

# ***Lo tiempo más largo: A cross-cultural analysis of nausea, vomiting, and diet change during early pregnancy in North Carolina***

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## **ABSTRACT**

In her 1988 article, Margie Profet proposed that morning sickness, otherwise known as NVP, along with cravings and aversions served as an evolutionary adaptation with the goal of increasing the likelihood of positive birth outcomes. However, her perspective failed to capture the possibility of cross-cultural variation in this supposed adaptation. This study aims to determine to what extent culture and biology impact the pregnancy experiences of English and Spanish speaking women in central North Carolina. Through semi-structured interviews, women were asked to recall symptomology of their most recent pregnancy and discussed cultural components of their pregnancy experience. This study found that the majority of women experience NVP, cravings and aversions, but could not conclusively determine an impact of culture on pregnancy symptoms or the impact of pregnancy symptoms on birth outcomes. However, this evidence suggests that a relationship between language spoken and reported NVP severity exists. The study's findings have implications for approaching women's care throughout pregnancy from a culturally appropriate lens, within certain communities and the United States as a whole. It is important for care providers to recognize to which certain belief systems women may subscribe, from whom they will likely receive and trust information, and what is influencing their choices throughout their pregnancy experience.

## **KEYWORDS**

pregnancy, North Carolina, Latinas, NVP, nausea, vomiting, early pregnancy

## INTRODUCTION

Pregnancy is in many ways a physical process that transcends culture, race, and ethnicity. Around the world, the majority of pregnant women experience cravings and aversions as well as nausea and vomiting during early pregnancy (Flaxman and Sherman 2000; Bayley et al. 2010). Morning sickness, or nausea and vomiting during pregnancy (NVP), has possible implications for the health of the growing embryo (Profet 1988). However, women's perceptions and symptoms of pregnancy are much more culture-specific. Cravings and aversions are related to the food women will consume during their pregnancy and will likely impact their diet. The food a woman would "typically" eat – i.e. what she ate prior to pregnancy – will affect what foods a woman craves or avoids since one is less likely to avoid or crave foods they've never eaten (Hook 1978).

Pregnancy is also a time of high nutrient demand on the mother (Lee et al. 2012); as such, nutrition is one of the most important considerations for women during pregnancy (Kaiser and Allen 2002). A mother's dietary habits impact the health and development of her fetus throughout gestation through the supply of macro and micronutrients (Kaiser and Allen 2002). Many prominent and respected informational outlets as well as individual physicians provide pregnant women with material dealing with suggested nutritional guidelines. Women's experiences and diets during pregnancy may also be influenced by the beliefs of those around them, particularly family and friends (Coronios-Vargas et al. 1992). The full experience of pregnancy, thus, impacts both the mother and the growing child.

While much research has been done about pregnancy experiences in different cultures around the world, very little has investigated the pregnancy experiences of women of different cultures living in the same geographic location. Within the United States, and North Carolina in

particular, the number of Latinos has been steadily increasing (US Census 2015), however no one has looked at how women are conceptualizing their pregnancy within the context of the cultures that are part of their lives. This information gap has important implications for the ways in which health care professionals treat women throughout their pregnancies.

This thesis examines how culture influences beliefs, which, in turn, influence the ways in which we perceive and interact with the world and experience health. Specifically, there is a cross-cultural variation in the way women experience pregnancy as a whole. My research seeks to describe (1) the cultural variation in diet during pregnancy and (2) the cross-cultural variation in nausea and vomiting. This research is concentrated on morning sickness and dietary changes in the forms of cravings and aversions during the most recent pregnancies of 25 women of different cultural backgrounds in North Carolina. Native Spanish speakers as well as non-Latina, English-speaking women will be included in the study sample in order to explore the distinctions between cultures. I hypothesized that I would see morning sickness in the majority of, if not all, women throughout the interview process. I proposed that it would be likely that symptomology would differ, but remain confident that the women in my sample would mirror the results from previously published research. Data from previous studies have been recreated with much accuracy and I do not anticipate that this will be any different. Additionally, most women were expected to demonstrate some sort of craving and or aversion outside of the realm of their “typical” diet. I also anticipated finding that diet is consciously and unconsciously regulated by mothers’ cultural beliefs about health and food. Finally, all three pregnancy symptoms – morning sickness, cravings, aversions – would serve as protective factors throughout pregnancy, preventing negative health outcomes for the mother and fetus.

The purpose of this study was to collect data about: (1) individual experiences of women currently living in and around Orange County, North Carolina with nausea and vomiting during pregnancy (heretofore referred to as morning sickness); and (2) dietary changes experienced during this time. An extensive literature review supplemented by in-person interviews conducted with women in and around Orange County comprised the investigative elements of this research.

Previously conducted research found two major schools of thought surrounding the functionality, or lack thereof, of morning sickness in an evolutionary sense (Profet 1988). My research and subsequent interviews will focus on the hypothesis that morning sickness is an evolutionary adaptation that serves to protect both the mother and the embryo during the early stages of pregnancy. Additionally, there is support for the idea that women experience diet changes (i.e. cravings and aversions) through the lens of their culture and beliefs about food and pregnancy (Coronios-Vargas et al. 1992).

As a result, I chose to interview both non-Latina native English speakers and native Spanish speakers with the intent of capturing trends in women from different cultures that currently live in the same area. Orange County and surrounding counties have been selected because of the significant Hispanic and Latino populations, and the general diversity of the women (United States Census Bureau 2015). Many residents in the county are considered to be foreign-born, thus offering an interesting and useful comparison in both previous and current cultural experiences with the women's experiences with morning sickness.

This study is one component of a larger exploration of the function and potential utility of morning sickness and diet change in women throughout pregnancy. As morning sickness impacts the majority of women, my research will provide insight into a typically unpleasant experience and may be utilized as a starting point for future research into the topic.

## LITERATURE REVIEW

Pregnancy as a state of being is obviously common across cultures, but the norms and perception of it are not. As noted by Wiley and Allen (2009), pregnancy requires physical and behavioral cooperation between the mother and the fetus. The majority of women experience symptoms commonly referred to as *morning sickness*, or *naúseas matutinas*, during their pregnancy (Bayley et al. 2002). Additionally, the occurrence of these symptoms “peaks” during the first trimester (Flaxman and Sherman 2000). A woman’s attitudes toward food will also likely change during the course of her pregnancy such that she *craves* or develops *aversions* to certain foods. All of these changes and negotiations between the mother and growing embryo function to create the most positive birth outcome (Wiley and Allen 2009).

The term “*morning sickness*” refers to nausea and vomiting experienced early in pregnancy (Flaxman and Sherman 2000). Nausea and vomiting during pregnancy, “*NVP*,” within the first trimester is typically used instead of “morning sickness” as it leaves less room for interpretation and subjective experience. It may occur throughout the day, not just in the morning as its name posits, and may or may not follow consumption. “*Aversions*” can be described as any previously enjoyed food that a woman no longer has any desire to eat and feels dislike towards. Aversions developed during pregnancy are often temporal, lasting only through the first trimester. “*Cravings*” often occur simultaneously with aversions and can be described as a more elevated desire than normal for a particular food item. All three symptoms of pregnancy have been described so ubiquitously in Western cultures that they are often used to indicate pregnancy in popular media (Wiley and Allen 2009).

In the course of this project, I will discuss both NVP and diet in depth. NVP is thought of more generally as a symptom of pregnancy; however, it tends to encompass a number of other

common pregnancy symptoms such as poor appetite, not eating for longer than you'd like, and sensitivity to smell (Profet 1988). NVP is most frequently experienced during the first trimester, which is, coincidentally, a time of monumental growth and development for the embryo. It is typically seen in approximately two thirds of pregnant women (Flaxman and Sherman 2000). In their papers in 2000 and 2008, Flaxman and Sherman support the idea that NVP is part of “maternal protection” mechanisms, and is thus an adaptive advantage for both the mother and her child. In terms of diet, I will focus on the general cultural variations of diets, discussing food staples and avoidances built into cultural practices. Beliefs and perceptions about food and health also warrant discussion as they too impact consumption, particularly during pregnancy when a woman is sensitive to advice and suggestions by those assumed to be knowledgeable (Beckham et al. 2015; Bermúdez-Millán 2007). Ideas of “hot” and “cold” as well as “pica” (the impulsive consumption of non-food items) are particularly relevant for Latina women, as they tend to be seen in Latin cultures (López et al. 2012). Beyond general food knowledge, many cultures recognize abortifacients, or substances that are believed to terminate pregnancy or cause serious health concerns – for example: coffee, tea, and alcohol.

In the late 1980s, Margie Profet wrote an article on what she called “pregnancy sickness” and its evolutionary function as a protective mechanism. Morning sickness, or NVP, aims to increase the growing embryo's chance of survival by discouraging the mother from ingesting toxins and should thus be considered an adaptation (Profet 1988; Flaxman and Sherman 2000). These toxins are likely historical risks that have been managed with the advent of cooking and refrigeration. It is also clear that NVP affects a woman's diet; Profet cites bitter or strong smelling foods and raw foods as potentially toxic such that her aversions to foods with similar identifiers are informed by biology (Profet 1988; Dickens and Trethowan 1971). In particular,

meat and strong-tasting vegetables tend to be high on the list of NVP-causing foods (Flaxman and Sherman 2008). Between her work and the work of Flaxman and Sherman, this theory was coined the maternal and embryonic protection hypothesis. As aforementioned, the first trimester is extremely important in the development of the fetus. It is also the time period in which NVP occurs most severely, indicating that the is and its consequences are critical for overall fitness of the embryo and that dietary changes serve a function for both the mother and embryo (Flaxman and Sherman 2000, 2008). Like cravings and aversions, NVP occurs across cultures and is well known for its ubiquity (Wiley and Allen 2009).

