encouraging PCPs to provide nutrition counseling further highlights the correlation of nutrition knowledge and reduction of morbidity and mortality in primary care. The following research review focuses on frequency of nutrition intervention provided by PCPs on a global scale.

Results from a survey conducted on residents in Washington State revealed that only 20% reported receiving any nutrition counseling from their PCPs (18). Furthermore, the same survey showed a higher rate of PCP nutrition consultation
for both males and females with higher levels of education compared to patients with lesser levels of education (18). Also, patients with chronic disease reported receiving nutrition counseling more often versus patients without chronic ailments (41). PCPs in another survey were asked; “Over a given month, what percentage of patients receive nutrition counseling by any provider in your practice, including yourself?” Sixty-nine percent of PCPs stated that only 40% or less of patients receives some nutrition counseling (10). A 1988 study produced similar results. It reported that 40-50% of patients received nutrition counseling, suggesting no increase in frequency of nutrition counseling provided by PCPs (15).

Wechleser et al. (37) conducted a survey in 1981 to evaluate health-promotion beliefs, attitudes, and practices among PCPs in Massachusetts. Results from the study show that only 58% of PCPs talked about the importance of eating a balanced diet to their patients (37). When the same survey was conducted 13 years later, even though the sample size was slightly smaller, the percentage of PCPs that included counseling on the importance of a balanced diet decreased to 47% (17).

A survey conducted among Australia’s PCPs revealed that the majority of PCPs believe in healthy nutrition as a key to living a long and healthy life. However, they reported providing nutrition counseling to only 15% of their patients with an emphasis that nutrition counseling originated from treatment of disease rather than for prevention (18,20). Strong evidence shows that practice of preventative medicine can not only increase quality of life, but reduce costs associated with it (22). The majority of PCPs from 10 European countries believe that overweight and obese patients require counseling on weight loss strategies; however, only 60% of
those PCPs have enacted such practices (42).

PCPs with some nutrition training were more likely to provide nutrition counseling compared to PCPs without such training (10). Furthermore, data have shown that younger PCPs and PCPs with healthier lifestyles reported providing nutrition counseling more often to their patients (40). PCPs seem to provide more nutrition counseling to high-risk patients, as well as those with chronic disease, compared to low-risk patients, suggesting inadequate preventative medicine practices (40,41). Additional findings illustrate a prevailing pattern of PCPs discussing weight loss intervention with high-income patients more frequently than with low-income patients (43), even though a direct relationship exists between socioeconomic status (SES) and presence of obesity, particularly in women(44). A national survey of physician practices related to the clinical recognition and management of obesity revealed that PCPs reported obesity in only one-third of their patients. Of those identified as obese patients, PCPs provided weight loss counseling to only 35% and diet counseling to 41% (44). It is evident that nutrition counseling is not being provided by PCPs to patients regardless of benefits associated with it. The percentage of patients that receive nutrition counseling by their PCPs is well below 75%, which is recommended goal of Healthy People 2010(36). The frequency of nutrition counseling provided by PCPs is not well understood and, as these data indicate, varies significantly.

A cross-sectional study of 84 family physician practices in northeast Ohio was conducted to determine frequency, time spent, and patient and visit characteristics associated with nutritional counseling. Nutrition counseling was
measured by direct observation on two days for all consecutive ambulatory visits. Results of this study revealed amount of nutrition counseling provided to patient varied significantly between PCPs (45). Of 138 PCPs observed, only 9(6.5%) included nutrition counseling in more than 50% of patient visits, and the majority of PCPs (n=75) incorporated nutrition counseling in 15-30% of patient encounters (45). Furthermore, out of 3,475 outpatient visits, nutrition counseling occurred in 24% of all patient visits, 17% of visits for acute illness, 30% of visits for chronic illness, and 41% of visits for well-care (45). The frequency of nutrition counseling delivered for chronic disease differed as well. For example, nutrition counseling occurred in 45% of visits in patients with diabetes, 25% of visits in patient with post myocardial infarction or stroke, 31% of visits in patients with hypertension, 26% of prenatal visits, and 33% of visits in patients that have BMI >30 or obese patients. Based on a logistic regression model, it was found that increased age, non-acute visits, duration of visits, history of diabetes, and gender were independently associated with nutrition counseling (45).

In another observational study, trained medical students observed PCPs and systemically evaluated dietary habits and physical activity counseling rates. A total of 4,344 patients were observed in 38 nonmetropolitan primary care offices. Counseling rates varied significantly between offices, and ranged from 0 to 55%. Dietary counseling was observed in 25 % (n=1,054) of encounters. Older patients and new patients received nutrition counseling more often, when compared to younger and established patients (p<0.01) (46). Results of this study also indicated that PCPs that had dietary brochures in their offices provided nutrition counseling
about 30% more often than PCPs working in offices without dietary brochures (p <0.05) (46).

Results from a cross-sectional survey consisting of 500 primary care physicians indicate that physicians with normal BMI were more likely to engage their obese patients in weight loss discussions as compared to overweight/obese physicians (30% vs. 18%, P = 0.010) (47). Physicians with normal BMI also reported higher confidence in their ability to provide dietary counseling (53% vs. 37%, P = 0.002) to their obese patients. A higher percentage of normal BMI physicians reported that overweight/obese patients would be less likely to trust weight loss advice from overweight/obese doctors (80% vs. 69%, P = 0.02). Authors of study concluded that physicians who are at normal weight more often provided recommended obesity care to their patients and felt confident doing so, compared to physicians who are overweight/obese.

**Amount of time Primary Care Physicians spend Providing Nutrition Counseling**

The amount of time spent providing nutrition counseling by PCPs varies. A study conducted to assess the attitudes, practice behavior, and barriers to the delivery of nutrition counseling by PCPs reported that 68% of PCPs surveyed spent 5 minutes or less discussing dietary changes (10). They further reported that PCPs in private practice spend more than 6 minutes discussing dietary changes compare to those practicing in university hospitals (10). These same PCPs reported wanting to spend more time discussing dietary changes (10).

Another more recent cross-sectional study of 84 family physician practices
was done to assess time spent by PCPs on nutrition counseling. In this study, the
time PCPs spent talking to their patients was observed, rather than reported by
PCPs. The authors reported the average time PCPs spent on nutrition counseling to
be 55 seconds (45). The time ranged from 20 seconds to 6 minutes (45). The visits
that included nutrition counseling were longer, at 12.8 minutes, compared to 9.8
minutes for those that did not include nutrition counseling (45).

**Barriers to Providing Nutrition Counseling by Primary Care Physicians**

Based on the review of literature so far, it is clear that nutrition counseling is
not being provided as frequently as needed. Surveys and observational studies
indicate that nutrition counseling delivered by PCPs varies significantly and is well
below 75%, a goal of Healthy People 2020. The following text reviews research
about barriers to providing nutrition counseling among PCPs.

In a survey conducted to assess the attitudes, practice behavior, and barriers
to nutrition counseling, 75% of PCPs cited lack of time as the number one barrier to
providing nutrition counseling to their patients (10). Other perceived barriers
reported in the same survey include: lack of patient compliance (71%); inadequate
teaching materials (69%); lack of training in nutrition counseling (67%); lack of
knowledge (62%); and lack of adequate reimbursement (61%), while fifty percent
of PCPs also stated that they lack confidence to improve patients’ diets.

Dutch PCPs revealed that perceived barriers to providing nutrition
counseling and treating obesity did not change from 1992 to 2007 among surveyed
PCPs, however the percentages increased, meaning that more PCPs agree with
previously stated barriers (19). Lack of time was reported by 68% of the PCPs as a
barrier for providing nutrition counseling, while lack of patient motivation was reported by 81% of the PCPs as barrier for treating obesity (19). PCPs reported a decrease in self-efficacy pertaining to treatment of overweight patients in 2007 (mean=2.57), compared to result in 1992 (mean=2.68 and p<0.043) (19).

A survey among Australian PCPs reported that 76% of surveyed PCPs agreed that diet has a significant impact on long-term health, and 96% of them agreed that PCPs can be influential in getting the patients to change their diets (20). Sixty-three percent of surveyed PCPs agreed that “faulty nutrition is the major cause of disease in Australian adults”; however, only 15% of their patients are counseled on nutrition (20). Major barriers reported by PCPs for providing nutrition counseling included lack of time, lack of confidence, lack of knowledge, patients’ attitudes, and financial obstacles (20).

In a more recent study, PCPs and residents in a focus group were asked to name the major barriers to providing nutrition counseling to their patients who needed to lose weight. The most common barriers listed by frequency were: low patient’s desire and ability to lose weight; low self-efficacy in effectiveness of weight loss counseling; lack of comprehensive obesity management resources (i.e., a weight loss clinic); insufficient time due to high patient volume; underuse of dietitians or lack of experience working with dietitians; lack of skills in providing brief counseling; and insufficient knowledge of best clinical practices (21).

Lack of time seems to be the barrier to nutrition counseling reported most frequently, followed by nutrition knowledge deficit and lack of counseling skills, low self-efficacy for providing nutrition counseling and improving patients outcomes,
and patient compliance (10,18–20). Barriers reported less frequently were lack of teaching material, lack of training/experience in brief counseling, and lack of experience in working with RDs (21). PCPs in every reported study considered their low self-efficacy as a major barrier to providing nutrition counseling to their patients.

Self-efficacy was first defined by Albert Bandura in 1977 as “peoples beliefs about their capabilities to produce designated levels of performance that exercise influence over event that affect their lives” (48); in other words, how competent a person is feeling about performing a certain task. Self-efficacy should not be confused with confidence because they are not the same. A person can be confident and yet have a low self-efficacy in performing a certain task. Self-efficacy influences choices that a person makes, how much effort a person exerts, as well as the individuals’ thought patterns and emotional reactions. If PCPs have low self-efficacy for providing nutrition counseling, they will not initiate nutrition counseling with their patients. People with high self-efficacy set higher goals, exert more effort, and expect positive outcomes; they also push through when faced with challenges. People with low self-efficacy have low expectation of outcomes and tend to give up when faced with challenges (49).

Experienced RDs reported to be highly capable of providing counseling for dietary behavior changes (50). These findings were published in a descriptive study developed to examine self-efficacy in a large, cross-sectional sample of practicing RDs in performing various counseling skills that promote dietary behavioral changes (50).
Clinical Inertia

Clinical inertia is a major factor that contributes to serious adverse events, including inadequate chronic disease care in patients with diabetes, hypertension, and hyperlipidemia (3). Clinical Inertia is defined as “recognition of the problem by physicians, but failure to act and intensify therapy of patients that are not at evidence-based goals” (3). O’Conner et al. associated clinical inertia with the following: 1. the patient fails to achieve major evidence-based clinical goals, and 2. the patient fails to receive appropriate intensifications of pharmacotherapy in a defined period of time.

