

THE FRUIT AND VEGETABLE CONSUMPTION PROBLEM

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**Title**

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**DOCTOR OF NURSING PRACTICE**

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## ABSTRACT

Fruit and vegetable consumption is an essential component of a healthy diet and one of the most modifiable risk factors for chronic disease. Only a small percentage of the world's population consumes the recommended amount of fruits and vegetables (Litt et al., 2011). In addition, young adults experience significant lifestyle changes as a result of independence, often establishing life-long dietary habits affecting future health and the health of their future families.

The purpose of this project was to improve provider practice by using a food frequency-screening tool and education within the clinical setting to facilitate increased knowledge, awareness, and fruit and vegetable consumption among young adults. A *Fruit and Vegetable Checklist* was incorporated into the clinic setting to provide ways to assess fruit and vegetable intake and identify education and interventional needs. The checklist tool was presented during well-check visits with patients between the ages of 18-24 years over a three-month period.

The seven-question tool provided a comprehensive look at an individual's nutritional status over the previous month and quickly identified nutritional deficits to narrow the focus for education and/or potential interventions. Printed educational information addressing the top barriers and top promoters of fruit and vegetable consumption were also provided to the patient at the end of their visit.

Analysis at the conclusion of this project included the provider perception of client fruit and vegetable consumption after use of the checklist tool and educational material with patients in a clinic setting. Results of the project indicated overall positive provider perception of the checklist tool and educational materials. The ultimate goal of the practice improvement project was to incorporate these interventions into a live setting to improve patient care and provider practice.

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## CHAPTER ONE. INTRODUCTION

### Background and Significance

Young adults experience significant change during their college years, often establishing life-long dietary habits affecting future health and the health of their future families. Due to busy lifestyles and numerous curricular and extracurricular activities, healthy dietary behaviors are often overlooked. Future health and importance of nutrition are often disregarded because of low rates of chronic disease for this age group. Health care providers can assess the dietary intake of patients in the clinic setting to identify nutritional strengths and areas for improvement. Incorporating education into patient encounters can prevent future body weight problems and chronic illness among young adults and college students. This project focuses on fruit and vegetable consumption of young adults.

### Statement of the Problem

Evidence shows that unhealthy dietary behavior puts college students and young adults at risk for chronic diseases. A study conducted by Kicklighter, Koonce, Rosenbloom and Commander (2010) report that 60.8% of college students consume one or two servings of fruits and vegetables per day. Inadequate fruit and vegetable intake commonly occurs, according to the recommendations put forth by the Food Guide Pyramid. The dietary deficiencies imply significant need for interventions with young adults. (Kicklighter et al., 2010).

According to the *Centers for Disease Control and Prevention*, “no State reached the *Healthy People 2010* national objective for fruit and vegetable consumption” which is consumption of two servings of fruit per day and three servings of vegetables per day (2005). Increased fruit and vegetable consumption positively impacts overall health, decreases rates of cancer and obesity, and improves well being. Consumption of fruits and vegetables is

considered an indicator of healthy eating and has protective effects for non-communicable diseases (Dehghan, Akhtar-Danesh, & Merchant, 2011). The Healthy People 2020 nutritional goals contain an emphasis on the consumption of nutrient-rich foods including fruits and vegetables (Healthy People, 2013). Based on literature review findings, a need exists to incorporate measures of fruit and vegetable consumption in the clinical setting for young adults. Many young adults are experiencing independence for the first time and nutritional education could influence future dietary choices. To address that need, this project utilized the *Fruit and Vegetable Checklist* into the clinic setting to assess fruit and vegetable intake and identify education and interventional needs, along with educational information tailored to address the top barriers and promoters of fruit and vegetable consumption (Townsend, 2011).

### **Purpose of the Project**

The purpose of this project is for providers to assess and educate 18-24 year olds regarding deficiencies in fruit and vegetable consumption through the use of a food-frequency screening tool and education within a clinical setting. It is assumed that increased provider emphasis will positively impact consumption.

The following objectives guided this project:

1. To assess current fruit and vegetable consumption of young adults between the ages of 18-24 years through provider interaction.
2. To promote increased fruit and vegetable consumption of young adult patients through provider interaction by incorporating education to patients regarding fruit and vegetable consumption.
3. To increase knowledge and awareness of fruit and vegetable consumption among young adults.

4. To assess the relevance of a fruit and vegetable screening tool and education in the clinic setting.

### **Significance for Nursing**

Fruit and vegetable consumption is an essential component of a healthy diet and one of the most modifiable risk factors for chronic disease, but only a small percentage of the world's population consumes the recommended amount (Litt et al., 2011). To change dietary behaviors, fruit and vegetables in particular, individuals need motivational and volitional factors to guide actual behaviors and self-regulatory processes (Kreusikon, Gellert, Lippke, and Schwarzer, 2011). Therefore, the nutritional message needs to be personally relevant and appealing to the individual. Nursing actions are essential to the future of young adults knowledge, awareness and consumption of fruits and vegetables (Uglen, Frolich, Stea, and Wandel, 2008).

The significance of this project for nursing practice included awareness and education for the patient to enhance self-efficacy and planning with fruit and vegetable consumption. In addition, providers were able to understand the positive impact screening and education can make within the patient encounter. Provider interventions in this project such as increasing awareness, knowledge, and motivation for change may have impacted the future of fruit and vegetable consumption among young adults (Kreusikon, et al., 2011).

## **CHAPTER TWO. LITERATURE REVIEW AND THEORETICAL FRAMEWORK**

### **Review of Related Literature**

Fruit and vegetable consumption has significant positive effects on health. Review of literature shows positive and negative associations with consumption, including promoters and barriers. Self-efficacy and education are important components in the promotion of fruit and vegetable dietary intake.

#### **Healthy Eating**

Consumption of fruits and vegetables is considered an indicator of healthy eating and has protective effects for non-communicable diseases (Dehghan, Akhtar-Danesh, and Merchant, 2011). Establishing a source of motivation for young adults to consume more fruits and vegetables can exemplify a way to avoid the development of chronic illness and body weight problems (Kreausukon et al., 2011). Ma, Betts, Horacek, Georgiou, and White (2003) report that dietary behaviors reflect an individual's ability to accurately perceive and evaluate their own needs. Therefore, a substantial gap exists between recommended and actual consumption of fruits and vegetables (Dehghan et al., 2011).

Epidemiological studies show "prudent" diets including fruits and vegetables are more protective in regards to health, and higher fruit and vegetable consumption is associated with higher education and income levels (Drewnowski, Darmon, and Briend, 2004). According to the *Centers for Disease Control and Prevention (CDC)*, college graduates have the highest rate of vegetable consumption in comparison to lower education levels. In addition, there is a higher vegetable consumption among individuals earning greater than \$50,000 per year in comparison to those earning less than \$50,000 per year (CDC, 2005).

Studies have found social determinants of fruit and vegetable intake associated with factors including income, marital status, and gender (Dehghan et al., 2011). Dehghan et al., (2011) state that women have higher fruit and vegetable consumption than men, in addition, single and never married individuals, higher levels of education and income level have also been positively associated with a higher rate of fruit and vegetable consumption. Lallukka et al. (2010) report education, income, and socioeconomic factors affect the consumption of fruit, vegetables and other healthy foods. Furthermore, the cost of healthy food likely plays a role among all income groups (Lallukka et al., 2010).

### **Fruit and Vegetable Barriers**

Young adults and/or college students often endure competing priorities and stressors in their daily lives and make food selections based on taste, time, convenience, and cost, not necessarily on nutritional value (Kicklighter, Koonce, Rosenbloom and Commander, 2010). Escoto, Laska, Larson, Neumark-Sztainer, and Hannan (2012) indicate young adult's (college students and nonstudents) barriers for fruit and vegetable consumption as cost, stress, limited knowledge on food preparation, and taste preferences. Other barriers of consumption include lack of time, working long hours, and balancing work, school and leisure activities (Escoto et al., 2012).

According to Lucan et al. (2010), individual taste, cultural heritage and values, social economic, and systemic influences can affect diet choices. The top rated barriers of fruit and vegetable consumption include convenience and availability, taste or flavor, cost and finances, and preferences; other important factors are lack of freshness and schedule/time constraints (Lucan et al., 2010). It was also noted that individuals might intend to eat the recommended amount of fruits and vegetables but lack an understanding of portion size (Ma et al., 2003). To

understand the quantity and number of servings recommended, strategies need to focus on clear messages to the intended population (Uglen et al., 2008).

**Fruit and Vegetable Promoters**

Factors promoting the consumption of fruit and vegetables include: taste or flavor, health concerns, family and friends’ influence, and digestive health (Lucan, Barg, & Long, 2010).

According to Lucan et al. (2010), the top promoters for fruit and vegetable consumption in a 2008 study were health and nutrition, taste or flavor, vitamins and minerals, preferences and likes. Perceived dietary self-efficacy is also positively attributed to fruit and vegetable consumption.

Table 1.

*Top Promoters and Barriers of Fruit and Vegetable Consumption: Summary of Literature*

<b>Top Promoters of Fruit and Vegetable Consumption</b>	<b>Top Barriers of Fruit and Vegetable Consumption</b>
<p>Health and nutrition</p> <p>Taste or flavor</p> <p>Vitamins and minerals</p> <p>Preferences and likes</p> <p>Self-efficacy</p>	<p>Cost</p> <p>Stress</p> <p>Limited knowledge on food preparation</p> <p>Taste preferences</p> <p>Time constraints</p> <p>Convenience and availability</p>

## **Self-efficacy**

Kreausukon et al. (2011) state self-efficacy traits among individuals facilitate goal achievement through planning and behavioral initiative. Self-efficacy is defined as the belief that one is capable of accomplishing something successfully (Psychology and Society, 2014). “Self-efficacy has been found to be consistently associated with consumption of fruit and vegetables” and “persons with high levels of dietary self-efficacy consume more fruit and vegetables than others” (Kreausukon et al., 2011, p. 445). Another study by conducted by Ma et al., (2003) shows those who ate more fruits and vegetables had consistently higher self-efficacy.

Incorporating positive dietary behaviors can improve overall health status, and prevent future body weight problems and chronic illness among young adults and college students. It has been shown that self-efficacy and planning skills enhances the likelihood of positive health behavior changes. As a result, dietary behavior changes increase fruit and vegetable consumption among young adults. Implications for nursing practice should include education and motivational strategies to enhance self-efficacy and planning when promoting fruit and vegetable consumption (Kreausukon, et al., 2011).