The articles by Margie Profet (1988) as well as Flaxman and Sherman (2000; 2008) will serve as cornerstone articles for this theoretical discussion. The three authors are concerned with investigating NVP as serving an evolutionarily adaptive function, meaning that it emerged in the course of human history as a strategy to increase the likelihood of survival and continuation of biological lineage on the individual level (Flaxman and Sherman 2008). Cravings and aversions, too, are very likely evolutionarily influenced, steering women toward helpful or needed foods and away from potentially toxic or harmful foods (Profet 1988). As such, cravings and aversions are related to NVP through their protective function. Additionally, all three processes will be influenced by an individual's culture and perceptions of pregnancy (Flaxman and Sherman 2000).

Nutrition, while always important, is of critical importance during pregnancy. The fetus obtains food and nutrients from their mothers' own diet practices during pregnancy, thus directly impacting development. As such, nutrition is one of the most important considerations for women during pregnancy (Kaiser and Allen 2002). A mother's dietary habits impact the health and development of her fetus throughout gestation through macro and micronutrients (Kaiser and

Allen 2002). During the first trimester, the nutrients consumed by the mother are stored in maternal tissues to be used to fuel growth of the fetus (Bermúdez-Millán 2007). Early pregnancy is also characterized by organogenesis and the formation of limbs from the fetus' perspective (Prenatal Development: How Your Baby Grows During Pregnancy 2015). As a result, according to the American Dietetic Association, the amount and types of nutrients needed by the fetus that the mother must consume increases (Kaiser and Allen 2002). The fetus may impose those changes on the mother in the form of cravings and aversions. In a study done by Dickens and Trethowan (1971), 76% of women experienced cravings and aversions during their pregnancies.

Most popular advice about dietary changes during pregnancy has to do with what one shouldn't eat. The research supports this idea with aversions seen more frequently than cravings in pregnant women (Dickens and Trethowan 1971). Additionally, it stands to reason that it is more crucial for a woman to avoid the intake of certain foods or compounds that may be potentially harmful than for a woman to increase her intake of something that may be potentially beneficial to the fetus (Bayley et al. 2002). Foods with unique or strong odors are often the subjects of aversions as well. Tea and coffee are frequently cited as aversive substances (Dickens and Trethowan 1971). While their smells are not predictive of this, it is known that both tea and coffee typically contain caffeine. Caffeine has been linked in various studies to negative birth outcomes (Caffeine During Pregnancy 2016). Through forced behavioral changes, women are thus consuming less of these potential harmful beverages. Additionally, animal products are among the most common substances to cause aversions (Wiley and Allen 2009). Historically, animal products such as meat and milk were likely to spoil, giving off pungent odors. As a result, humans seem to have adapted a mechanism such that, when an organism and its progeny are most vulnerable, it feels a repulsion through feelings of strong dislike, nausea, or



vomiting as a means of protection. Many pregnant women avoid raw vegetables and undercooked meat for similar reasons; cooking food reduces the risk of consumption of potentially harmful bacteria and parasites (Profet 1988). Anecdotally, pregnant women also react negatively to the fumes of certain aversive foods being cooked, which could speak to a still more profound protection measure for the mother (Profet 1988). However, as Profet (1988) mentioned, it is important to note that aversions may result in a decrease in food and, thus, nutrient variety. A lack of particular nutrients, especially folic acid and iron, can significantly impact fetal development and lead to a more negative birth outcome (Kaiser and Allen 2002). On the other hand, many women avoid an overconsumption of fats or carbohydrates as they may lead to an unhealthy amount of weight gain for the mother (Cantor 2016); however, this is not likely to be an evolutionary issue.

A pregnant woman's food choices are dictated by more than just evolution and biology. Her family, her culture, her physician, and the media will also influence a woman as to what she should be consuming during pregnancy (Beckham et al. 2014). As demonstrated by Coronios-Vargas et al. (1992), a woman's race and culture impacts her diet. A 1949 study of African American pregnant women in Alabama in which milk was left off of the list of cravings provides an interesting example of the interplay of culture and the biology of race (Hook 1978). Black women are more likely to have lactose intolerance; they also receive calcium from other culturally specific sources in their diets (Hook 1978). Therefore, while calcium is a much-needed nutrient during pregnancy, African American's biological aversions toward milk are overcome with their cultural practices of eating calcium rich substances. Additionally, many taboos prevent women from consuming substances that are considered to be abortive by other women in their community (Cantor 2016). Costa Rican women considered a variety of teas to be abortive, and

thus aversive, but not because of their connection with caffeine (Cantor 2016). Instead, the women were worried that the typical use of the teas as anti-inflammatory remedies would result in their bodies trying to get rid of the “infection” that was their baby (Cantor 2016). Other women may simply form temporary aversions to *all* foods in their fear of nausea (Bermúdez-Millán 2007).

Popular culture can also influence cravings. Often, a region’s popular foods are the subjects of a woman’s cravings (Coronios-Vargas et al. 1992). As shown by Forestell and Mennella (2016), many Mexican women eat more local fruit while pregnant than prior to or following pregnancy. Pregnant women often cite comfort foods and homemade items when discussing cravings (Cantor 2016). In young Mexican American women, variations of a *caldo* (soup) that was consumed daily prior to pregnancy were frequently craved during pregnancy (Gutierrez 1999). Since food choices impact nutrient intake, popular culture also influences the nutrition of a mother’s diet. Puerto Rican women tend to consume more eggs than American women (Bermúdez-Millán 2007). Eggs are a particularly good source of protein for women who may not be eating meat as a result of their aversions. However, the more time that Puerto Rican women spend in the US, a country that doesn’t consume as many eggs, the women are less likely to cite eggs as cravings (Bermúdez-Millán 2007). Nutritive needs may also influence the inclusions of particular customs and practices into a culture. A study done by López et al. (2012) on Argentinian women demonstrated that their eating habits were based on a combination of biology and tradition. Their *pica* habits, or the consumption of nonfood substances, of clay eating were based in the beliefs that it carried some protective properties against disease (López et al. 2012). Additionally, clay is thought to make up for a deficiency of iron in a woman’s

regular diet. Iron deficiency is the most frequent nutrient-related issue affecting pregnant women (Kaiser and Allen 2002).

Women may also consciously choose foods that they believe have health benefits for them or for their babies (Cantor 2016). For Latin American women, many of these ideas stem from their beliefs of hot and cold medicine. Hot and cold practices are not related to temperature, but reference the effects of food on the body's *humors*, or fluids (Manderson 1987). One typically eats hot or cold foods to correct an imbalance within the body – a woman could eat a hot food if her body is in a cold state and vice versa (Manderson 1987). In Latin America, pregnancy is a condition that heats the body, so women frequently forgo hot foods and form culturally based aversions (Wiley and Allen 2009). However, it is likely that, yet again, biology and cultural practices informed each other. Animal products, fatty, or spicy foods are both frequent aversions and hot foods (Manderson 1987; Hook 1978). It is also clear that hot and cold beliefs, as well as aversions and cravings, occur across cultures and social classes (Inam et al. 2003).

From an evolutionary medicine perspective, this study of pregnancy allows us to learn more about the adaptive characteristics of human biology and the accompanying behavioral traits. We will be better able to care for pregnant women across all cultures as we fully acknowledge the implication of cultural influence on their experiences and how those overlap with the similarities in the biological process. Particularly in the case of diet and nutrition, the findings from this study will provide insight into how best to approach dietary guidelines and suggestions for pregnant women in our increasingly global society in which cultures and perceptions of the world freely mix and mingle. Additionally, women's beliefs about food before and during pregnancy have implications for their children's later beliefs about said food

(Beauchamp and Mennella 2011). Knowing how a woman considers the food she consumes and how that limited her nutrient intake during pregnancy will prove useful in later dietary or nutrition interventions for her children.

## **SAMPLE AND METHODS**

In order to begin recruitment, I placed flyers in public spaces, including Chapel Hill Public Library and Piedmont Health of Carrboro and Chapel Hill. The flyers included information about the study as well as my contact information. Many women in the sample reached out to me upon hearing about my study and talking with other female friends. As a result, many interviewees are members of the same church congregations or are co-workers, and did not contact me as a result of the flyers.

Upon receiving notice of interest in participation, a time to meet was scheduled and the study's premise further explained to the participant. The respondent read the consent form, gave her verbal consent, and then the recording of the interview began. A semi-structured interview strategy was used such that I could collect the most, relevant information possible in one sitting (Bernard 2002). It was very difficult, initially, for me to find Spanish speakers willing to participate in this study. I was told by various sources that Spanish speaking women may not be reaching out as a function of the recently changed political climate as well as "they had no reason to help [me]" because they did not personally know me prior to the initiation of the study. Additionally, many women who meet the criteria of *pregnant within the last 5 years* often have small children or are pregnant again, making their time a very valuable resources to them and, thus, increasing scheduling conflicts.

Quantitative and qualitative data was recorded from in-person interviews with 25 women, 12 in English and 13 in Spanish, in which women were asked to recall symptomology, or lack

thereof, during their most recent pregnancy that occurred within the last five years. Women were questioned about severity, frequency, and timing of NVP. They were also asked to report information on any cravings, aversions, or pica experienced during their pregnancy experience. The survey instrument consists of questions concerned with where participants are from and currently living, their experiences with nausea and/or vomiting during pregnancy - including the severity to which they experienced morning sickness, complications during pregnancy, their diet and cravings while pregnant, supplements or over-the-counter medications taken while pregnant, and from where they received information regarding diet information. No personally identifiable information was collected. All interviews were recorded on my password-protected iPhone in order to avoid the formality of a bulkier recording device.

Survey data, once compiled, was sorted by language spoken by the participant as well as by various responses given to my questions. Of the questions on my survey instrument, approximately three fourths were binary, “yes” or “no” questions and were thus quantified by counting the number of each response; for example, women were asked if they experienced NVP, cravings, and/or aversions. Women were also asked to rank their experience on a scale, which I totaled and averaged. In terms of complications, women were asked to state whether or not they experienced a complication during pregnancy or birth and, if so, what it was. These included gestational diabetes and the occurrence of Cesarean sections. Food lists were generated by evaluating which foods were discussed in previous research and through discussions with previously pregnant women prior to the initiation of this study. The lists were used to count the number of women who cited various foods as cravings or aversions. Data analyses to determine means, standard deviations, chi-squared tests for independence, and Fishers exact test calculations were carried out in SPSS 24.

