Nutrition and Mental Health

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Abstract

This research study was focused on the barriers mental health clients experience to consuming a plant-based diet. The research participants included seven clients at an outpatient mental health clinic consisting of different diagnoses, races, and ages. A multi-method approach was utilized with the use of a nutritional survey followed by a semi-structured interview. Six of the seven participants consume a poor diet per the nutritional assessment. When asked the barrier(s) to consuming a healthy diet, five participants expressed lack of interest and another participant reported lack of resources. Further research is recommended in this area.

Nutrition and Mental Health

Nutrition and mental health are interconnected and affected by each other. Specifically, it has been found that nutrition plays a role in the onset and severity of mental health disorders. People with mental health disorders often have nutritional deficiencies due to less than adequate diets (Lakhan & Vieira, 2008; Sathyanarayana, Asha, Ramesh, & Rao, 2008). This link between dietary habits and mental health has been noticed primarily with depression (Sathyanarayana et al., 2008). In addition to the correlation with mental health, Craig (2010) has suggested a link between poor nutrition and high blood cholesterol levels, obesity, heart disease, diabetes, and some cancer.

This literature review provides an overview of the components of proper nutrition, the benefits of a plant-based diet as an example of healthy nutrition, and the complexity of eating behaviors. The link between nutrition and mental health and its implications to the treatment and recovery of individuals living with mental illness are also explored. Individuals' eating behaviors and the reasons behind why some people eat the way they do are discussed. In addition, barriers to healthy eating are mentioned and related to the likeliness of changing someone's eating behavior.

Proper Nutrition

Receiving essential nutrients are achieved through the consumption of fruits and vegetables. An ideal diet would include at least two servings of fruits and three servings of vegetables every day. However, these nutrients are often under-consumed (Moore, 2014). In developed countries, only 11% of adults are consuming the recommended intake of nutrients (Lea et al., 2006). In particular, very few Americans consume the proper amount of fruits and

vegetables (Moore, 2014). The under-consumption of these important nutrients can be problematic for the following reasons.

Nutrition is often related to health. When eaten in excess, foods low in nutrients such as processed food, fast food, and sugar have been associated with obesity and other serious, related health problems (Murphy, 2003; Parry, 2010; Stern, 2009). In addition to physical ailments, mental health can be affected. Konttinen et al. (2010) found that depressive symptoms are related to less healthy diets. Of course just as food can contribute to poor health, it can be responsible for wellness.

Eating a diet high in nutrients can lead to positive health outcomes. According to the Center for Disease Control, the intake of under-consumed nutrients may reduce the risk of many chronic diseases (Moore, 2014). Specifically, mental health disorders such as depression may be prevented or treated with the intake of crucial nutrients (Craig, 2010; Munoz, Fito, Marrugat, Covas, & Schroder, 2008; Sathyanarayana et al., 2008; Lakhan & Vieira, 2008). For this literature review, a healthy diet will be measured according to the number of fruits and vegetables consumed daily, as recommended by the Center for Disease Control.

Plant-Based Diet

One example of a diet that is focused around consuming fruits and vegetables is a plant-based diet. According to Tuso et al. (2013), healthy eating may be best achieved with a plant-based diet. A plant-based diet usually consists of fruits and vegetables along with whole grains, legumes, and nuts (Craig, 2010). Following a plant-based diet aims to maximize nutrient dense foods, while minimize less beneficial or harmful foods. Striving to minimize the intake of processed foods and animal products, including meat, is encouraged in this diet (Tuso, Ismail,

Ha, & Bartolotto, 2013).

Mental Health and Diet

In America, one in four adults have been diagnosed with a mental health disorder. The incidence of mental health disorders is higher in America than in other countries. One reason for the increase in the prevalence of mental health disorders is correlated with the deterioration of the Western diet (Lakhan & Vieira, 2008). The correlation between nutritional deficiencies in diets and mental health has been researched.