## **Education**

In addition to self-efficacy, education plays a vital role in healthy dietary choices. Due to the transitional period among young adults, many dietary challenges and lifelong health behaviors are developed during these years. Young adult’s lifestyle can influence their dietary choices and habits; incorporating education and prevention efforts are important for positive health outcomes (Kicklighter et al., 2010).

Knowledge regarding nutrition is positively associated with making healthier food choices. Researchers recommend nutritional education as part of a health promotion plan to



improve dietary choices among college students. Education needs to be specific to population needs; results of a 2010 study showed nutritional modules, focus groups, food models, and pictures of food within a PowerPoint presentation as useful tools when providing education to college students (Kicklighter et al., 2010).

Nutrition modules have been found helpful in knowledge attainment and behavior change in young adults. Characteristics of the instructor providing education to the target population also contribute to positive outcomes; college students reported graduate nutrition student instructors were well-valued in the learning process. Food models and visuals lead to increased awareness of food proportions and eating habits, and are perceived to be a very helpful aspect of learning modules. The dissemination of or uses of other educational delivery modalities are recipes and education targeted to the appropriate population (Kicklighter et al., 2010).

### **Provider Influence**

Patient education can be delivered in various ways such as interactions with the health care provider. Royer and Zahner (2009) found that identifying misconceptions with patient interactions was useful for tailoring education and counseling interventions. In addition, eliciting information from the patient before providing new education can allow for the provider to give individualized care, resulting in greater patient acceptance (Royer & Zahner, 2009).

Clarke (2009) stated information should be tailored to individual needs and reinforced when opportunities arise. Tailoring patient needs based upon individual perceptions can help focus attention on strategies to improve self-efficacy and adoption of the needed behavior change. Therefore, individualizing patient education and information aids in the delivery of key messages pertinent to successful outcomes (Clarke, 2009).

In addition to a relevant plan of care, there is an importance to prevent non-adherence of the treatment plan, therefore providers and patients to discuss both the diagnosis and intervention before leaving the visit. Ensuring the patient is confident about details concerning the plan of care improves patient adherence and outcomes. As a result, providers need to be consistent with patient education of diagnosis and treatment plan, as well as keep the patient engaged during the learning process (Stavropoulou, 2011).

## **Theoretical Framework**

### **Health Promotion Model**

The health promotion model (HPM), developed in the 1980's by Nola J. Pender, was a “guide for exploration of the complex biopsychosocial process that motivates individuals to engage in behaviors directed toward the enhancement of health” (Pender, 2011, p.51). The model attempts to explain and predict health behaviors and does not include fear or threat as a component. The HPM can be used across an individual's lifespan and looks at the many ways people pursue health as they interact within their environment. The model can include all ages, but primarily focuses on adolescents and adults, and is relevant to people from all socioeconomic levels (Pender, 2011).

Theoretical propositions are theoretical statements derived from the model provide a basis for investigative work on health behaviors. For the purpose of this project the researcher will focus on the following theoretical propositions: “perceived competence or self-efficacy to execute a given behavior increases the likelihood of commitment to action and actual performance of the behavior,” and “greater perceived self-efficacy results in fewer perceived barriers to a specific health behavior” (Nursing Theories, 2011, p. 1).

Pender's HPM is used as a framework for research aimed at predicting behaviors and health promoting lifestyles. The model has a broad range of usability and can be used in different populations regarding health promotion (Pender, 1996). Furthermore, the basis of this model identifies cognitive, perceptual factors in clients that are modified by demographic and biological characteristics, interpersonal influences, situational and behavioral factors that help predict in health promoting behavior (Nursing Theories, 2011).

The health promotion model provides a guide for intervention by involving behavioral and personal factors, then adding in behavior-specific cognitions and affect, resulting in a behavioral outcome. Identifying areas of needed improvement within the behavioral aspect of health-promotion can enhance patient-focused care. Health promoting behavior is the desired behavioral outcome and end point in the HPM, resulting in improved health, enhanced functional ability and better quality of life at all stages of development (Nursing Theories, 2011).

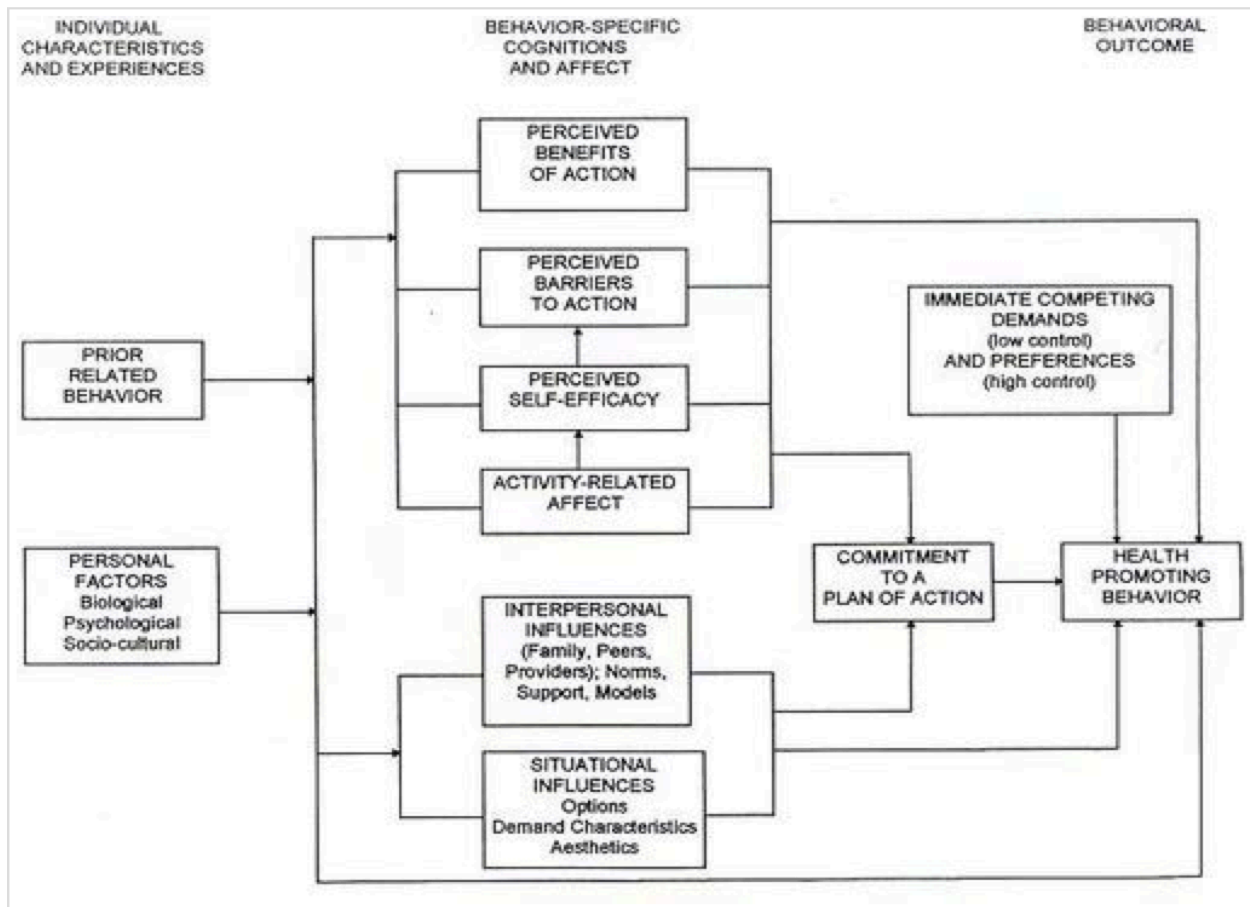


Figure 1.

*Nola Pender's Revised Health Promotion Model*

### Logic Model

The logic model for the food frequency tool has been utilized as guide for survey and educational interventions of the fruit and vegetable project. According to Kellogg (2014), the logic model is a way to present and share relationships among resources available to manage a project, the activities planned, and evaluate the results achieved. The logic model for this project involved inputs, activities, outputs, and outcomes. The purpose of this project was to determine if providers deemed patients were consuming enough fruits and vegetables and to assess if

utilization of a food frequency tool improved provider practice. Short-term outcome objectives of the project were to determine if individuals were consuming adequate fruits and vegetables and to determine if providers felt a food frequency tool is a worthwhile component of patient care. Long-term objectives were to improve fruit and vegetable consumption by creating awareness and providing education to patients. Process objectives of the project were to incorporate the tool within the clinic setting, involve young adults between the ages of 18-24, all race and gender, and receive provider feedback.

Desired outcomes of the project included short and long-term aims. Short-term outcomes involved awareness of current fruit and vegetable status, positive provider feedback on the potential to improve provider practice, and the opportunity for improvements in dietary intake, education and health promotion. Long-term outcomes of the project were geared towards the continued use of the fruit and vegetable checklist and education in the clinical setting and provide continued ways to assess fruit and vegetable intake to identify education and interventional needs.

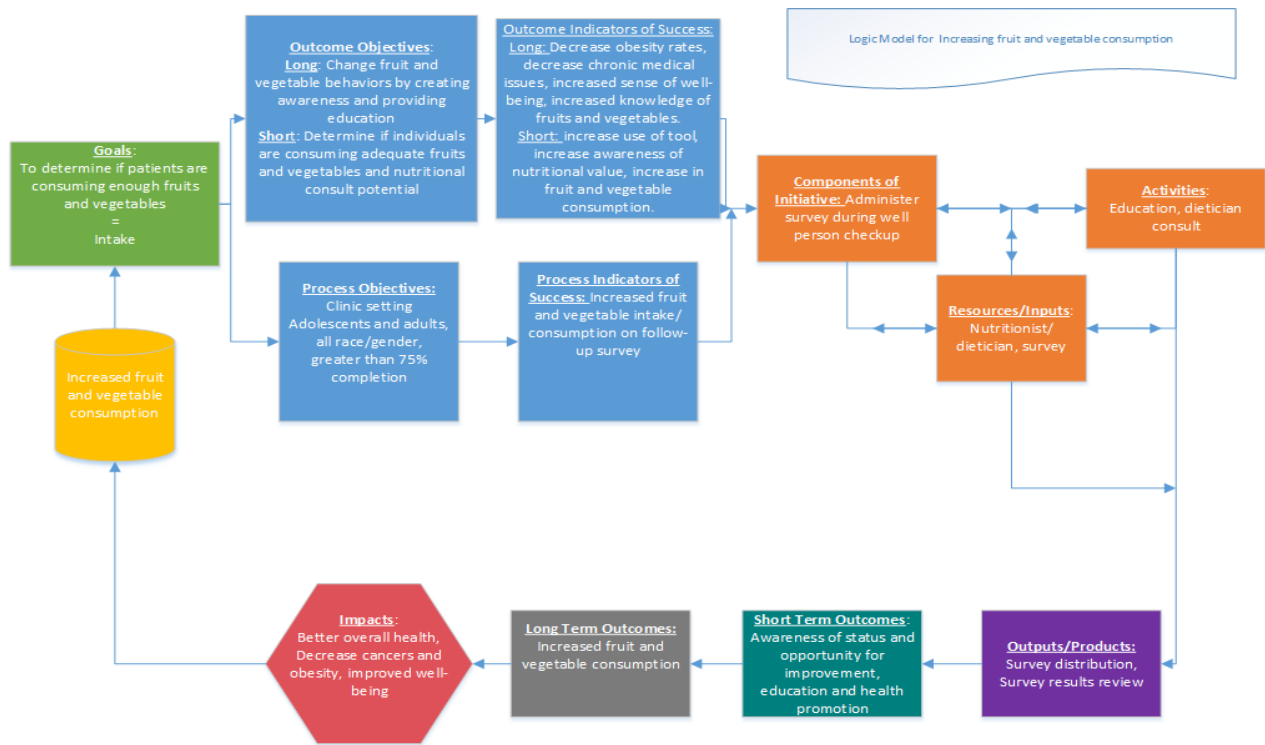


Figure 2.