## RESULTS

The average time since pregnancy was approximately 21 months ( $\pm 16$  months). The vast majority of women experienced NVP (80%), or cravings (96%), with fewer women recalling aversions (62.5%). An overview of the occurrences of NVP and diet changes reported by the women can be seen in *Table 1*.

Table 1. NVP and dietary changes by language overview

Language ( <i>n</i> =25)	NVP?		Cravings?		Aversions?	
	Yes	No	Yes	No	Yes	No
Spanish ( <i>n</i> =13)	10	3	13	0	9	4
English ( <i>n</i> =12)	10	2	11	1	6	6

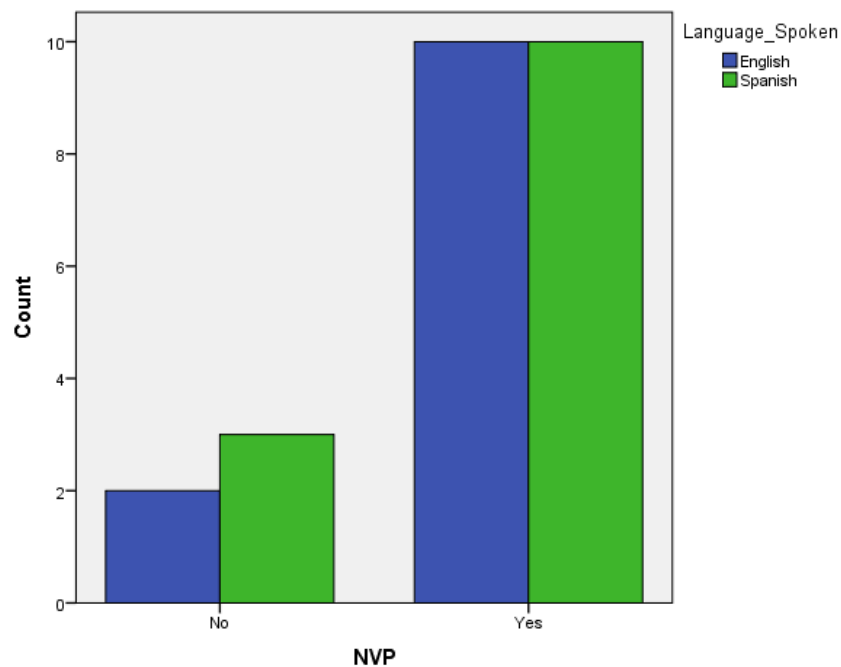
### NVP

In this sample, 80% of women experienced NVP throughout the course of their most recent pregnancy. Occurrence of NVP was compared across languages spoken and was found to not be significant based on an alpha  $p$  value of 0.05 ( $\chi^2 = .160$ ,  $df = 1$ ,  $p = .689$ ). An equal number of both English and Spanish speakers experienced NVP. Of the English speakers with NVP, 8 experienced any vomiting, while only 3 of the Spanish speakers with NVP cited vomiting. However, there was no significant association between language spoken and vomiting severity at  $p < .05$  ( $\chi^2 = 6.473$ ,  $df = 3$ ,  $p = .091$ ). I anticipate, though, that with a larger sample size, there may be a significant relationship between language spoken and reported vomiting severity.

Within this sample, of the 20 women who experienced NVP, 13 women confirmed that other female family members had also demonstrated symptoms during their pregnancies. Of the

5 women who had no NVP symptoms, no one else in their family demonstrated symptoms during their pregnancies either. NVP occurrence and the presence of symptoms in other female family members are significantly associated ( $\chi^2 = 6.771$ ,  $df = 1$ ,  $p = .009$ ). See *Graph 1* for the distribution of NVP across language.

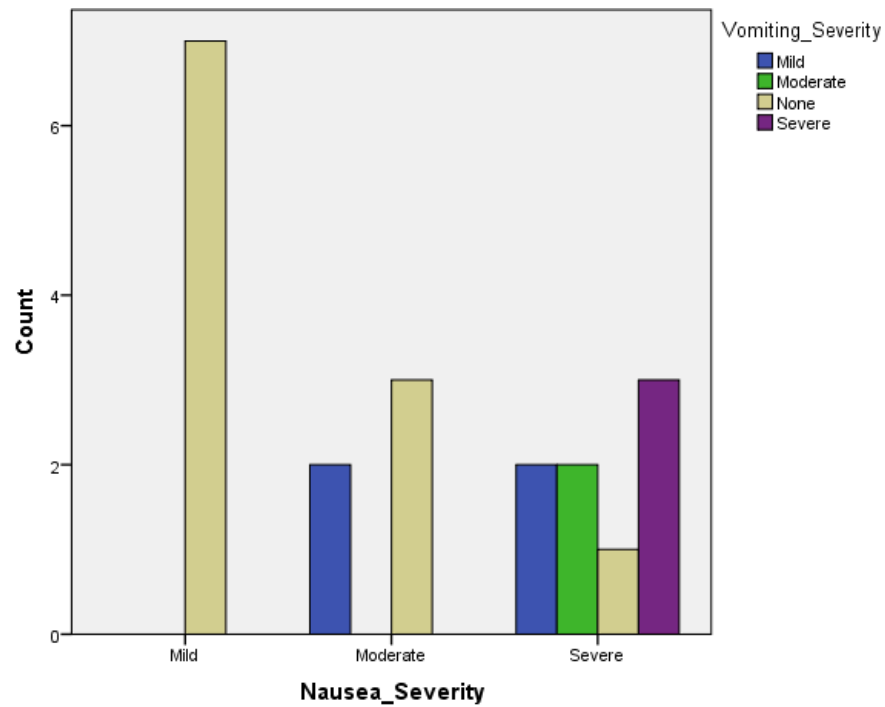
Graph 1. NVP Occurrence by Language Spoken



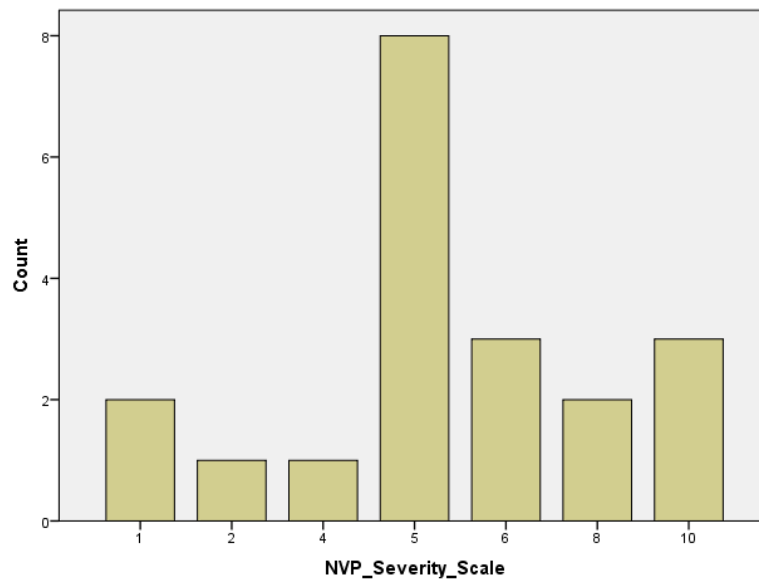
Of the 20 women who had NVP during their most frequent pregnancy, all 20 experienced nausea while only 9 experienced both nausea and vomiting. Nausea and vomiting severity were determined to be associated ( $\chi^2 = 15.227$ ,  $df = 6$ ,  $p = .019$ ). Thus, there is a relationship between the symptoms; mild nausea was associated with no incidences of vomiting, while severe nausea and severe vomiting only occur together. See *Graph 2A* for this distribution of vomiting severity across nausea severity reported by the women in this sample. When asked to rate their experience of NVP, so both nausea and vomiting associated with their most recent pregnancy, from 1-10 with 1 = not bad at all and 10 = severe, eight women rated it with a 5, and three

women each rated their NVP as a 6 or a 10. See *Graph 2B* for the distribution of severity ratings of NVP for the women in the sample who experienced NVP.

Graph 2A. Nausea severity by vomiting severity



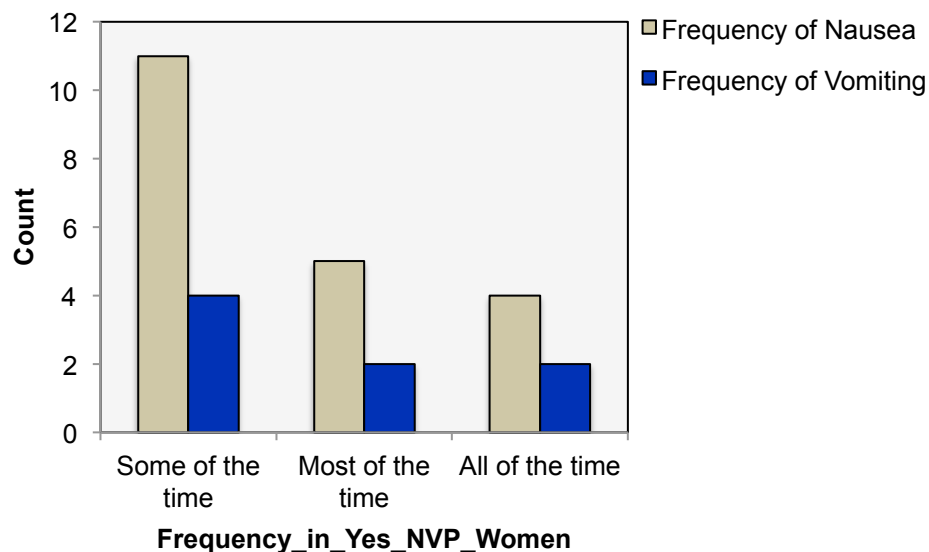
Graph 2B. Distribution of severity ratings of NVP as a whole for yes NVP women





Of the 20 women who reported nausea, the slight majority of women ( $n = 11$ ) experienced it “some of the time” during the course of their pregnancy, followed by “most of the time” ( $n = 5$ ), and “all of the time” ( $n = 4$ ). Likewise, of the 9 women who reported vomiting, most reported experiencing it “some of the time” ( $n = 4$ ). An equal number of women noted that it occurred “most of the time” and “all of the time” ( $n = 2$ ). See *Graph 3* for the distribution. In alignment with previous research, 19 of the 20 women that had symptoms experienced them during the first trimester; the one woman who didn’t had the flu during her first trimester and thus could not answer conclusively. Sixteen of the 19 women cited NVP *only* in the first trimester, and three said it extended into the second trimester. The one woman who was unsure about NVP during the first trimester due to her illness noted that her symptoms lasted throughout her entire pregnancy.

