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Meat on the Mind: Associations Between Meat Consumption and Mental Health

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Abstract

The purpose of this non-experimental study was to explore patterns of association between meat consumption frequency and mental health in a convenience sample of 240 patients at a general practice/primary care acupuncture and Chinese medicine clinic in Northwest Arkansas, United States. Data were obtained from intake forms with questions about diet and mental health completed by the clinic's patients. An analysis of the responses revealed interesting patterns of association between meat consumption frequency and some mental health issues, including depression, suicide, memory, and susceptibility to stress. The analysis, however, did not show patterns of association between frequency of meat consumption and anxiety, temper, insomnia, or disturbed sleep.

Keywords: meat consumption, plant-based diet, vegetarian diet, mental health, depression, suicide

Meat on the Mind: Associations Between Meat Consumption and Mental Health

Mental illness is highly prevalent internationally, with rates of many psychological disorders on the rise. Worldwide an estimated 300 million people are affected by depression (World Health Organization, 2018). Approximately 1 in 5 adults in the United States experience mental illness in a given year (National Institute of Mental Health, 2017). The 12-month prevalence rate of major depressive disorder is approximately 7% in the United States, while 1 in 9 adults over 45 years of age in the United States reports experiencing cognitive decline (American Psychiatric Association, 2013; Taylor, Bouldin, & McGuire, 2018). Extensive research has been conducted on dietary patterns and their relation to mental health (Bhattacharyya et al., 2014; Beezhold, Johnston, & Daigle, 2010; Hosseinzadeh et al., 2016; Jacka et al., 2010; Li, et al., 2019; Munoz, Fito, Marrugat, Covas, & Schröder, 2008). However, many of the findings have been contradictory, calling for further clarifying research to inform health care providers, the public, and the scientific community about important dietary habits that may be associated with improved mental health outcomes. Many of these controversial dietary debates are centered around meat consumption and the degree in which to limit it, ranging from plant-based diets like veganism, vegetarianism, semi-vegetarianism, and lacto-vegetarianism, to consuming meat several times daily, as in the paleolithic, ketogenic, or carnivore diets. So-called “plant-based” diets, which completely eliminate meat and animal products, are on the rise globally. According to one report, there was a 600% increase in United

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States consumers claiming to be vegan between the years 2014 and 2017 (*Top Trends in Prepared Foods* 2017, n.d.). In 2014, only 1% of U.S. consumers were self-proclaimed vegans, but, by 2017, that number was up to 6% (*Top Trends in Prepared Foods* 2017, n.d.). Other estimates place the percentage of self-identifying vegans or vegetarians somewhere between 2% and 5% of the United States population (*Americans who are vegetarians or vegans*, 2018). This trend is not limited to the United States alone. In recent years, government agencies in several European countries, China, and the United States have all released dietary guidelines encouraging a shift to plant-based diets or a reduction in meat consumption (Health Council of the Netherlands, 2015; Public Health England, 2016; Swedish National Food Agency, 2015; Chinese Nutrition Society, 2016; United States Department of Health and Human Services & United States Department of Agriculture, 2015). Overall, the trend of adopting a plant-based, no-meat, or low-meat diet lifestyle is clearly on the rise.

Contemporary Research

There are varied and contradictory findings on the relationship between meat consumption and mental health. For instance, Hosseinzadeh et al. (2016) found that the lacto-vegetarian diet had protective qualities against depression in women and was associated with decreased likelihood of anxiety. Hosseinzadeh et al. (2016) also observed that this dietary pattern was typically correlated with lesser odds of psychological distress. Furthermore, Beezhold et al. (2010) found that vegetarians in a Seventh Day Adventist (SDA) population reported more positive mood states and less negative emotion than their omnivore counterparts.

In contrast, other researchers have found that diets with moderate meat consumption, including the Mediterranean diet and traditional diets are associated with positive mental health outcomes, including lessened anxiety and depression (Jacka et al., 2010; Munoz et al., 2008). Other research has shown that meat consumption is protective of negative psychological symptoms (Bhattacharyya et al., 2014; Michalak, Zhang, & Jacobi, 2012). For example, meat consumption has been found to reduce psychological distress in women (Bhattacharyya et al., 2014). Further, fish consumption has been negatively correlated with anxiety disorders and depressive disorders, while reducing the odds of psychological distress by half in men and women (Bhattacharyya et al., 2014; Michalak et al., 2012).

Michalak et al. (2012) identified increased prevalence of depressive disorders, anxiety disorders, somatoform disorders and syndromes, and eating disorders in vegetarian populations. Baines, Powers, and Brown (2007) found that vegetarian and semi-vegetarian women had more mental health problems, including depression, anxiety, and sleeplessness, while also exhibiting menstrual problems and low iron. Adolescent vegetarians have also been found to have an increased likelihood of having attempted or contemplated suicide and have an increased risk for unhealthy and extreme weight control behaviors, including binge eating, self-induced vomiting, laxative use, and frequent dieting (Perry, McGuire, Neumark-Sztainer, & Story, 2001). Other researchers discovered that some individuals use a vegetarian diet to cover up such dieting behaviors (Martins, Pliner, & O'Connor, 1999). Further, vegetarian diets are more common among adolescent populations with eating disorders, and Turkish vegetarian adolescents have been found to exhibit abnormal eating attitudes, low self-esteem, high social physique anxiety, and high trait anxiety (Baş, Karabudak, & Kiziltan, 2005; Perry et al., 2001).

Beyond this, eating disorders are psychologically complex, with behavioral, cognitive, and emotional factors. Abnormal eating attitudes, low self-esteem, high anxiety, and increased

weight concerns are all highly correlated and related to disordered eating (Fisher, Schneider, Pegler, & Napolitano, 1991). But even the known challenges associated with a vegetarian lifestyle may vary across different populations. For instance, Lavalley, Zhang, Michalak, Schneider, and Margraf (2019) found negative mental health factors were only reliably related to vegetarianism in Chinese populations but not in the American (United States), German, and Russian populations. Similarly, no meaningful difference in emotional symptoms between vegetarian and non-vegetarian adolescent populations across Ethiopia, Peru, and Vietnam were found (Santiv   ez-Romani, Carbajal-Vega, & Pereyra-Elias, 2018). There was also no difference between preschool Norwegian children on fish-based diets versus those on meat-based diets (Hysing, et al., 2018). These findings may suggest the presence of a cultural underpinning to the relationship between diet and mental health. In all, contemporary investigation of this phenomenon leaves much room for a clearer understanding of these relationships, especially in unexplored populations.

Biological Mechanisms

There are many mechanisms at play in the relationship between diet and mental health. For instance, diet has a modulatory effect on psychological disorders (G  mez-Pinilla, 2008; Hosseinzadeh et al., 2016; Jacka et al., 2010). Depression and other psychological disorders are affected by “genetic, hormonal, immunological, biochemical, and neurodegenerative factors”, which are all modulated by diet (Hosseinzadeh et al., 2016; Jacka et al., 2010, p. 310). Plausibly, then, diet impacts the development and course of psychological disorders (Jacka et al., 2010).