*Logic Model for Increasing Fruit and Vegetable Consumption*

Model used with permission, courtesy of Kellogg Foundation.

## CHAPTER THREE. PROJECT DESCRIPTION

### Project Design

This project involved interventions loosely controlled, including the specific interventions and precision of the tool being utilized. Interventions also involved flexibility and tailoring of the use of the tool for different settings and patient interactions by the various providers. A *Fruit and Vegetable Checklist* was incorporated into the clinic setting; presented during well-check visits with patients between the ages of 18-24 years. See Appendix A. A vital component of the tool initiative was to administer the tool during a patient's well-person checkup or annual physical. Implementation of the tool during a well-person exam approached the patient when they were generally healthy and more time was available to spend on health promotion and disease prevention. An acute visit when an individual was ill may have not allowed enough time for the interventions and acceptance to complete the checklist tool depending on the patient's health status.

Two clinical settings were utilized for the purpose of this project. The first setting in this project was a student health services clinic for a mid-sized college (approximately 14,000 students) in the upper mid-west. Services provided at the college's student health services integrate health promotion, education for prevention of disease, and clinical treatment for illness (NDSU, 2014). The second type of clinical setting was a public family practice clinic setting in the upper mid-west. The clinics utilized for the purpose of this project were part of an integrated health system, serving patients in Minnesota, Wisconsin, North Dakota and Idaho. The clinic settings utilized within the system, also known as Essentia Health, included approximately 13,868 employees, including 1,500 physicians and credentialed practitioners within their health system (Essentia Health, 2014).

In the college-based setting the nurse provided the checklist tool in a paper form of documentation to the patient as they waited for the provider; the patient recorded their responses. The provider reviewed the results with the patient once the provider was in the room. In the public-based clinic setting the provider had an electronic format of the questions they would record in the computer as the patient was in the room during their clinic visit. The electronic version involved typing in four particular characters into the patient documentation then the questions would appear. The provider was then able to select an answer for each question, clicking once for each response. These electronic questions and answers were entered into patient documentation for their visit. Both forms of the checklist asked the same questions but the method of checklist response documentation varied slightly. In both settings, the patient was able to view a laminated copy of the actual checklist tool as they answered the questions. The tool was an assessment summarized into seven questions focusing specifically on fruit and vegetable intake of the individual over the past month. Information obtained from the survey prompted the provider towards educational needs. The *Fruit and Vegetable Checklist* has already been validated according to the California Department of Public Health and Evaluation Unit. See Appendix A (California Department of Public Health Research and Evaluation Unit, 2011).



Table 2.

*Fruit and Vegetable Checklist Questions*

Question	Response Choices
1. Do you eat fruits or vegetables as snacks?	No  Yes, sometimes  Yes, often  Yes, everyday
2. Did you have citrus fruit or citrus juice during this past week?	Yes  No
3. How many servings of fruit do you eat each day?	
4. Do you eat more than one kind of fruit each day?	No  Yes, sometimes  Yes, often  Yes, always
5. Do you eat more than one kind of vegetable each day?	No  Yes, sometimes  Yes, often  Yes, always
6. How many servings of fruit do you eat each day?	
7. Do you eat 2 or more vegetables at your main meal?	No  Yes, sometimes  Yes, often  Yes, everyday

The food frequency tool used words and pictures for visual prompts and enhanced understanding. Viewing the results of the seven-question tool allowed for a comprehensive look at an individual's nutritional status over the past month. The tool allowed nutritional deficits to

be quickly identified by the provider and allowed for a narrower focus for interventions. Examining and reviewing food frequency results provided the opportunity for intervention activities such as nutritional education and dietary awareness focused discussion between the patient and provider.

Printed educational information addressing the top barriers and promoters of fruit and vegetable consumption was also provided to the patient during or at the end of their visit. The researcher created this educational information through the knowledge gained during the analysis of literature review findings. In the college-based clinic setting, the provider had printed copies of the two-page educational handout that was given to them before their visit was completed. The public-based clinic setting had an electronic version of the education that was entered under patient instructions and printed in the after-visit-summary when the patient's appointment was finished. In addition to the checklist tool, the provider was able to type in four particular characters into the patient instructions section for the educational information to appear.

### **Population and Sample**

Measures of fruit and vegetable consumption are needed in the clinical setting. For the purpose of this project, no individuals with chronic disease or pregnant women were included as research subjects because nutritional needs vary in certain health circumstances. Healthy young adults (no chronic illness) between the ages of 18-24 years were the primary focus for this project. Sample size was not identified in this project; providers were not requested to specify the gender or number of patients able to utilize the tool and education interventions. In addition, patient responses could only be viewed by the patient/provider and documentation in the patient's chart by the provider. The researcher did not request raw data from the checklist tool since the project results focused on provider perception from the project interventions.

## **Institutional Review Board Approval**

Institutional Review Board (IRB) approval and compliance officer/utilization review board of the researched facility granted approval for the needed food frequency tool and education to be applied in the clinical setting and for the protection of human subjects. Providers had the right to refuse participation and personal information remained anonymous. Examining the fruit and vegetable checklist for purposes of this project indicated the importance of assessing an individual's fruit and vegetable intake in association with health status and disease processes. Only the provider had access to the individual patient survey data. Time constraints were minimal during the provider/patient visit because of the simplicity of the tool. IRB approval was granted from North Dakota State University and Essentia Health; approval was also granted from Student Health Services. See Appendix E.

Provider participants were promised confidentiality of their responses and information. Provider response results were reported through documentation in Survey Monkey. Personal identifying information was not part of the interpretation of results and discussion results. Raw data of survey results were available through the Survey Monkey website for the researchers to view. Participants were provided a consent form that informed them that all data was kept confidential by not using personal identifying information other than site location in discussion of research findings. Practice location was disclosed to provide as a comparison of outcome findings. If deemed useful in practice, the algorithm may be disseminated to clinician's in targeted areas in the form of aggregate data.

## **Data Collection**

The providers were able to guide patients through a paper form or electronic version of the tool to complete the checklist. The paper form of the checklist tool included words and

pictures for the patient to view as the questions were answered; this was available to all patients in each of the clinic settings. After the baseline assessment was completed, the provider promptly assessed the gaps of knowledge regarding fruit and vegetable consumption, and then introduced needed content and education to each study participant. The provider was also able to reinforce current strengths identified in the initial checklist tool.

Gathering provider perception information relevant to the purpose of this study was completed through a post-intervention survey. The fruit and vegetable checklist that assessed the patient's fruit and vegetable intake over the past month was completed upon the visit, and educational material was provided upon leaving the clinic visit. The assessment tool and interventions were evaluated after three months by assessing provider responses related to usefulness of the tool and education. The survey included post-intervention responses from each of the providers through Survey Monkey, an online survey site that keeps responses anonymous. Each of the questions in the post provider survey addressed components of the project to evaluate its significance and to measure project objectives. See Appendix D.

## **CHAPTER FOUR. EVALUATION**

### **Evaluation Methods Using the Health Promotion Model**

Post-intervention evaluation was completed anonymously through an online survey called Survey Monkey; personally identifying information is not available but the facility name was disclosed for purposes of comparison. The post intervention survey asked seven questions regarding provider response to the interventions and significance of the tool. Survey questions addressed provider perception of young adults fruit and vegetable consumption, knowledge and awareness of young adults fruit and vegetable consumption, significance of the checklist tool, significance of the educational material, and perception on future health if young adults utilize interventions from the project. After completion of provider follow-up surveys, data were compiled and analyzed. See Appendix D. Pender's Health Promotion model was the basis for data analysis of the fruit and vegetable consumption project. Each objective of the project was evaluated using Pender's HPM.

### **Individual Characteristics and Experiences**

Each person has unique individual characteristics from experiences that affect subsequent actions (Gonzalo, 2011). Prior related behavior and personal factors such as biological, psychological, and socio-cultural factors affect the individual characteristics and experiences of Pender's health promotion model (Pender, 2010). The first objective of the project assessed current fruit and vegetable consumption of young adults between the ages of 18-24 years through provider perception. The project addressed this objective in many ways including the questions on the fruit and vegetable checklist, administering the survey to the correct population of age, and having two locations of data collection for the desired population. Pender's health promotion model addressed this objective in the evaluation process because the model can

include all ages, but primarily focuses on adolescents and adults, and is relevant to people from all socioeconomic backgrounds. In addition, the model attempts to explain and predict health behaviors and does not include fear or threat as a component (Pender, 2002).

### **Behavior-Specific Cognitions and Effect**

Behavior specific knowledge and affect have important motivational significance, which can be modified through nursing actions (Gonzalo, 2011). The second objective of the fruit and vegetable project was to promote increased fruit and vegetable consumption of young adult patients through provider interaction by incorporating education to patients on fruit and vegetable consumption. The second objective was assumed to be met using Pender's health promotion model through utilization of the process that motivates individuals to engage in behaviors directed toward the enhancement of health. In particular, this component of the model addressed activity-related affect, interpersonal influences, and situational influences to guide potential behavior change. The educational component within the second objective addressed barriers and benefits of action in regards to fruit and vegetable consumption. The model primarily focuses on adolescents and adults, and is relevant to people from all socioeconomic backgrounds (Pender, 1996). This component of the model applied to the educational interventions completed through the interactions between the provider and young-adult patient.