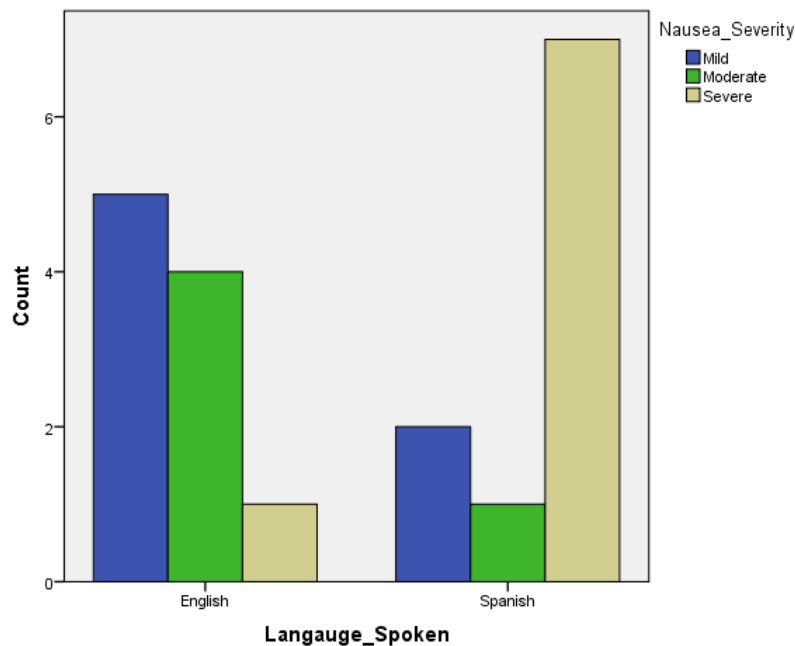
Graph 3. Frequency of nausea and vomiting in yes NVP women



Additionally, there were observed differences in severity between English and Spanish speakers confirmed by a chi-squared test for independence’s results that severity is significantly

associated with language spoken ( $\chi^2 = 7.586$ ,  $df = 2$ ,  $p = .023$ ). Significantly more Spanish speakers reported more severe nausea than English speakers ( $n = 7$  and  $n = 1$  respectively), leaving more English speakers to describe mild or moderate nausea than Spanish speakers ( $n = 9$  and  $n = 3$ ). See *Graph 4* for the distribution of nausea severity by language spoken.

Graph 4. Nausea severity by language spoken



Based on previous research into NVP, women in the sample were asked about other symptoms associated with NVP beyond nausea and vomiting including: fatigue, lack of energy, tiredness, poor appetite, not eating for longer than you would've liked, and dry-heaving. These symptoms tend to reflect effects felt by the women as a result of the physical toll of nausea and/or vomiting during their pregnancy experience. For the women involved in this study, the symptoms of "fatigue, lack of energy, and tiredness," while seemingly similar appeared to have significant distinctions that were made during further discussion of their symptoms. The distribution of the symptoms across the sample as a function of language spoken can be seen in

*Table 2.* The women in the study commonly experienced fatigue, tiredness, and lack of energy, with fatigue occurring in every woman’s pregnancy experience. All of the English speakers noted that “tiredness” was a symptom for them, compared to only 77% of Spanish speaking women. Twice as many Spanish speakers cited “dry heaving” and “not eaten for longer than you would’ve liked” as symptoms associated with their most recent pregnancy as did English speaking women. Across the languages within the symptoms, the same number of women experienced “NVP” ( $n = 10$ ) as well as “sensitivity to smell” ( $n = 9$ ).

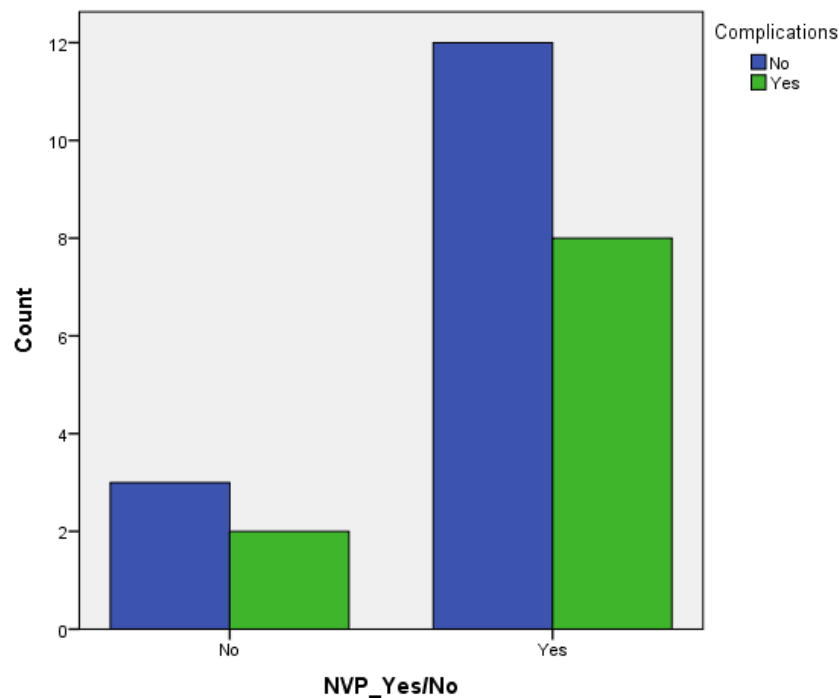
Table 2. Symptoms By Language Spoken

Language Spoken	Symptom							
	Fatigue % (n)	Lack of Energy % (n)	Tiredness % (n)	Poor Appetite % (n)	Not eaten for longer than you would’ve liked % (n)	Dry-heaving % (n)	NVP % (n)	Sensitivity to Smell % (n)
Spanish ( $n = 13$ )	100% (13)	62% (8)	77% (10)	31% (4)	46% (6)	76% (8)	77% (10)	69% (9)
English ( $n = 12$ )	100% (12)	92% (11)	100% (12)	42% (5)	25% (3)	33% (4)	83% (10)	75% (9)
Total ( $n = 25$ )	100% (25)	76% (19)	88% (22)	32% (8)	36% (9)	48% (12)	80% (20)	72% (18)

A number of women ( $n = 8$ ) mentioned being “really tired” or “constantly exhausted” throughout their pregnancy and spoke frequently about how “hard [their] body was working” to carry a child. Among other things, NVP frequently made women feel “uncomfortable” or “weak” ( $n = 3$ ) with some women even describing it as “aggressive” and “debilitating” ( $n = 4$ ). Just under a third of the women spoke explicitly about how affected they were by the smells ( $n = 7$ ).

Finally, the relationship between NVP and pregnancy outcome was used to assess my original hypothesis that NVP was negatively associated with pregnancy complications and outcomes. The variables are not significantly associated for this sample ( $\chi^2 = .000$ ,  $df = 1$ ,  $p = 1.000$ ). See *Graph 5* for the distribution of complication occurrence by NVP occurrence. Three women who noted complications during the interview had gestational diabetes, while four mentioned the necessity of a Cesarean section. This hypothesis was not supported based on the numbers, but more research is needed to further assess this relationship.

Graph 5. Complication occurrence by NVP occurrence

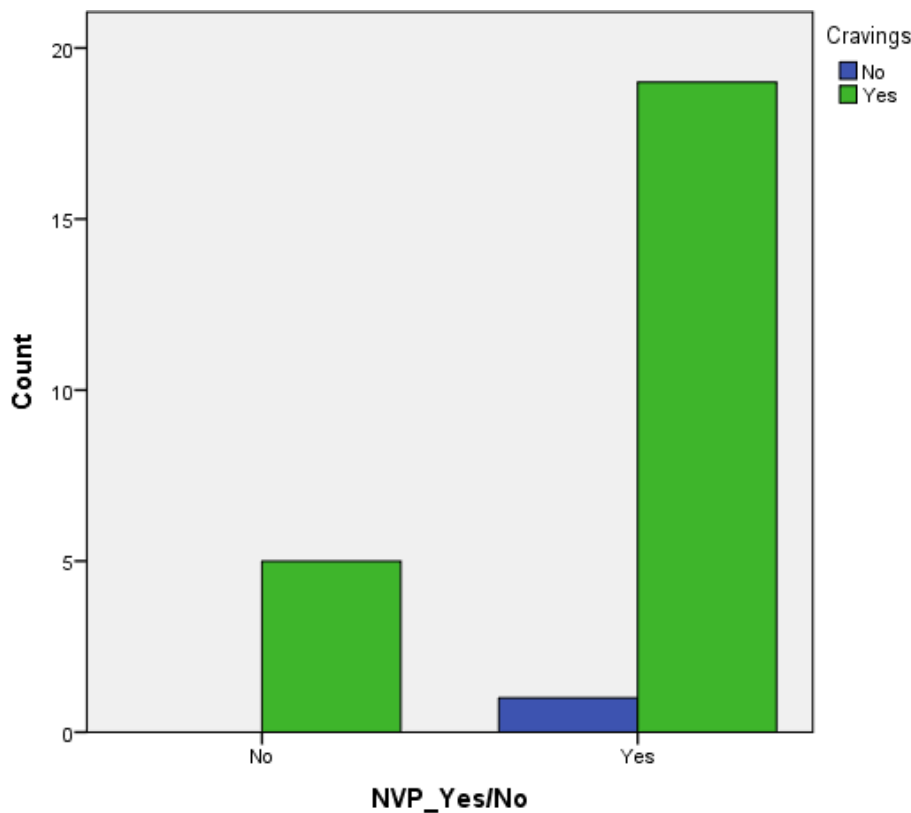


## DIETARY CHANGES

Almost all ( $n = 24$ ) women in the sample cited cravings as part of their pregnancy experience. Of these 24 women, 19 also had NVP while 5 did not. Cravings and NVP occurrence were found to not be associated ( $p = 1.000$ ). From the list of foods I generated, mangos, ice

cream, beef, and processed foods were most commonly craved among women ( $n = 9$  for each), with leafy greens, chicken, and soups as close seconds ( $n = 8$  for each). Butter, green beans, and clay (pica) were not craved at all by women in this sample ( $n = 0$  for each). See *Table 3* for a more detailed breakdown of all cravings and *Graph 6* for the distribution of craving occurrence across NVP occurrence.