Inflammation. One possible explanation for the association between diet and mental health is inflammation, which is thought to have a major role in the onset and maintenance of depression (Jacka et al., 2010; Rahe, Unrath, & Berger, 2014). Specific diets have been shown to affect inflammation in the body. Mediterranean diets, for example, which are high in vegetables, fruits, fish, olive oil, low-fat dairy products, legumes, and whole grains, are correlated with lower levels of inflammatory markers, while diets high in refined carbohydrates, as well as western-type diets, are correlated with low-grade inflammation (Chrysoshoou, Panagiotakos, Pitsavos, Das, & Stefanadis, 2004; Jacka et al., 2010).

Oxidative stress. Oxidative stress, which could be involved in the pathophysiology of depression, also appears to be modulated by dietary factors (Hosseinzadeh et al., 2016; Jacka et al., 2010; Rahe et al., 2014). For example, diets high in antioxidants seem to effectively slow or prevent age-related pathophysiological and cognitive changes while reducing age-related diseases (Engelhart et al., 2002; Joseph et al., 1998). Further, decreased inflammation and oxidative stress in adults has been associated with high consumption of fruits and vegetables, which are often a major part of the lacto-vegetarian diet (Hosseinzadeh et al., 2016). Therefore, the lacto-vegetarian diet may be protectively associated with psychological disorders because of the high content of antioxidants (Hosseinzadeh et al., 2016).

Nutrients. Nutritional factors directly affect our neural physiology, including brain function (G  mez-Pinilla, 2008; Jacka et al., 2010). For example, high red meat and fish consumption can help brain function due to several factors including the presence of long-chain omega-3 fatty acids (Fayet, Flood, Petocz, & Samman, 2014; Hosseinzadeh et al., 2016; Li, Siriamornpun, Wahlqvist, Mann, & Sinclair, 2005). Low consumption of several micronutrients, including thiamine, riboflavin, iron, folate, vitamin C, and vitamin B12 have been associated with adverse mental symptoms (Benton & Donohoe, 1999; Engelborghs et al., 2004; Rannelli,

Watterson, Pandya, & Leung, 2014; Reynolds, 2006). Results from these studies point to a clear neural-nutritional relationship, especially between long-chain omega-3 fatty acids and brain function.

B12 and folate. Several researchers have reported correlations between vitamin B12 and folate deficiencies and psychological symptoms and disorders including depression, dementia, and Alzheimer's Disease (Benton & Donohoe, 1999; Engelborghs et al., 2004; Rannelli, Watterson, Pandya, & Leung, 2014; Reynolds, 2006). In a sample of geriatric patients, those below median levels of folate and vitamin B12 had lower scores on cognitive functioning tests, while depression severity was negatively associated with folate levels (Benton & Donohoe, 1999). In fact, both vitamin B12 and folic acid deficiencies may cause megaloblastic anemia, which results in neurologic damage (Dwyer, 1991; Rannelli et al., 2014). This is further complicated in diets high in folic acid, which is the case with many vegetarians who eat unusually high amounts of leafy green vegetables, because folic acid intake temporarily masks anemia development (Dwyer, 1991). Hematologic damage may be slowed while the brain damage from vitamin B12 deficiency progresses without delay, undiscovered (Dwyer, 1991). By the time the anemia is discovered, irreversible and severe damage to the central nervous system may have already taken place (Dwyer, 1991). The final stage of vitamin B12 deficiency includes a "patchy, diffuse, progressive demyelination with an insidious and progressive neuropathy" (p. 66), and, once it progresses to the brain, is referred to as megaloblastic madness (Dwyer, 1991, p. 66). Possible psychiatric symptoms include "emotional lability, mania, paranoia, delusions, amnesia, and psychosis" (Rannelli et al., 2014, p. 3). Considering vitamin B12 is found in virtually no plant foods, B12 deficiency could be an important factor relating to nutrient deficiency and potential adverse psychological symptoms in individuals restricting meat intake.

Iron. One of the most common nutritional issues in the world is iron deficiency (Benton & Donohoe, 1999). Iron deficiency anemia can lead to poor mood, lethargy, and attentional problems, while low iron levels without anemia has been associated with depressive symptoms in individuals who use oral contraceptives (Fordy & Benton, 1994; Rangan, Blight, & Binns, 1998). Not all sources of iron, however, will insure adequate iron levels in the body. Heme-iron is a highly bioavailable form of iron that is only found in meat (Dwyer, 1991; Monsen, 1988). Plant-based foods, on the other hand, contain nonheme-iron, which is poorly available and contains components that inhibit its absorption (Monsen, 1988). In Donovan and Gibson's (1996) research, half of the adolescents adhering to vegetarian or semi-vegetarian diets were iron-deficient. Their iron-deficiency could be due to the fact that the adolescents were only consuming nonheme-iron, preventing nutritionally adequate levels of iron in the body.

Zinc. Another important nutrient associated with brain function and mental health is zinc (Levenson, 2006). Low zinc levels have been associated with major depression, while zinc treatment has been used effectively to treat depression (Levenson, 2006). Several antidepressant therapies, including pharmaceuticals and electroconvulsive shock, have effectively been shown to increase zinc levels in the brains of rats, suggesting that zinc regulation may have antidepressant effects (Nowak & Schlegel-Zawadzka, 1999). Not only can zinc treatments improve mood, but depression and impaired cognitive function are early signs of clinical-level zinc deficiency (Maes et al., 1997). Clearly, adequate levels of zinc in one's diet can have positive mental health effects. However, lower than RDA zinc levels have been associated with vegetarianism, pointing to a possible lack of adequate zinc sources in meatless diets, as over two-thirds of zinc in the American diet comes from animal products (Dwyer, 1991; Gajski et al.,

2018; Janelle & Barr, 1995). Plausibly, then, avoiding meat could have a negative impact on one's mental health and brain function, due to inadequate dietary zinc levels.

Food avoidance. Another important factor that has been found to affect vital nutrient consumption, and, therefore, brain function and mental health, is the avoidance of specific foods (Fayet et al., 2014; Foote, Murphy, Wilkens, Basiotis, & Carlson, 2004). Fayet et al. (2014) found that reduced intake of vital nutrients, including iron, zinc, selenium, vitamin B12 and omega-3 fatty acids, resulted from food avoidance. More specifically, the avoidance of two or more types of meat, specifically, beef, lamb, chicken, or pork, has been found to drastically lower zinc, vitamin B12, selenium, and omega-3 fatty acids intakes (Fayet et al., 2014). Similarly, vegetarianism and veganism have been associated with lower levels of protein, calcium, copper, cholesterol, vitamin B12, zinc, bioavailable iron, selenium, omega-3 fatty acids, vitamin D, and calcium (Donovan & Gibson, 1996; Dwyer, 1991; Fayet et al., 2014; Gajski et al., 2018; Janelle & Barr, 1995; Obeid, Geisel, Schorr, Hübner, & Herrmann, 2002). Vegetarians also show a lower antioxidant defense system, higher homocysteine and genome damage, and shorter telomeres (Gajski et al., 2018). Thus, individuals avoiding animal product-consumption must be careful to consume vital nutrients, that are found primarily in animal products, such as vitamin B6, retinol, and carnitine, as deficiencies in these vital nutrients can lead to negative health implications, including compromised immune function resulting from even a mild zinc deficiency, anemia from iron and vitamin B12 deficiencies, malnutrition, and other nutrient deficiency related symptoms (Dwyer, 1991; Fayet et al., 2014; Gajski et al., 2018).