Evidence for Clinical Inertia

There are two lines of evidence for occurrence of clinical inertia: epidemiological and PCPs’ behavior (2). Epidemiological data indicate that diagnosis for hypertension is made in only about 69% of patients, 47% of patients with elevated cholesterol levels, and 65% of patients with diabetes (2). Drug therapy is used for 53% of patients with hypertension, 17-23% of patients with hyperlipidemia (51–53), and 73% of those diagnosed with diabetes (54). Moreover, based on the analysis of physicians’ behavior during patient visits, there is evidence that therapy is not advanced despite failure to achieve healthy goals in many patients diagnosed with or treated for hypertension, hyperlipidemia, and diabetes (55–57). Based on these data, PCPs are aware of the chronic disease, but are failing to initiate treatment due to clinical inertia.

Significance of Clinical Inertia

O’Conner et al. compares clinical inertia to a medical error, with the only
difference being the time frame over which adverse event occurs (3). For example, a medical error such as erroneous injection of a certain medication can lead to death rapidly, compared to clinical inertia, which will lead to adverse effects in many patients but may take years or even decades to occur; both errors may result in patient deaths (3). Clinical inertia is responsible for frequent occurrences of serious adverse events, and therefore is a great contributor to overall health care costs (3).

**Causes of Clinical Inertia**

O’Conner et al. postulated that clinical inertia is caused by three factors, listed in order from most to least important: physician factors, patient factors, and office system factors. (3).

**Likelihood that Primary Care Physicians will Refer Patients to Registered Dietitians**

Recent research on the likelihood of PCPs to refer their patient to RDs is very limited, especially in the U.S. A few studies were conducted in North America in late 1980’s and early 1990’s; however, none of them addressed RDs referral, but rather with the overall likelihood of PCPs to refer their patients to other providers. In a 1985 study to assess PCPs referral to outside providers for smoking cessation, obesity, and lack of exercise, it was reported that PCPs failed to refer their patients, due to pessimistic view about their patient’s abilities to change lifestyles, lack of confidence in outside treatments, and financial obstacles (27).

In a more recent study conducted in Australia, financial barriers seem to be the main factor limiting PCP referrals for their patients to RDs. They have reported that the cost to the patient for counseling, as well as lack of availability and access to
subsidized services, are the main barriers for not referring their patients to RDs. In Australia, like in many other countries, RDs are not covered by Australia’s health care system. There are RDs working at public institutions, but this group of surveyed PCPs said that they don’t refer their patient there because of the long wait time (28).

Another study in Australia examined PCPs’ decision-making process for reducing nutritional risk in cardiac patients by referring them to dietitians (29). The study reported that the decision to refer patient involves four elements: 1. synthesizing management information; 2. forecasting outcomes; 3. planning management; and 4. actioning referrals. Patients that were considered by their PCP to be able to commit to dietary changes and willing to attend nutrition consultation were more likely to be referred to RDs. PCPs were most likely to refer patients with high BMI and HbA1c levels. Also, 8 out of 10 PCPs were likely to refer patients with type 1 or type 2 diabetes. On the other, hand 8 out of 10 PCPs reported that they would not refer a patient to a dietitian if the patient had CVD and was taking statin drugs. More than 50% of PCPs were not likely to refer the patient who had dyslipidemia and hypertension. Other deciding factors that were reported were the amount of wait time and cost. Finally, 9 out 10 PCPs reported that they would refer their patient to the RDs if they personally knew the RDs (29).

**Effectiveness of Registered Dietitians**

Studies conducted in the U.S. and other developed countries indicate that RDs may be more effective in helping patients lose weight, and lower serum cholesterol, serum glucose, and blood pressure compared to PCPs and other medical
practitioners.

A randomized study was done in the Netherlands to compare the effect on weight loss, blood lipids, and cardiovascular risks in patients with high risk for Ischemic Heart Disease (IHD). Selected patients were counseled on nutrition either by a PCP or a dietitian. Results of this study showed that both groups experienced a decrease in weight, cholesterol, and cardiovascular risks; however, people counseled by the RDs lost significantly more weight compared to the other group (mean = 4.5 kg vs. 2.4 kg) (22). As for blood lipids, the group counseled by PCPs had greater reduction in total cholesterol and higher increase in HDL; however, a higher percentage of patients counseled by the PCPs were reported to be taking lipid-lowering medication compared to the subjects counseled by RDs (22).

Additional research assessed the effectiveness of a dietitian-based nutrition counseling and education program for patients with hyperlipidemia and found dietitians to be very effective in reducing total and saturated fat intake, serum total and LDL cholesterol, and body weight (p<0.05) (26). Results of this study further showed that changes in fat intake, serum and LDL cholesterol, as well as, weight were smallest for the subjects who were never referred to the dietitian-based program. Greater changes were reported in subjects who were referred to the dietitian-based program and attended 3 or 4 sessions. (26) A systemic review of the literature also indicates that RDs may be more effective in helping patients reduce blood cholesterol compared to PCPs (25). Another study conducted to compare effectiveness of cholesterol-lowering intervention implemented by RDs or PCPs not only found that RDs are significantly better at lowering patients’ cholesterol.
compared to PCPs, but also found greater patient satisfaction reported when RDs were the ones providing the intervention (58).

A recent observational study conducted to examine the effectiveness of RDs’ education and counseling on diet-related patient outcomes compared to the general education provided by the Cardio Rehabilitation (CR) staff found that RDs had more improved diet-related outcomes compared to the CR staff. More specifically, subjects in the RD group significantly improved their total and low density lipoprotein (LDL), waist circumference, BMI, and meats, eggs, dairy, fried foods, in baked goods, convenience foods, table fats, and snack (MEDFICTS) score. MEDFICTS is a self-reported diet questionnaire that quantifies diet quality and identifies adherence to a diet according to restrictions for cholesterol and saturated fats (23).

Lifestyle modifications have been associated with reduced incidence of diabetes in high risk patients. Lifestyle modifications have been shown to be more effective in reducing diabetes incidence in high risk patients compared to a popular diabetes drug, metformin (49, 50). Results of a recent randomized controlled trial indicates that onsite RDs may be helpful in improving glycemic control in patients with uncontrolled type 2 diabetes (61). This study was conducted to evaluate the effect of RD–led management of diabetes on glycemic control and macronutrient intake in type 2 diabetic patients in primary care clinics in Taiwan. This study consisted of 154 adult patients with type 2 diabetes who were assigned randomly to a routine care control group (n = 79) or an RD–led intervention group (n = 75). The test group received on-site diabetic self-management education every 3 months for a year. Results of the study have shown that RD–led diabetes management programs
in primary care clinics significantly improved the glycemic control of type 2 diabetic patients with baseline A1C ≥7%. A strong and independent association between a reduction in carbohydrate intake and improvements in A1C (P < 0.001) was also found. The test group had a reduction in mean fasting glucose plasma by 13.4mg/dl compared to the control group, who had an increase in fasting glucose by 16.9 mg/dl (P = 0.007) (61).

**Registered Dietitians’ Cost Effectiveness**

RDs are not only more effective in providing MNT and improving outcomes, but they are also cost effective. It has been concluded that MNT can improve outcomes in patients with diabetes, and can also decrease the cost of managing diabetes for Medicare (62). Sheils et al reported that in individuals aged 55 years and older, the savings can actually exceed the cost of providing the MNT (63) RDs can also be cost effective in reducing serum cholesterol in people with hyperlipidemia, compared to lipid-lowering medications (64), since the mean cost for nutrition intervention with a dietitian is reported to be $163 (a mean of four visits). In contrast, the estimated annual cost of treatment for patients with hyperlipidemia using drug therapy was estimated to $1,450. Therefore other studies have reported providing MNT to patients with cardiovascular risks and patients with diabetes can lead to tremendous savings in health care costs (63).

**Conclusion**

Obesity rates have increased dramatically over the past 25 years, and today obesity is the second leading preventable cause of disease and death in the U.S. (1). Obesity, the current pandemic, is also the primary cause for increased incidences of
chronic diseases such as type 2 diabetes, hypertension, cardiovascular disease, hyperlipidemia, and some cancers (1). Reports from 2005 indicate that one out of two adults has at least one chronic disease (2), and that 70% of all deaths in the U.S. are caused by chronic diseases (3). Furthermore, in 2009 the CDC released a statement declaring that more than 75% of health care costs can be attributed to chronic conditions.

PCPs are the main health care providers for patients with chronic diseases; however, strong evidence indicates that there is inadequate chronic disease care by PCPs due to clinical inertia. PCPs are also failing to initiate nutrition intervention in the majority of their patients. This review of the literature suggests that a lack of knowledge, self-efficacy, and time are major barriers to nutrition counseling by PCPs. RDs have been shown to be effective in improving outcomes of patients with chronic disease, as well as reducing overall health care cost associated with chronic disease. This review of the literature indicates that PCPs are failing to refer their patients to RDs for nutrition counseling. More research is warranted to find out if PCPs are capable of providing nutrition counseling to patients in need, and if they are not capable, reasons for low referral rates to RDs.
CHAPTER 3: METHODOLOGY

Background

The most visible and yet the most neglected health problem facing Americans is obesity. Obesity is accountable for 133 million Americans living with at least one chronic diseases (65), and additional 445 billion dollars in health care costs(6).

Primary Care Physicians (PCPs) are the main health care providers for people with chronic disease, however there is strong evidence indicating that they are failing to initiate treatments due to clinical inertia (2,3,51–57,66). PCPs are further failing to promote therapeutic lifestyle changes (TLC), even though TCL has been shown as an effective approach to treating obesity(22,24,26,67). Literature, conducted mainly outside the U.S. indicates that the majority of Primary Care Physicians (PCP) believe that most of their patients can greatly benefit from nutrition counseling (20).

However, they are not able to provide nutrition counseling within the current health care system due to; lack of time, lack of knowledge in nutrition, lack of financial compensation, and low self-efficacy among PCPs(10,19–21).

The purpose of this thesis is to gain a better understanding of attitudes and self-efficacy among PCPs providing nutrition counseling to patients within the Primary Care network, with special attention to common barriers to nutrition counseling. The secondary goal of this thesis is to investigate the
likelihood that PCPs will refer patients to an on-site RD if additional cost accrues to the patients.