The third objective of the project was to increase knowledge and awareness of fruit and vegetable consumption among young adults. The third objective was assumed to be met using Pender's HPM by utilizing her framework for research aimed at predicting behaviors and health promoting lifestyles. This objective utilized Pender's model through use of the fruit and vegetable survey tool to young adult patients, discussion between the patient and provider, and the printed educational component given to the patient during their visit with the provider. Post-

intervention provider survey questions and responses also addressed the third objective by asking how the provider felt completion of a fruit and vegetable checklist increases fruit and vegetable consumption among young adults, and if the provider felt the educational material provided to the participant during their clinic visit would enhance awareness and knowledge of fruits and vegetables.

### **Behavioral Outcome**

The end point of the Health Promotion Model is behavioral outcome. Health promoting behavior is the desired behavioral outcome and end point in the HPM, resulting in improved health, enhanced functional ability and better quality of life at all stages of development. The fourth objective of the fruit and vegetable consumption project was to assess the relevance of a fruit and vegetable screening tool and education in the clinic setting. The health promotion model provided a guide for intervention and behavior-specific affect, thus assuming behavioral outcomes. The fourth objective was met through a post-intervention provider survey to assess the relevance of the screening tool and educational component in the clinic setting. The anonymous survey included open-ended questions so each provider could discuss various aspects of the project interventions. The relevance of the screening tool allowed for evaluation of behavioral outcomes, including commitment to a plan of action and health promoting behavior (Nursing Theories, 2011).

### **Evaluation Methods Using the Logic Model**

Utilization of the logic model was another source of analysis for the fruit and vegetable project. Pender's health promotion model was the basis for data analysis of the fruit and vegetable consumption project, but there was also a focus on the logic model to pull different

dynamics into the intervention and evaluation process. Each objective of the project was also evaluated using the logic model.

### **Inputs**

The logic model for the food frequency tool was utilized to provide ways to assess fruit and vegetable intake and identify education and interventional needs. The purpose of utilizing the logic model in this project was to determine if patients are consuming enough fruits and vegetables and to assess if utilization of a food frequency tool improves provider practice. The nurse and/or provider time was an input for the logic model due to administering and assessing the checklist to young adult patients. Provider/nurse time and resources such as staff knowledge and utilizing the food frequency tool were the primary inputs for this project. The first objective of the fruit and vegetable consumption project assessed current fruit and vegetable consumption of young adults between the ages of 18-24 years through provider interaction. The logic model addressed this objective through the time taken by providers to administer the survey tool to the correctly aged population in the clinic setting (Kellogg, 2004).

### **Activities**

A *Fruit and Vegetable Checklist* was incorporated into the clinic setting to provide ways to assess fruit and vegetable intake and identify education and interventional needs. Tailored education addressing the top promoters and barriers of fruit and vegetable consumption were also provided to the patient during their visit. The first objective of the fruit and vegetable consumption project assessed current fruit and vegetable consumption of young adults between the ages of 18-24 years through provider interaction. The logic model addressed this objective through administration of the survey tool to the correctly aged population in the clinic setting, and having two locations of data collection for the desired population (Kellogg, 2004).



## **Outputs**

Short-term outcome objectives for utilizing this model were to determine if individuals are consuming adequate fruits and vegetables and determine if providers feel a food frequency tool is a worthwhile component of patient care. Outcome objectives, long-term, were to change fruit and vegetable consumption by creating awareness and providing education to patients.

Process objectives of the project were to incorporate the tool within the clinic setting, involving young adults between the ages of 18-24, all race and gender, and receive provider feedback. The second objective of the fruit and vegetable project was to promote increased fruit and vegetable consumption of young adult patients through provider interaction by incorporating education to patients on fruit and vegetable consumption. The researcher did not directly measure if there was a change in behavior or increased knowledge based on this health promotion intervention.

The second objective was met using the logic model through creating opportunities for increased awareness and providing education to patients during their clinic visit with the provider (Kellogg, 2004).

## **Outcomes**

Desired outcomes of the project include short and long-term aims. Short-term outcomes involved awareness of current fruit and vegetable status, positive provider feedback on the potential to improve provider practice, and the opportunity for improvement, education and health promotion. Long-term objectives were to improve fruit and vegetable consumption by creating awareness and providing education to patients, with the potential to sustain these concepts in daily life. The third objective of the project was to increase knowledge and awareness of fruit and vegetable consumption among young adults, which was identified through the post-intervention provider survey responses. In addition, the fourth objective was affected in

the outcomes component of the logic model. The fourth objective of the fruit and vegetable consumption project was to assess the relevance of a fruit and vegetable screening tool and education in the clinic setting. The fourth objective was met through a post-intervention provider survey to assess the relevance of the screening tool and educational component in the clinic setting (Kellogg, 2004).

## CHAPTER FIVE. RESULTS

### Presentation of Findings

There were a total of six providers who completed the post-intervention provider perception survey; three were from a mid-sized metropolitan health clinic in the upper mid-west and three were from the student health center at a mid-sized college/university in the upper mid-west. Of the providers who participated, five of them were family practice nurse practitioners and one was a family practice medical doctor. See Appendix F.

When asked if there is an inadequate consumption among young adults between the ages of 18-24 years, four responses (66%) were “yes” and two responses (33%) stated “no”. The next question asked if they feel there is a knowledge gap in young adults’ current awareness of fruit and vegetable consumption; four responses (66%) were “yes” and two responses (33%) stated “no”. One of the open-ended questions asked how the provider felt incorporating a fruit and vegetable checklist identifies areas of concern in regards to consumption; the responses varied between the providers. These are their responses: “Ok, good to discuss nutrition,” “excellent teaching tool,” “It is helpful. We have so many things to cover having a list is helpful to check off,” “positive conversation starter,” “helps them see areas of strength and weakness,” and “I feel that it would target at risk populations for malnutrition and lead to possible education.”

The next question of the post-intervention provider perception survey asked how the provider feels completion of a fruit and vegetable checklist increases awareness of fruit and vegetable consumption among young adults. This open ended question resulted in the following responses: “I feel it would be good to have a checklist if not lengthy,” “the more we bring up the subject the more the client realizes it is important,” “whenever a subject is mentioned by a provider it increases its importance to the client,” “helps them to find out what they need to eat

more of,” “very positive response from patient,” and “helps them see areas of strength and weakness.”

One of the survey questions asked if the provider felt there is a desire to increase fruit and vegetable consumption after incorporation of motivational techniques and education by the provider or other clinician. The responses varied among the providers; three of the providers (50%) said “yes”, one provider said “maybe”, and the remaining providers explained their answer as “I’m sure it increases awareness at the time. It’s hard to say if that translates into behavior change.” and “I’m not sure there is time for any behavioral counseling but being more aware increases health activities.”

The educational component was the other main component to the practice improvement project in addition to the fruit and vegetable checklist. Addressing this component, the provider was asked if they feel the educational material provided to the participant during their clinic visit will enhance awareness and knowledge of fruits and vegetables. All six of the providers (100%) responded “yes” to the question.

The final question in the post-intervention survey asked if individuals utilize the survey results and education, does the provider feel an increased fruit and vegetable consumption will decrease obesity rates and chronic medical issues, and improve sense of well-being in their future. Four of the providers (66%) responded “yes”, with two of them explaining “yes, very much!” and “yes, but we know behavioral change through sporadic office counseling is not very effective.” The remaining two providers (33%) responded to the question by saying “possibly, if incorporated into lifestyle” and “I’m not sure if one visit will cure obesity however the more teaching done the more important the client understands it is.”

## CHAPTER SIX. DISCUSSION AND RECOMMENDATIONS

### Interpretation of Results

The results from the post-intervention provider survey demonstrated an overall positive response to the interventions within the fruit and vegetable consumption project. The researcher believes there were appropriate responses from each of the survey questions to provide a source of evaluation of the project findings. Through the evidence of positive provider responses, there is a potential to utilize these interventions in the clinic setting to improve provider practice and enhance health promotion and disease prevention for patients.

Table 3.

#### *Summary of Data Results*

Question	Result
Inadequate consumption of fruits and vegetables among young adults?	66% Yes 33% No
Knowledge gap in young adults' current awareness of fruit and vegetable consumption?	66% Yes 33% No
How does the provider felt incorporating a fruit and vegetable checklist identifies areas of concern in regards to consumption?	“Ok, good to discuss nutrition” “Excellent teaching tool” “It is helpful. We have so many things to cover having a list is helpful to check off” “Positive conversation starter” “Helps them see areas of strength and weakness” “I feel that is would target at risk populations for malnutrition and lead to possible education”

Table 3. *Summary of Data Results (Continued)*

<p>How does the provider feel completion of a fruit and vegetable checklist increases awareness of fruit and vegetable consumption among young adults?</p>	<p>“I feel it would be good to have a checklist if not lengthy”</p> <p>“The more we bring up the subject the more the client realizes it is important” “Whenever a subject is mentioned by a provider it increases its importance to the client”</p> <p>“Helps them to find out what they need to eat more of”</p> <p>“Very positive response from patient,” “Helps them see areas of strength and weakness”</p>
<p>Does the provider feel there is a desire to increase fruit and vegetable consumption after incorporation of motivational techniques and education by the provider or other clinician?</p>	<p>50% Yes</p> <p>16% Maybe</p> <p>33% Other:</p> <p>“I’m sure it increases awareness at the time. It’s hard to say if that translates into behavior change.”</p> <p>“I’m not sure there is time for any behavioral counseling but being more aware increases health activities.”</p>
<p>Does provider feel the educational material provided to the participant during their clinic visit will enhance awareness and knowledge of fruits and vegetables?</p>	<p>100% Yes</p>
<p>If the young adult utilizes the information, does the provider feel an increased fruit and vegetable consumption will decrease obesity rates and chronic medical issues, and improve sense of well-being in their future?</p>	<p>66% Yes</p> <p>33% Possibly</p>

## **Objective One**

The first objective of the fruit and vegetable consumption project assessed current fruit and vegetable consumption of young adults between the ages of 18-24 years from the provider perspective. When asked if there is an inadequate consumption among young adults between the ages of 18-24 years, four responses were “yes” and two responses stated “no”. Literature review shows there is definitely a consumption problem among young adults, but based on the provider responses, there is a mixture of responses (Litt et al., 2011). There is a potential for the provider to view the topic differently based on the number of patients that utilized the interventions during their clinic visits. The number of times providers utilized project interventions was not measured. The gender of patients (male vs. female) may have also had an impact on the provider’s perception of adequate or inadequate consumption of fruits and vegetables. According to Dehghan et al. (2011) females have been found to consume more fruits and vegetables than the male gender. The majority of respondents feel there is inadequate consumption of fruits and vegetables, which demonstrates the importance of these interventions.

