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Assessment of Caffeine and Sugar Sweetened Beverage Consumption Among Adult Pregnant Women in an Urban Medical Center in Nebraska

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Abstract

Background: Unhealthy non-alcoholic drinks for pregnant women include beverages with high caffeine and added sugar. High caffeine intake during pregnancy has been reported to be linked with adverse pregnancy outcomes such as miscarriages and stillbirth. In addition, high sugar-sweetened-beverages (SSBs) intake increases the risk of maternal obesity that is associated with many serious health problems in both mother and the fetus such as gestational diabetes, hypertension, congenital anomalies, macrosomia, childhood obesity and cardiac diseases. Maternal obesity also increases the cost of prenatal and postnatal healthcare by increasing the need of surgical and anesthetic care for mother and intensive care for the newborns. Lack of national data on consumption of caffeine and SSB in pregnant women warrants the need for further research in this area.

Goal: Assess caffeine and SSB consumption of adult pregnant women in an urban medical center in Nebraska.

Aims: a) Determine the adherence of surveyed pregnant women to established recommendations for caffeine consumption. b) Investigate factors associated with high sugar consumption from SSB among pregnant women.

Methods: A cross-sectional study was conducted among 114 pregnant women aged 19 years and older visiting Nebraska Medicine who agreed to participate in the survey. Caffeine intake was assessed by quantifying the amount of caffeine consumption per day from different caffeine sources. Daily intake of added sugar from SSB was quantified using the standard amount of added sugar in specific types of SSB. The data from the survey was analyzed using statistical software SPSS**.**

Results: The mean BMI of women before pregnancy was 27.84±0.84 and 7% of surveyed women reported smoking during pregnancy. Almost 90% of surveyed women adhered to the current recommendation for caffeine intake during pregnancy. However, half of the women reported consuming more sugar from SSBs than recommended. Younger age, early gestational age, African American race and single or divorced marital status were associated with high sugar intake from beverages.

Impact of the project

The results of this study will inform healthcare professionals about the unhealthy drinking behaviors of pregnant women so they can make necessary recommendations to the pregnant women and women who are planning to become pregnant to improve their pregnancy outcomes as well as the health of both mother and the newborn. This study will also facilitate other researchers to conduct similar studies in different age, race or ethnic groups, and in different geographic settings. A similar concept can be utilized to assess consumption of other dietary items as well.

Service Learning

Placement Site: Olson Center for Women's Health, Nebraska Medicine

The mission of Nebraska Medicine is to provide excellent patient care, offer leading educational programs and promote research in order to improve the overall health of every individual within the community. The Olson Center for Women's Health promotes women's health by providing necessary education and best clinical care in a friendly environment. Apart from general OB/GYN services, there are several other special services provided to the patient such as breast care, diabetes services, internal medicine, high risk obstetrics, physical therapy, Centering Pregnancy Care, urogynecology, midwifery, genetic counseling, lactation consultation, nutrition and social work.

The service learning period ran from December 2017 to February 2018 with the goal of learning and engaging in activities to serve women attending the Olson Center. Service Learning activities at the site included:

- Assisting with the conduct of other research studies at the center by:
    1. Evaluating patients for their eligibility to participate in a research study
    2. Consenting and recruiting patients
    3. Calling and reminding patients to drop off urine specimen
- Creating an educational pamphlet for pregnant women and new mothers
    1. The educational materials available at the Olson Center contain a lot of information however; due to the complexity of these materials many women cannot comprehend the information. So one of my service learning activities was to create a simplified pamphlet that can be used to educate new mothers about the

benefits of breastfeeding. The pamphlet designed during the service learning period is provided in appendix 4.

2. Develop the pamphlet in Spanish language to promote breastfeeding among Hispanic/ Latino community in Nebraska.

- Serving as an interpreter for patients from the Bhutanese refugee community

Importance of the project to the organization

Results of this study will provide valuable information about pregnant women attending the Olson Center. The information on caffeine and total sugar intake from SSB among pregnant women will help healthcare providers to identify the group of women who are more likely to consume high sugar and caffeine. In addition, it will provide them necessary information on issues related to nutrition, and healthy lifestyle in order to improve pregnancy outcomes. The results of this study will also provide data on pregnant women's knowledge on pregnancy weight gain, smoking habits, and pursuit of nutritionist consultation. These findings will assist healthcare professionals and hospital administration to identify areas where changes can be made to improve pregnant women's health and run the clinic efficiently.