Dietary diversity. Another factor that influences diet, brain functioning, and mental health is dietary diversity. Dietary diversity refers to the variation in one's diet. High dietary diversity scores, calculated according to multiple varying food groups consumed over a period of time, have been found to be positively correlated with nutrient adequacy of adolescent and adult diets (Foote et al., 2004; Kennedy, Ballard, & Dop, 2013; Mirmiran & Azizi, as cited in Poorrezaeian et al., 2015). Multiple researchers have found that increased consumption of vegetables, fruits, meat, fish, eggs, and dairy result in increased dietary diversity scores (Jayawardena et al., 2013; Poorrezaeian et al., 2015). For instance, Mirmiran and Azizi (as cited in Poorrezaeian et al., 2015) found consumption of many types of food to be associated with maximum protection against disease, further emphasizing the importance of dietary diversity. Poorrezaeian et al., (2015) also found that dietary diversity scores and anxiety were inversely related. One could hypothesize, then, that individuals who maximize variety in their diet and have a high dietary diversity score, i.e., those who consume meat, fish, vegetables, fruits, dairy, etc., would experience improved mental health, considering the association between sufficient nutrient intake and reduced risk of mental health problems.

Psychological Mechanisms

On the other hand, Michalak et al. (2012) claim that biological mechanisms fail to explain the positive association between meat consumption avoidance and mental disorders. Instead, Michalak et al. (2012) suggest that the temporal relationship between the start of a vegetarian diet and age of onset of mental disorders points to a possible psychological mechanism. Michalak et al. (2012) found that, in the case of depressive, anxiety, and somatoform disorders, the adoption of a vegetarian diet typically follows the onset of a mental disorder. Michalak et al. (2012) propose two possible causal mechanisms behind the relationship.

Mental disorders cause vegetarian diet. First, it could be the case that mental disorders increase the probability of choosing to adhere to a vegetarian diet (Hibbeln, Northstone, Evans, & Golding, 2018; Michalak et al., 2012). In other words, the mental disorder causes the vegetarian diet (Hibbeln et al., 2018; Michalak et al., 2012). For instance, individuals with mental disorders may become more health-oriented to positively affect the outcome of their disease, or their mental disorder may make them more sensitive to the suffering of animals (Michalak et al., 2012). Furthermore, increased health-related anxiety from mental disorders may lead to the adherence to a vegetarian diet as a form of self-protection, because common conceptions are that meat is unhealthy (Michalak et al., 2012).

Independent third variable. Michalak et al.'s (2012) second proposal is that a stable psychological mechanism, i.e., a third variable, may increase both the likelihood of mental disorders and choosing a vegetarian diet, independently. For example, the mechanism could be "the tendency to experience and regulate negative emotions, high levels of responsibility and perfectionism, or contrasting social values of vegetarians" (Michalak et al., 2012, p. 8). Such mechanisms, however, could not easily explain the temporal relationship between mental disorders and the vegetarian diet (Michalak et al., 2012). Hibbeln et al. (2018) also hypothesize that intrinsic differences in the rate of psychiatric or personality issues between vegetarians and non-vegetarians could exist. It is possible, for instance, that choosing to follow a vegetarian diet is a marker for psychiatric disorders for some part of the population (Hibbeln et al., 2018).

Personality and interests. Another perspective on the relationship between meat consumption and mental health involves personality and interests. Researchers have found that meat avoidance may be associated with individual personality and interests (Forestell & Nezlek, 2018; Goldberg & Strycker, 2002; Pfeiler & Egloff, 2018). Specifically, Goldberg and Strycker (2002) found that individuals who avoided meat tended to have interests similar to those of "liberal arts professors, elementary and high school teachers, physicians, and commercial artists," (p. 60) while individuals who consumed meat had interests similar to those of "managers (store and hotel), marketing directors, corporate CEO/presidents, financial planners, and realtors" (p. 60). Goldberg and Strycker (2002) also found that individuals who avoided meat typically described themselves in ways that emphasized imagination and reflection, over talkativeness and sociability. Forestell and Nezlek (2018) discovered that vegetarians had higher levels of openness than semi-vegetarians, who were more open than omnivores. Further, vegetarians and semi-vegetarians were found to be more neurotic and depressed than omnivores (Forestell & Nezlek, 2018). Pfeiler and Egloff (2018) uncovered that agreeableness was associated with vegetarianism, and conservative, right-wing political ideology was associated with higher meat consumption. These findings point to possible personality, interest, and political differences between vegetarians and non-vegetarians (Forestell & Nezlek, 2018; Goldberg & Strycker, 2002; Pfeiler & Egloff, 2018). Contemporary research points to a strong relationship between personality and mental disorders, further shedding light on the possible underlying mechanisms involved in the association between meat consumption, personality, and mental health (Krueger et al., 1996; Krueger & Eaton, 2010; Widiger, 2011).

Reverse Causality

It is possible the relationship between diet and mental health is bi-directional. For example, some mental disorders such as depression or anxiety may create changed appetite, dietary patterns, and self-care habits (Jacka et al., 2010; Hosseinzadeh et al., 2016). Therefore,

in some cases, poor diet may result from mental health symptoms, rather than diet resulting in mental health symptoms (Hosseinzadeh et al., 2016; Sarlio-Lähteenkorva, Lahelma, & Roos, 2004). Mental illness, dietary inadequacy, and depletion of vital nutrients may, then, plausibly form a vicious cycle (Jacka et al., 2010).

There have been many contemporary studies on the relationship between meat consumption and mental health. Although there is evidence to suggest that vegetarianism has a negative impact on mental health in the form of depression, anxiety, somatoform disorders, eating disorders, and more, some researchers suggest a positive relationship between vegetarianism and mental health. Various mechanisms likely contribute to this relationship between meat consumption and mental health, including nutritional deficiencies, psychological mechanisms, e.g., personality traits and interests, and reverse causality. Further research is needed to understand why meat consumption and mental health seem to be related and to clarify what factors influence this relationship. The purpose of this study, therefore, was to determine if there is an association between meat consumption frequency and mental health. Specifically, it was predicted that there is an association between meat consumption frequency and depression, anxiety, susceptibility to stress, bad temper, insomnia, disturbed sleep, poor memory, having ever been treated for emotional problems, and having ever contemplated or attempted suicide.

Method and Material

Sample

The sample in this study comprised 240 patients from a general practice/primary care acupuncture and Chinese medicine clinic in Northwest Arkansas selected using convenience sampling technique. Patients were self-selected, seeking medical assistance with pain and/or internal medical problems, including digestive problems, immunological issues, sleep problems, psychological issues, etc. Some patients were currently receiving acupuncture and Chinese medical treatments at the clinic. Current patients were typically being treated for their medical condition(s) on a regular basis, some as frequently as 3 times per week and others closer to once per month. Some patients were receiving care at the clinic on an as-needed basis while other patients had previously received treatments but were no longer under the direct care of the clinic. Non-psychoneurological health conditions, use of medication, and other medical records of patients were not taken into consideration for this study. However, the proportion of patients within the age categories was similar between the low meat consumption and high meat consumption groups. The demographic characteristics of the sample are presented in Table 1.