## **Objective Two**

The second objective of the fruit and vegetable project was to promote increased fruit and vegetable consumption of young adult patients through provider interaction by incorporating education to patients on fruit and vegetable consumption. One of the survey questions asked if the provider felt there is a desire to increase fruit and vegetable consumption after incorporation of motivational techniques and education by the provider or other clinician. The responses varied among the providers; three of the providers said “yes”, one provider said “maybe”, and the remaining providers explained their answer “I’m sure it increases awareness at the time. It’s hard to say if that translates into behavior change,” and “I’m not sure there is time for any

behavioral counseling but being more aware increases health activities.” There was an overall positive response to the question, but the respondents that questioned behavior change made valid points on how it’s difficult to measure if the patient will translate the learned material into a (sustainable) change in health behavior. In addition, repeated exposure to the material and a receptive connection between the provider and patient can also affect the patient buy-in and motivation to accept and utilize the education provided.

### **Objective Three**

The third objective of the project was to increase knowledge and awareness of fruit and vegetable consumption among young adults, which was identified through the post-intervention provider survey responses. One of the survey questions asked if they feel there is a knowledge gap in young adults current awareness of fruit and vegetable consumption; four responses were “yes” and two responses stated “no”. The educational component was the other main component to the practice improvement project in addition to the fruit and vegetable checklist. Addressing this component, the provider was asked in the post-intervention survey if they feel the educational material provided to the participant during their clinic visit will enhance awareness and knowledge of fruits and vegetables. All six of the providers (100%) responded “yes” to the question. A positive response to the educational component demonstrates the content was appropriate for patients in a clinic setting, the top barriers and promoters of fruit and vegetable consumption were addressed, and also demonstrated how to tailor the information to the desired population. In addition, the positive feedback shows the value and quality of the education component, and that there is potential to continue using the material in an ongoing clinic environment.



## **Objective Four**

The fourth objective of the fruit and vegetable consumption project was to assess the relevance of a fruit and vegetable screening tool and education in the clinic setting. One of the questions asked how the provider felt incorporating a fruit and vegetable checklist identifies areas of concern in regards to consumption; the responses varied between the providers. There was an overall positive response to the question indicating that providers were able to identify areas of concern in regards to fruit and vegetable consumption. The checklist allowed providers an easy to follow, short questionnaire to assess young adults intake, thus creating opportunities to address an individual's area of concern relating to dietary choices. A couple providers discussed it was a positive conversation starter and the checklist and education brought up the fruit and vegetable topic in a neutral fashion with potential to assess a person's dietary status in a non-threatening way. Another provider mentioned it would target at risk populations for malnutrition and lead to possible education. Without a measurement tool, it can be difficult to identify at risk populations for malnutrition; a person cannot be judged solely on their external appearance. Utilizing a validated screening tool identified young adults who may have been at risk for malnutrition, which created an opportunity for patient education. Another response to the survey question regarding the provider identifying areas of concern for fruit and vegetable consumption was that it was helpful and there were so many things to cover having a list is helpful to check off. Well-visits involve many topics to cover to ensure a complete health maintenance visit, having some aspects available in a checklist type format, such as the fruit and vegetable checklist, assured the needed components were getting addressed. In addition, it created standardization for each patient receiving the same questions and educational information. Other

provider responses indicated the interventions were a good way to discuss nutrition and it was excellent teaching tool.

Another question of the post-intervention provider perception survey asked how the provider feels completion of a fruit and vegetable checklist increases awareness of fruit and vegetable consumption among young adults. This open ended question resulted in valuable feedback for the researcher. Identifying areas of concern for fruit and vegetable consumption can make an individual reevaluate their diet and potentially make healthy changes. One of the providers said they feel it would be good to have a checklist if not lengthy; the fruit and vegetable checklist is seven questions long, keeping the length to a minimum. A couple of the providers implied the more we bring up the subject the more the client realizes it is important, and whenever a subject is mentioned by a provider it increases its importance to the client. It can be difficult to address a problem if the person doesn't know the problem exists; the fruit and vegetable checklist was a helpful way for individuals to see what they actually consume in comparison to current recommendations. Other providers mentioned it helps them to find out what they need to eat more of and identifies areas of strength and weakness. These additional responses confirm there can be an increased awareness of fruit and vegetable consumption from exposure to the checklist tool.

The final question in the post-intervention survey asked if individuals utilize the checklist tool results and education, does the provider feel an increased fruit and vegetable consumption will decrease obesity rates and chronic medical issues, and improve sense of well-being in their future. Four of the providers responded "yes" to the question and the remaining two providers responded to the question with responses questioning the effectiveness of one visit making a significant impact on nutrition, but explained the importance of continued teaching and

education during patient encounters. Each of the providers had valuable responses for evaluation purposes. There is support to show these interventions have potential for positive health behavior change and healthy outcomes. The two providers who had a more apprehensive response brought up valid points on how these changes need to be incorporated into a young adults' daily lifestyle, and the importance of patient education with every patient encounter. Patient education can be easily overlooked and each provider's method of delivery can vary, but repetition of the values of health promotion and disease prevention need to be at the forefront of patient encounters.

### **Limitations**

This project was implemented in two locations, which provided a basis for different sources of intervention implementation and results. Direct comparison of survey responses from each of the locations was not completed due to the low number of project participants and for the protection of confidentiality. Two locations for implementation supported the ability of the interventions to be applicable in more than one location. Having greater than two locations and more than one geographical location would enhance the strength of the project results. With more than one geographical location, results could be different in other areas within the United States. Results could vary depending on healthcare availability, types of providers, socioeconomic status of patients and the region in general, and availability of fruits and vegetables in the particular area.

There were six total providers, three from each facility. A higher number of providers could also have an impact on the responses and overall feedback from the study. Each provider involved brought another dimension and viewpoint to the impact of the interventions; having a greater number of providers to implement the project could create additional perspectives and

validity of the project. The practice improvement project had a three-month time frame for incorporation of the interventions into the clinic setting. A longer period of time for project implementation such as six months to one year may improve the providers' comfort level in applying the tool and educational component, in order to be proficient using it in well-visits with patients. A longer implementation period could also achieve a larger number of patient interactions utilizing the interventions and a better understanding of young adults' knowledge, awareness, and consumption of fruits and vegetables. In addition, the amount of times the project interventions were used by each provider was not assessed and may be beneficial to assess in future studies.

### **Recommendations**

Positive provider perception from this study indicates the impacts this project has and should be continued in the practice setting. Research projects and studies typically have room for improvement and recommendations for future projects. For purposes of this project, recommendations for future projects should include additional dietary follow-up when needed. When there is a significant nutritional deficit or lack of nutritional awareness for certain individuals, additional follow-up with a dietician may be indicated to educate the patient appropriately. A dietician can provide more in-depth education to an individual and develop a plan focused to a patient's particular needs.

Another recommendation for future projects is to have the patient education visible in more areas than the printed material provided at the end of the visit. Education posted on the walls in the clinic rooms can provide more exposure to the positive impacts of fruit and vegetable consumption. Patients often wait a short amount of time before the provider enters the clinic exam room; having education on the walls may intrigue patient's to view the material as

they wait to be seen for their clinic visit. Educational material visible in the exam room also brings potential for other individual's (in addition to young adults) to see the material, to potentially enhance their knowledge of the positive impacts of fruit and vegetable consumption.

### **Implications for Practice**

The results of this project support implications for practice due to the positive results from the evaluation process of the fruit and vegetable project. Implications for nursing practice should include education and motivational strategies to enhance self-efficacy when promoting fruit and vegetable consumption. The educational component needs to be available to any provider in the clinic setting. In addition, a survey tool, such as the one used in this study should be used in the clinic setting to assess fruit and vegetable consumption, and areas of needed education and increased awareness. The most positive result of the project was the educational component addressing the top fruit and vegetable barriers and promoters to consumption. Making this component accessible in different forms can lower the barriers and increase the promoters of fruit and vegetable consumption. Printed copies of the material should be available in clinic waiting and/or patient exam rooms, available as an electronic supplement to patient instructions, and visual display of the educational material for patients and visitors to view during their clinic visit.

The dissemination component of a research project is an important step to distribute study results and materials, and improve provider practice. Results will be disseminated at the 2015 North Dakota State University poster presentation. The researcher will provide the two participating facilities with results of the project. The providers who participated in the study were granted permission to continue using the educational material, which addresses the top barriers and promoters of fruit and vegetable consumption. Dissemination also includes making

the educational component available as a resource to all employees within the two participating facilities. The researcher will submit this project for publication in the spring of 2015. An executive summary of the project is attached. See Appendix G.

### **Implications for Future Research**

Future research projects of the fruit and vegetable consumption problem could involve the researcher viewing individual patient checklists to analyze actual results findings of fruit and vegetable consumption. In this study, only the provider's conducting the interventions had viewing access to the checklist results. In addition, future research should have follow-up with patients after the initial survey and educational interventions. Future studies for longitudinal projects that measure long-term effects of the assessment and intervention follow-up might include re-administering the survey and educational material once a year over the course of one to five years during the individual's yearly wellness exam. Continued follow-up and education can be used to measure if fruit and vegetable awareness and knowledge is still present, evaluate if dietary consumption of fruits and vegetables has increased and/or is sustained, and to evaluate if it affects the person's health status and incidence of chronic illness. Maintaining the *Health Insurance Portability and Accountability Act* (HIPPA) would be at the utmost importance through this process to ensure and protect patient confidentiality. Addressing the limitations of the study can also be used in recommendations for future studies. Future studies may benefit from an increased number of primary care providers to create a more dynamic source of interpretation and utilization of interventions. More providers and geographical locations utilized could contribute to more impactful study findings and could enhance the strength of study results. A new project with additional geographical locations may affect study results depending on the educational and socioeconomic status of the general population for each area,

as well as climate and availability of fruit and vegetables. Future research of this topic may be enhanced with a focus on how to address nutritional referrals appropriately. Some dietician services are not covered in the clinic for healthy individuals, so dietician services need more research into coverage and qualifications for patient and provider utilization. One of the final limitations of this study was the length of time for implementation of the interventions; recommendations for future studies may be strengthened by an increased length of study duration.

### **Application to Other Nurse Practitioner Roles**

Health promotion and disease prevention are in the foundation of nurse practitioners practice model. Utilizing the appropriate tools and educational components can positively influence the lives and health of our patients. Increasing awareness, knowledge, and motivation for change can make a large impact on the future of fruit and vegetable consumption among young adults. In addition, establishing a source of motivation for young adults to consume more fruits and vegetables can demonstrate ways to avoid the development of chronic illness and body weight problems. The fruit and vegetable consumption project can be applied to other nurse practitioner roles through the incorporation of positive dietary behaviors, which can improve the overall health status for patients.