**Research Questions**

1. What proportion of time do PCPs spend on nutrition counseling with patients?
2. Does the time spent on nutrition counseling differ by (a.) years in practice or (b.) patient population?
3. What is the confidence of PCPs to provide effective nutrition counseling for various diseases?
4. What are the most common barriers to providing effective nutrition counseling by PCPs?
5. What is the history of referrals by PCPs to RDs for nutrition counseling?
   a. Does the referral history to an RD differ by years in practice?
   b. Does the referral history to an RD differ by patient population?
6. What is the likelihood a PCP would refer to an RD for various diseases?
   a. Does the likelihood of referral to an RD differ by years in practice?
   b. Does the likelihood of referral to an RD differ by patient population?
7. What is the relationship between the confidence of a PCP to provide counseling and his/her likelihood to refer a patient to an RD?

**Survey Development**

A survey has been developed by a research team as part of a grant submission for placing RDs in family practice settings. The survey was designed to
assess attitudes and barriers among PCPs within the Primary Care network to providing nutrition counseling. Items were also included to assess the likelihood of the providers to refer a patient to an on-site RD with no additional cost to the patient.

The survey consisted of a total of nine questions. The initial questions were used to determine the primary location of practice, the length of time (years) in practice and the ages of the patients for which the PCPs provide care. Two questions were developed to assess the percentage of patients with whom PCPs discuss dietary habits and the percentage of the visit time they spend discussing dietary habits with their patients. A percentage scale ranging from 0 to 100 was used to collect the responses.

PCPs’ self-efficacy for providing effective nutrition counseling for each of the following situations: general wellness, obesity, diabetes hyperlipidemia, hypertension and cancer was measured using a standard five-point likert scale of 0% chance to 100% chance. This is example of a 5-point measuring scale:

<table>
<thead>
<tr>
<th>Score</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>no chance at all</td>
</tr>
<tr>
<td>25</td>
<td>25% chance</td>
</tr>
<tr>
<td>50</td>
<td>50/50 chance</td>
</tr>
<tr>
<td>75</td>
<td>75% chance</td>
</tr>
<tr>
<td>100</td>
<td>Completely certain</td>
</tr>
</tbody>
</table>

To improve content and face validity, the items presented were developed utilizing research literature and previous surveys used in other studies to assess barriers among PCPs for providing nutrition counseling to their patients (10,19,21).
To examine the referral practices to RDs of PCPs, a series of questions were developed to determine previous history and likelihood to refer to an RD. The first question assessed if PCPs have referred their patients to an RD and whether the RD was on-site or outside of their office. Participants were encouraged to select all that apply, from three choices which included: no, meaning they have never referred patient to an RD, yes, to one on-site, or, yes, but the one out of the office.

A five-point likert scale used to assess self-efficacy of PCPs for providing nutrition counseling was also used to assess the likelihood of PCPs to refer their patients for various conditions. The scenario was to on-site RDs at no direct cost to the patient to inform the receptivity of using RDs in a Patient Centered Medical Home.

The survey was evaluated for face and content validity by the members of Primary Care research subcommittee. Suggested revisions were reviewed and incorporated into the final draft of the survey. Institutional Review Board approval was received prior the initiation of data collection. The final survey is provided in the Appendix.

Research Subjects

The research population consisted of faculty who are of age 20 or older that provide care within the OSU Family Practice network. The number of participants was defined as the number of individuals who agree to participate by providing consent and those who agreed to have their records accessed, even if all do not prove eligible or complete the study. Subjects were recruited directly from faculty’s University email accounts, and without any incentives being offered for
Data Collection

After approval from IRB to contact faculty providers within the primary care network, an email was sent by inviting participants in a brief online survey. The email contained a description of the purpose of the study and an embedded hyperlink to the survey. Data were collected for two weeks between May and June of 2011 using subscription online survey architecture (SurveyMonkey.com). A reminder email was sent 4 days prior to the conclusion of the survey window. The invitation and reminder emails are provided in the Appendix.

Statistical Analysis

Data were collected online and tabulated into an online database. Individual responses were downloaded from the server to a local research machine for tabulation and analysis. Data was analyzed using SPSS (version 19, SPSS Inc, Chicago, IL). To describe the frequencies of responses, frequency analyses were used to provide the proportion of individuals responding to each item. Chi square analyses were used to identify significant differences in the proportions of PCPs confidence to provide nutrition counseling and likelihood to refer to an RD by length of time practicing. T-tests were used to compare the mean differences in the amount of time spent addressing nutrition, the proportion of patients with whom nutrition is discussed, self-efficacy to provide nutrition counseling and likelihood to refer to an RD by length of time practicing.
CHAPTER 4: RESULTS AND DISCUSSION

Results

Of the 83 individuals that were sent the original email invitation, 28 Primary Care Physicians (PCPs) completed the questionnaire (n=28; 33%). The majority of PCPs (n=22; 77%) had at least 10 years of practice, with nearly one-third (n=9; 32%) practicing over 20 years, while only (n=6; 21%) were in practice for 5 years or less. PCPs most commonly treated patients in age groups between 20-51 years (n=26; 93%), and over 51 years (n=20; 71%). The majority of (n=15; 54%) of PCPs also treated children and adolescents.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Category</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length of time practicing as a Primary Care Provider</td>
<td>Less than 5 years</td>
<td>6</td>
<td>21%</td>
</tr>
<tr>
<td></td>
<td>5-10 years</td>
<td>6</td>
<td>21%</td>
</tr>
<tr>
<td></td>
<td>11-15 years</td>
<td>4</td>
<td>14%</td>
</tr>
<tr>
<td></td>
<td>16-20 years</td>
<td>3</td>
<td>11%</td>
</tr>
<tr>
<td></td>
<td>More than 20 years</td>
<td>9</td>
<td>32%</td>
</tr>
<tr>
<td>Ages of the patients typically provide care</td>
<td>12 years and younger</td>
<td>15</td>
<td>54%</td>
</tr>
<tr>
<td></td>
<td>13-18 years</td>
<td>15</td>
<td>54%</td>
</tr>
<tr>
<td></td>
<td>20-51 years</td>
<td>26</td>
<td>93%</td>
</tr>
<tr>
<td></td>
<td>Over 51 years</td>
<td>20</td>
<td>71%</td>
</tr>
</tbody>
</table>

Table 4.1: The length of time in practice and ages of patients commonly seen by Primary Care Physicians
Percent of Patients and Time spent on Nutrition Counseling by PCPs

PCPs reported discussing dietary habits with approximately half (52.6%) of their patients and spent approximately 12% of the time in the session discussing dietary habits (Table 4.2). Those who have practiced longer than 15 years, discussed dietary habits more often (55.4%) compared to PCPs that have been practicing for less than 15 years (50.6%), but the differences were not significant (p=0.643). Those who have practiced longer also spent a greater proportion of time during the visit talking about dietary habits (16%), compared to PCPs who have been practicing for 15 years or less (9.7%, p=0.196). PCPs that commonly treat older patients (over 50 years) discussed dietary habits with a greater proportion of patients (55.4%) and spend nearly twice as much time as those with less time in practice. The proportion of the visit spent did not differ greatly by age of the patient commonly seen.

A significant variation is evident in the percentage of patients who receive nutrition counseling by their PCPs. In studies conducted in the late 1980's and mid 1900's PCPs reported to provide nutrition counseling to 58% or less of their patients (10)(17)(37). More specifically, a 1995 study was conducted to evaluate barriers to providing nutrition counseling among PCPs. Over two-thirds of
<table>
<thead>
<tr>
<th>Factor</th>
<th>Categories</th>
<th>% of Patients seen discuss diet</th>
<th>% of time of visits spent discussing diet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td></td>
<td>52.7 (26.4)</td>
<td>11.9 (10.4)</td>
</tr>
<tr>
<td>Years of practice</td>
<td>≤15 years</td>
<td>50.6 (25.2)</td>
<td>9.7 (7.6)</td>
</tr>
<tr>
<td></td>
<td>≥16 years</td>
<td>55.4 (28.9)</td>
<td>15.0 (13.2)</td>
</tr>
<tr>
<td>Ages of patients</td>
<td>≤12 years</td>
<td>52.7 (28.0)</td>
<td>11.3 (12.3)</td>
</tr>
<tr>
<td></td>
<td>13-18 years</td>
<td>52.7 (28.0)</td>
<td>11.3 (12.3)</td>
</tr>
<tr>
<td></td>
<td>20-51 years</td>
<td>51.3 (26.4)</td>
<td>12.2 (10.7)</td>
</tr>
<tr>
<td></td>
<td>&gt; 51 years</td>
<td>54.8 (28.2)</td>
<td>11.0 (10.9)</td>
</tr>
</tbody>
</table>

Data presented as mean (SD)

Table 4.2: The percent of patients with whom PCPs discuss dietary habits, and the proportion of visit time PCPs spend discussing dietary habits

PCP’s provided nutrition counseling to 40% or less of their patients (10). Another study completed in 1981 in which health-promotion beliefs, attitudes, and practices among PCPs living in Massachusetts were evaluated. Only 58% of PCPs in this study talked about the importance of eating a balanced diet with their patients (37). The same study with a slightly smaller sample size was repeated 13 years later, and percentage of PCPs that discussed the importance of consuming a balanced diet with their patients decreased by 11% (17).

Results from observational studies indicated that a much smaller percentage of patients receive nutrition counseling by their PCPs, compared to self-reported data (45,46). More specifically only 9 (6.5%) out of 138 observed physicians included nutrition counseling in the majority (>50%) of patients visits, while the majority of PCPs (n=75) incorporated nutrition counseling in only 15 to 30% of patient encounters (45). Similarly, only 24% of 3,475 PCPs incorporated nutrition
counseling during all visits observed; nutrition counseling was provided more often in patients with chronic disease, especially diabetes (46). When Washington state residents were asked in a survey if their PCPs provided nutrition counseling, only 20% reported receiving nutrition counseling by their PCPs. Patients with chronic disease reported to be counseled on nutrition more often by their PCPs, compared to patients without chronic disease (41). Female PCPs who had healthier lifestyles and some nutrition training were reported to engage in nutrition counseling more often with their patients (10)(40).

These findings are not similar to findings reported in other studies, which indicated that younger physicians have more nutrition knowledge, are more likely to engage in nutrition counseling with their patients (10,40). PCPs reported to provide nutrition counseling to patients 51 years and older more often, which seems reasonable considering that they have the highest rates of obesity and therefore are at greatest risk for chronic disease development. Similarly, other studies have reported that nutrition counseling is being provided more often to older and new patients, compared to young and established patients (45,46).