Introduction

Eating nutritious food in the right amount improves the well-being of an individual, strengthens immunity, and reduces the risk of cancer and other non-communicable diseases such as diabetes, stroke, cardiovascular diseases and obesity (American Cancer Society, 2017; WHO, 2017). The importance of a healthy diet is even greater for pregnant women since maternal nutrition has significant effects on the perinatal outcome, mother's and child's health later in life (The American Congress of Obstetricians and Gynecologists [ACOG], 2017). The amount of each dietary group recommended for pregnant women is as listed in Table 1. It is also recommended to limit the intake of mercury-containing fish and caffeine during pregnancy while some foods such as raw eggs, meat, and unpasteurized dairy products are advised not to be consumed at all (March of Dimes, 2014). Additionally, reducing the amount of added sugar, processed meat, and refined grains is also considered to be a part of a healthy diet for pregnant women. It is evident from previous research that following recommended dietary guidelines promotes good health and decreases the risk of many diseases thorough all stages of life (US Department of Health and Human Services, 2017).

The health impact of high caffeine intake during pregnancy

Pregnant women are advised to limit caffeine consumption during pregnancy. Caffeine is the most commonly consumed pharmacological compound around the world. It is found in coffee, tea, chocolates, soda and some energy drinks but most of the caffeine intake in adults comes from coffee and tea. Nearly 90% of adults in the United States consume caffeine on daily basis. Along with enhancing alertness and mood, studies have suggested that caffeine alleviates symptoms of Parkinson's disease, prevents sunlight-induced skin cancer, and promotes weight loss (Heckman, Weil & Mejia, 2010). However during pregnancy, metabolism of caffeine slows

down in the mother resulting in prolonged caffeine exposure to the fetus. Due to the lack of an enzyme necessary to metabolize caffeine in the placenta and fetus, the risks associated with caffeine consumption to the fetus increase (Chen et al., 2014). In the last few decades studies have shown the relation between maternal high caffeine intake and adverse fetal outcomes such as miscarriage (Weng, Odouli & Li, 2008), increased fetal growth restriction (Olsen & Bech, 2008), and stillbirth (Greenwood et al., 2010). Some studies even suggested that maternal coffee consumption may increase the risk of childhood leukemia (Thomopoulos et al., 2015) and, childhood brain tumor (Greenop et al., 2014). Many of these studies are subjected to skepticism due to the methods used to quantify caffeine intake assessment during pregnancy, bias, confounding factors, and inconsistent results (Heckman, Weil & Mejia, 2010). Due to lack of sufficient evidence, different countries issued precautionary guidelines recommending limited caffeine intake during pregnancy (Greenwood et al., 2014). In the United States, the current recommendation for caffeine consumption during pregnancy is 200mg or less per day. However, this is difficult to quantify as the amount of caffeine intake from caffeinated beverages as it depends on cup size, brewing method, serving method, and brand (March of Dimes, 2015).

The health impact of high added sugar consumption during pregnancy

It is recommended to limit added sugar intake for the general population as well as pregnant women. According to the 2015-2020 Dietary Guidelines for Americans, the recommended daily intake of added sugar should be less than 10% of the total daily calorie intake, however, added sugar represents 13% of total daily calories intake of an adult American [Center for Disease Control and Prevention (CDC), 2017] and 14% of total daily calories intake of pregnant American women (Regnault, Gentili, Sarr, Toop, & Sloboda, 2013). American Heart

Association (AHA) recommends women to limit their added sugar consumption to no more than 25 grams per day which is equivalent to 100 calories [American Heart Association (AHA), 2018). Consuming added sugar in liquid form such as Sugar-sweetened beverages (SSBs) is more risky than added sugar in solid form due to differences in metabolism. Sugary drinks involve less time for oral processing and digestion, thus raising blood glucose levels in a short period. SSBs also have low satiety value compared to solid food containing sugar (Wang, 2013). SSBs contribute to almost one-third of the added sugar consumption among adults in the U.S. [Center for Disease Control and Prevention (CDC), 2017]. According to the 2009-2010 NHANES data, almost 50% of U.S. adults reported to consume one or more SSB in a day. (CDC, 2017). In Nebraska, 29.8% of adults reported drinking SSB at least once per day in 2013 (Park, Xu, Town, & Blanck, 2016).

Table 1. Recommended dietary guidelines during pregnancy

Food Groups	**Recommendation**
Grains	6oz/day in first trimester 7 oz/day in second trimester 8 oz/day in the third trimester
Vegetables	$2^1/_2$ cups/day in first trimester 3 cups/day in second and third trimester
Fruits	$1^1/_2$ to 2 cups/day in first trimester 2 cups/day in second and third trimester
Dairy	3 cups/day throughout pregnancy
Proteins	5 oz/day in first trimester 6 oz/day in second trimester $6^1/_2$ oz/day in the third trimester

Note: Adapted from "Choosing healthy foods," by March of Dimes, 2014. Retrieved September 3, 2017, from https://www.marchofdimes.org/pregnancy/eating-healthy-during-pregnancy.aspx. Copyright 2017 by March of Dimes Foundation.