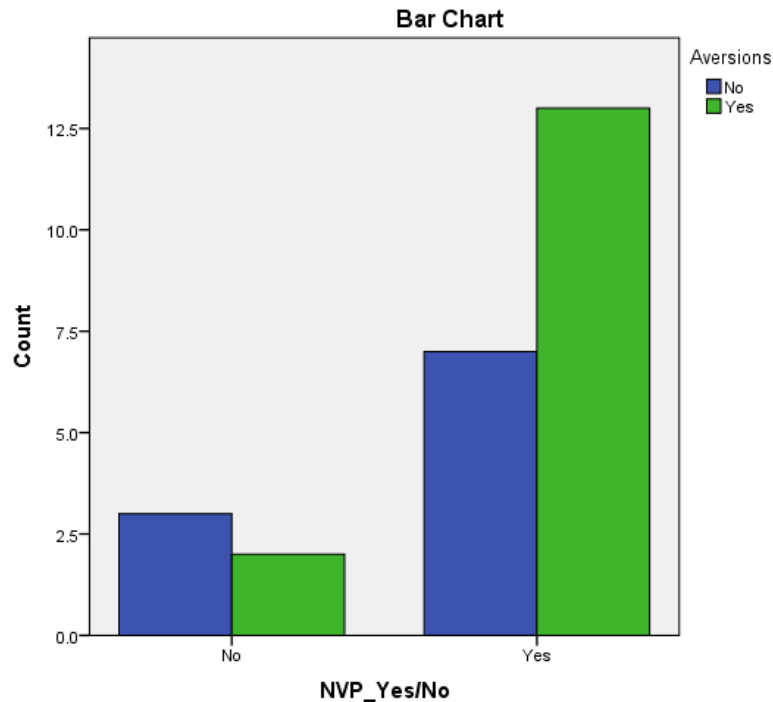
Graph 6. Occurrence of cravings by NVP occurrence



Comparatively, 60% of women in the sample said aversions were part of their pregnancy experience ( $n = 15$ ). Of the 15 women, 13 had NVP and 2 did not. Aversions and NVP occurrence were not found to be significantly associated ( $\chi^2 = 1.042$ ,  $df = 1$ ,  $p = .307$ ). See *Graph 7* for the distribution of aversion occurrences by NVP occurrence. Coffee, greasy foods, and chicken were the most common aversions cited by women ( $n = 9$ ,  $n = 7$ ,  $n = 6$  respectively),

making chicken both a common craving and aversion. Processed foods were not cited at all as aversive by the women in the sample such that it was only considered to be a craving.

Graph 7. Occurrence of aversions by NVP occurrence



In addition to cravings and aversions, women were asked to explain how their birth country and culture impacted their food preferences, from whom they received information about how to modulate their diet during pregnancy, and what intentional diet-related steps they were taking to ensure the utmost health of their child. All 25 women agreed that where they are from impacted their food preferences. The Spanish-speaking women, in particular, noted the importance of their mother country on both what they cooked and what they ate. All 13 Spanish-speaking women, when asked about their regular diet, cited foods of Latin American origin. The 12 English-speaking women ate largely an “American” diet, often citing “access” as something that influenced their food choices more so than any particular culture. Only two women, one

English speaker and one Spanish speaker, were familiar with “hot” or “cold” food and medicine: one working in the medical field and only knew of the idea but did not subscribe to it, while the other only subscribed to it insofar that she knew it was a good idea to eat soup during pregnancy.

Beyond their country of origin, 17 women noted that they received suggestions of foods they should either eat or avoid throughout their pregnancy, while 15 women noted that most of the information had come from their doctor. Of the 15 women, 10 of them were English-speakers. Of the two English-speakers that did not note the significance of a doctor’s advice, one received no input at all due to the mild nature of her symptomology, while the other *did* receive information in the form of pamphlets, but never read them because she valued her mother’s input more, choosing more homeopathic solutions. Of the eight Spanish-speakers who did not cite significant information from her doctor, only two explicitly noted the importance of the input from their mother and grandmother, respectively. Of the other six Spanish-speaking women, 5 did receive information from unspecified sources and one received no input due to the mild nature of her symptomology during pregnancy. See *Table 4* for a more detailed breakdown of the locus of authoritative knowledge across language spoken.

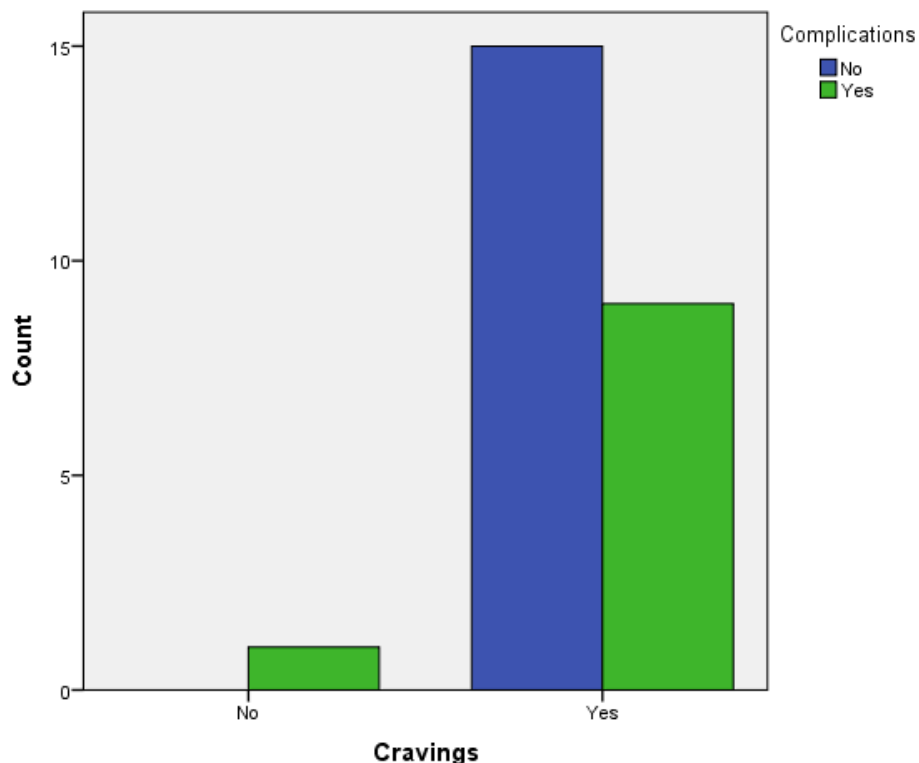
Table 4. Authoritative knowledge

Language Spoken	Authoritative Knowledge					
	Received suggestions from family members or friends?		Significant info from doctor?		Significant info from family?	
	Yes	No	Yes	No	Yes	No
Spanish ( <i>n</i> = 13)	10	3	5	8	2	6
English ( <i>n</i> = 12)	7	5	10	2	1	1
Total ( <i>n</i> = 25)	17	8	15	10	3	7

Almost all ( $n = 23$ ) women intentionally made changes to their diet, while the others ( $n = 2$ ) only added prenatal vitamins to their existing diets. Of all 25 women in the sample, 21 noted that they tried to add healthier foods to their diet, while 4 of them spoke about avoiding certain foods for the health of their baby. It was frequently noted that snacking was a useful trick to satiate appetite or quell nausea ( $n = 14$ ).

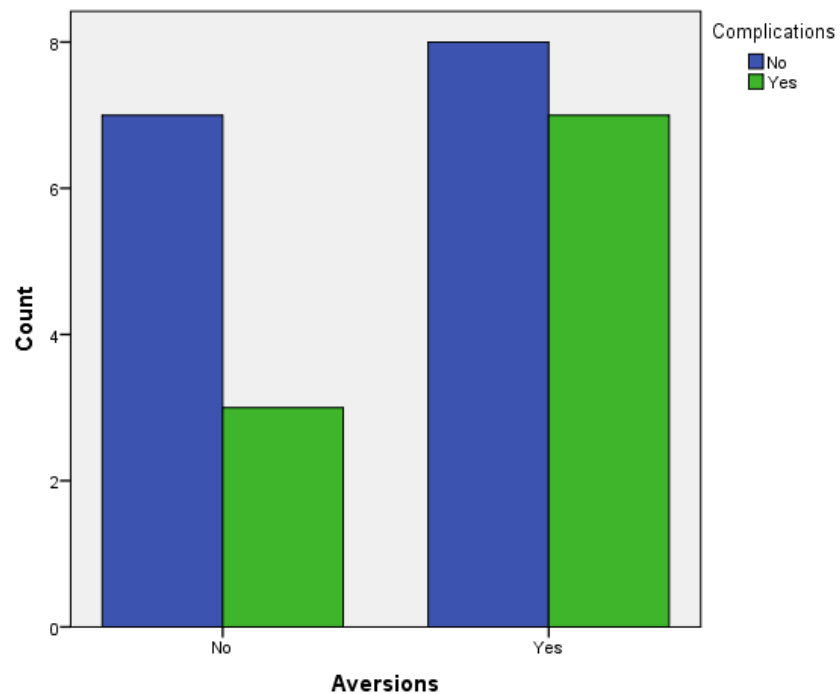
I also tested the relationship between complications and the occurrence of cravings, as well as the occurrence of aversions to test my original hypothesis. I found that complications are not significantly associated with either cravings ( $p = .400$ ) or aversions ( $p = .678$ ). As a result, my original hypothesis that diet changes through cravings and aversions would be associated with pregnancy complications and outcomes was not supported. See *Graph 8A* for the distribution of complication occurrence by cravings and *Graph 8B* for the distribution of complication occurrence by aversions.