Based on the recent observational studies, the percentage of patients that receive nutrition counseling by their PCPs is significantly lower than reported by PCPs in this and other studies. PCPs further report to provide nutrition counseling more often to obese, older and patients with chronic diseases, which may further indicate lack of preventative medicine. Based on this study, as well as, other literature, percentage of patients that receive nutrition counseling for chronic diseases is well below the Healthy People 2010 goal of 75 percent (36).
Based on the review of the literature, the amount of time physicians spend with their patients varies significantly. One recent study reported that on average physicians spend 22 minutes per patient visit (68), suggesting that PCPs in this study spend on average 2 to 3 minutes discussing dietary habits with their patients. The reported time by the PCPs differs from other studies, in which PCPs reported to spend significantly more time providing nutrition counseling. In one study, 68% of PCPs reported to spend 5 minutes or less discussing dietary changes with their patients (10). PCPs working in private practices reported to spend 6 minutes or more discussing dietary changes with patients compared to PCPs practicing in university hospitals or Health Maintenance Organizations (HMO). All of the PCP’s that already included nutrition as part of their visit expressed that they would like to dedicate even more time to discussing dietary changes.

Results of observational studies indicate that PCPs spend significantly less time providing nutrition counseling to their patients then previously reported. In a recent cross-sectional study, physicians were observed to spend on average 55 seconds providing nutrition counseling to their patients (45). This study further implied that physician’s visits that include nutrition counseling were longer at 12.8 minutes compared to those that did not include nutrition counseling with 9.8 minutes. Results from observational studies further suggest that PCPs may be overestimating the percentage of patients with whom they discuss dietary habits, as well as, the amount of time they spend discussing dietary habits (45,46).

According to the US Preventive Task Force (USPTF) time required for PCPs to provide effective counseling for complex behavioral changes such as cholesterol
reduction is 8.2 minutes (69), suggesting that the amount of time PCPs are currently spending on nutrition counseling may be inadequate for intervention, prevention and treatment of chronic diseases.

**Self-Efficacy to Provide Effective Nutrition Counseling for Various Diseases**

Less than half (n=12, 43%) of PCPs reported 100% confidence to provide nutrition counseling for general wellness, obesity, with fewer completely confident to address diabetes, hypertension, hyperlipidemia and malignancies (Table 4.3). PCPs reported to feel most confident providing nutrition therapy for obesity (n=13, 46%), and least confident for malignancies (n=2, 7%). Approximately one third (n=9, 32%) reported 100% confidence to provide nutrition counseling for diabetes, hyperlipidemia, and hypertension.

PCPs that have been practicing for longer than 16 years reported to feel more confident providing nutrition counseling to their patients. In our study, unlike in previous reports, PCPs practicing for longer than 15 years reported to discuss dietary habits more often with patients, as well as, spend more time discussing them. They further reported to have higher confidence, which explains why they discuss dietary habits with greater amount of patients and spend more time doing so, compared to PCPs who have been practicing for less than 15 years. PCPs further reported to feel more confident providing nutrition counseling pertaining to general wellness, obesity and hypertension to patients between ages of 20 and 51 years, and to patients that are over age of 51 years. However, PCPs reported to feel more comfortable providing nutrition counseling for diabetes to patients who are 18 years old or younger (Table 4.4)
<table>
<thead>
<tr>
<th>Condition</th>
<th>Complete confidence to provide nutrition counseling n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Wellness</td>
<td>12 43%</td>
</tr>
<tr>
<td>Obesity</td>
<td>13 46%</td>
</tr>
<tr>
<td>Diabetes</td>
<td>9 32%</td>
</tr>
<tr>
<td>Hyperlipidemia</td>
<td>9 32%</td>
</tr>
<tr>
<td>Hypertension</td>
<td>10 37%</td>
</tr>
<tr>
<td>Cancer</td>
<td>2 7%</td>
</tr>
</tbody>
</table>

Table 4.3: Number of Primary Care Physicians that were 100% confident their ability to provide effective nutrition counseling to patients for various diseases.

<table>
<thead>
<tr>
<th>Condition</th>
<th>Years in practice</th>
<th>Age of patients</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td>&lt;15 yrs</td>
</tr>
<tr>
<td>Wellness</td>
<td>79.5 (22.6)</td>
<td>75.0 (25.8)</td>
</tr>
<tr>
<td>Obesity</td>
<td>75.9 (28.4)</td>
<td>71.9 (34.0)</td>
</tr>
<tr>
<td>Diabetes</td>
<td>73.2 (25.4)</td>
<td>67.2 (27.0)</td>
</tr>
<tr>
<td>Hyperlipidemia</td>
<td>74.1 (23.1)</td>
<td>68.8 (25.0)</td>
</tr>
<tr>
<td>Hypertension</td>
<td>75.9 (25.5)</td>
<td>70.0 (30.2)</td>
</tr>
<tr>
<td>Cancer</td>
<td>31.3 (33.1)</td>
<td>28.1 (28.7)</td>
</tr>
</tbody>
</table>

\[P>0.05 \text{ for all values by years in practice}\]
\[\text{Data presented as Mean (SD)}\]

Table 4.4: Confidence for providing effective Nutrition counseling for various diseases among Primary Care Physicians.
Self-efficacy was first defined by Albert Bandura in 1977 as “people’s beliefs about their capabilities to produce designated levels of performance that exercise influence over events that affect their lives” (48). PCPs who have low confidence or low self-efficacy in providing nutrition counseling, don’t believe in themselves to be effective in delivering nutrition intervention, as well as making a positive impact on their patients, and are, therefore, less likely to engage in nutrition counseling with their patients. Results of this study suggest that the majority of PCPs lack confidence in their ability to provide nutrition counseling for some of the most prevalent diseases. Similar results were reported in studies conducted both within and outside the United States (10,19–21), with some evidence indicating that the self-efficacy of PCPs for providing nutrition counseling is decreasing (19).

Dutch PCPs reported a significant (p<0.043) decrease in self-efficacy for providing nutrition counseling for treatment and prevention of cardiovascular disease (CVD) and obesity. This was reported in a longitudinal study conducted between 1992-2007 in order to evaluate perceived barriers by PCPs pertaining to nutrition education and treatment of overweight and obese patients (19). Similar results were reported in a study, conducted to assess barriers among PCPs when providing nutrition counseling. In this study, the majority (50%) of PCPs reported to have low self-efficacy in their ability to provide effective nutrition counseling for improving diets of their patients (10). In another recent study conducted to determine barriers among physicians and residents for providing nutrition counseling for weight loss revealed that residents and physicians consider their low self-efficacy as a barrier for providing weight loss counseling. (21).
Obesity is the leading cause of chronic diseases and, one out of two adults in the United States has at least one chronic disease. The majority of primary care physicians believe that dietary treatment can be an effective approach to deal with the obesity epidemic, reduce prevalence of chronic diseases, as well as improve patient outcomes. Results of this study, as well as, results of additional research indicate that the majority of PCPs have low self-efficacy toward nutrition counseling of their patients for some of most prevalent, deadly and costly diseases in the United States.

**Barriers reported by PCPs for Providing Effective Nutrition Counseling**

The greatest perceived barrier by PCPs that limited the amount of time and effort they spend on nutrition counseling was lack of time (Table 4.5), followed by competing demands and poor patient compliance. The concerns were followed by the lack of formal training in nutrition and methods to facilitate behavior change, as well as a general lack of knowledge in the area of nutrition. Barriers such as unfeasibility to promote lifestyle change in a family practice setting, uncomfortable with the topic and nutrition is a low priority compared to other issues to be addressed were least likely agreed to be barriers by PCPs.

Significant differences were seen by year of practice for competing demands and being uncomfortable with the topic (p=0.003; p=0.027, respectively, Table 4.5). More than half of PCPs (n= 17; 61%) somewhat agreed, agreed, or strongly agreed that lack of knowledge in the area as being a barrier to providing nutrition counseling to their patients. Almost (n=20; 71%) of PCPs somewhat agreed, agreed, or strongly agreed that lack of training in nutrition is a barrier to providing nutrition
counseling, while half (n=14; 50%) of PCPs somewhat agreed, agreed, or strongly agreed that lack of training in behavioral changes is a barrier to providing nutrition counseling to their patients.

Results of the studies conducted both within and outside the United State reported similar results. PCPs most commonly reported lack of time as being a number one barrier to providing nutrition counseling to their patients (10,19,20). There was one study in which PCPs and residents reported that lack of patients desire to lose weight as a prime barrier.

More specifically, in a study conducted to determine the change in perceived barriers for providing nutrition education and treatment of obesity among Dutch PCPs revealed that lack of time and patient motivation remained the most commonly reported barriers (19). This means that in 15 years nothing has changed, and PCPs are continuing to report lack time to be a barrier to provide nutrition counseling to their patients. In this same study, PCPs reported a significant decrease in self-efficacy for treating obesity in 2007 (mean= 2.6), compared to results in 1992(p=<0.43)(19). In a different study, conducted to assess the attitudes, practice behavior and barriers to nutrition counseling, 75% of surveyed PCPs reported that lack of time is a number one barrier to providing nutrition counseling (10). Other perceived barriers reported by same PCPs were lack of patients’ compliance (71%), inadequate teaching materials (69%), lack of training in nutrition counseling (67%), lack of knowledge (62%), and lack of adequate reimbursement (61%) (10).

Moreover, 50% of PCPs also stated that they lack confidence to improve patients’ diet (10).
A survey conducted to assess nutrition attitudes among Australian PCPs indicated that the majority (76%) of surveyed physicians agreed that diet has a significant impact on long-term health, while 63% of survey physicians agreed that “faulty nutrition is the major cause of disease in Australian adults” (20). PCPs further reported that they can be a propelling force for their patients to change their diets. However, PCPs reported providing nutrition counseling to only 15% of their patients. PCPs reported that lack of time, lack of confidence, lack of knowledge, patients’ attitudes, and financial obstacles to be major barriers to providing nutrition counseling to patients.

In a more recent study, physicians and residents in a focus group were asked what were the major barriers for providing nutrition counseling to their patients who needed to lose weight. Most common barriers listed by frequency were: low patient desire and ability to lose weight, low self-efficacy in effectiveness of weight loss counseling, lack of comprehensive obesity management resources (i.e., a weight loss clinic), insufficient time due to high patient volume, underuse of dietitians or lack of experience working with RDs, lack of skills in providing brief counseling, insufficient knowledge of best clinical practices (21).