The most common nutritional deficiencies seen in people with mental health problems are B vitamins, minerals, amino acids, and omega-3 fatty acids (Lakhan & Vieira, 2008). The brain is highly concentrated with fatty acids. Omega-3 fatty acids are a precursor to the function of neurotransmitters (Sathyanarayana et al., 2008). The lack of mood elevating neurotransmitters such as serotonin and dopamine is correlated with depression (Sathyanarayana et al., 2008; Volker & Ng, 2006). These brain chemicals can be impacted positively by certain nutrient-rich foods and supplements.

Though controversial, nutrients have been correlated with treating depression (Lakhan & Vieira, 2008). Whether obtained by food or a supplement, omega-3 fatty acids is one avenue that correlates with effectively treating depression (Sathyanarayana et al., 2008). The amino acids that make serotonin and dopamine are found in fish and legumes (Sathyanarayana et al., 2008). The consumption of the fatty acids found in fish has decreased depression in certain individuals (Lakhan & Vieira, 2008). Amino acids can also be obtained through supplements. According to Sathyanarayana et al. (2008), the daily consumption of omega-3 supplements stimulated mood elevation. Unfortunately, many individuals are not treated with nutrients or supplements.

A popular approach to treating depression is with prescription drugs. However, as a result of the medications' side effects, many clients become noncompliant (Lakhan & Vieira, 2008). Clients who are noncompliant with taking their medications as directed are at higher risk for committing suicide (Sathyanarayana et al., 2008). In addition to prescription drugs, supplements or proper nutrition may help with the symptoms of depression (Sathyanarayana et al., 2008). A more effective and holistic approach may be to combine prescription drugs with nutrition therapy.

Eating Behavior

At this time, approximately 66% of adults in the United States are overweight or obese (Wang, Ye, Zheng, & Burke, 2015). Additional research on eating behavior and diet will be necessary as the rates of obesity increases. Until then, researchers have already attributed individuals' psychological eating style to be a factor in weight gain (Konttinen, Mannisto, Sarlio-Lahteenkorva, Silventoinen, & Haukkala, 2010). In other words, people choose to eat unhealthy diets for different mental and emotional reasons.

The reasons why people choose to eat unhealthy diets can be categorized into two psychological eating styles: external and emotional. External eating (as a result of food cues) and emotional eating (in response to stress and negative emotions) influence eating behavior (Cleobury & Tapper, 2014). Both cues can contribute to eating less healthy foods. External eaters crave fast foods or foods that are high in fat (Burton, Smith, & Lightowler, 2007). Fatty foods as well as sweets are also consumed in higher quantities by emotional eaters (Oliver, Wardle, & Gibson, 2000). Both external and emotional eating are elaborated further.

External Eating

External eating is a result of external cues. External cues are derived from temptation, hunger, and habit (Cleobury & Tapper, 2014). Cleobury and Tapper (2014) found that more than half of the time when people choose to eat unhealthy foods it is because the food looked or smelled tempting. In other situations, people were experiencing food cravings when they were bored or anxious (Hill, Weaver, & Blundell, 1991). However, the most common external eating drive originates from habit.

Habit is more responsible for external eating than hunger. In one study, 21% of the participants ate due to hunger, while 46% ate due to habitual patterns (Cleobury & Tapper, 2014). Habit is one of the most powerful predictors of eating behavior (Riet, Sijtsema, Dagevos, & De Bruijn, 2011). When behavior is habitual, people can make decisions on what to eat with little information required (Riet et al., 2011). As a result, eating in the absence of hunger or the consumption of unhealthy foods can occur. This habitual eating behavior is not related to eating due to emotional distress (Van Strien, Schippers, & Cox, 1995). No correlation has been found between depression and external eating (Ouwens, Strien, & Leeuwe, 2009). However, there is a strong relationship between depression and emotional eating (Ouwens et al., 2009).

Emotional Eating

Depression is one disorder that can trigger individuals to emotionally eat. Emotional eating is in response to a variety of negative emotions as well as stress (Cleobury & Tapper, 2014). Emotional eating can be caused by anxiety, depression, phobias, intimate relations, sexual contacts, and suicidal ideation or behavior (Van Strien et al., 1995; Ouwens et al., 2009). Stress and other negative moods not only increase the desire to eat, but also the amount eaten and the choice to eat unhealthy foods (Cleobury & Tapper, 2014). One reason for this is the effect food

has on the brain's reward system. The hypo-functioning of dopamine-related reward systems located in the brain correspond with emotional eating (Ouwens et al., 2009).