Patient education can and should be incorporated into every patient encounter; education regarding fruit and vegetables can be a valuable source of information for most individuals and can make a positive impact on their current and future health. Leadership qualities are important in the application of fruit and vegetable consumption because providers often lead by example. Being a leader in healthcare can be done by paying attention to prevention and education in patient interactions. It can be difficult to follow the recommendations of a provider if they do

not value or demonstrate health promotion interventions in their daily lives. Leading by example and advocating for our patients can improve the provider-patient relationship, establish trust, and promote positive lifestyle behavior.



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APPENDIX A. FRUIT AND VEGETABLE CHECKLIST

**Food Stamp  
Program**

# Fruit and Vegetable Checklist

These questions are about the ways you plan and fix food.  
Think about how you usually do things.

Name \_\_\_\_\_ Date \_\_\_\_\_ ID# \_\_\_\_\_  Entry  
 Exit

Choose one answer for each question.

1.



Do you eat fruits or vegetables  
as snacks?

- no     
  yes,  
sometimes     
  yes,  
often     
  yes,  
everyday

2.



Did you have citrus fruit or citrus juice  
during the past week?

- yes     
  no

3.



How many servings of fruit  
do you eat each day?



Do you eat more than one kind of fruit each day?

- no     
  yes, sometimes     
  yes, often     
  yes, always



Do you eat more than one kind of vegetable each day?

- no     
  yes, sometimes     
  yes, often     
  yes, always



How many servings of vegetables do you eat each day?



Do you eat 2 or more vegetables at your main meal?

- no     
  yes, sometimes     
  yes, often     
  yes, everyday

- Use the accompanying instruction guide when administering this tool.
- Research and development for this illustrated diet quality checklist were a joint effort of University of California (UC) Cooperative Extension, the California Nutrition Network, UC Davis Design Program and UC Davis Nutrition Department. Authors: Kathryn Sylva, Marilyn Townsend, Azma Martin, Diane Metz.
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- Funded by the USDA Food Stamp Program via the California Nutrition Network, UC Cooperative Extension and UC Davis.


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# APPENDIX B. VISUALLY ENHANCED FRUIT AND VEGETABLE CHECKLIST

## Food Stamp Program Visually Enhanced Fruit and Vegetable Checklist (FBC)<sup>1, 2, 3</sup> Instruction Guide

The purpose of this tool is to document client behavior change by assessing client eating behaviors before and after the nutrition education lessons.

Instructions: Use this instruction guide when administering the Food Behavior Checklist tool to clients. Administer this tool on 2 occasions—at the registration time before the first lesson is taught and then after the last lesson is taught.


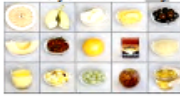
FBC Questions	Photograph	Explanation	Potential Questions from Clients	Staff Response Suggestions
<p>Q1. Do you eat fruits or vegetables as snacks?</p> 	<p>Items pictured include 3 photos:</p> <ul style="list-style-type: none"> <li>Far left- a woman sitting eating a whole apple</li> <li>Top right- hands of a person holding carrots sticks</li> <li>Bottom right- hands of a person holding grapes</li> </ul>	<p>Snacks are eating occasions which occur before, after, or between meals. If you do not eat fruits or vegetables, mark 'No.'</p>	<p>I ate apple pie, does that count? How about carrot cake?</p> <p>Do fruit snacks count?</p> <p>Can they be in something like zucchini bread?</p>	<p>No, in both cases</p> <p>No if a 'fruit snack' is a fruit roll up or gummy fruit snacks. Yes if the 'fruit snack' is something like a piece of fruit.</p> <p>No</p>
<p>Q2. Did you have citrus fruit or citrus juice during the past week?</p>	<p>Items pictured include:</p> <ul style="list-style-type: none"> <li>100% orange juice in a carton</li> <li>frozen concentrated 100% orange juice</li> <li>100% juice in a glass</li> </ul>	<p>Citrus fruit includes orange, grapefruit, kumquat, lemon, lime, tangerine, tangelo, mandarin, an pomelo. Count juices of these citrus fruit, but not juice drinks.</p>	<p>Does Hawaiian punch count? Does Sunny-D count?</p> <p>Are those in the picture the only type of citrus</p>	<p>No, only count 100% juice.</p> <p>No, citrus fruit includes oranges.</p>



<sup>1</sup> Prepared by Marilyn Townsend, Christine Davidson and Larissa Leavens, Anna Martin, and Diane Metz. Reviewed by Gloria Espinosa-Hall, Lucia Kaiser, and Cathi Lamp, Anna Martin.


<sup>2</sup> If you have additions for this guide, please contact Christine Davidson at 530-754-8051 in the Nutrition Dept, UC Davis.


<sup>3</sup> Version F&V Food Behavior Checklist English 9/06

Updated 9/22/2006

FBC Questions	Photograph	Explanation	Potential Questions from Clients	Staff Response Suggestions
	<ul style="list-style-type: none"> <li>a can of mandarin oranges</li> <li>a cut orange</li> <li>a cut grapefruit</li> <li>2 tangerines</li> <li>a pomelo</li> </ul>	<p>punches or aides. Do not count lemonade or limeade.</p>	<p>fruits?</p> <p>Does citrus soda count? What about Sunkist or orange soda?</p> <p>Does kiwi count?</p>	<p>grapefruit, kumquats, lemon, lime, tangerine, tangelo, and mandarins.</p> <p>No</p> <p>No</p>
<p>Q3. How many servings of fruit do you eat each day?</p> 	<p>Items pictured include 3 rows of small pictures:</p> <ul style="list-style-type: none"> <li><b>Row 1-</b> ½ grapefruit, 1 banana, ½ cup canned pears, ½ cup canned peaches, ½ cup cherries.</li> <li><b>Row 2-</b> ½ cup cantaloupe, ½ cup strawberries, 1 small orange, box of raisins, ½ cup applesauce</li> <li><b>Row 3-</b> ¾ cup orange juice, ½ cup canned fruit cocktail, ½ cup grapes, 1 small apple, ¾ cup apple juice</li> </ul>	<p>This question is about total quantity or amount of fruit. One serving of fruit is 1 piece of fruit or melon wedge, ¾ cup of 100% juice, ½ cup of canned fruit, or ¼ cup of dried fruit.</p> <p>Examples of one serving:</p> <ul style="list-style-type: none"> <li>1 medium apple, banana, or nectarine</li> <li>2 medium apricots</li> <li>12 grapes</li> </ul> <p>If you do not eat fruit, mark '0.'</p> <p>Note: These serving sizes reflect the recommendations of the Food Guide Pyramid, not the MyPyramid guidelines.</p>	<p>Does all the fruit in the picture count as 1 serving?</p> <p>Does frozen fruit count?</p> <p>Does cran-raspberry juice count?</p> <p>I eat dried mangos, do those count?</p> <p>Do fruit snacks count?</p> <p>What if I eat less than ½ a cup?</p> <p>Does apple pie or cherry pie count?</p>	<p>No, count each square as 1 serving.</p> <p>Yes</p> <p>Only if it is 100% juice with no added sugar.</p> <p>Yes, dried fruit count but remember that ¼ cup counts as a serving.</p> <p>'No' if a 'fruit snack' is a fruit roll up or gummy fruit snacks. 'Yes' if the 'fruit snack' is something like a piece of fruit.</p> <p>Mark less than 1.</p> <p>No</p>

FBC Questions	Photograph	Explanation	Potential Questions from Clients	Staff Response Suggestions
<p>Q4. Do you eat more than one kind of fruit each day?</p> 	<p>Items pictured include 4 photos:</p> <ul style="list-style-type: none"> <li><b>Top left picture-</b> bag of frozen whole strawberries, a jar of applesauce, a pear, a nectarine, a peach, and a bowl of mixed fruit including dried plums (prunes), dried apricot, and dried nectarines</li> <li><b>Top right picture-</b> small carton of orange juice, a glass of orange juice, a can of frozen orange juice, a can of frozen grape juice, a grapefruit, a banana, a slice of watermelon, and a bowl of fresh strawberries and blueberries</li> <li><b>Bottom right-</b> a pomegranate, a persimmon, half of a honeydew melon, a cut papaya, a box of raisins, and a can of sliced pears</li> <li><b>Bottom left-</b> a can of fruit cocktail, a can of sliced pineapple, a whole cantaloupe melon, a whole mango, cut kiwi fruit, 2 whole plums, and a whole apple</li> </ul>	<p>This question is attempting to address variety. Different preparation methods of the same fruit do not count as variety (e.g. raw apple for snack, applesauce at dinner). Small amounts of fruit should not be counted (e.g. raisins in a cookie).</p>	<p>Does it count if I only had 2 grapes and ½ a banana?</p> <p>Does juice count or does it have to be the piece of fruit?</p> <p>If I eat canned fruit cocktail does it count as more than one fruit?</p>	<p>No. The minimally accepted amount for each is: ¼ cup of raw or canned fruit, ¼ cup 100% fruit juice, 2 tablespoons dried fruit, or equivalent.</p> <p>Juice counts if it is 100% juice with no added sugar.</p> <p>The minimally accepted amount for each is: ¼ cup of raw or canned fruit, ¼ cup 100% fruit juice, 2 tablespoons dried fruit, or equivalent.</p>
<p>Q5. Do you eat more than one kind of vegetable each day?</p> 	<p>Items pictured include:</p> <ul style="list-style-type: none"> <li>tomatoes</li> <li>potato</li> <li>cilantro</li> <li>onion</li> <li>squash</li> <li>cucumber</li> <li>peppers</li> <li>radishes</li> <li>avocado</li> <li>garlic</li> <li>cactus</li> <li>corn</li> <li>carrots</li> <li>chayote</li> <li>cauliflower</li> <li>spinach</li> <li>canned tomatoes</li> <li>canned salsa</li> <li>canned sweet potatoes</li> <li>canned peas</li> </ul>	<p>This question is about "variety." Different preparation methods of the same vegetable do not count as variety (e.g. coleslaw at lunch, cooked cabbage at dinner). Small amounts of vegetables should not be counted (e.g. the few carrot pieces in canned chicken noodle soup). If you do not eat vegetables, mark 'No.'</p>	<p>Do frozen vegetables count?</p> <p>If I eat French fries and lettuce on my hamburger does that count?</p> <p>Do lettuce and onions on my taco count?</p> <p>If I eat a can of mixed vegetables does that</p>	<p>Yes</p> <p>The minimally accepted amount for each item is: ¼ cup of chopped raw or cooked vegetables, ¼ cup 100% vegetable juice, ½ cup of leafy vegetables, or equivalent.</p> <p>Yes, the minimally accepted amount</p>