Results of this questionnaire, as well as other literature indicate that lack of time might be one of the biggest barriers to PCPs not providing nutrition counseling to their patients. Other commonly reported barriers include lack of nutrition knowledge and lack of self-efficacy among primary care physicians.
Barriers | Total | ≤15 years | ≥16 years | P
--- | --- | --- | --- | ---
Lack of time | 5.0 (1.5) | 5.3 (1.2) | 4.6 (1.8) | .261
Competing demands | 3.5 (1.7) | 5.0 (1.4) | 3.6 (1.8) | .003
Poor patient compliance | 4.0 (1.5) | 4.4 (1.1) | 3.7 (1.9) | .195
Lack of training in nutrition | 3.5 (1.3) | 4.3 (1.2) | 3.7 (1.4) | .302
Lack of training in facilitating behavior change | 2.2 (1.5) | 3.8 (1.4) | 3.2 (1.5) | .449
Lack of knowledge in the area | 2.5 (1.3) | 4.1 (1.1) | 2.7 (1.2) | .194
Nutrition is a low priority compared to other issues to be addressed | 4.1 (1.5) | 2.8 (1.4) | 2.1 (1.4) | .183
Uncomfortable with the topic | 4.4 (1.1) | 2.3 (1.1) | 2.0 (1.0) | .027
Unfeasible to promote lifestyle change in a family practice setting | 2.1 (1.2) | 2.4 (1.3) | 1.7 (0.8) | .156

Data presented as Mean (SD)
Response scale: 1=strongly disagree; 2=disagree; 3=somewhat disagree; 4=somewhat agree; 5=agree; 6=strongly agree

**Table 4.5 Perceived barriers by PCPs that limit the amount of time and effort they devoted to nutrition counseling of patients.**

*The Likelihood to refer to a RD*

The majority of PCPs (n=22, 79%) reported to have referred their patients to an off-site dietitian, while only (n=18, 64%) reported to have referred their patients to an on-site dietitian (Table 4.6). PCPs also reported to have referred their patients to off-site RDs more often for all age groups. On average PCPs reported that they would most likely refer patients (at no additional cost to the patient) for diabetes counseling, followed by obesity, hyperlipidemia, and hypertension (Table 4.7). PCPs were less likely to refer their patients to RDs for general wellness and cancer. The order of disease for which PCPs reported that they would refer their patient to a RDs did not differ for years in practice or patient population for which they provide care (Table 4.7).
<table>
<thead>
<tr>
<th>Variable</th>
<th>Category</th>
<th>On-Site RD</th>
<th>RD out of office</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td></td>
<td>18 (64%)</td>
<td>22 (79%)</td>
</tr>
<tr>
<td>Years in practice</td>
<td>≤15 years</td>
<td>11 (69%)</td>
<td>11 (69%)</td>
</tr>
<tr>
<td></td>
<td>≥16 years</td>
<td>7 (58%)</td>
<td>11 (92%)</td>
</tr>
<tr>
<td>Ages of the patients for which you typically provide care</td>
<td>≤12 years</td>
<td>11 (73%)</td>
<td>12 (80%)</td>
</tr>
<tr>
<td></td>
<td>13-18 years</td>
<td>11 (73%)</td>
<td>12 (80%)</td>
</tr>
<tr>
<td></td>
<td>20-51 years</td>
<td>17 (65%)</td>
<td>20 (77%)</td>
</tr>
<tr>
<td></td>
<td>&gt;51 years</td>
<td>14 (70%)</td>
<td>15 (75%)</td>
</tr>
</tbody>
</table>

**Table 4.6: Primary Care Physicians that referred their patients either to an on-site or off-site dietitian**

<table>
<thead>
<tr>
<th>Condition</th>
<th>Total</th>
<th>≤15 years</th>
<th>≥16 years</th>
<th>≤12 years</th>
<th>13-18 years</th>
<th>20-51 years</th>
<th>&gt;51 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>General wellness</td>
<td>56.5 (31.5)</td>
<td>61.7 (31.1)</td>
<td>50.0 (32.0)</td>
<td>53.6 (29.2)</td>
<td>53.6 (29.2)</td>
<td>57.0 (29.3)</td>
<td>53.9 (32.6)</td>
</tr>
<tr>
<td>Obesity</td>
<td>90.7 (17.2)</td>
<td>88.3 (20.8)</td>
<td>93.8 (11.3)</td>
<td>91.1 (12.4)</td>
<td>91.1 (12.4)</td>
<td>90.0 (17.7)</td>
<td>93.4 (11.3)</td>
</tr>
<tr>
<td>Diabetes</td>
<td>94.2 (10.7)</td>
<td>92.9 (11.7)</td>
<td>95.8 (9.7)</td>
<td>94.2 (11.0)</td>
<td>94.2 (11.0)</td>
<td>93.8 (11.1)</td>
<td>95.8 (9.6)</td>
</tr>
<tr>
<td>Hyperlipidemia</td>
<td>88.9 (16.0)</td>
<td>88.3 (16.0)</td>
<td>89.6 (16.7)</td>
<td>87.5 (16.3)</td>
<td>87.5 (16.3)</td>
<td>88.0 (16.3)</td>
<td>88.2 (17.4)</td>
</tr>
<tr>
<td>Hypertension</td>
<td>80.6 (28.0)</td>
<td>86.7 (18.6)</td>
<td>72.9 (36.1)</td>
<td>76.8 (31.7)</td>
<td>76.8 (31.7)</td>
<td>82.0 (26.5)</td>
<td>76.3 (31.7)</td>
</tr>
<tr>
<td>Cancer</td>
<td>65.4 (32.5)</td>
<td>71.7 (20.8)</td>
<td>56.8 (43.4)</td>
<td>59.6 (37.6)</td>
<td>59.6 (37.6)</td>
<td>65.6 (32.0)</td>
<td>59.7 (34.4)</td>
</tr>
</tbody>
</table>

Data presented as Mean (SD)

**Table 4.7 The Likelihood of Primary Care Physicians to refer patients to Registered Dietitians for various diseases.**
There are no current studies in the United States that specifically evaluated the PCPs likelihood to refer patient to a RD for treatment and prevention of chronic diseases. One study conducted in the late 1980’s evaluated PCPs on the likelihood to refer patients to other health care providers for smoking cessation, obesity and lack of exercise. In this study, PCPs reported that they don’t believe in their patient’s ability to change, and therefore fail to refer them to other practitioner who might help them (27). PCPs further reported that they don’t refer patient to other practitioner because they lack confidence in the outside treatments, as well as, due to financial obstacles (27).

In a more recent study conducted in Australia, PCPs reported that the high cost of nutrition counseling for their patients, as well as, lack of availability and access to subsidized services, are the main reasons they don’t refer their patients to RDs (28). Much like in the US, RDs are not covered by insurance companies in Australia. This group of PCPs reported that they don’t refer their patient to RDs working in public institutions due to long waiting time.

Another recent Australian study described PCPs decision making processes for reducing nutritional risk in cardiac patients by referring them to RDs. Patients’ referral to dietitian depended on the PCPs reasoning process, which consisted of four elements: synthesizing management information; forecasting outcomes; planning management; and actioning referrals. These elements influence the PCPs decision to make a referral to RDs. PCPs reported to refer patient to RDs more often than those that they believe would commit to dietary changes and were willing to attend nutrition consultation.
Most of the (87%) PCPs reported that they would refer patients to RDs with high BMI and HbA1c levels, as well as, diabetes (Type 2). Almost all (92%) of PCPs reported that they would refer their patient to an RD for diabetes (Type 1). However, (80%) indicated that they would not refer patient to a RDs who had CVD controlled with statin drugs. Over half (52% and 62%) also reported that they would not refer their patients with dyslipidemia and hypertension to an RD. The majority (68%) of PCPs further reported that they would refer their patient to RD if they personally knew the RD (29).

At this time the thought process of PCPs for referring their patient to RDs seems to be a multifaceted process requiring more research to be completely understood. Results of this study and results reported by Pomeroy et al (29) suggest that PCPs are more likely to refer patient to RDs for some of the more complex chronic disease such as diabetes, suggesting that they are not trying prevent chronic diseases, but rather treat them once they occur. This lack of preventative medicine could be possible due to lack of time, which is reported by PCPs to be a number one barrier to providing nutrition counseling. Furthermore, a recent study conducted to determine the amount of time required for PCPs to provide recommended preventive services to an average patient panel reported, that PCPs would need to spent 7.4 hours per day for provision of preventative services based on USPSTF recommendations (69), therefore suggesting that preventative medicine is all that they would have time for.
**Relationship between PCPs Self-efficacy to Provide Nutrition Counseling and Likelihood to refer to a RD**

There was no significant correlation noted between PCPs confidence in their ability to providing nutrition counseling for general wellness ($r=.16, p=.43$); obesity ($r=.25, p=.22$); diabetes ($r=.05, p=.83$); hyperlipidemia ($r=-.01, p=.97$); hypertension ($r=.132, p=.52$); cancer ($r=-.121, p=.60$), and their likelihood to refer their patients to an RD.

These results suggest that, even though PCPs express high levels of confidence in their ability to providing counseling to their patients, they are not likely to refer them to RDs either. However, PCPs to have refer, most of them further reported to likely refer patient with chronic disease to an RD. RDs have been shown to be effective in promoting positive patient outcomes, including weight loss, lower blood cholesterol, blood sugar, and blood pressure (22, 23, 26,67). Patients reported greater satisfaction when RDs were intervening compared to other health professionals (24). These improvements in clinical outcomes have also been achieved in a cost-effective manner. Medical Nutrition Therapy (MNT) has been reported to not only improve outcomes in patients with diabetes, but also decrease cost of managing diabetes for Medicare (62). Moreover, RDs also seem to be cost effective in reducing serum cholesterol in people in hyperlipidemia, compare to lipid lowering medications (64). Other studies have reported providing MNT to patients with cardiovascular risks and patients with diabetes can lead to tremendous saving in health care costs (63).

Based on our results, as well previous studies, it is clear that PCPs don't have
time to provide nutrition counseling to patients with chronic diseases, as well as, patients who are at risk for developing them. PCPs are further lacking self-efficacy to provide nutrition counseling, nutrition knowledge and skills for behavioral changes. Incorporating RDs into patients care will not only free PCPs from doing it, and allow them to focus their expertise elsewhere, but it may lead to better patient outcomes and overall savings in health care costs.
CHAPTER 5:

BARRIERS TO PROVIDING NUTRITION COUNSELING BY PRIMARY CARE PHYSICIANS: OPPORTUNITIES FOR REGISTERED DIETITIANS

Emina Suta, Christopher A. Taylor, Advisor PhD, RD, LD; Kay N. Wolf PhD, RD, LD; Marcia Nahikian-Nelms PhD, RD, LD; Randy Wexler MD, MPH

Abstract

There is a positive trend for obesity and chronic disease in the U.S. that have placed a significant strain on the current health system. Currently, Primary Care Physicians (PCPs) are the main health care providers for patients with chronic diseases. The aim of this study is to gain a better understanding of self-efficacy and common barriers among PCPs providing nutrition counseling to patients, as well as, likelihood that PCPs will refer patients to an on-site RD if additional cost accrues to the patients. A sample of 28 Ohio PCPs completed an on-line questionnaire investigating self-efficacy, common barriers to providing nutrition counseling, and likelihood that PCPs will refer patient to an on-site dietitian. PCPs discussed dietary habits with half (53%) of their patients, and spend about 2-3 minutes discussing dietary habits with patients. Less than 50% PCPs reported 100% confidence to provide effective nutrition counseling for various diseases. The greatest barrier to
providing effective nutrition counseling reported by PCPs is lack of time. Most of PCPs reported to “mostly likely” refer their patients to an RD for chronic diseases. The proportion of patients and time spent on nutrition counseling by PCPs may not be adequate for intervention, treatment and prevention of obesity and chronic diseases. PCPs are further lacking time, knowledge and confidence to provide effective nutrition counseling. The high likelihood of PCPs to refer patients to RDs for nutrition counseling of chronic diseases provides opportunity to engage and embed RDs in health care structure to improve health outcomes of patients, as well as reduce the national health care costs associated with obesity and chronic diseases.