Though emotional eaters have learned to use food as a reward, it is not always a healthy coping mechanism. People using food to reduce stress can develop this learned coping mechanism early in life. Emotional eating is a learned, inadequate affect regulation method and an inappropriate response to distress (Konttinen et al., 2010; Spoor, Bekker, Van Strien, & Van Heck, 2007). It is the consequence of the inability to distinguish hunger from affect (Konttinen et al., 2010). When people eat as a result of emotions, there is often an increase in the consumption of sweet and high-fat foods (Konttinen et al., 2010). The reaction to emotionally eat can be found in both males and females.

Gender and Eating. Eating behavior in males and females show both similarities and differences. One commonality is food consumption in response to depression. Both genders emotionally eat when experiencing higher depressive symptoms (Konttinen et al., 2010). Higher depressive symptoms are related to lower consumption of fruits and vegetables in both genders (Konttinen et al., 2010). However, males report mainly eating due to environmental cues and hunger (Cleobury & Tapper, 2014). Females on the other hand, report unhealthy eating as a result of internal thoughts and external social cues (Cleobury & Tapper, 2014). Among women, fewer fruits and vegetables are consumed when under higher levels of psychological distress (Konttinen et al., 2010).

Childhood and Adolescence. For males and females, experiences during childhood and adolescence may play a significant role in eating behavior for several reasons. Primarily, children and adolescents are more likely to eat unhealthy if their parents or peers engage in poor

eating habits (Kinard & Webster, 2011). Children are generally not given a choice and eat the food provided to them by their caregivers. With little control over their diet, children will learn to eat certain foods from watching their parents or peers (Kinard & Webster, 2011). Specific to adolescents, choosing which food to buy can be influenced by their peers (Stevenson et al., 2007).

As reported in the *Journal of the American Medical Association,* 17% of adolescents are obese in the United States (Kinard & Webster, 2011). Several factors play into the diet of adolescents. Eating behaviors are influenced by developmental, social, physical, environmental, and macrosystem factors (Stevenson, Doherty, Barnett, Muldoon, & Trew, 2007). For adolescents, expressing rebellion and independence can be shown through eating less healthy foods (Stevenson et al., 2007). In addition, advertising strongly influences adolescents in their decision to eat unhealthy foods (Kinard & Webster, 2011). Constant advertisements impact the type of food consumed. With the high number of unhealthy food advertisements, learned unhealthy eating begins at an early age and continues through adulthood.

Barriers to Consuming a Plant-Based Diet

Adults choose to eat or not eat a particular diet. Differences in food consumption can be based on sex, age, gender, and culture. However, some people experience barriers to eating a healthy diet. Some formerly found barriers include lack of education, lack of ability, lack of interest, and lack of resources (Lea et al., 2006). The researchers, Lea et al. (2016) and Skuland (2015) did not report mental health disorders as being a barrier to healthy eating.

Lack of Information

A primary barrier to eating healthy is due to lack of knowledge. In one study, the lack of

information and education was the most common barrier to eating a plant-based diet (Lea et al., 2006). If the population is unaware of plant-based diets and the health benefits, changing their diet to plant-based is unrealistic. Both men and women reported needing more information before changing their eating behavior (Lea et al., 2006). However, even if individuals have the knowledge, not all have the ability to eat a plant-based diet.

Lack of Ability

Having the ability to eat mainly plant-based food is not always possible. Some individuals have schedules or situations that do not allow a healthy lifestyle. Practical barriers include irregular work hours or lack of access to healthy foods (Lea et al., 2006). Time, usually due to work, is a significant barrier to eating healthy (Skuland, 2015). Consuming enough nutrients can require planning and preparing meals. A busy schedule can hinder one's ability to accomplish these tasks.