Graph 8A. Complication occurrence by cravings





Graph 8B. Distribution of complication occurrence by aversions



#### INTERACTION BETWEEN NVP AND DIETARY CHANGES

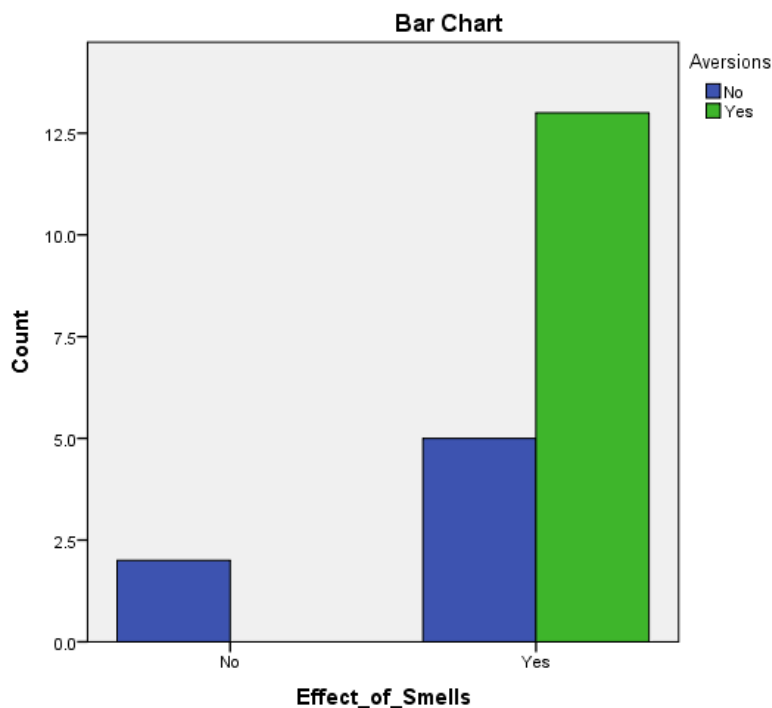
In addition to NVP and dietary changes, sensitivity to smell was also mentioned during the interviews. In the present study, 21 women confirmed their sensitivity to smells during the course of their most recent pregnancy. Of those 21 women, 18 also experienced NVP symptoms. The other two women who experienced NVP did not mention sensitivity to smells. See *Table 5* for a breakdown of this data. NVP and scent sensitivity were not associated ( $\chi^2 = 2.679$ ,  $df = 1$ ,  $p = .102$ ).

Table 5. NVP and sensitivity to smell

	Yes Sensitivity to Smell	No Sensitivity to Smell	Total
Yes NVP	18	2	20
No NVP	3	2	5
Total	21	4	25

In order to evaluate the way in which smell sensitivity might also impact her diet, the relationship between sensitivity and aversions was investigated. Of the 15 women with aversions, all also noted sensitivity to smell. Of the 10 without aversions, 4 also didn't experience sensitivity to smell. Sensitivity to smell and the occurrence of aversions were significantly associated ( $p = .017$ ). See *Graph 9* for the distribution of aversion occurrence by sensitivity to smell.

Graph 9. Occurrence of aversions by sensitivity to smell



I was also interested in examining the inverse relationship between cravings and nausea severity for women with NVP. NVP has been cited as a protective measures that prevents women from consuming certain foods, but conversely, cravings may be seen as the mother consuming something the baby needs. Following Profet's logic, it can be assumed that increased nausea severity [within the range of normal] indicates a stronger biological maternal instinct

regarding consumption. Therefore, it was likely that nausea severity and the occurrence of cravings were significantly associated with one another given the occurrence of NVP. However, the symptoms are not significantly associated ( $\chi^2 = 3.158$ ,  $df = 2$ ,  $p = .206$ ). See *Graph 10* for the distribution of nausea severity by the occurrence of cravings.

Graph 10. Nausea severity by occurrence of cravings

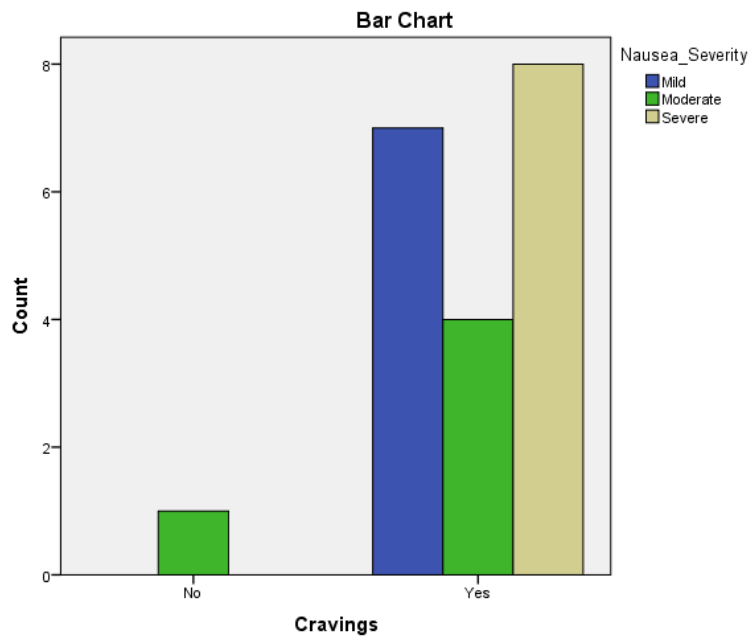


Table 3A. Frequencies of Cravings

Food		Number of Cravings	Comments
Dairy	Milk	3	
	Yogurt	3	
	Butter	0	
	Cheese	6	
	Ice Cream	9	
Fruit	Apples	5	
	Oranges	6	
	Bananas	4	
	Plantains	5	
	Papayas	2	Considered abortive by some women
	Mangos	9	Green preferred, with salt
	Melon	2	
	Watermelon	1	
	Raspberry	1	
	Strawberries	2	
	Blueberry	1	
	Lime	2	Preferred with salt
Fruit Drinks		4	
Vegetables	White/yellow potatoes	6	Half noted in the form of fries
	Sweet potatoes	2	
	Leafy greens (spinach, collards)	8	
	Green beans	0	
	Okra	2	
	Beets	1	
Spicy Peppers		4	
Meat	Chicken	8	
	Beef	9	Hamburgers frequently mentioned
	Pork	2	
	Turkey	1	In the form of sandwich meat
	Shrimp	1	

Beans or lentils		7	
Misc.	Peanut butter	7	
	Chocolate	7	
	Cookies	5	
	Chips	5	
	Soups	8	
	Rice	4	
	Tortillas	3	
	Eggs	6	
	Salsa	1	
Processed Foods		9	
Pica	Clay	0	
	Ice	5	
Spices & Herbs	Cilantro	4	
	Basil	2	
	Cinnamon	1	
	Garlic	1	
	Cumin	1	

Table 3B. Frequency of Aversions

Food		Number of Aversions	Comments
Drinks	Coffee	9	
	Tea	2	
	Soda	2	
Dairy Products	Milk	1	
	Cheese	1	
Fruit	Papayas	1	Considered abortive
Vegetables	Leafy greens (spinach, collards)	4	
Meat	Chicken	6	
	Beef	2	
	Pork	2	
	Deli Meat	2	
	Fish	1	
	Shrimp	2	
Beans or Lentils		1	
Misc.	Eggs	1	
	Chocolate	1	
	Sweets	1	
Processed Foods		0	
Salty Foods		2	
Greasy Foods		7	
Spicy Foods		5	
Hot Peppers		3	
Honey		1	
Herbs		2	
Spices	Cilantro	2	
	Basil	2	
	Coriander	1	
	Garlic	1	
	Onion	1	

## DISCUSSION

At the start of this project, I hypothesized that the majority of women in the sample would experience NVP, cravings, and aversion. I anticipated seeing that a woman's culture would impact her experience of pregnancy as well as any dietary changes. Finally, I expected to see significant associations between the occurrence of NVP, aversions, or cravings with birth outcomes and complications experienced by the women in their most recent pregnancy. Essentially, my research questions were guided by Margie Profet's (1988) original theory that NVP, cravings, and aversions are adaptive mechanisms. They serve to protect mother and embryo against potential toxins or teratogens that were particularly common for our evolutionary ancestors, but have been shaped in current evolutionary times by culture. Additionally, culture shapes food choices, particularly during pregnancy, which may be very influential for women and their developing child (Wiley & Allen 2009). While the data do clearly demonstrate that a majority of women experienced all three symptoms, the other two proposals are not as well supported.

The percentage of women studied in the sample that experienced NVP comes close to the percentage observed by Dickens and Trethowan (1971) and supported my hypothesis that the majority of women would experience NVP. A majority of women also experienced cravings and aversions, with 96% and 60% of women citing them, respectively. Collectively, this data supports Flaxman and Sherman's (2000) findings that women would experience the most symptoms in the first trimester and would experience cravings and aversions during this time. This study also confirms yet again that the results are replicable in the general population. As, anecdotally and through popular media, pregnancy is best recognized by its symptomology, it is

unsurprising that most women who participated in this study explicitly noted NVP, cravings, and aversions as part of their pregnancy experience.