**Introduction**

The recent increases in obesity and chronic disease have placed a significant strain on the current health care system, accounting for more than 75% of health care costs to treat chronic conditions (1). Currently, Primary care physicians (PCPs) are the main health care providers for patients with chronic diseases, however, there is strong evidence which indicates that there is inadequate chronic disease care by PCPs (2). This lack of chronic disease care by PCPs can be contributed to clinical inertia, which is defined as “lack of treatment intensifications in a patient not at evidence-based goals for care” (2). Epidemiological, as well as, physicians behaviors are the main evidence for existence of clinical inertia. Epidemiological studies indicate that there are more people suffering from chronic diseases than there are diagnosis made (3). Physicians’ behavior has shown that they are failing to advance therapy for patients with hypertension, hyperlipidemia and diabetes type
2, even though patients are not at their healthy goals, and have not been for a 3 months or longer (4–6).

Therapeutic lifestyle change (TLC), is believed to be a foundation for preventing, as well as treating obesity. TLC’s can therefore play a major role in prevention and treatment of chronic diseases. However, number of physicians that include nutrition counseling as part of their visits varies significantly (7,8), and is well below the goal of 75% set by Healthy People 2010. Other studies have suggested that nutrition counseling by PCPs is even declining (9,10).

The purpose of this thesis is to gain a better understanding of attitudes and self-efficacy among PCPs providing nutrition counseling to patients in Primary Care network, with special attention to common barriers to nutrition counseling. The secondary goal of this thesis is to investigate the likelihood that PCPs will refer patients to an on-site RD if additional cost accrues to the patients.

**Materials and Methods**

**Experimental Design and Subjects**

A descriptive research design was applied using an online survey of PCPs to assess their efficacy and barriers to providing nutrition counseling in the primary care setting and likelihood to refer patients to an RD. Subjects were recruited from the Department of Family Medicine in Midwestern University via email and were asked to complete the online survey.

**Instrumentation**

A questionnaire was developed by a research team to assess confidence, attitudes, and common barriers to providing nutrition counseling among PCPs
within a primary care network. The initial questions were used to determine the primary location of practice, the length of time (years) in practice and the ages of the patients for which the PCPs provided care. Two questions were developed to assess the percentage of patients with whom PCPs discuss dietary habits and the percentage of the visit time they spend discussing dietary habits with their patients. A percentage scale ranging from 0 to 100 was used to collect the responses.

PCPs self-efficacy to providing effective nutrition counseling was measured using a standard five-point likert scale of 0% chance to 100% chance for each of the following situations: general wellness; obesity; diabetes; hyperlipidemia; hypertension; and cancer. This is example of a 5-point measuring scale:

0- no chance at all
25- 25% chance
50-50/50 chance
75- 75% chance
100- Completely certain.

A perceived barrier for providing nutrition counseling in primary care settings was assessed using a likert scale. To improve content and face validity, the items presented were developed utilizing research literature and previous questionnaires used in other studies to assess barriers among PCPs for providing nutrition counseling to their patients(7,11,12)

To examine the referral practices of patients to RDs, a series of questions were developed to determine previous history and likelihood to refer to an RD for
the aforementioned conditions. The first question assessed if PCPs had previously referred patients to an RD and whether the RD was on-site or outside of their office.

PCPs then provided their likelihood to refer a patient to an on-site RD for various conditions using the same five-point scale used to assess self-efficacy. The question addressed the specific scenario that the RD’s services were provided at no direct cost to the patient; this was conducted to inform the receptivity of utilization of RDs within a Patient Centered Medical Home.

The survey was evaluated for face and content validity by the members of the department’s Primary Care research subcommittee. Suggested revisions were reviewed and incorporated into the final draft of the survey. Institutional Review Board approval was received prior the initiation of data collection.

**Data Collection**

Upon approval by the IRB and approval from the Primary Care Practice-Based Research Network (PCPBRN), an email was sent inviting participants to complete a brief online questionnaire. Data were collected during two week period between May and June of 2011 using an on-line survey architecture (SurveyMonkey.com). A reminder email was sent 4 days prior to the conclusion of the survey window.

**Statistical Analysis**

Data were collected online and tabulated into an online database. Individual responses were downloaded from the server to a local research machine for tabulation and analysis. Data were analyzed using SPSS (version 19, SPSS Inc, Chicago, IL). To describe the frequencies of responses, frequency analyses were
used to provide the proportion of individuals responding to each item. T-tests were used to compare the mean differences in the amount of time spent addressing nutrition, the proportion of patients with whom nutrition is discussed, self-efficacy to provide nutrition counseling and likelihood to refer to an RD by length of time practicing.

Results

Out of 83 emailed subjects (55 faculty and 23 residents), 28 providers (n=28; 33%) completed the survey. Nearly half (n=12; 43%) of the respondents had practiced over 15 years and the majority (n=22; 77%) had at least 10 years of practice experience. Only (n=6; 21%) of PCPs were in practice for 5 years or less. PCPs most commonly treated patients in age groups between 20-51 years (n=26; 93%), and over 51 years (71%). The majority of (n=15; 54%) of PCPs treated children and adolescents as well.

Percent of Patients and Time spent on Nutrition Counseling by PCPs

PCPs reported discussing dietary habits with half (53%) of their patients and spent approximately 12% of total visit time discussing dietary habits with patients (Table 5.1). Those that have practiced longer than 15 years (55.4%, p=0.643) discussed dietary habits more often and spent more time talking (16% of the visit, p=0.196) about dietary habits with patients, compared to PCPs that have practiced for 15 years or less (51% of patients; 10% of the visit). PCPs discuss dietary habits most often (55%) with patients who 51 years and over, but reported spending more of their visit time discussing dietary habits with patients between ages of 20 and 51 (12%), than those who are younger than 20 (11%) and older than 51 (11%).
Self-Efficacy of PCPs to Provide Effective Nutrition Counseling for Various Diseases

Mean self-efficacy of the PCPs to provide effective nutrition counseling are provided in Table 5.2. PCPs feel most confident providing nutrition therapy for obesity (46%), and least confident for cancers (n=2; 7%). Less than half (n=12; 43%) were 100% confident in their ability provide effective nutrition counseling for general wellness, with fewer (n=9; 32%) being 100% confident to provide nutrition counseling for diabetes and hyperlipidemia.

There was not a significant difference between years in practice among PCPs and confidence to provide nutrition counseling (Table 5.2). PCPs felt more confident providing effective nutrition counseling for general wellness, obesity and hypertension to patients between ages of 20 and 51 years, and with patients over the age of 51.

Barriers reported by PCPs for Providing Effective Nutrition Counseling

The greatest perceived barriers by PCPs that limited the provision of nutrition counseling were lack of time, competing demands and poor patient compliance (Table 5.3). The concerns were followed by the lack of formal training in nutrition and methods to facilitate behavior change, as well as a general lack of knowledge in the area of nutrition. Significant differences were seen by year of practice for competing demands and being uncomfortable with topic.

The Likelihood to refer to a RD

The majority of PCPs (n=22; 79%) had referred patients to an off-site dietitian, and (n= 18; 64%) of PCPs referred their patients to an on-site dietitian. (Table 5.4) On average PCPs would most likely refer patients (at no additional cost
to the patient) for diabetes counseling follow by obesity, hyperlipidemia, hypertension, but were least likely refer for general wellness and cancer (Table 5.5). Likelihood was not significantly different across length of time in practice.

**Discussion**

*Frequency and time spent on nutrition counseling*

Data from the present study, as well as from previously reported results (7-10,13) suggest that nutrition counseling for chronic disease is initiated with less than 75% of patients, a goal set by Healthy People 2010(14). PCPs in our study reported to discuss dietary habits with slightly more than half of their (53%) patients; previous studies in which PCPs reported to discuss dietary habits between 40 and 58% of their patients (7,9). When directly observed, PCPs discussed dietary habits with only 15 to 30% of their patients (15,16). Similarly, only 20% of patients reported receiving nutrition counseling by their PCPs when surveyed (17).

Approximately 12% of the total visit time PCPs report to spend discussing dietary habits with their patients. Given a standard visit lasts 22 minutes (18), PCPs in the present study would spend approximately 2-3 minutes discussing dietary habits with patients. These estimates are lower than other reports of 5 minutes spent discussing dietary changes with patients (7) and up to 6 minutes for those in private practice (7). The US Preventive Task Force (USPTF) reported that the time required for PCPs to provide effective counseling for complex behavioral changes such as cholesterol reduction requires 8.2 minutes (19). Further, observational studies of PCPs documented only 55 seconds discussing dietary habits with patients (11, 12), suggesting that the currently reported time spend on nutrition counseling
by PCPs may be inadequate for intervention, prevention and treatment of chronic diseases.

RDs have been shown to be most effective in improving patient outcomes when providing nutrition counseling for continued time, further signifying that current tendency of PCPs who are spending less than 5 minutes at the time providing nutrition counseling is inadequate to make a positive difference. One recent study reported that amount of time with an RD, and the number of visits, or both were significantly related to biochemical and anthropometric outcomes in patients with type 2 diabetes (20).

PCPs reported to discuss dietary habits with patients who are 51 years of age or older more often (Table 5.1), which seems reasonable since older patients are the one with highest rates of obesity and more likely to present with chronic diseases. Our finding are parallel with previous reports in which PCPs revealed discussing dietary habits more often with older and new patients, compared to young and established patients (15,16). PCPs have also been shown to provide more nutrition counseling to high-risk patients, as well as those with chronic disease (17,21), suggesting less of a trend for diet as preventative medicine. Further, it has estimated the PCPs would need to spend 7.4 hours per day specifically on preventative services to meet USPSTF recommendations (19).