Lack of Interest

Other people are lacking interest in changing their diet. Most significantly, taste is shown to affect the consumption of vegetables (Skuland, 2015). Some people prefer the satisfying, unhealthy foods over vegetables. Other common barriers involve an unwillingness or inability for themselves or their family to alter their dietary patterns (Lea et al., 2006). One reason for the unwillingness to change can be due to an attitudinal barrier. An attitudinal barrier is the belief that one's diet is already healthy (Lea et al., 2006). If someone believes they already consume a healthy diet, they may not be motivated to change. The disinclination to change is found in both men and women.

Both sexes reported being unwilling to alter their eating habits or routines (Lea et al.,

2006). However, more men than women believe that humans should eat large quantities of meat, that only they should decide what they should eat, and that a healthy diet would not be satisfying (Lea et al., 2006). Men blame avoiding healthy foods due to poor taste and the inability to be satisfied, however Gough and Conner (2006) believe that masculinity and freedom of choice are the underlying reasons.

Lack of Resources

Another barrier is lack of resources. Resources include the availability of healthy foods or financial ability to purchase healthy food. One common, perceived barrier is the lack of availability of plant-based options when eating out (Lea et al., 2006). This perception of lack of availability may also stem from lack of education. Also, individuals may be inhibited from buying healthy food if they lack the financial means. As reported by Skuland (2015), empirical evidence shows that socioeconomic status determines the intake of healthy food. Higher socioeconomic status is associated with lower fat consumption and higher intake of vegetables and micronutrients (Beydoun & Wang, 2008).

Changing Eating Behavior

Being aware of these barriers would be necessary for change. Unfortunately, the majority of individuals do not recognize their barriers to eating a plant-based diet (Lea et al., 2006). Changing unhealthy eating behavior starts with the knowledge of why one is eating a poor diet in the first place. Understanding individuals' habits and behaviors makes changing their lifestyle an option (Riet et al., 2011). After awareness and understanding of an individual's eating behavior, change is made possible through different techniques.

One avenue is behavior change intervention. Behavior change interventions heavily rely

on habits (Riet et al., 2011). Interventions targeting habitual behavior focus on changing the situation that triggers the habitual behavior, promote or inhibit the habitual response, and change relevant contingencies (Riet et al., 2011). In addition, the individual may have more success if the change is rewarding. The benefits of change need to outweigh the barriers for behavioral change to occur (Lea et al., 2006). As a result, the barriers to healthy eating are lessened.

Healthy Eating Behavior

Fortunately, not all individuals have barriers to healthy eating and have reasons why they eat a healthy diet. These reasons include hunger, health benefits, and awareness (Cleobury & Tapper, 2014; Lea et al., 2006). In one study, research participants reported healthy eating to be a result of hunger (Cleobury & Tapper, 2014). In addition, healthy eating may be a result of perceived health benefits. These benefits include weight control, overall health, improved quality of life, and disease prevention (Lea et al., 2006). Being aware of the positive health impacts can be attributed to education. Individuals who continued into higher education are more likely to accept changes to their diet, try unusual foods, and recognize the importance of a plant-based diet (Lea et al., 2006).

Research

Currently, research on eating behavior is not widely studied. Specific to my research question, "...no other studies appear to have been conducted on the perceived barriers and benefits of eating a plant-based diet…" (Lea et al., 2006). In addition, few interventions that are based on habit theory have been tested in a food context (Riet et al., 2011). As a result, using habit theory to change eating behavior may not be readily available. Also, the perceived benefits and barriers the population holds regarding a plant-based diet has not been examined in detail

(Lea et al., 2006). Gough & Conner (2006) stated that there is little known on the link between food and health.

The consequences of unhealthy eating are related to physical and mental ailments. Mental health disorders, primarily depression, are impacted by nutrients. These important nutrients, such as fatty acids can be found in fruits and vegetables. A diet that provides high amounts of fruits and vegetables is the plant-based diet. The benefits of consuming a plant-based diet has been studied and shown to be effective in the prevention and treatment to several health problems, including mental health.