FBC Questions	Photograph	Explanation	Potential Questions from Clients	Staff Response Suggestions
	<ul style="list-style-type: none"> <li>zucchini</li> <li>V-8 vegetable juice</li> </ul>		<p>count?</p> <p>What if I eat a medley of frozen vegetables? Does that count as more than one kind?</p>	<p>for each item is: ¼ cup of chopped raw or cooked vegetables, ¼ cup 100% vegetable juice, ½ cup of leafy vegetables, or equivalent.</p>
<p>Q6. How many servings of vegetables do you eat each day?</p> 	<p>Items pictured include 3 rows of small pictures:</p> <ul style="list-style-type: none"> <li><b>Row 1-</b> ½ cup salsa, ½ cup snap peas, ½ cup canned corn, whole corn on the cob, ½ cup broccoli.</li> <li><b>Row 2-</b> ½ cup canned peas, ½ cup radishes, 1 cup field greens, ½ cup carrots, ½ cup cucumbers</li> <li><b>Row 3-</b> 1 small potato, ½ cup vegetable medley, ½ cup canned green beans, ½ cup cherry tomatoes, ¾ cup tomato juice</li> </ul>	<p>This question is about total quantity or amount of vegetables or vegetable juice. One serving of vegetable is ½ cup of chopped raw or cooked vegetables, 1 cup raw leafy vegetables, ¾ cup 100% vegetable juice, or ¼ cup of dried vegetables.</p> <p>Examples of one serving:</p> <ul style="list-style-type: none"> <li>7-8 raw celery or carrots sticks</li> <li>1 medium ear of corn</li> <li>1 cup of vegetable soup</li> </ul> <p>If you do not eat vegetables, mark '0.'</p> <p>Note: These serving sizes reflect the recommendations of the Food Guide Pyramid, not the MyPyramid guidelines.</p>	<p>Does it have to be the ones in the picture?</p> <p>If I have a salad with carrots, tomatoes, lettuce and onions, what do I mark.</p> <p>Do they have to be fresh or can they be frozen or canned?</p> <p>What do I mark if I eat less than ½ a cup?</p> <p>Does vegetable soup count?</p> <p>Do I count all the pictures as one serving?</p>	<p>No, any vegetable will count.</p> <p>Count 1 cup of the salad as 1 serving. If the salad is 1 ½ cups count as 1 ½ servings. If the salad is 2 cups count as 2 servings.</p> <p>They can be fresh, frozen, canned, or vegetable juice.</p> <p>Mark less than 1.</p> <p>Yes, 1 cup counts as 1 serving.</p> <p>No, each square is one serving.</p>
<p>Q7. Do you eat 2 or more vegetables at your main meal?</p>	<p>Items pictured include 4 photos:</p> <ul style="list-style-type: none"> <li><b>Top left photo-</b> a plate with chili with cheese, salad (lettuce and tomato) with creamy dressing, and cooked cut carrots</li> <li><b>Top right photo-</b> a plate with an</li> </ul>	<p>This question is about "variety." French fries count as a vegetable because they are potatoes. Potato chips do not count as a vegetable. If you do not eat vegetables, mark 'No.'</p>	<p>How much do I have to eat of each kind to count?</p> <p>Do French fries count?</p>	<p>2 or more.</p> <p>Yes, count French fries because they are made from potatoes.</p>

FBC Questions	Photograph	Explanation	Potential Questions from Clients	Staff Response Suggestions
	 <ul style="list-style-type: none"> <li>• <b>open hamburger</b> (beef patty, bun, lettuce and tomato), coleslaw, and an ear of corn</li> <li>• <b>Bottom right photo-</b> a plate with a pork chop, cooked broccoli, a baked potato with sour cream and chives, and a bowl with a salad (lettuce, tomato, and a creamy dressing)</li> <li>• <b>Bottom left photo-</b> a plate with a piece of chicken, cooked spinach, marinated peppers and carrots, and a small plate with a biscuit</li> </ul>		<p>If I have a bag of mixed frozen vegetables, does that count as more than 1 vegetable?</p>	<p>Yes</p>



## APPENDIX C. FRUIT AND VEGETABLE REFERENCE SHEET

### Fruit and Vegetable Reference Sheet

EAT YOUR FRUITS AND VEGETABLES:

Healthy body. Healthy Life.

Fruit and vegetable consumption:

- Fruit and vegetable consumption can impact overall health, decrease rates of cancer and obesity, and improve well-being.
- Fruit and vegetable consumption is an essential component of a healthy diet and one of the most modifiable risk factors for chronic disease.
- Consumption of fruits and vegetables is considered an indicator of healthy eating and has protective effects for non-communicable diseases.
- A diet rich in fruits and vegetables can lower the risk of heart disease and stroke.

Make fruits and vegetables part of your daily routine:

- Eat 5 or more fruits and vegetables on a daily basis.
- Wash and cut up fruits and vegetables after purchasing so they are accessible and ready to eat at any time.
- Prepared food is easy to grab.
- Create a meal plan for the week that uses similar fruits and vegetables, prepared in different ways.
- Variety is as important as quantity. No single fruit or vegetable provides all of the nutrients you need to be healthy.
- Choose a variety of different fruits and vegetables including dark-green, leafy vegetables.

How to get the most for your dollar:

- Enjoy the comforts of home. Eating at restaurants can increase food spending. Include fruits and vegetables in quick, simple meals that you prepare at home.
- Learn basic food math. Taking the time to make a food budget before grocery trips can make food-buying decisions easier, and can help you decide which is a better buy.
- Homemade soup is a healthy and tasty way to use vegetables. Make a big batch and freeze leftovers in small lunch-size containers.
- Cut your fruits and vegetables at home. Pre-cut produce can cost much more than whole fruits and vegetables.
- Canned fruits and vegetables will last a long time and can be a healthy addition to a variety of meals.

- Frozen fruit and vegetables store well in the freezer until you're ready to add them to a meal.
- Avoid buying single servings. Purchasing many small packages of produce is often more expensive than buying in larger amounts.
- Get creative with your leftover fruits and vegetables.
- To make many fresh fruits and vegetables last longer, store them in the refrigerator or freezer soon after getting home from your shopping trip.

**Websites to check out:**

“MyPlate” - Make *half* your plate fruits and vegetables

<http://www.choosemyplate.gov/myplate/index.aspx>

<http://www.choosemyplate.gov/food-groups/vegetables-tips.html>

Up to Date – Fruits and Vegetables

[http://www.uptodate.com/contents/diet-and-health-beyond-the-basics?source=related\\_link](http://www.uptodate.com/contents/diet-and-health-beyond-the-basics?source=related_link)

References:

Centers for Disease Control, 2012

Dehghan, Akhtar-Danesh, & Merchant, 2011

Litt, Soobader, Turbin, Hale, Buchenau, & Marshall, 2011

Optimalhealthsystems.com, 2002

## APPENDIX D. PROVIDER PERCEPTION SURVEY

### Provider Perception of Fruit and Vegetable Consumption:

#### Post-Checklist and Education Interventions

Provider Status: Nurse Practitioner      Medical Doctor      Physician's Assistant

Provider Specialty: Family Practice      Other \_\_\_\_\_

1. Do you feel there is an inadequate consumption of fruits and vegetables among young adults between the ages of 18-24 years?
2. Do you feel there is a knowledge gap in young adults current awareness of fruit and vegetable consumption?
3. How do you feel incorporating a fruit and vegetable checklist identifies areas of concern in regards to consumption?
4. How do you feel completion of a fruit and vegetable checklist increases awareness of fruit and vegetable consumption among young adults?
5. Do you feel there is a desire to increase fruit and vegetable consumption after incorporation of motivational techniques and education by the provider or other clinician?
6. Do you feel the educational material provided to the participant during their clinic visit will enhance awareness and knowledge of fruits and vegetables?
7. If individuals utilize the survey results and education, do you feel an increased fruit and vegetable consumption will decrease obesity rates and chronic medical issues, and improve sense of well-being in their future?

## APPENDIX E. INSTITUTIONAL REVIEW BOARD APPROVAL LETTER



February 11, 2014

FederalWide Assurance FWA00002439

Dr. Mykell Barnacle  
Nursing  
103 Sudro Hall

**Re:** IRB Certification of Exempt Human Subjects Research:  
Protocol #PH14175, "The Fruit and Vegetable Consumption Problem"

Co-investigator(s) and research team: **Natalie Aughinbaugh**

Certification Date: 2/11/14      Expiration Date: 2/10/17  
Study site(s): **Essentia Health**  
Funding: **n/a**

The above referenced human subjects research project has been certified as exempt (category # 2) in accordance with federal regulations (Code of Federal Regulations, Title 45, Part 46, *Protection of Human Subjects*). This determination is based on the original protocol materials and revised consent (received 2/10/2014).

Please also note the following:

- If you wish to continue the research after the expiration, submit a request for recertification several weeks prior to the expiration.
- Conduct the study as described in the approved protocol. If you wish to make changes, obtain approval from the IRB prior to initiating, unless the changes are necessary to eliminate an immediate hazard to subjects.
- Notify the IRB promptly of any adverse events, complaints, or unanticipated problems involving risks to subjects or others related to this project.
- Report any significant new findings that may affect the risks and benefits to the participants and the IRB.
- Research records may be subject to a random or directed audit at any time to verify compliance with IRB standard operating procedures.

Thank you for your cooperation with NDSU IRB procedures. Best wishes for a successful study.

Sincerely,

A handwritten signature in cursive script that reads "Kristy Shirley".

Kristy Shirley, CIP, Research Compliance Administrator

**INSTITUTIONAL REVIEW BOARD**

NDSU Dept 4000 | PO Box 6050 | Fargo ND 58108-6050 | 701.231.8995 | Fax 701.231.8098 | [nds.u.edu/irb](http://nds.u.edu/irb)

Shipping address: Research 1, 1735 NDSU Research Park Drive, Fargo, ND 58102

NDSU is an EO/AA university.

**NDSU**

**North Dakota State University**

Department of Nursing  
1401 Albrecht Blvd  
103 Sudro Hall  
NDSU Dept. 2670  
PO Box 6050  
Fargo, ND 58108-6050  
701.231.6257

**The Fruit and Vegetable Consumption Problem**

Dear Health Care Provider:

My name is Natalie Aughinbaugh. I am a graduate student in the Doctor of Nursing Practice program at North Dakota State University, and I am conducting a performance improvement project to assess provider perception of the use of a survey and educational material in the clinical setting. This project utilizes a survey checklist to assess the fruit and vegetable consumption of young adults between the ages of 18-24 years of age. Educational material is also available for the patient to increase knowledge and awareness of fruits and vegetables role for better health and well-being. It is our hope, that with this practice improvement project, we will learn more about patient awareness and meaningful use of fruit and vegetable consumption to positively impact patient care and improve provider practice.