**Self-efficacy**

Self-efficacy is defined as “peoples beliefs about their capabilities to produce designated levels of performance that exercise influence over event that affect their lives” (22). PCPs that have low confidence or low self-efficacy in their ability to
provide nutrition counseling are therefore less likely to initiate nutrition counseling with their patients. Less than half (43%) of PCPs in our study reported 100% confidence in their ability to provide effective nutrition counseling for chronic diseases (Table 5.2). Similarly, PCPs in other studies reported to have low self-efficacy in their ability to provide effective nutrition counseling for weight loss and treatment of chronic disease diseases (7,12). Less than one-third of PCPs reported 100% confidence for providing nutrition counseling for diabetes and hyperlipidemia. Low self-efficacy among PCPs for treatment and prevention of CVD and obesity was reported in a longitudinal study as well (9,10). The same study was repeated 13 years later, and results indicated that self-efficacy among PCPs for provision of effective nutrition counseling for treatment and prevention of Cardiovascular Diseases (CVD) and obesity decreased by 11%.

Therapeutic Lifestyle Changes (TLC) is essential for prevention and treatment of obesity and chronic diseases related to obesity. Lifestyle modifications have been associated with reduced incidence of diabetes in high risk patients, and have been shown to be more effective in improving patients outcomes compared to a popular diabetes drug, metformin (49, 50). PCPs are considered the frontline health care providers for management of chronic diseases, and yet PCPs are not likely to initiate nutrition counseling with their patients (7,11,12,25). Lack of nutrition counseling initiation in primary care, especially for general wellness or preventive medicine, further eludes that obesity rates, as well as chronic diseases, will continue to rise.
Barriers

In addition to reporting low self-efficacy in their ability to provide effective nutrition counseling to patients for various diseases, PCPs further agreed that lack of time is greatest barrier to providing nutrition counseling to their patients (Table 5.3). Similarly, the most common barrier reported for the past 17 years by PCPs that hinder delivery of nutrition counseling to patients in need is lack of time (7,11,25,26).

More than half of PCPs (n= 17; 61%) in our study somewhat agreed, agreed, or strongly agreed that lack of knowledge in the area as being a barrier to providing nutrition counseling to their patients. Almost 3/4 (n= 20; 71%) of PCPs somewhat agreed, agreed, or strongly agreed that lack of training in nutrition, while half (n=14; 50%) of PCPs somewhat agreed, agreed, or strongly agreed that lack of training in behavioral changes is a barrier to providing nutrition counseling to their patients. Our results are corresponding to previous report in which PCPs considered lack of nutrition knowledge and counseling skills as barriers to providing nutrition counseling to their patients. (7,11,25,26).

Lack of nutrition knowledge and counseling skills among PCPs could be due to inadequate nutrition teaching at medical schools. On average medical students receive 23.9 contact hours on nutrition (27). Lately, there has been strong attempt to integrate more problems based learning at many medical schools, however amount of nutrition education in medical schools still remains inadequate (27). Most of the surveyed instructors (88%) expressed the need for additional nutrition teaching at their institutions (27).
**Referral history, likelihood to refer and correlations**

RDs have cost-effective care to facilitate weight loss, and lower blood cholesterol blood sugar, and blood pressure compared to PCPs and other medical practitioners (12,23,28–32). MNT provided by RDs has produced improve outcomes in patients with diabetes, and decreased the cost of managing diabetes for Medicare (33). RDs also seem to be cost effective in reducing cholesterol in people with hyperlipidemia, compared to lipid-lowering medications (34). Other studies have reported providing MNT to patients with cardiovascular risks and patients with diabetes can lead to tremendous saving in health care costs (35).

PCPs reported that they have referred their patient’s ether to an off-site or on-site dietitian (Table 5.4). More research is warranted to find out the frequency of patients referral to an RD by PCPs, and reasons for referral. Most of the PCPs further reported that they would most likely refer patients to RDs for diabetes obesity, hyperlipidemia, and hypertension, while majority reported that they would refer for general wellness and cancer.

Recent research on the likelihood of PCPs to refer their patient to RDs is very limited, especially in the U.S. In a 1985 study, which assessed PCPs referral to outside providers for smoking cessation, obesity and lack of exercise, PCPs reported that they failed to refer their patients to RDs. The decisions not to refer were most commonly due to pessimistic views about their patient’s abilities to change lifestyles, lack of confidence in outside treatments and financial obstacles (36). PCPs in a 2003 study conducted in Australia reported that financial burden on the patients was the main factor why they did not refer their patients to RDs (26).
Our results indicate that there is lack of nutrition counseling for chronic disease by PCPs, and PCPs are not spending enough time providing nutrition counseling. PCPs are further lacking time, confidence and nutrition knowledge to provide effective nutrition counseling to patients. However, PCPs have referred and are likely to refer patient to a RD if the services were no additional cost to the patient for chronic diseases, affording an opportunity to engage and embed RDs in the health care structure to improve health outcomes.

**Study Limitations**

The study has limitations which may influence the interpretation of the findings. Results were based on self-reported data. The response rate was moderate; therefore PCPs who participated in our survey might have had a special interest in our topic.

**Conclusion**

Previous results, as well as, results from our study indicate that the proportion of patients with whom Primary Care Physicians (PCPs) discuss dietary habits, as well as, the time they are currently spending discussing dietary habits may not be enough time for intervention, prevention and treatment of obesity and chronic diseases. PCPs further reported to lack self-efficacy to provide effective nutrition counseling to patients with chronic diseases, which is parallel with previous reports. The greatest barrier to providing nutrition counseling reported by PCPs is lack of time, which is also a number one barrier previously reported by PCPs for the past 17 years. PCPs reported that they referred their patients to RDs in past.
Most of PCPs reported that they likely to refer their patients with chronic disease to RDs in future (at no additional cost to the patient).

**Future Directions**

Future research effort should be focused on implementing RDs in a new health care reform, since most of PCPs indicate that they would refer their patients to RDs (at no additional cost to the patient). PCPs out of the U.S. think that RDs should be the ones providing nutrition counseling to patients. Plethora of studies further indicated that RDs can produce positive outcomes in patients with chronic diseases, as well as, be impelling cause of health care costs savings.
References


<table>
<thead>
<tr>
<th>Factor</th>
<th>Categories</th>
<th>% of Patients seen discuss diet</th>
<th>% of time of visits spent discussing diet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td></td>
<td>52.7 (26.4)</td>
<td>11.9 (10.4)</td>
</tr>
<tr>
<td>Years of practice</td>
<td>≤15 years</td>
<td>50.6 (25.2)</td>
<td>9.7 (7.6)</td>
</tr>
<tr>
<td></td>
<td>≥16 years</td>
<td>55.4 (28.9)</td>
<td>15.0 (13.2)</td>
</tr>
<tr>
<td>Ages of patients</td>
<td>≤12 years</td>
<td>52.7 (28.0)</td>
<td>11.3 (12.3)</td>
</tr>
<tr>
<td></td>
<td>13-18 years</td>
<td>52.7 (28.0)</td>
<td>11.3 (12.3)</td>
</tr>
<tr>
<td></td>
<td>20-51 years</td>
<td>51.3 (26.4)</td>
<td>12.2 (10.7)</td>
</tr>
<tr>
<td></td>
<td>&gt; 51 years</td>
<td>54.8 (28.2)</td>
<td>11.0 (10.9)</td>
</tr>
</tbody>
</table>

Data presented as mean (SD)

Table 5.1: The percent of patients with whom PCPs discuss dietary habits, and the proportion of visit time PCPs spend discussing dietary habits
<table>
<thead>
<tr>
<th>Disease</th>
<th>Total</th>
<th>&lt;15 yrs</th>
<th>&gt;15 yrs</th>
<th>≤12 years</th>
<th>13-18 years</th>
<th>20-51 years</th>
<th>&gt;51 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wellness</td>
<td>79.5</td>
<td>(22.6)</td>
<td>85.4</td>
<td>75.0</td>
<td>75.0</td>
<td>78.8</td>
<td>78.8</td>
</tr>
<tr>
<td>Obesity</td>
<td>75.9</td>
<td>(28.4)</td>
<td>81.3</td>
<td>71.7</td>
<td>71.7</td>
<td>75.0</td>
<td>73.8</td>
</tr>
<tr>
<td>Diabetes</td>
<td>73.2</td>
<td>(25.4)</td>
<td>81.3</td>
<td>75.0</td>
<td>75.0</td>
<td>72.1</td>
<td>71.3</td>
</tr>
<tr>
<td>Hyperlipidemia</td>
<td>74.1</td>
<td>(23.1)</td>
<td>81.3</td>
<td>73.3</td>
<td>73.3</td>
<td>73.1</td>
<td>72.5</td>
</tr>
<tr>
<td>Hypertension</td>
<td>75.9</td>
<td>(25.5)</td>
<td>83.3</td>
<td>73.2</td>
<td>73.2</td>
<td>75.0</td>
<td>73.7</td>
</tr>
<tr>
<td>Cancer</td>
<td>31.3</td>
<td>(33.1)</td>
<td>35.4</td>
<td>31.7</td>
<td>31.7</td>
<td>27.9</td>
<td>35.0</td>
</tr>
</tbody>
</table>

Confidence reported as 0%, 25%, 50%, 75% and 100% change to provide effective nutrition counseling.