In addition to reviewing current research on healthy versus unhealthy diets and their consequences, the reasons behind eating behavior has been reviewed. The causes for high-fat and high-sugar diets can be due to external or emotional triggers. These triggers can be experienced by children, adolescents, males, and females. Changing these eating behaviors can be complex, but require at least the knowledge of the barriers preventing healthy eating.

These barriers include individuals' lack of education, lack of ability, lack of interest, and lack of resources. Previous researchers have found that the primary perceived barrier is the population's lack of knowledge on plant-based diets. In addition, habit plays a large role in eating behavior. Continuing the research on the barriers to healthy eating would be beneficial to the area of study. I plan to conduct a research study to further explore the barriers to healthy eating among a population of adults diagnosed with a mental health disorder.

This research investigates why mental health clients at Pinewild Behavioral Health are not eating healthy diets. The hypotheses to the research question include a primary and null hypothesis. Clients at the outpatient mental health clinic may express financial barriers for not

eating healthy diets. Financial barriers to eating healthy diets is the primary hypothesis. The null hypothesis is that clients have lack of availability to plant-based foods.

Method

The objective of this study is to determine why mental health clients are not receiving adequate nutrition. A multi-method approach was utilized. The pre-test survey method determines the daily amount of fruits and vegetables the individual is consuming. When the survey revealed that clients are not consuming the recommended servings of fruits and vegetables, the researcher conducted an interview with these individuals. The semi-structured interview consists of three questions to determine why the clients are not choosing a more nutrient rich diet. My hypothesis was that some clients at the outpatient mental health clinic do not have access to fruits and vegetables due to lack of financial resources or lack of access to plant-based foods.

Participants

The participants for the research were clients at an outpatient mental health clinic. The clinic services a variety of clients. The participants consisted of 4 females and 3 males. The ages ranged from 19 to 56 years old. The participants have diagnoses from the outpatient mental health clinic. The diagnoses include major depressive disorder, alcohol dependence, mood disorder unspecified, generalized anxiety disorder, borderline personality disorder, and depersonalization disorder.

Instruments/Materials

A portion of the writer's clients were asked to participate in the study. The clients

completed a nutritional assessment. The survey is the Behavioral Risk Factor Surveillance System Questionnaire (BRFSS) (see Appendix). Section 11 of the BRFSS was used to assess the clients' consumption of fruits and vegetables (BRFSS, 2013). The assessment was used to identify populations at risk of nutritional deficiencies with a 6-item brief dietary assessment measuring the frequency of consumption of fruits, legumes, and vegetables (Moore, 2014). Based on similar results produced by the module to other national surveys, the 2011 version of the assessment has moderately validity (Moore, 2014). Reliability was also deemed moderate. Reliability was measured by correlation coefficients and kappa values (Moore, 2014).

If the results of the survey conclude a less than adequate diet (less than 2 servings of fruits and 3 servings of vegetables every day), the client will be asked to participate in a semi-structured interview. The clients who accept the interview will be asked a sequence of questions to determine the reason for their poor diet. The researcher will audio record the client answering a set of 3 questions. The answers to the questions will be transcribed and placed into the category of diet barriers that would be best fit. The answers to the questions asked may lead to the results of the primary outcome. Any further discussion between the client and counselor may lead to a secondary outcome. The interview questions are as follows:

What are your reactions to the nutritional assessment and the fact that according to that assessment you are not consuming a healthy diet?

What hinders you from eating a better diet?

What would make it easier for you to eat healthier?

Procedure

Individuals for the study were recruited by the researcher. The researcher asked clients within the researcher's caseload to participate. The clients in the caseload were all diagnosed with a mental health disorder. The researcher informed the clients of the study after the third individual session. The clients were asked if they were interested in participating at the end of their session. Client who were willing to stay were given and read a copy of the consent form. After the individual understood and agreed to the study, he or she signed the consent form. Then, the client was given a copy of the nutritional assessment to following along with while the researcher asked the questions. The client responses were written down to be later calculated. Following the calculations, the researcher determined if the clients reported eating the recommended daily diet. If the client did meet adequate nutrition, they were made aware and no further questions were necessary for the study. If the client did not meet adequate nutrition, he or she was asked to continue participation with the audio-recorded interview. Every client agreed to continue and the researcher turned on the recording device. The researcher again gave the clients the three questions on a sheet of paper to follow along. The researcher asked the client one question at a time and the client's responses were later transcribed.