Table 1
Demographic Summary of Sample

	Low Frequency		High Frequency		Total (n=240)
	Female (n=65)	Male (n=27)	Female (n=91)	Male (n=65)	
Meat Consumption Frequency	n(%)	n(%)	n(%)	n(%)	n(%)

Age	0-9	0(0)	1(100)	0(0)	0(0)	1(100)
	10-19	2(33)	0(0)	2(33)	2(33)	6(100)
	20-29	15(34)	4(9)	15(34)	10(23)	44(100)
	30-39	18(33)	2(4)	20(37)	14(26)	54(100)
	40-49	10(27)	3(8)	12(32)	12(32)	37(100)
	50-59	13(28)	9(19)	19(40)	6(13)	47(100)
	60-69	5(14)	6(16)	17(46)	9(24)	37(100)
	70-79	2(17)	1(8)	5(42)	4(33)	12(100)
	80-89	0(0)	1(50)	1(50)	0(0)	2(100)
Type of Meat	No Meat	16(70)	7(30)	0(0)	0(0)	23(100)
	Red Meat (RM) Only	4(67)	0(0)	0(0)	2(33)	6(100)
	Fish Only	4(36)	1(9)	4(36)	2(18)	11(100)
	Poultry Only	14(32)	4(9)	14(32)	12(27)	44(100)
	Pork Only	2(40)	0(0)	2(40)	1(20)	5(100)
	Fish & Pork	0(0)	0(0)	0(0)	1(100)	1(100)
	Fish & Poultry	3(16)	3(16)	10(53)	3(16)	19(100)
	Poultry & Pork	1(9)	0(0)	6(55)	4(36)	11(100)
	RM & Fish	0(0)	0(0)	2(40)	3(60)	5(100)
	RM & Poultry	3(16)	3(16)	6(32)	7(37)	19(100)
	Fish, Poultry & Pork	0(0)	0(0)	3(75)	1(25)	4(100)

RM, Fish & Poultry	2(40)	0(0)	2(40)	1(20)	5(100)
RM, Poultry & Pork	0(0)	0(0)	4(100)	0(0)	4(100)
RM, Fish, Poultry & Pork	0(0)	0(0)	0(0)	1(100)	1(100)
No Response	16(20)	9(11)	38(46)	19(23)	82(100)

Instrumentation

The primary instrumentation for this study was the current version (11/2018) of the clinic's patient intake form (see Appendix), which is filled out prior to the patient's first appointment at the clinic. All data existed prior to the start of this study but were compiled to be analyzed for this study. Information used for this study from the intake form included: age, sex, number of times individual consumes meat daily on average, and neuropsychological conditions, including whether the individual reports experiencing depression, anxiety, bad temper, insomnia, disturbed sleep, or poor memory, whether they are easily susceptible to stress, whether they have ever been treated for emotional problems, and whether they have ever contemplated or attempted suicide. For the purpose of this study, meat was defined as any animal flesh, including red meat, poultry, and fish.

The validity of the information may have been limited by environmental factors, since testing environment was not controlled for. Some patients filled out the intake form on their own, e.g., at home, work, etc., while some patients filled out the intake form at the clinic before their appointment. Distraction and time-restraints may have affected patient responses. Another potential factor affecting the validity of the information is the degree of honesty in which patients filled out the intake form. Due to the sensitive nature of mental health and suicide, some patients may not have responded honestly. There is a high degree of reliability of the information, because all patients received the same intake form, and only one observer recorded data from the intake forms.

Procedure

Once IRB approval was obtained for this nonexperimental study, existing data were compiled by the researcher from the acupuncture clinic's intake forms. These forms were originally filled out by patients before their first appointments or at the clinic during their first appointments. The intake forms were all in paper format and cover approximately 2 years of patient records. The clinic administrators de-identified all data relevant to the project which I then obtained in the form of a Microsoft Excel spreadsheet. A meat serving was counted if the patient explicitly mentioned meat (e.g., "steak with vegetables", "chicken salad", "hamburger", "cold cuts", "bacon", etc.) in the "Lifestyle Information" section of the intake form under "On a typical day, what do you eat or drink for?" (see Appendix). If it was not clear whether the patient was referring to meat (e.g., "sandwich" or "salad"), that patient's data was not included (see Appendix). If meat was mentioned only on the dinner line, then the patient was marked as

consuming meat once per day on average (see Appendix). If meat was mentioned on two lines (e.g., lunch and dinner), the patient was marked as consuming meat two times per day on average (see Appendix). If meat was mentioned on the breakfast, lunch, and dinner lines, the patient was marked as consuming meat three times per day on average (see Appendix). Neuropsychological data were indicated by a checked box next to the condition or symptom (see Appendix). Reported frequency of meat consumption and neuropsychological conditions were examined for association using chi-square tests of independence. Each hypothesis in this study was examined at an alpha level of 0.05 and Cramer's V , as well as odds ratios were calculated as estimates of the effect size for each analysis.

Results

Data analysis was conducted using IBM SPSS® software version 25. A total of 9 hypotheses were tested as part of exploring the broader purpose of this study. Specifically, tests were conducted to determine if there were statistically significant associations between frequency of meat consumption and common mental health issues (depression, anxiety, susceptibility to stress, bad temper, considering or attempting suicide, insomnia, disturbed sleep, poor memory, and treatment for emotional problems) in the population of interest.

To explore the association between the frequency of reporting depression in individuals who reported consuming meat zero to one time per day and individuals who reported consuming meat two to three times per day, a chi-square test of independence was conducted (See Table 2). A statistically significant association was found between reported depression and reported meat consumption frequency $\chi^2(1) = 13.32, p = 0.001, OR = 2.87$ (95% CI: 1.613, 5.106). These results were not only statistically significant but indicated a small to medium effect size (Cramer's $V = 0.24$) such that patients with a lower frequency of meat consumption were more likely to report that they experienced depression (57%) compared to those who reported a higher frequency of meat consumption (43%). The odds of reporting depression were therefore 2.87 times higher for those with low meat consumption than for those with high meat consumption. Similarly, a chi-square test of independence was calculated comparing the reported frequency of anxiety in individuals who consume meat zero to one time per day and individuals who consume meat two to three times per day (See Table 2). No statistically significant association was found between reported anxiety and reported meat consumption frequency $\chi^2(1) = 3.70, p = .054, OR = 1.67$ (95% CI: 0.99, 2.83). These results suggest that individuals who reported consuming meat less often were not significantly more likely to experience anxiety (53%) than individuals who reported consuming meat more often (41%). The estimated effect size for this association was also small (Cramer's $V = 0.12$). Next, to test the association between reported susceptibility to stress in individuals who reported consuming meat zero to one time per day and individuals who reported consuming meat two to three times per day, a chi-square test of independence was conducted (See Table 2). In this case, a statistically significant association was found between being easily susceptible to stress and meat consumption frequency $\chi^2(1) = 3.74, p = .037$. Individuals who reportedly consumed more meat also reported being less susceptible to stress (66%) than individuals who consumed less meat (34%). The odds of being easily susceptible to stress were therefore 1.80 (95% CI: 1.031, 3.133) times higher for those with low meat consumption than for those with high meat consumption. Cramer's V results (0.13) indicated a small effect size for this association.