\(^1\)P>0.05 for all values by years in practice

**Table 5.2: Confidence for providing effective Nutrition counseling for various diseases among Primary Care Physicians**
<table>
<thead>
<tr>
<th>Barriers</th>
<th>Total</th>
<th>≤15 years</th>
<th>≥16 years</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack of time</td>
<td>5.0 (1.5)</td>
<td>5.3 (1.2)</td>
<td>4.6 (1.8)</td>
<td>.261</td>
</tr>
<tr>
<td>Competing demands</td>
<td>3.5 (1.7)</td>
<td>5.0 (1.4)</td>
<td>3.6 (1.8)</td>
<td>.003</td>
</tr>
<tr>
<td>Poor patient compliance</td>
<td>4.0 (1.5)</td>
<td>4.4 (1.1)</td>
<td>3.7 (1.9)</td>
<td>.195</td>
</tr>
<tr>
<td>Lack of training in nutrition</td>
<td>3.5 (1.3)</td>
<td>4.3 (1.2)</td>
<td>3.7 (1.4)</td>
<td>.302</td>
</tr>
<tr>
<td>Lack of training in facilitating behavior change</td>
<td>2.2 (1.5)</td>
<td>3.8 (1.4)</td>
<td>3.2 (1.5)</td>
<td>.449</td>
</tr>
<tr>
<td>Lack of knowledge in the area</td>
<td>2.5 (1.3)</td>
<td>4.1 (1.1)</td>
<td>2.7 (1.2)</td>
<td>.194</td>
</tr>
<tr>
<td>Nutrition is a low priority compared to other issues to be addressed</td>
<td>4.1 (1.5)</td>
<td>2.8 (1.4)</td>
<td>2.1 (1.4)</td>
<td>.183</td>
</tr>
<tr>
<td>Uncomfortable with the topic</td>
<td>4.4 (1.1)</td>
<td>2.3 (1.1)</td>
<td>2.0 (1.0)</td>
<td>.027</td>
</tr>
<tr>
<td>Unfeasible to promote lifestyle change in a family practice setting</td>
<td>2.1 (1.2)</td>
<td>2.4 (1.3)</td>
<td>1.7 (0.8)</td>
<td>.156</td>
</tr>
</tbody>
</table>

Data presented as Mean (SD)
Scale of items: 1=strongly disagree; 2=disagree; 3=somewhat disagree; 4=somewhat agree; 5=agree; 6=strongly agree

Table 5.3 Perceived barriers by PCPs that limit the amount of time and effort they devoted to nutrition counseling of patients.
<table>
<thead>
<tr>
<th>Variable</th>
<th>Category</th>
<th>On-Site RD</th>
<th>RD out of office</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td></td>
<td>18 (64%)</td>
<td>22 (79%)</td>
</tr>
<tr>
<td>Years in practice</td>
<td>≤15 years</td>
<td>11 (69%)</td>
<td>11 (69%)</td>
</tr>
<tr>
<td></td>
<td>≥16 years</td>
<td>7 (58%)</td>
<td>11 (92%)</td>
</tr>
<tr>
<td>Ages of the patients for which you typically provide care</td>
<td>≤12 years</td>
<td>11 (73%)</td>
<td>12 (80%)</td>
</tr>
<tr>
<td></td>
<td>13-18 years</td>
<td>11 (73%)</td>
<td>12 (80%)</td>
</tr>
<tr>
<td></td>
<td>20-51 years</td>
<td>17 (65%)</td>
<td>20 (77%)</td>
</tr>
<tr>
<td></td>
<td>&gt;51 years</td>
<td>14 (70%)</td>
<td>15 (75%)</td>
</tr>
</tbody>
</table>

Table 5.4: Proportion of Primary Care Physicians that have referred their patients either to a Registered Dietitian
<table>
<thead>
<tr>
<th>Condition</th>
<th>Total</th>
<th>$\leq 15$ years</th>
<th>$\geq 16$ years</th>
<th>$\leq 12$ years</th>
<th>13-18 years</th>
<th>20-51 years</th>
<th>$&gt;51$ years</th>
</tr>
</thead>
<tbody>
<tr>
<td>General wellness</td>
<td>56.5</td>
<td>61.7</td>
<td>50.0</td>
<td>53.6</td>
<td>53.6</td>
<td>57.0</td>
<td>53.9</td>
</tr>
<tr>
<td></td>
<td>(31.5)</td>
<td>(31.1)</td>
<td>(32.0)</td>
<td>(29.2)</td>
<td>(29.2)</td>
<td>(29.3)</td>
<td>(32.6)</td>
</tr>
<tr>
<td>Obesity</td>
<td>90.7</td>
<td>88.3</td>
<td>93.8</td>
<td>91.1</td>
<td>91.1</td>
<td>90.0</td>
<td>93.4</td>
</tr>
<tr>
<td></td>
<td>(17.2)</td>
<td>(20.8)</td>
<td>(11.3)</td>
<td>(12.4)</td>
<td>(12.4)</td>
<td>(17.7)</td>
<td>(11.3)</td>
</tr>
<tr>
<td>Diabetes</td>
<td>94.2</td>
<td>92.9</td>
<td>95.8</td>
<td>94.2</td>
<td>94.2</td>
<td>93.8</td>
<td>95.8</td>
</tr>
<tr>
<td></td>
<td>(10.7)</td>
<td>(11.7)</td>
<td>(9.7)</td>
<td>(11.0)</td>
<td>(11.0)</td>
<td>(11.1)</td>
<td>(9.6)</td>
</tr>
<tr>
<td>Hyperlipidemia</td>
<td>88.9</td>
<td>88.3</td>
<td>89.6</td>
<td>87.5</td>
<td>87.5</td>
<td>88.0</td>
<td>88.2</td>
</tr>
<tr>
<td></td>
<td>(16.0)</td>
<td>(16.0)</td>
<td>(16.7)</td>
<td>(16.3)</td>
<td>(16.3)</td>
<td>(16.3)</td>
<td>(17.4)</td>
</tr>
<tr>
<td>Hypertension</td>
<td>80.6</td>
<td>86.7</td>
<td>72.9</td>
<td>76.8</td>
<td>76.8</td>
<td>82.0</td>
<td>76.3</td>
</tr>
<tr>
<td></td>
<td>(28.0)</td>
<td>(18.6)</td>
<td>(36.1)</td>
<td>(31.7)</td>
<td>(31.7)</td>
<td>(26.5)</td>
<td>(31.7)</td>
</tr>
<tr>
<td>Cancer</td>
<td>65.4</td>
<td>71.7</td>
<td>56.8</td>
<td>59.6</td>
<td>59.6</td>
<td>65.6</td>
<td>59.7</td>
</tr>
<tr>
<td></td>
<td>(32.5)</td>
<td>(20.8)</td>
<td>(43.4)</td>
<td>(37.6)</td>
<td>(37.6)</td>
<td>(32.0)</td>
<td>(34.4)</td>
</tr>
</tbody>
</table>

Data presented as Mean (SD)
Likelihood to refer reported as: 0%, 25%, 50%, 75% and 100% chance to refer to a Registered Dietitian

**Table 5.5** The Likelihood of Primary Care Physicians to refer patients to Registered Dietitians for various diseases.
References for Thesis


APPENDIX

SURVEY INSTRUMENT AND INVITATION
1. OSU Primary Care Provider Nutrition Survey

This survey represents a partnership between the Department of Family Medicine and Medical Dietetics Division to assess the nutrition counseling delivered by Primary Care Providers. Completing this survey is voluntary. The data from this survey will be used to support an upcoming grant submission and guide efforts to improve patient care and outcomes.

1. Out of which site do you primarily practice?

Other (please specify)

2. How long have you been practicing as a Primary Care Provider?

☐ Less than 5 years

☐ 5-10 years

☐ 11-15 years

☐ 16-20 years

☐ More than 20 years

3. What are the ages of the patients for which you typically provide care?

(Select all that apply)

☐ 12 years and younger

☐ 13-18 years

☐ 20-51 years

☐ Over 51 years

4. Please estimate with what percent of patients do you discuss their dietary habits?

Percent (0-100)

5. During each patient visit, what is the average percent of time you spend discussing their dietary habits?

Percent (0-100)

6. How confident are you in your ability to provide effective nutrition counseling in the following areas?

<table>
<thead>
<tr>
<th></th>
<th>0% chance (No chance at all)</th>
<th>25% chance</th>
<th>50/50 chance</th>
<th>75% chance</th>
<th>100% change (Completely confident)</th>
</tr>
</thead>
<tbody>
<tr>
<td>General wellness</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Obesity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diabetes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hyperlipidemia</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hypertension</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cancer</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
7. How much do you agree that these barriers limit the amount of time and effort you spend on nutrition counseling of patients in your primary care setting?

<table>
<thead>
<tr>
<th>Barriers</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Somewhat Disagree</th>
<th>Somewhat Agree</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack of time</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lack of knowledge in the area</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lack of training in nutrition</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lack of training in facilitating behavior change</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Uncomfortable with the topic</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nutrition is a low priority compared to other issues to be addressed</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poor patient compliance</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Competing demands</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unfeasible to promote lifestyle change in a family practice setting</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other (please specify)</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

8. Have you ever referred a patient to a Registered Dietitian for nutrition counseling? (Select all that apply)

- No
- Yes, to one on-site
- Yes, but referred to one out-of-office

9. If the visit was provided on-site (at no additional cost to the patient), what is the percent chance you would refer your patients to a Registered Dietitian for the following?

<table>
<thead>
<tr>
<th>Conditions</th>
<th>0% chance</th>
<th>25% chance</th>
<th>50% chance</th>
<th>75% chance</th>
<th>100% chance</th>
</tr>
</thead>
<tbody>
<tr>
<td>General wellness</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Obesity</td>
<td></td>
<td></td>
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<tr>
<td>Diabetes</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Hyperlipidemia</td>
<td></td>
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</tr>
<tr>
<td>Hypertension</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Cancer</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

10. Any additional comments you would like to add?
Invitation Email

Dear X,
Please take 5 minutes to complete an anonymous survey assessing your interactions with patients with regards to nutritional issues. These data will serve as preliminary data to support a joint NIH application between the School of Allied Medical Professions and the Department of Family Medicine focused on the Patient Centered Medical Home. The survey may be completed by date at:

https://www.surveymonkey.com/s/PrimaryCareNutritionSurvey

Your participation is voluntary and no personal information will be collected during the survey. The data will be used in aggregate to describe the current of care provided in the primary care setting. If you have any questions or concerns regarding the survey, please contact Randy Wexler at Randy.Wexler@osumc.edu or Chris Taylor at Chris.Taylor@osumc.edu.

For questions about your rights as a participant in this study or to discuss other study-related concerns or complaints with someone who is not part of the research team, you may contact Ms. Sandra Meadows in the Office of Responsible Research Practices at 1-800-678-6251.

Sincerely,
Randy Wexler, MD, MPH
Associate Professor, Department of Family Medicine

Chris Taylor, PhD, RD, LD
Associate Professor, Medical Dietetics Division and Department of Family Medicine
Dear X,
Recently we shared an invitation to complete a brief, online survey to provide your experiences with providing nutrition counseling in the primary care setting and your likelihood to refer patients for counseling. If you have already completed the survey, thank you for your time. If you have not yet completed the survey, you have until DATE to provide your feedback. The survey can be found at:
The original email is included below. Thank you for your time and commitment to excellence in patient care.
Sincerely,
Randy Wexler, MD, MPH
Associate Professor, Department of Family Medicine

Chris Taylor, PhD, RD, LD
Associate Professor, Medical Dietetics Division and Department of Family Medicine

Dear X,
Please take 5 minutes to complete an anonymous survey assessing your interactions with patients with regards to nutritional issues. These data will serve as preliminary data to support a joint NIH application between the School of Allied Medical Professions and the Department of Family Medicine focused on the Patient Centered Medical Home. The survey may be completed by date at:
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