Assessment

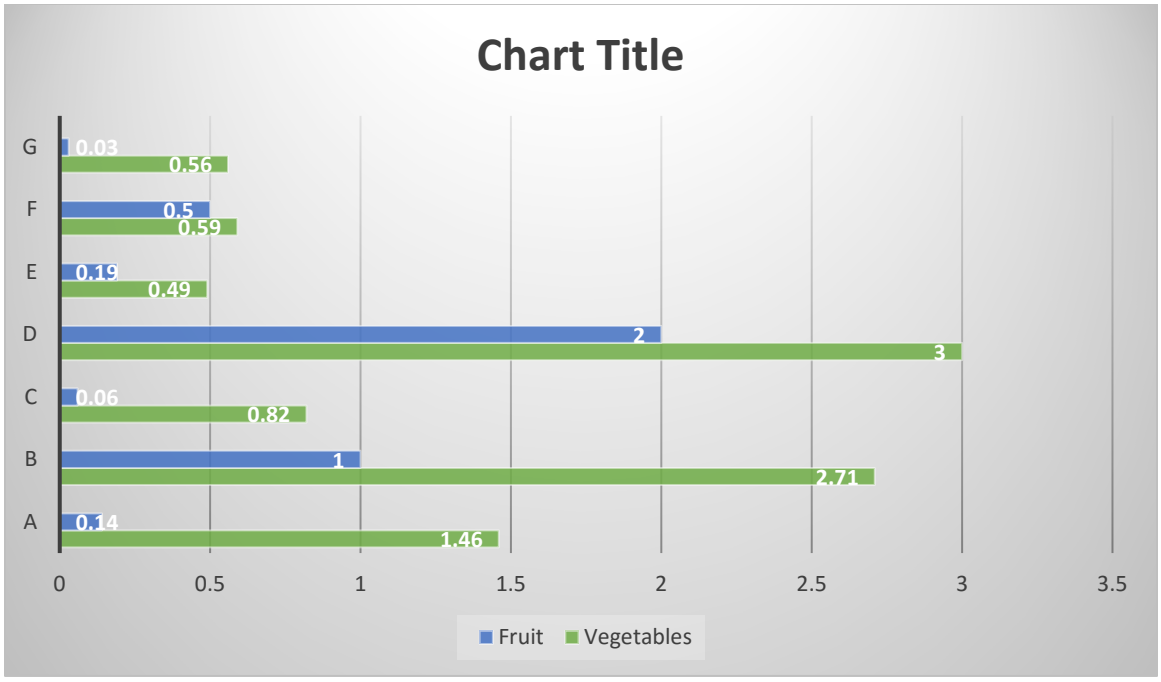
The nutritional assessment will be evaluated based on the number of fruits and vegetables the individuals consumes daily. For this study, the BRFSS will be considering an adequate diet to be a consumption of 2 or more fruits each day and 3 or more vegetables each day (Moore, 2014). The calculation will determine whether the individual consumes a total of 5 or more servings of fruits or vegetables daily.

The individuals who consume less than 5 servings of fruits/vegetables every day will then be asked to participate in an interview about their eating habits. The interview will be transcribed and the main points will be highlighted. I will group like answers together to determine the most popular responses.

Results

Data was collected from a total of 7 participants. The gathering of information was done January, 2017 to March, 2017. Six out of the 7 participants did not meet the criterion for consuming a plant-based diet; meaning they were qualified participants for the interview questions. The results of the nutrition survey are shown in Figure 1.

Figure 1



Participant D who consumed the daily recommended servings of fruits and vegetables was surprised to hear that her diet was considered adequate. The remaining 6 participants whose

diets were less than adequate reported expecting those results. Everyone reported already knowing they did not eat a healthy diet. Comments to the results included, “My diet sucks, its bad”, “that’s probably about right; I need to eat more healthy”, and “I eat like a welfare guy”.