Table 2

Self-Reported Frequency of Meat Consumption and Mental Health [Part A]

	Low Frequency of Consumption 0-1 Times/day <i>n</i> (%)	High Frequency of Consumption 2-3 Times/day <i>n</i> (%)	Significance
Depression	39(57)	30(43)	
No Depression	53(31)	117(69)	$p=.001^{***}$
Anxiety	49(45)	60(55)	
No Anxiety	43(33)	88(67)	$p=.054$
Easily Susceptible to Stress	36(48)	39(52)	
Not Easily Susceptible to Stress	56(34)	109(66)	$p=.038^*$
Bad Temper	10(43)	13(57)	
No Bad Temper	82(38)	135(62)	$p=.594$
Considered or Attempted Suicide	13(65)	7(35)	
Not Considered or Attempted Suicide	75(35)	138(65)	$p=.009^{**}$

 $p<.05^*$, $p<.01^{**}$, $p<.001^{***}$

Similarly, a chi-square test of independence was calculated to compare the frequency of reporting bad temper between individuals who reported low meat consumption frequency and individuals who reported higher meat consumption frequency (See Table 2). No statistically significant association was found between these variables $\chi^2(1) = 0.09, p = .596, OR = 1.27$ (95% CI: 0.53, 3.02). It was therefore concluded that individuals who reportedly consumed less meat were no more likely than those reporting a higher frequency of meat consumption to report experiencing bad temper. Furthermore, these results had a very small effect size (Cramer's $V = 0.03$). To test the fifth hypothesis in this study, a chi-square test of independence was calculated comparing the reported frequency of contemplated or attempted suicide in individuals who consume meat zero to one time per day and individuals who consume meat two to three times per day (See Table 2). The results of this analysis revealed a statistically significant association between reported contemplated or attempted suicide and reported meat consumption with a small to medium effect size $\chi^2(1) = 6.90, p = .009$, Cramer's $V = 0.20, OR = 3.42$ (95% CI: 1.31, 8.93). Individuals who reportedly consumed less meat on average were more likely to report ever having contemplated or attempted suicide (65%) than individuals who reportedly consumed more meat on average daily (35%). The odds of reporting contemplated or attempted suicide were therefore 3.42 times higher for those with low meat consumption than for those with high meat consumption.

Table 3

Self-Reported Frequency of Meat Consumption and Mental Health [Part B]

	Low Frequency of Consumption 0-1 Time/day <i>n</i> (%)	High Frequency of Consumption 2-3 Times/day <i>n</i> (%)	Significance
Insomnia	31(45)	38(55)	$p = .182$
No Insomnia	61(36)	110(64)	
Disturbed Sleep	45(37)	76(63)	$p = .775$
No Disturbed Sleep	46(39)	72(61)	
Poor Memory	29(57)	22(43)	$p = .002^{**}$
No Poor Memory	63(33)	126(67)	

Treated For Emotional Problems	30(43)	39(57)	
Not Treated for Emotional Problems	62(37)	106(63)	$p = .346$

$p < .05^*$, $p < .01^{**}$, $p < .001^{***}$

To test the hypothesis of an association between the frequency of reported insomnia and meat consumption frequency, a chi-square test of independence was conducted (See Table 3). The results of this analysis revealed no statistically significant association between reported insomnia and meat consumption frequency $\chi^2(1) = 1.41$, $p = .182$, OR = 1.47 (95% CI: 0.833, 2.597). Individuals who reported consuming more meat were no more likely to report experiencing insomnia than individuals who consumed less meat. The estimated effect size for this analysis was also small (Cramer's $V = 0.09$). However, in the sample, the odds of reporting insomnia were 1.47 times higher for those reporting low meat consumption than for those reporting high meat consumption. A chi-square test was also used to examine the association between reports of disturbed sleep and reported daily meat consumption frequency (See Table 3). No statistically significant association and a very small effect size was found for the association between these variables $\chi^2(1) = 0.02$, $p = .777$, Cramer's $V = 0.018$. Individuals who reported consuming less meat were no more likely than those who reportedly consumed more meat to have insomnia. The odds of experiencing disturbed sleep were merely 0.93 times higher (95% CI: 0.55, 1.56) for those reporting low meat consumption than for those reporting high meat consumption in the sample. Similar analyses were conducted to compare the frequency of poor memory in individuals who consume meat zero to one time daily and individuals who consume meat two to three times daily (See Table 3). A statistically significant association with a small to medium effect size was found between reported poor memory and reported frequency of meat consumption $\chi^2(1) = 9.41$, $p = .002$, Cramer's $V = 0.20$. Individuals who reported consuming less meat were more likely to report experiencing poor memory (57%) compared to individuals who consumed more meat (43%). The odds of reporting poor memory were 2.64 times higher (95% CI: 1.40, 4.95) for individuals reporting low meat consumption than for those reporting high meat consumption. Lastly, a chi-square test of independence was calculated comparing reported frequencies of having been treated for emotional problems in individuals who consume meat zero to one time per day and individuals who consume meat two to three times per day (See Table 3). No statistically significant association was found between reports of having received treatment for emotional problems and frequency of meat consumption $\chi^2(1) = 0.89$, $p = .345$, Cramer's $V = 0.061$. These results suggest no association between frequency of meat consumption and the likelihood of being treated for emotional problems. In the sample, however, the odds of reporting treatment for emotional problems were 1.32 times higher (95% CI: 0.74, 2.33) for those reporting low meat consumption than for those reporting high meat consumption.

Discussion

Findings

Our goal in this study was to take the first steps in exploring the phenomenon of meat consumption frequency in order to identify possible patterns of association between this phenomenon and a range of common mental health concerns of patients at an acupuncture clinic in Northwest Arkansas. Results of our data analysis revealed interesting patterns of associations between reported frequency of meat consumption and several mental health issues. Specifically, we found a significantly higher frequency of reporting depression, being easily susceptible to stress, experiencing poor memory, as well as considering or attempting suicide when low meat consumption frequency was reported. Although our findings identify statistically significant patterns of association between frequency of meat consumption and certain mental health issues, they do not imply a causal relationship between these variables. Rather, these findings are exploratory and, therefore, should serve to direct possible future research efforts.

The results of this study are noteworthy given the increasing number of people who are adopting vegetarian, vegan, and other dietary practices reducing or eliminating animal protein. Many of these individuals are adopting low meat consumption lifestyles as a means of managing chronic illness or aging, for moral or religious reasons, or out of concern for the environment (Cramer, et al., 2017; Laestadius, Neff, Barry, & Frattaroli, 2016). The body of evidence suggesting that these dietary restrictions may be associated with certain mental health risks are greatly contributed to by this research. What we discovered is consistent with previous research. For instance, the findings regarding depression and susceptibility to stress mirror those of Bhattacharyya et al. (2014) that found meat consumption to reduce psychological distress in women, as well as discoveries by Michalak et al. (2012) and Li et al. (2019) regarding an increased prevalence of various mental disorders in vegetarian populations. Furthermore, other investigators have noted that various nutrient deficiencies, including vitamin B12 or folate (commonly found in individuals adhering to vegetarian diets), are correlated with psychological disorders, including depression and dementia (Benton & Donohoe, 1999; Engelborghs et al., 2004; Rannelli, Watterson, Pandya, & Leung, 2014; Reynolds, 2006). The significant results from the current study support the hypothesis that there is an association between meat consumption frequency and mental health.