To address my question about NVP during pregnancy, I utilized language as a stand in for culture. All but one of the English and Spanish speakers were from the United States or Latin American countries, respectively. Although, the English speaker was UK-born, she cited her North Carolina background as more significant. The Spanish speaker was born in the United States but mainly cooked and ate Latin American food. Therefore, I felt that language was an appropriate indicator of the woman's culture as it related to food and pregnancy conceptualization. In the sample, ten English speakers and ten Spanish speakers experienced NVP during their most recent pregnancy, suggesting that culture is not a factor in the distribution of NVP. This may then support Profet's (1988) argument that the behavior stems from biology and is a cross-cultural experience. However, following that logic, there is a presumption that all biological mechanisms investigated in this study (i.e. NVP, cravings, aversions) would be associated with the occurrence of pregnancy complications. In this sample, neither NVP nor cravings and aversions were associated with pregnancy complications. Therefore, for this sample, there appear to be no lasting adaptive benefits, even if the behavior itself has persisted throughout time. Additionally, the complications observed throughout the study, gestational diabetes in particular, are relatively novel obstacles in pregnancy. Thus these findings indicate the need for further research on the possible associations and implications between evolutionary problems and consequent adaptations and modern symptomology, particularly where pregnancy is concerned.

NVP and cravings during pregnancy appeared to have a similarly insignificant relationship as well. Not only did the occurrence of NVP not confer an advantage to the women



in terms of birth outcome, it also didn't effectively impact their diet through cravings. NVP may be purposefully initiated by biology, but it may no longer have an impactful, advantageous effect. This could be attributed to changing food consumption patterns throughout evolutionary history that could have lead the women in the study to have access to and eat different foods than those of their evolutionary ancestors. It may also be the case that increased awareness about food storage and safety as well as about nutritious food has attenuated the relationship between food choice and maternal and child health during pregnancy. Additionally, the way women's bodies process these novel changes to food, pregnancy, and birth may have reshaped the processes that once existed as a result of evolution. It is also important to note that tobacco, coffee, and alcohol aversions are evolutionarily novel and thus could not stem from learned aversions throughout history. Further research is necessary to explore the mechanisms behind these effects.

While language spoken wasn't associated with NVP occurrence, it did significantly affect the severity to which women experienced nausea. More Spanish speaking women reported severe nausea and used words such as "*agresiva*," or "*horrible*" to describe their symptoms, while English speakers experienced more mild and moderate nausea and no vomiting, and described it as "uncomfortable." This may speak to cross-cultural variations in pain or discomfort expectation and their subsequent subjective experience (Alabas, Tashani and Johnson 2012; Burnett et al. 2009). The Spanish-speaking women may have anticipated more severe NVP based on cultural information surrounding pregnancy, while English speakers may have anticipated milder NVP. However, more research is necessary to determine whether or not this may have contributed to this study's findings. Regardless of their differences, almost all of the women in the sample described NVP during the first trimester, with slightly fewer experiencing it *only* during the first trimester, supporting Profet's (1988) proposal that NVP occurs primarily

during this time. More Spanish speakers suffered from dry heaving, and not eating for a longer time than would have been preferred. This may have impacted their ratings of their NVP more so than the other symptoms as they are less directly connected to feelings of nausea and vomiting. Whether the cause is biological or due to cultural expectations or conceptualizations of pain management requires further research, but could serve as a significant comparison to Profet's completed work on the subject.

In previous research, NVP has been seen to be heritable, with female family members of approximately 73% of women with NVP also experiencing symptoms (Colodro-Conde et al. 2016). However, in the current study, only 65% of women with NVP noted another female family member with similar symptoms. Based on Profet's argument, it stands to reason NVP would be heritable in the sense that mothers who experienced NVP likely had more positive pregnancy outcomes, leading to a daughter who could then, too, demonstrate symptoms. While the thirteen women do constitute only a slight majority, the relationship is clearly statistically significant, thus supporting Profet (1988) and Colodro-Conde et al.'s (2016) proposals and results. Evolutionarily and currently this observed heritability could function as an adaptation in that women could rely on other female family members for information and support throughout pregnancy. As this sample demonstrates that it is highly likely that they've been through comparable experiences, it stands to reason that women of earlier generations may have advice in terms of how to handle pregnancy symptoms. Combined with the fact that Latina women were more likely to rely on familial information, it stands to reason that maternal and child health initiatives focused on intergenerational transfer of information may be successful and more culturally sensitive than other approaches, particularly among Latina women. Although, further research is necessary in order to investigate this particular proposition.

Seventeen of the twenty-five women acknowledged that they received suggestions about their diet from family members, further emphasizing the importance of information passed through generations, either biologically or by word of mouth. While fifteen noted that the majority of the information came from their medical care providers, ten were English speakers. Of the thirteen Spanish speakers who received outside input, only five attributed it to their doctors. Therefore, it is reasonable to hypothesize that authoritative information for English speaking women is likely to reside within the realm of biomedicine, while Spanish speakers rely on socially relayed information and advice. Future maternal and child health initiatives could take advantage of the relational links that already exist between related women as a means of distributing important health and safety information surrounding pregnancy, birth, and breastfeeding, particularly within Spanish-speaking families.

The Spanish speakers in the sample were also much more likely to cite the significance of their birth country and culture in their food choices, with almost all noting that they only cook and eat food from home. These results were unsurprising as individuals' diets, cravings, and aversions in their daily lives are influenced by their cultures (Hook 1978). The English speakers, on the other hand, spoke of access to fresh food and different types of cuisine or their upbringing as the most influential factors on their dietary choices; their food choices had more to do with their family than their home country. The English speakers may be inadvertently addressing the idea that access impacts not only food eaten, but also food available toward which women could form cravings or aversions (Cantor 2016). Furthermore, the English speakers' experience represents the dominant culture and, thus, does not fully examine the impact of culture on their food choices.

Only one Spanish-speaking woman of the thirteen was both familiar with and prescribed to the belief of “hot” and “cold” medicine. I predicted that all would be affected by this belief system as much literature references its significance in Latin American culture, particularly in the way pregnancy is a “hot” condition calling for “cooler” foods (Juckett 2013; Lefèber & Voorhoeve 1998; Manderson 1987; Wiley & Allen 2009). Lee et al. (2012) also found that macronutrient and micronutrient intake is different between women of different cultures, beyond the general difference in food eaten.

However, comparisons of both the qualitative and quantitative data collected surrounding women’s diets during pregnancy show that the Spanish speakers may subconsciously follow the “hot” and “cold” rules. Fruit, which the dichotomous belief system identifies as “cold” and therefore something women should consume, was the most craved food ( $n = 11$ ), particularly citrus and mangos (Gutierrez 1999; Kaiser & Allen 2009; Lefèber & Voorhoeve 1998). Coronios-Vargas et al. (1992) have suggested that the hot-cold beliefs are likely based, in part, on what women “should be eating” or, conversely, what they should be avoiding (Forestell & Mennella 2016); therefore, foods with the necessary macro- and micronutrients for positive pregnancy outcomes are likely seen as acceptable “cold” foods to consume during pregnancy, while those that may be harmful are “hot” and, thus, unacceptable. If this is accurate, more women and their cravings could be viewed as validating the cultural assumption. However, within the scope of this study and sample, I cannot definitively come to that conclusion.

That being said, the vast majority of women in the study deliberately altered their diet in some way, primarily in an attempt to “eat healthier.” Much of their focus was on adding certain foods to their diets, such as prenatal vitamins or vegetables. Women also frequently mentioned snacking often to quell any potential nausea, satiating their appetite, or to avoid going too long

without eating even in the absence of hunger. Nine of the women noted consuming ginger in some form as a means of reducing nausea, a behavior that is recommended by the Journal of Midwifery and Women's Health (2016). Conversely, less than 20% of the women interviewed spoke of intentionally avoiding foods as a means of, hopefully, improving their baby's health. Unintentional aversions were more common, but not nearly as prevalent as cravings for this sample. These trends may be supported by the demonstrated lack of relationship between aversions and NVP occurrence as well as the lack of relationship between aversions and birth complication occurrences. I anticipated aversions having a less significant association with NVP occurrence as well as more significant impacts on birth outcomes in conjunction with literature that posited that all three may be, at the very least, correlated (Bayley et al 2002; Profet 1988). However, my original hypothesis that the occurrences of NVP, cravings, and aversions would all be predictive of the occurrences of pregnancy complications was not supported.

It is possible that all three elements are more abstractly related by another factor: sensitivity to smell. Profet (1988) argued that sensitivity to smells and NVP, cravings, and aversions serve as protective factors against consumption of harmful foods. Approximately 85% of the women in the sample noted that they became more sensitive to the smells around them during their most recent pregnancy. While the relationship between NVP and sensitivity to smells falls just outside of the cutoff for dependence, eighteen women experienced both symptoms, still constituting a considerable proportion of women in the sample. It was demonstrated, however, that sensitivity to smell could significantly contribute to the occurrence of aversions. For the women in this sample, "strong" or "intense" smells, or even "anything with a smell," would trigger nausea or discomfort. This data further supports Profet (1988), and Flaxman and Sherman's (2000; 2008) hypotheses and observations that strong smelling and

tasting foods trigger the most symptoms. It is well within the realm of possibility that the urge to get away from particularly pungent scents is an evolutionary relic meant to continue to protect us from consuming potentially harmful foods.

An important limitation of the present study is the small sample size, which contributed to low expected statistical counts when conducting chi-squared analyses and Fisher's exact tests. Under the time constraints, it was simply not feasible to do further research nor was it possible to speak to additional women about their experience. The small sample size may have lead to exaggerated or minimized relationships and, thus, could be better validated with a larger sample of women. Moreover, this sample did not take into consideration the exact environment or socioeconomic status of the women. The results and impacts of NVP on women who are disadvantaged or who do not have the ability to fulfill their nutritional requirements would likely look different than those results discussed in this study; as a result, further investigation into certain populations is necessary in order to better examine Profet's assertions for current populations (Pike 2000). Additionally, throughout the interviews, some questions on the survey instrument were more open to interpretation than others, leading some women to provide varied responses that occasionally contradicted each other. Finally, the scope of the study was limited to discussion of only NVP, cravings, and aversions in detail and thus may provide an overly narrow view of the pregnancy experience.