These six participants with inadequate diets were each asked the reasons for not consuming a plant-based diet. Five of the clients expressed a lack of interest and the last reported a lack of resources. Comments from the participants included, “my attitude”, “I like yummy food”, and “I like comfort food”. One client expressed the lack of resources in her area by stating, “…it’s not that available to me; like where I live… more like hood areas like alcohol is so accessible; unhealthy food is so accessible; where can you find anything that’s good for you…it’s like they’re trying to kill us”. The hypothesis was that clients at the outpatient mental health clinic would primarily have financial barriers to eating healthy. However, the hypothesis was not supported. Most of the responses concluded a lack of interest in eating a plant-based diet.

Discussion

The findings in the study did not support the writer’s hypostasis. Barriers to eating healthy were not reportedly due to lack of financial resources, but rather due to lack of interest. Even though the final consensus was strong, the research has some limitations. Potential bias occurred when the writer coded and categorized the interview answers. Interpreting participants’ answers was completely solely from the opinion of the writer. In addition, the sample size of participants used to answer the research question was limited to 6 individuals.

Nevertheless, research regarding mental health and nutrition is important. With the connection between health and food, eliminating barriers to healthy eating is becoming

increasingly prevalent. Continued research on the primary barriers to eating healthy may improve the likeliness of changing the population's diet from inadequate nutrition to more plant-based diets.

Appendix

BRFSS Section 11 Fruit and Vegetable Assessment

These next questions are about the fruits and vegetables you ate or drank during the past 30 days. Please think about all forms of fruits and vegetables including cooked or raw, fresh, frozen or canned. Please think about all meals, snacks, and food consumed at home and away from home.

I will be asking how often you ate or drank each one: for example, once a day, twice a week, three times a month, and so forth.

INTERVIEWER NOTE: If respondent responds less than once per month, put "0" times per month. If respondent gives a number without a time frame, ask: "Was that per day, week, or month?"

11.1 During the past month, how many times per day, week or month did you drink 100% PURE fruit juices? Do not include fruit-flavored drinks with added sugar or fruit juice you made at home and added sugar to. Only include 100% juice.

___ Per day ___ Per week ___ Per month ___ Never ___ Don‘t know / Not sure ___ Refused

INTERVIEWER NOTE: Do not include fruit drinks with added sugar or other added sweeteners like Koolaid, Hi-C, lemonade, cranberry cocktail, Tampico, Sunny Delight, Snapple, Fruitopia, Gatorade, PowerAde, or yogurt drinks. Do not include fruit juice drinks that provide 100% daily vitamin C but include added sugar. Do not include vegetable juices such as tomato and V8 if respondent provides but include in "other vegetables" question 9.6. DO include 100% pure juices including orange, mango, papaya, pineapple, apple, grape (white or red), or grapefruit. Only

count cranberry juice if the perception is that it is 100% juice with no sugar or artificial sweetener added. 100% juice blends such as orange-pineapple, orange-tangerine, cranberry-grape are also acceptable as are fruit-vegetable 100% blends. 100% pure juice from concentrate (i.e., reconstituted) is counted.

11.2 During the past month, not counting juice, how many times per day, week, or month did you eat fruit? Count fresh, frozen, or canned fruit.

___ Per day ___ Per week ___ Per month ___ Never ___ Don‘t know / Not sure ___ Refused

Read only if necessary: “Your best guess is fine. Include apples, bananas, applesauce, oranges, grape fruit, fruit salad, watermelon, cantaloupe or musk melon, papaya, lychees, star fruit, pomegranates, mangos, grapes, and berries such as blueberries and strawberries.”
INTERVIEWER NOTE: Do not count fruit jam, jelly, or fruit preserves. Do not include dried fruit in ready to-eat cereals. Do include dried raisins, cran-raisins if respondent tells you - but due to their small serving size they are not included in the prompt. Do include cut up fresh, frozen, or canned fruit added to yogurt, cereal, jello, and other meal items. Include culturally and geographically appropriate fruits that are not mentioned (e.g. genip, soursop, sugar apple, figs, tamarind, bread, fruit, sea grapes, carambola, longans, lychees, akee, rambutan, etc.).