However, it is also important to note that we found no statistically significant patterns of associations between frequency of meat consumption and anxiety, bad temper, insomnia, disturbed sleep, and having ever received treatment for emotional problems. Again, the findings of our current research are generally consistent with the scant extant literature regarding sleep and emotional symptoms presumed to be associated with dietary practices reducing or eliminating meat consumption. Unfortunately, with the exception of investigations regarding anxiety, much of the literature in this area are based on populations in dietary cultures that are markedly different from those in the United States (Hysing, et al., 2018; Santivanez-Romani, et al., 2018).

Finally, it is not clear from the current study which factors account for the separation between those mental health concerns we have identified as prevalent among people with low meat consumption and those for which the differences between the two groups (low and high meat consumption) were not substantial. While, our discoveries do not suggest a causal relationship between lower meat consumption frequency and any of the mental health disorders

in this study, we do believe that our results provide great exploratory insights that can guide further investigation of this phenomenon. These findings are also a relevant addition to the knowledge base, and the gaps we have identified warrant further research.

Limitations

The results of this study should be considered in light of certain limitations. First and foremost, the data in this study were obtained from a relatively small convenience sample of 240 individuals. Data were collected and analyzed solely from this acupuncture clinic because it was easily accessible to the author of the study, due to an existing work relationship with the clinic. The sample size and non-probability technique pose certain limits on the extent to which these discoveries can be confidently generalized to the larger population. Additionally, the samples were drawn from a single acupuncture clinic in Northwest Arkansas, and, thus, may not adequately represent the dietary, ethnic, gender, and socioeconomic diversity of the larger United States population. Further, Northwest Arkansas as a metropolitan area has unique characteristics that may limit generalization of these findings to nonmetropolitan settings. Beyond these limitations that pertain to the external validity of these discoveries, there may also be challenges to the internal validity of the study resulting from the use of self-report data. With these types of data, it is entirely possible that some patients may not have been fully transparent in documenting the criteria we investigated in this study due to the sensitive nature of the issues of dietary habits and mental well-being.

Implications

Nutrition literature clearly show that plant-based foods and animal proteins each provide distinct and essential nutrients for both physiological and neurological health. Much of the previous research in this area also strongly suggest that dietary practices that do not entirely eliminate either one of these food groups lead to better mental health outcomes (McMartin, Jacka, & Colman, 2013; Murphy & Allen, 2003; Neumann, Harris, & Rogers, 2002). The results from this study further support the current body of evidence that optimal mental health may best be achieved through a diet that includes meat. Since vegetarian-related diets necessarily exclude meat, whereas the reverse is not true (i.e. non-vegetarian diets do not exclude plant-based foods), we recommend that individuals partaking in dietary practices which reduce or eliminate animal protein consider receiving regular mental health check-ups, given the association between these dietary practices and lower levels of mental health. This study sheds new light on the subject of diet and nutrition, insofar as it addresses meat consumption frequency and its association with mental health. Specifically, the results of the study show that the consumption of meat multiple times daily may benefit mental health on various levels, and is, therefore, recommended. Some mental health symptoms in individuals suffering from depression, susceptibility to stress, poor memory, or suicidality may be improved with regular meat consumption, given the associations found in this study. This could also mean that eating a diet rich in animal protein may be a good preventative measure for individuals with a personal or family history of depression, susceptibility to stress, poor memory, or suicidality. Finally, it is recommended that individuals with a personal or family history of the aforementioned mental health conditions carefully consider these outcomes before committing to vegetarian and other meatless diets.

Perhaps most importantly, physical and mental health practitioners need to help educate the public about the potential consequences associated with eating or not eating meat. Given the fact that many laypeople turn to these practitioners for guidance about best health practices, including diet, this could go a long way toward counteracting the many misconceptions surrounding meat consumption and its physical and mental health implications. Educating patients may also help counteract the potentially dangerous trend of going completely meatless without consulting a health care provider to determine if such a diet is right for them.

Future Research

Because mental illness continues to affect a large portion of the world's population, the connection between diet and mental health will continue to generate interest among researchers in a variety of fields. In the area of this investigation that pertains to outcomes related to meat consumption or vegetarianism, there is a need for investigations that specifically explore causal relationships. Future research in this area should, therefore, include larger randomized studies with samples drawn from yet to be explored populations while accounting for important demographic characteristics such as socioeconomic status, ethnicity, and age. Additionally, investigations that employ more robust approaches to operationalizing both dietary patterns as well as mental health concerns would provide higher levels of construct validity. Ultimately, additional empirical evidence that helps us better understand the complex relationship between diet and mental health should be of high priority to researchers in this area.

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Appendix

Health & Medical History

Please help us provide you with a complete evaluation by taking the time to fill out this questionnaire carefully. All your answers will be held confidential. The more information you provide, the better care we can offer you. Take your time and use the comments section for any additional info you'd like us to have.

Today's Date _____

Name: _____

Street _____ City: _____ State: _____ Zip: _____

Age: _____ Date of Birth: _____ Height: _____ Weight: _____

Home Phone: _____ Cell Phone: _____

Email: _____ Occupation: _____

In Emergency Notify: Name _____ Phone# _____

Referred by: _____ Family Physician: _____

Have you used Acupuncture before? Yes/No Prescription herbal medicine? Yes/No

What are the main problems, for which you are seeking care? / How long has it been a problem?

What diagnosis have you received? _____

What imaging or lab results do you have? _____

What kinds of treatment have you tried? _____ Were they effective? _____

List all medications taken within the last two months (vitamins, drugs, herbs, etc)

_____	_____	_____
_____	_____	_____
_____	_____	_____

Past Medical History (Select all that apply)

- | | |
|--|--|
| <input type="checkbox"/> Diabetes | <input type="checkbox"/> Accidents or significant trauma (Please describe) |
| <input type="checkbox"/> Hepatitis | _____ |
| <input type="checkbox"/> High blood pressure | _____ |
| <input type="checkbox"/> Heart disease | _____ |
| <input type="checkbox"/> Seizures | |

Are you currently taking blood thinners or on an aspirin regimen? Yes/No

(For females) Are you currently pregnant? Yes/No

Have you received a Botox treatment in the last 2 weeks? Yes/No

Do you have HIV/AIDS? Yes/No

Do you have Hepatitis B? Yes/No

Past Surgical History or Hospitalization (List any past surgeries and dates)

_____	Date
_____	Date
_____	Date

Known Allergies (Drugs, Food, etc)

Lifestyle Information

Do you follow a regular exercise/activity program? Yes/No

If Yes, please describe: _____

On a typical day, what do you eat and drink for:

Breakfast: _____

Lunch: _____

Dinner: _____

Snacks: _____

Please circle any of the following habits that apply.