With all results considered, it is evident that pregnancy symptoms are influenced by a woman's culture as well as her evolutionary biology. Even women living in similar areas may experience pregnancy in very different ways as function of their culture; women may receive information about her physical condition and needs from different sources as well as consider her symptomology differently depending on cultural values. The study's findings have implications

for approaching women's care throughout pregnancy from a culturally appropriate lens, within certain communities and the United States as a whole. It is important for care providers to recognize to which certain belief systems women may subscribe, from whom they will likely receive and trust information, and what is influencing their choices throughout their pregnancy experience (Juckett 2013). Additional research is needed to more fully explore cultural factors that may lead to different perceptions of the severity of NVP symptoms as well as the source and reasoning behind the information that has been incorporated into cultural beliefs.

Finally, while unplanned for and unexpected, women revealed interesting information throughout the interview process that requires further investigation. Many women who participated in the study had experienced multiple births and noted that, generally, each birth stood alone in that symptoms varied dramatically. It would be fascinating to investigate whether symptoms tend to worsen or improve with women's additional pregnancies. This information may serve to inform my understanding of why some women in this study, and women globally, did not and do not experience NVP. If NVP symptoms tend to lessen as a woman endures more pregnancies, it is possible that they may disappear completely. This information could also, again, be compared against Profet's hypothesis in order to determine the 'necessity' or lack thereof of NVP.

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## **APPENDIX 1A. Survey Instrument – English**

Date:

Interview Number:

Language:

1. Are you from NC// Where are you from?
2. How long have you lived here?
3. Do you feel that where you are from impacts your food choices and preferences?  
(Y/N)
  - a. If yes, how?
4. Where did you live during your last pregnancy?
5. How long has it been since you were last pregnant?
6. Did you experience fatigue?
7. Did you experience any other symptoms?
  - a. Lack of energy
  - b. Tiredness
  - c. Poor appetite
  - d. Not eaten for longer than you would've liked
  - e. Dry-heaving
8. Did you experience nausea or vomiting during pregnancy? (Y/N)
  - a. If yes, when?

- i. First Trimester?
    - ii. Did it get worse?
    - iii. Did it get better?
  - b. How long did it last?
    - i. On a scale of 1-10 with 1=not bad at all, 10=severe, how bad was it?
  - c. How often?
    - i. Daily, Weekly, Constant
  - d. Has anyone else in your family - mother, sister, etc - experienced NVP in previous pregnancies? (Y/N)
    - i. If yes, who?
- 9. Did any smells affect you?
  - a. How did they affect you?
- 10. Did your pregnancy have any complications? (Y/N)
  - a. If yes, what were they?
- 11. What was the makeup of your diet? // What did a typical day of meals look like?
- 12. Are you familiar with the concept of “hot” and “cold” foods and/or medicine?  
(\*\*NOT related to the temperature)

- a. Did those ideas or beliefs affect your diet?
  - b. Did you eat certain foods because they are “hot”? because they were “cold”?
    - i. What foods?
13. Were there any foods that you craved during your pregnancy? (Y/N)
- a. If yes, what foods?
  - b. How often did you eat those foods? Daily/Weekly/Constantly
14. Were there any foods that you normally liked/enjoyed that you found you had an aversion toward during your pregnancy? (Y/N)
- a. If yes, what foods?
15. Did those cravings and aversions change during the course of your pregnancy? (Y/N)
- a. If yes, how?
16. Did you eat/take/use anything to help alleviate the nausea or vomiting? (Y/N)
- a. If yes, what?
17. Did family members or friends suggest foods to you that you should eat?
- a. If yes, what foods and why?
18. Did family members or friends suggest foods to you that you should avoid?

- a. If yes, what foods and why?

19. Tell me about any foods you ate because you thought they were good for the baby.

- a. Why?



**Symptom Chart: Put a check or an X in the box that you feel best describes your symptoms during pregnancy**

## 20. Severity of Symptoms

Symptom	Mild	Moderate	Severe
Nausea			
Vomiting			
Fatigue			
Lack of Energy			
Poor appetite			
Dry-heaving			
Not eating for longer than you'd like			
Tiredness			
Sensitivity to smell			

## 21. Frequency of Symptoms

Symptom	Never	Some of the time	Most of the time	All of the time
Nausea				
Vomiting				
Fatigue				
Lack of Energy				
Poor appetite				
Dry-heaving				
Not eating for longer than you'd like				
Tiredness				
Sensitivity to smell				

## **List of foods – CRAVINGS**

### Dairy Products

- Milk
- Yogurt
- Butter

### Fruit

- Apples
- Oranges
- Bananas
- Plantains
- Papayas
- Mangos

### Fruit Drinks

### Vegetables

- White/yellow potatoes
- Sweet potatoes
- Leafy greens (spinach, collards)
- Green beans

### Spicy Peppers

### Meat

- Chicken
- Beef
- Pork

### Beans or lentils

### Misc.

- Peanut butter
- Chocolate
- Cookies
- Chips
- Soups

### Rice

### Tortillas

### Eggs

### Processed Foods

### Salsa

### Clay

### Ice

### Herbs

### Spices

- Cilantro
- Basil

**List of foods – AVERSIONS**

Coffee

Tea

Soda

Dairy Products

Milk

Vegetables

Leafy greens (spinach, collards)

Meat

Chicken

Beef

Pork

Processed Foods

Salty Foods

Greasy Foods

Spicy Foods

Hot peppers

Honey

Herbs

Spices

Cilantro

Basil

## **APPENDIX 1B. Survey Instrument - Spanish**

Fecha:

Número de entrevista:

Idioma:

1. Ud es de Carolina del Norte? // De dónde es?
2. Por cuánto tiempo ha vivido en su residencia corriente?
3. Siente como su país natal impacta sus preferencias de comida? (Sí/No)
  - a. Si sí, como?
4. Dónde vivó durante su último embarazo?
5. Cuánto tiempo hasta estuvo embarazada?
6. Tuvo fatiga?
7. Tuvo otras síntomas?
  - a. La falta de energía
  - b. Cansancio
  - c. Malo apetito
  - d. No come por más tiempo que prefiere
  - e. Tiene arcadas
8. Tuvo las náuseas o vomita durante el embarazo? (S/N)
  - a. Si sí, cuándo?
    - i. El primer trimestre?
    - ii. Empeoraba?
    - iii. Mejoraba?

- b. Por cuánto tiempo dura?
    - i. En una escala 1-10 con 1=no malo y 10=severo – como fue?
  - c. Con cuál frecuencia?
    - i. Diariamente/Semanal/Constante
  - d. Alguien más en su familia – madre, hermana, etc – tuvo las nauseas o vomita en embarazos previos? (S/N)
    - i. Si sí, quien?
9. Le afectan los olores? (S/N)
- a. Cómo?
10. Hubo complicaciones en su embarazo? (S/N)
- a. Si sí, cuales?
11. Cómo fue la composición de su dieta? // Que comió durante un día normal?
12. Conoce la idea del concept de comida o medicina “caliente” y “fria”? (\*\*NO relacionado con la temperatura)
- a. Esas ideas o creencias afectan su dieta?
  - b. Comió comidas especificas porque son “calientes”? porque son “frias”?
    - i. Cuáles comidas?
13. Hubo comida que esperaba durante su embarazo? (S/N)

- a. Si sí, cuales?
  - b. Con cuál frecuencia comió esa comida?
    - i. Diariamente/Semenal/Constantamente
14. Hubo comida que usualmente le gustaba pero durante el embarazo, le causaba una aversión? (S/N)
- a. Si sí, cuales?
15. Cambiaron los antojos o las aversiones durante el embarazo? (S/N)
- a. Si sí, como?
16. Comió o tomó algo para ayudarle con las nauseas o el vomito? (S/N)
- a. Si sí, que?
17. Los miembros de la familia o amigos te sugirieron comida que debiera comer?
- a. Si sí, cuales comidas y por qué?
18. Los miembros de la familia o amigos te sugirieron comida que no debiera comer?
- a. Si sí, cuales comidas y por qué?
19. Dígame sobre cualquier comida que comió porque pensaba que fuera buena para el/la bebe?
- a. Por qué?

**Gráfico de síntomas: Pon un ✓ o un X en la caja que tiene la mejor descripción de sus síntomas durante el embarazo**

**20. La severidad de las síntomas**

Síntoma	Leve/Suave	Moderata	Severa
Náusea			
Vomito			
Fatiga			
La falta de energía			
Cansancio			
Malo apetito			
No come por más tiempo que prefiere			
Tiene arcadas			
Sensibilidad de olores			

**21. La frecuencia de las síntomas**

Síntoma	Nunca	Algunas veces	Mayoría del tiempo	Todo el tiempo
Náusea				
Vomito				
Fatiga				
La falta de energía				
Cansancio				
Malo apetito				
No come por más tiempo que prefiere				
Tiene arcadas				
Sensibilidad de olores				

## **Lista de comida – Antojos**

### **Productos de lácteos**

- Leche
- Yogur
- Mantequilla

### **Fruta**

- Manzanas
- Naranjas
- Bananas
- Plátanos
- Papayas
- Mangos

### **Bebidas de fruta**

### **Vegetales**

- Papas blancos o amarillos
- Camote
- De hoja (espinacas, berza, col)
- Ejotes/judías verdes

### **Pimientas picantes**

### **Carne**

- Pollo
- Carne de res
- Cerdo

### **Frijoles o lentejas**

### **Mixto**

- Crema del maní
- Chocolate
- Galletas dulces
- Chifles
- Caldos

### **Arroz**

### **Tortillas**

### **Huevos**

### **Comida procesada**

### **Salsa**

### **Barro**

### **Hielo**

### **Hierbas**

### **Especias**

- Cilantro
- Albahaca



## **Lista de comida – Aversiones**

Café

Te

Fresca

Productos de lácteos

Leche

Vegetales

De hoja (espinacas, berza, col)

Carne

Pollo

Carne de res

Cerdo

Comida procesada

Comida salada

Comida grasiento

Comida picante

Pimientas picantes

Miel

Hierbas

Especias

Cilantro

Albahaca