Because you work with the desired age group of young adults (18-24 years), you are invited to take part in this practice improvement project. Your participation is entirely your choice, and you may change your mind or quit participating at any time, with no penalty to you.

It is not possible to identify all potential risks in research procedures, but we have taken reasonable safeguards to minimize any known risks. These known risks include: emotional or psychological distress.

By taking part in this performance improvement project, you may benefit by knowing patient's fruit and vegetable consumption and how education can improve their awareness and knowledge to facilitate increased consumption. This project can improve clinical practice by understanding and responding to young adult's nutritional knowledge deficits and intake patterns. However, you may not get any benefit from being in this study. Benefits to others are likely to include advancement of knowledge, and possible benefits to persons in the prospective subject's position.

It should take about 3-5 minutes to complete the survey questions and discuss the results with each patient. The researcher requests that you participate in a provider survey that will be completed once at the end of the project. The post-checklist and education survey for the provider will take approximately 15 minutes to complete. The provider survey will be completed once at the end of the clinical setting project; this survey can be completed through survey monkey, an Internet survey service.

This study is confidential and does not use personal identifiers. The location of research will be disclosed for purposes of comparison, but there will be no personal identifiers attached to the responses and content of this study. Your willingness to complete the post survey will signify your consent to participate.

If you have any questions about this project, please contact me at 701-866-7890 or [natalie.aughinbaugh@ndsu.edu](mailto:natalie.aughinbaugh@ndsu.edu), or contact my advisor Mykell Barnacle, DNP at 701-231-7730 or [mykell.barnacle@ndsu.edu](mailto:mykell.barnacle@ndsu.edu)

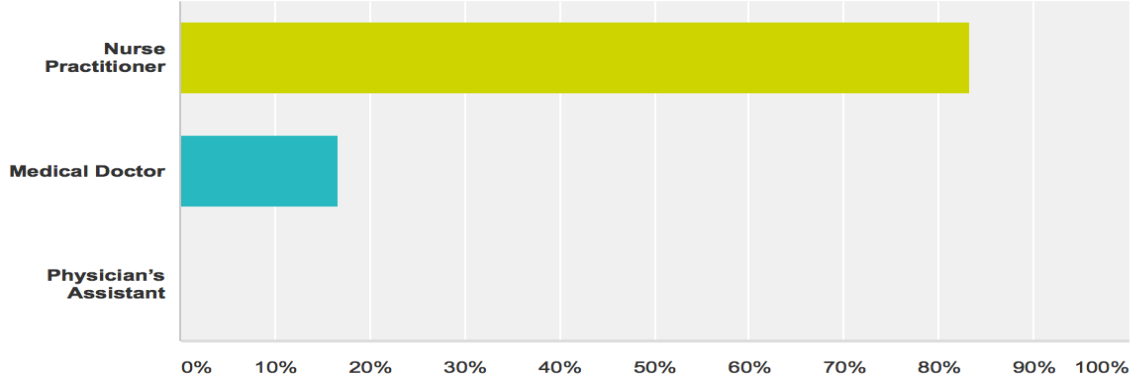
You have rights as a research participant. If you have questions about your rights or complaints about this research, you may talk to the researcher or contact the NDSU Human Research Protection Program at 701.231.8908, toll-free at 1-855-800-6717, by email at [ndsu.irb@ndsu.edu](mailto:ndsu.irb@ndsu.edu), or by mail at: NDSU HRPP Office, NDSU Dept. 4000, P.O. Box 6050, Fargo, ND 58108-6050.

Thank you for your taking part in this research. If you wish to receive a copy of the results, please email Natalie Aughinbaugh at [natalie.aughinbaugh@ndsu.edu](mailto:natalie.aughinbaugh@ndsu.edu)

## APPENDIX F. PROVIDER SURVEY RESULTS

### What is your Provider status?

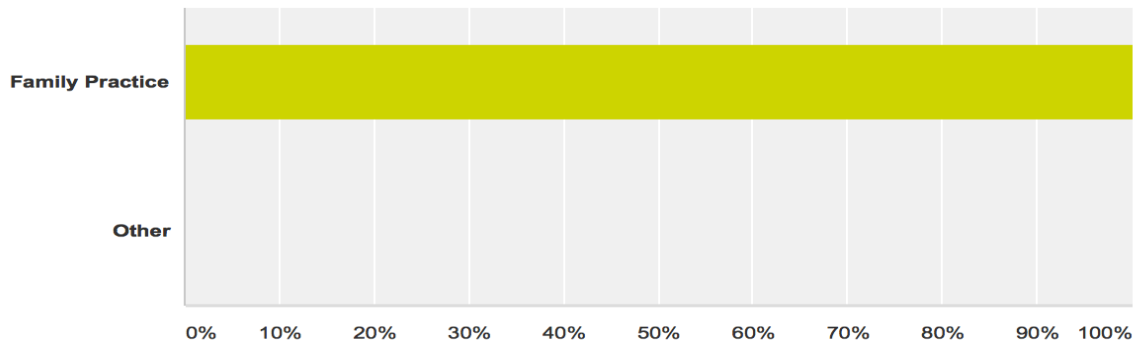
Answered: 6 Skipped: 0



Answer Choices	Responses
▼ Nurse Practitioner	83.33% 5
▼ Medical Doctor	16.67% 1
▼ Physician's Assistant	0.00% 0
Total	6

### What area is your current practice?

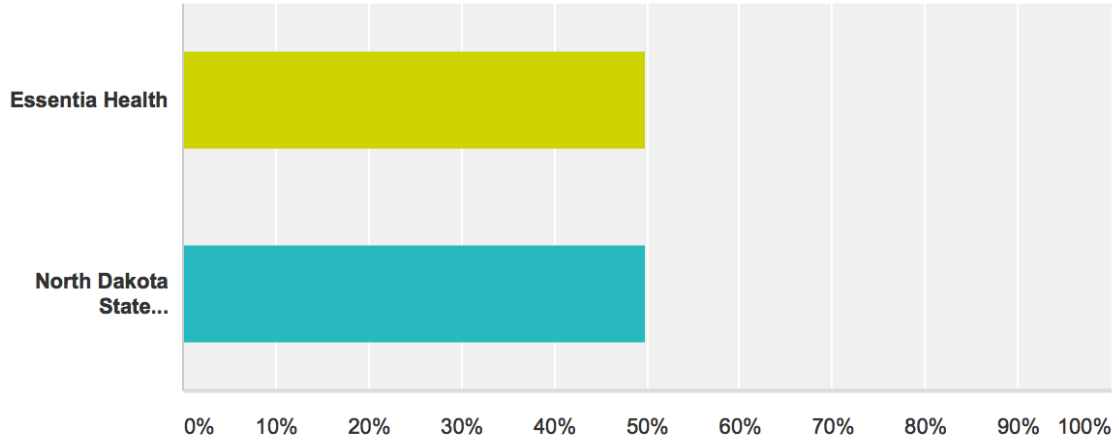
Answered: 6 Skipped: 0



Answer Choices	Responses
▼ Family Practice	100.00% 6
▼ Other	0.00% 0
Total	6

# Where is your practice location?

Answered: 6 Skipped: 0



Answer Choices	Responses
▼ <b>Essentia Health</b>	<b>50.00%</b> 3
▼ <b>North Dakota State University: Student Health Services</b>	<b>50.00%</b> 3
Total	6



## APPENDIX G. EXECUTIVE SUMMARY

### Background

Fruit and vegetable consumption is an essential component of a healthy diet and one of the most modifiable risk factors for chronic disease. Only a small percentage of the world's population consumes the recommended amount of fruits and vegetables (Litt et al., 2011). Young adults experience significant change during their college years, often establishing life-long dietary habits affecting future health and the health of their future families. Future health and importance of nutrition are often disregarded because of low rates of chronic disease for this age group. Incorporating nutritional awareness and educational interventions in patient visits can prevent future body weight problems and chronic illness among young adults and college students. This project focused on fruit and vegetable consumption of young adults.

### Project Summary

The purpose of this project was to improve provider practice by using a food frequency-screening tool and education within the clinical setting to facilitate increased knowledge, awareness, and fruit and vegetable consumption among young adults. A *Fruit and Vegetable Checklist* was incorporated into the clinic setting over a three-month period to provide ways to assess fruit and vegetable intake and identify education and interventional needs. The survey checklist was presented during well-check visits with patients between the ages of 18-24 years.

Viewing the results of the seven-question checklist tool allowed for a comprehensive look at an individual's nutritional status over the past month and quickly identified nutritional deficits to narrow the focus for education and/or potential interventions. Printed educational information addressing the top barriers and top promoters of fruit and vegetable consumption were also provided to the patient at the end of their visit. Analysis at the conclusion of this

project included the provider perception of fruit and vegetable consumption after use of the tool and educational material with patients in a clinic setting. Results of the project indicated overall positive provider perception of the survey tool and educational materials.

### **Results**

The results from the post-intervention provider survey demonstrated an overall positive response to the interventions within the fruit and vegetable consumption project. Each of the objectives of the project was met: assess current fruit and vegetable consumption of young adults between the ages of 18-24 years through provider interaction, promote increased fruit and vegetable consumption of young adult patients through provider interaction by incorporating education to patients on fruit and vegetable consumption, increase knowledge and awareness of fruit and vegetable consumption among young adults, and assess the relevance of a fruit and vegetable screening tool and education in the clinic setting. Through the evidence of positive provider responses, there is a potential to continue utilizing these interventions in the clinic setting to improve provider practice and enhance health promotion and disease prevention for patients.

### **Recommendations**

The ultimate goal of the practice improvement project is to incorporate these interventions into a live setting to improve patient care and provider practice. Positive provider perception from this study indicates the impacts this project consumes and should be continued. Recommendations for future studies should include additional dietary follow-up when needed. When there is a significant nutritional deficit or lack of nutritional awareness for certain individuals, additional follow-up with a dietician may be indicated to educate the patient

appropriately. A dietician can provide more in-depth education to an individual and develop a plan focused to a patient's particular needs.

Another recommendation for future research is to have the patient education visible in more areas than the printed material provided at the end of the visit. Education posted on the walls in the clinic rooms can provide more exposure to the positive impacts of fruit and vegetable consumption. Implications for nursing practice should include education and motivational strategies to enhance dietary self-efficacy when promoting fruit and vegetable consumption.