	How often?
Overeating	
Cigarette smoking/Vaping	
Coffee/Sweet Tea/Soda	
Alcoholic beverages	
Use of recreational drugs	

How have you taken care of your health in the past? Please check all that apply.

- | | |
|---------------------------------------|---|
| <input type="checkbox"/> Medications | <input type="checkbox"/> Physical therapy |
| <input type="checkbox"/> Acupuncture | <input type="checkbox"/> Diet and nutrition |
| <input type="checkbox"/> Exercise | <input type="checkbox"/> Vitamins/Supplements |
| <input type="checkbox"/> Chiropractic | <input type="checkbox"/> Other _____ |

Were these methods helpful? Please explain in detail.

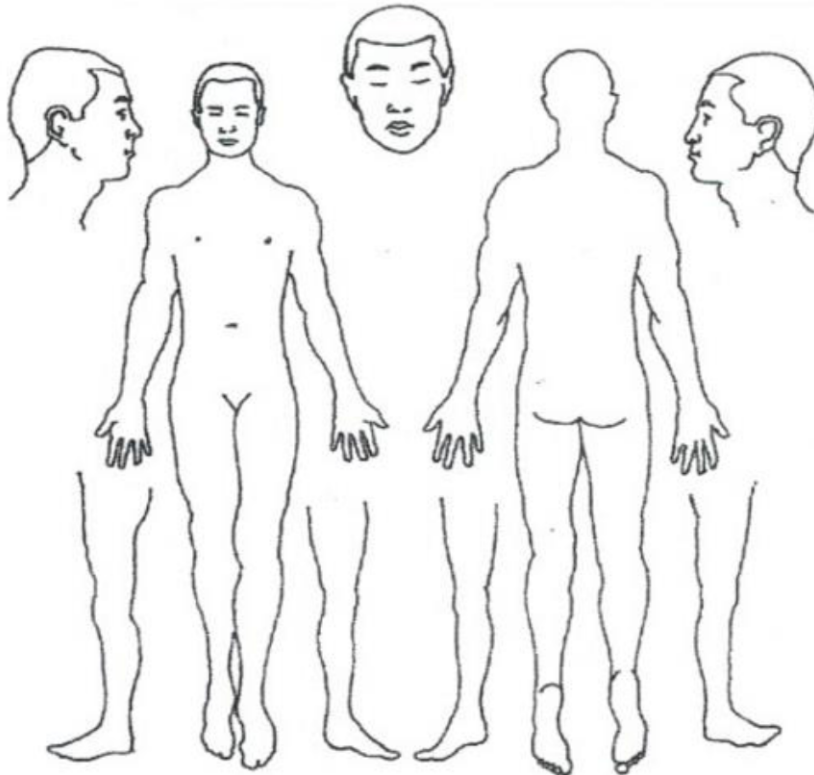
Family Medical History (Please select all that apply)

- | | | |
|------------------------------------|--|---------------------------------------|
| <input type="checkbox"/> Allergies | <input type="checkbox"/> Cancer | <input type="checkbox"/> Seizures |
| <input type="checkbox"/> Diabetes | <input type="checkbox"/> Heart disease | <input type="checkbox"/> Stroke |
| <input type="checkbox"/> Asthma | <input type="checkbox"/> High blood pressure | <input type="checkbox"/> Other: _____ |

Other relevant medical history

Please mark painful or distressed areas using symbols on the chart below.

Tension: ///	Pain: XXX	Tingling: ttt	Numbness: OOO
--------------	-----------	---------------	---------------



Check next to any conditions you have experienced within the last **THREE MONTHS**. Indicate the length of time you have had this condition.

General

- | | | |
|---|--|---|
| <input type="checkbox"/> Poor appetite | <input type="checkbox"/> Weight gain | <input type="checkbox"/> Night sweats |
| <input type="checkbox"/> Insomnia | <input type="checkbox"/> Weight loss | <input type="checkbox"/> Fever |
| <input type="checkbox"/> Disturbed sleep | <input type="checkbox"/> Changes in appetite | <input type="checkbox"/> Chills |
| <input type="checkbox"/> Localized weakness | <input type="checkbox"/> Sweating easily | <input type="checkbox"/> Sudden energy drop(time of the day?) |
| <input type="checkbox"/> Cravings | <input type="checkbox"/> Tremors | <input type="checkbox"/> Poor balance |
| <input type="checkbox"/> Strong thirst | <input type="checkbox"/> Bleeding or bruising easily | |

Other unusual conditions you have noticed in your general sense of health

Skin and Hair

- | | | |
|--------------------------------------|------------------------------------|---|
| <input type="checkbox"/> Rashes | <input type="checkbox"/> Eczema | <input type="checkbox"/> Recent mole |
| <input type="checkbox"/> Ulcerations | <input type="checkbox"/> Pimples | <input type="checkbox"/> Changes in texture of hair or skin |
| <input type="checkbox"/> Hives | <input type="checkbox"/> Dandruff | |
| <input type="checkbox"/> Itching | <input type="checkbox"/> Hair loss | |

Any other related problems:

Head, Eyes, Ears, Nose, Throat

- | | | |
|---|--|---|
| <input type="checkbox"/> Dizziness | <input type="checkbox"/> Color blindness | <input type="checkbox"/> Recurrent sore throats |
| <input type="checkbox"/> Concussions | <input type="checkbox"/> Cataracts | <input type="checkbox"/> Nose bleeds |
| <input type="checkbox"/> Migraines | <input type="checkbox"/> Blurry vision | <input type="checkbox"/> Grinding teeth |
| <input type="checkbox"/> Glasses | <input type="checkbox"/> Earaches | <input type="checkbox"/> Sores on lips or tongue |
| <input type="checkbox"/> Spots in front of eyes | <input type="checkbox"/> Ringing in ears | <input type="checkbox"/> Facial pain |
| <input type="checkbox"/> Eye pain | <input type="checkbox"/> Poor hearing | <input type="checkbox"/> Teeth problems |
| <input type="checkbox"/> Poor vision | <input type="checkbox"/> Eye strain | <input type="checkbox"/> Headaches (Where? When?) |
| <input type="checkbox"/> Night brightness | <input type="checkbox"/> Sinus problems | <input type="checkbox"/> Jaw clicks |

Any other related problems:

Cardiovascular

- | | | |
|--|--|--|
| <input type="checkbox"/> Dizziness | <input type="checkbox"/> High blood pressure | <input type="checkbox"/> Swelling of feet |
| <input type="checkbox"/> Low blood pressure | <input type="checkbox"/> Fainting | <input type="checkbox"/> Blood clots |
| <input type="checkbox"/> Chest pain | <input type="checkbox"/> Cold hands or feet | <input type="checkbox"/> Difficulty in breathing |
| <input type="checkbox"/> Irregular heartbeat | <input type="checkbox"/> Swelling of hands | <input type="checkbox"/> Phlebitis |

Any other related problems:

Respiratory

- | | | |
|--|--|---|
| <input type="checkbox"/> Cough | <input type="checkbox"/> Bronchitis | <input type="checkbox"/> Difficulty breathing when lying down |
| <input type="checkbox"/> Coughing up blood | <input type="checkbox"/> Pain with deep inhalation | <input type="checkbox"/> Excessive phlegm(color?) |
| <input type="checkbox"/> Asthma | <input type="checkbox"/> Pneumonia | |