11.3 During the past month, how many times per day, week, or month did you eat cooked or canned beans, such as refried, baked, black, garbanzo beans, beans in soup, soybeans, edamame, tofu or lentils. Do NOT include long green beans.

___ Per day ___ Per week ___ Per month ___ Never ___ Don‘t know / Not sure ___ Refused

Read only if necessary: “Include round or oval beans or peas such as navy, pinto, split peas, cow

peas, hummus, lentils, soybeans and tofu. Do NOT include long green beans such as string beans, broad or winged beans, or pole beans."

INTERVIEWER NOTE: Include soybeans also called edamame, TOFU (BEAN CURD MADE FROM SOYBEANS), kidney, pinto, hummus, lentils, black, black-eyed peas, cowpeas, lima beans and white beans. Include bean burgers including garden burgers and veggie burgers. Include falafel and tempeh.

11.4 During the past month, how many times per day, week, or month did you eat dark green vegetables for example broccoli or dark leafy greens including romaine, chard, collard greens or spinach?

___ Per day ___ Per week ___ Per month ___ Never ___ Don't know / Not sure ___ Refused

INTERVIEWER NOTE: Each time a vegetable is eaten it counts as one time. INTERVIEWER NOTE: Include all raw leafy green salads including spinach, mesclun, romaine lettuce, bok choy, dark green leafy lettuce, dandelions, komatsuna, watercress, and arugula. Do not include iceberg (head) lettuce if specifically told type of lettuce. Include all cooked greens including kale, collard greens, choys, turnip greens, mustard greens.

11.5 During the past month, how many times per day, week, or month did you eat orange-colored vegetables such as sweet potatoes, pumpkin, winter squash, or carrots?

___ Per day ___ Per week ___ Per month ___ Never ___ Don't know / Not sure ___ Refused

Read only if needed: "Winter squash have hard, thick skins and deep yellow to orange flesh. They include acorn, buttercup, and spaghetti squash."

FOR INTERVIEWER: Include all forms of carrots including long or baby-cut. Include carrot-

slaw (e.g. shredded carrots with or without other vegetables or fruit). Include all forms of sweet potatoes 19 including baked, mashed, casserole, pie, or sweet potatoes fries. Include all hard-winter squash varieties including acorn, autumn cup, banana, butternut, buttercup, delicate, hubbard, kabocha (Also known as an Ebisu, Delica, Hoka, Hokkaido, or Japanese Pumpkin; blue kuri), and spaghetti squash. Include all forms including soup. Include pumpkin, including pumpkin soup and pie. Do not include pumpkin bars, cake, bread or other grain-based dessert-type food containing pumpkin (i.e. similar to banana bars, zucchini bars we do not include).

11.6 Not counting what you just told me about, during the past month, about how many times per day, week, or month did you eat OTHER vegetables? Examples of other vegetables include tomatoes, tomato juice or V-8 juice, corn, eggplant, peas, lettuce, cabbage, and white potatoes that are not fried such as baked or mashed potatoes.

___ Per day ___ Per week ___ Per month ___ Never ___ Don‘t know / Not sure ___ Refused

Read only if needed: “Do not count vegetables you have already counted and do not include fried potatoes.”

INTERVIEWER NOTE: Include corn, peas, tomatoes, okra, beets, cauliflower, bean sprouts, avocado, cucumber, onions, peppers (red, green, yellow, orange); all cabbage including American-style cole-slaw; mushrooms, snow peas, snap peas, broad beans, string, wax-, or pole-beans. Include any form of the vegetable (raw, cooked, canned, or frozen). Do not include products consumed usually as condiments including ketchup, catsup, salsa, chutney, relish. Do include tomato juice if respondent did not count in fruit juice. Include culturally and geographically appropriate vegetables that are not mentioned (e.g. daikon, jicama, oriental cucumber, etc.). Do not include rice or other grains.

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