Any other related problems:

Gastrointestinal

- | | | |
|---------------------------------------|--|---|
| <input type="checkbox"/> Nausea | <input type="checkbox"/> Belching | <input type="checkbox"/> Rectal pain |
| <input type="checkbox"/> Vomiting | <input type="checkbox"/> Black stools | <input type="checkbox"/> Hemorrhoids |
| <input type="checkbox"/> Diarrhea | <input type="checkbox"/> Blood in stools | <input type="checkbox"/> Abdominal pain or cramps |
| <input type="checkbox"/> Constipation | <input type="checkbox"/> Indigestion | <input type="checkbox"/> Frequent laxative use |
| <input type="checkbox"/> Gas | <input type="checkbox"/> Bad breath | <input type="checkbox"/> Heartburn/Acid reflux |

Any other related problems:

Genitourinary

- | | | |
|---|---|--|
| <input type="checkbox"/> Pain on urination | <input type="checkbox"/> Unable to hold urine | <input type="checkbox"/> Prostate problems |
| <input type="checkbox"/> Urgent or frequent urination | <input type="checkbox"/> Decrease in flow | <input type="checkbox"/> Impotence |
| <input type="checkbox"/> Blood in urine | <input type="checkbox"/> Kidney stones | <input type="checkbox"/> Sores on genitals |

Do you wake up at night to urinate? Yes/No If Yes, how often?

Any particular color to your urine?

Any other genital or urinary problems

Reproductive and Gynecologic

- | | | |
|--|---|---|
| <input type="checkbox"/> PMS symptoms | <input type="checkbox"/> Heavy menstrual flow | <input type="checkbox"/> Premature births |
| <input type="checkbox"/> Menstrual clots | <input type="checkbox"/> Light menstrual flow | <input type="checkbox"/> Miscarriages |
| <input type="checkbox"/> Painful menses | <input type="checkbox"/> Irregular menses | <input type="checkbox"/> Abortions |
| <input type="checkbox"/> Unusual menses | <input type="checkbox"/> Other problems _____ | |

Age at first menses

Age at menopause

Number of pregnancies

Time between cycles

Duration of bleeding

First day of last menses

Do you practice birth control? Yes/No If Yes, what type? For how long?

Any other gynecologic problems

Musculoskeletal

- | | | |
|---------------------------------------|---|---|
| <input type="checkbox"/> Neck pain | <input type="checkbox"/> Back pain | <input type="checkbox"/> Hand/wrist pains |
| <input type="checkbox"/> Muscle pains | <input type="checkbox"/> Muscle weakness | <input type="checkbox"/> Shoulder pains |
| <input type="checkbox"/> Knee pain | <input type="checkbox"/> Foot/ankle pains | <input type="checkbox"/> Hip pain |

Any other related problems:

Neuropsychological

- | | | |
|--|---|---|
| <input type="checkbox"/> Seizures | <input type="checkbox"/> Poor memory | <input type="checkbox"/> Anxiety |
| <input type="checkbox"/> Dizziness | <input type="checkbox"/> Lack of coordination | <input type="checkbox"/> Bad temper |
| <input type="checkbox"/> Loss of balance | <input type="checkbox"/> Concussion | <input type="checkbox"/> Easily susceptible to stress |
| <input type="checkbox"/> Areas of numbness | <input type="checkbox"/> Depression | |

Have you ever been treated for emotional problems? Yes/No

Have you ever considered or attempted suicide? Yes/No

Any other neurological/psychological problems (Please describe):

(If selected "Yes" to any questions above) Do you have professional resources to help? Yes/No

Comments

Please list any other problems you would like to discuss:



Stress Management Assessment

On a scale of 0 to 10 (10 being the most) how high do you rate your current level of stress?

0 1 2 3 4 5 6 7 8 9 10
None Extremely

What factors contribute to your stress? Please select all that apply.

- | | |
|---------------------------------------|--|
| <input type="checkbox"/> Work | <input type="checkbox"/> Health |
| <input type="checkbox"/> Family | <input type="checkbox"/> Finances |
| <input type="checkbox"/> Relationship | <input type="checkbox"/> Others: _____ |

What ways have you identified in your life for effectively and safely dealing with stress?(e.g. Prayer, Medication, journaling, counseling, etc)

Do you practice any of the following to relieve your stress?

How long have you been doing?

How often?
(everyday, a few times a week, etc)

- | | | |
|--|-------|-------|
| <input type="checkbox"/> Exercise
(please specify: _____) | _____ | _____ |
| <input type="checkbox"/> Medication
(please specify: _____) | _____ | _____ |
| <input type="checkbox"/> Yoga | _____ | _____ |
| <input type="checkbox"/> Acupuncture | _____ | _____ |
| <input type="checkbox"/> Chiropractic | _____ | _____ |
| <input type="checkbox"/> Physical therapy | _____ | _____ |
| <input type="checkbox"/> Meditation/Prayer | _____ | _____ |
| <input type="checkbox"/> Talk to friends/family | _____ | _____ |
| <input type="checkbox"/> Professional counseling | _____ | _____ |
| <input type="checkbox"/> Church/Spiritual gatherings | _____ | _____ |
| <input type="checkbox"/> Other
(please specify: _____) | _____ | _____ |

Your Health Goals

If you were to imagine your life 3 years from now, what changes would you like to experience in your health? (Please take your time and include anything that is part of your happiness, include health, family, work, finances, travel, marriage, or personal goals.)

What potential barriers do you foresee that would prevent these things from happening?

Do you feel it is possible to eliminate or prevent these potential barriers?

How important is it for you to resolve your health concerns?
(Rate on a scale of 1 to 10. 10 being extremely important)

0	1	2	3	4	5	6	7	8	9	10
Not at all					Neutral					Extremely

Name _____

Date _____

We see excellent results because we take the time to evaluate your health conditions and personal goals. If we feel like our program can help you accomplish those goals, we will create an action plan for you at the time of your visit.



Wellness Assessment

In order for us to offer you the best care it is essential that we ascertain your current state of *overall* health. We welcome any questions or thoughts you may have.

Chief complaints:

- | | |
|----------|-----------------|
| 1) _____ | How long? _____ |
| 2) _____ | How long? _____ |
| 3) _____ | How long? _____ |

When your problems are at their worst, how do they make you feel?

How do these problems interfere with the following areas in your life?

Work: _____

Family: _____

Hobbies: _____

Life: _____

Do you know how these problems may have started?

Are there any health conditions you are afraid these problems might turn into? Please check all that apply.

- | | |
|--|---------------------------------------|
| <input type="checkbox"/> Diminish future abilities | <input type="checkbox"/> Surgery |
| <input type="checkbox"/> Panic/Anxiety | <input type="checkbox"/> Arthritis |
| <input type="checkbox"/> Weight gain | <input type="checkbox"/> Cancer |
| <input type="checkbox"/> Heart disease | <input type="checkbox"/> Diabetes |
| <input type="checkbox"/> Depression | <input type="checkbox"/> Other: _____ |