SSB consumption can be very harmful for pregnant women's diet. A pregnant woman with normal body mass index (BMI) requires around 300 extra calories per day (ACOG, 2017). SSBs represent an easy way to add in those calories in one's diet without adding in any beneficial nutrients. According to one study, SSBs were one of the major sources of energy among nulliparous pregnant American women in their first trimester (Bodnar et al., 2017). A large longitudinal study among Norwegian pregnant women also showed that drinking more than 1 serving of SSB was associated with higher risk of preterm delivery (Englund-Ogge et al., 2012). In addition, high consumption of SSB during pregnancy is associated with increased risk of maternal obesity, cardiovascular diseases and diabetes (CDC, 2017).

Maternal obesity is linked to many short and long-term complications before, during, and after pregnancy as well as on the fetus (March of Dimes, 2015). Overweight and obesity during pregnancy is associated with maternal complications such as miscarriage, gestational diabetes (GDM), pregnancy-induced hypertension, pre-eclampsia, eclampsia and deep venous thrombo-embolism (Guelinckx, Devlieger, Mullie, & Vansant, 2010). Maternal obesity is also associated with a decrease in successful vaginal deliveries and an increase in assisted and cesarean deliveries which incur significantly higher costs. The odds of cesarean delivery among overweight (OR=2.05{95% CI, 1.86-2.27}) and obese (OR=2.89{95% CI, 2.28-3.79}) women have been reported to be significantly higher compared to women with normal BMI (OR=1.46{95% CI, 1.34-1.60}). Obese women are also at higher risk of anesthetic and intraoperative complication during cesarean deliveries. Obstetric complications in obese pregnant women are shown in Table 2 (Leddy, Power, & Schulkin, 2008). Maternal obesity is also associated with lower rates of initiation and continuation of breastfeeding (Guelinckx, Devlieger, Bogaerts, Pauwels, & Vansant, 2011). Fetal risks linked with maternal obesity include

stillbirth, birth asphyxia, congenital and cardiovascular anomalies. Maternal obesity also increases the risk of obesity, diabetes and cardiovascular diseases later in life of the child. Apart from physical complications, maternal obesity may also raise the financial burden on the family due to the extra cost of extended obstetrical care, Intensive Care Unit (ICU) admission, surgical care, operative care and medicines (Guelinckx, Devlieger, Mullie, & Vansant, 2010).

Table 2. Obstetric Complications in Obese Pregnant Women

	Complications	OR (955 CI) or % vs Normal Weight	p
Early Pregnancy	Spontaneous abortion (miscarriage)		
	• After spontaneous conception	1.2 (1.1-1.5)	0.04
	• After IVF	1.8 (1.1-3.0)	<0.05
	• Recurrent miscarriage	3.5 (1.1-21.0)	0.04
	Congenital anomalies		
	• Neural tube defects	1.8 (1.1-3.0)	<0.05
	• Spina bifida	2.6 (1.5-4.5)	<0.05
	• Congenital heart disease	1.2 (1.1-1.3)	<0.05
	• Omphalocele	3.3 (1.0-10.3	<0.05
Late pregnancy	Hypertensive disorder of pregnancy		
	• Gestational nonproteinuric hypertension	2.5 (2.1-3.0)	<0.0001
		3.2 (1.8-5.8)	0.007
	• Preeclampsia	2.6 (2.1-3.4)	<0.001
	Gestational diabetes mellitus	1.5 (1.1-2.1)	<0.05
	Preterm birth	2.8 (1.9-4.7)	<0.001
	Intrauterine fetal demise (stillbirth)		
Peripartum	Cesarean delivery	47.7% vs 20.7%	<0.01
	Decreased VBAC success	84.7% vs 66%	0.04
	Operative morbidity	33.8% vs 20.7%	<0.05
Fetal/neonatal complications	Fetal macrosomia (EFW ≥ 4500 g)	2.2 (1.6-3.1)	<0.001
	Shoulder dystocia	3.6 (2.1-6.3)	<0.001
	Birth weight > 4000 g	1.7 (1.4-2.0)	0.0006
	Birth weight > 4500 g	2.0 (1.4-3.0)	<0.001
	Childhood obesity	2.3 (2.0-2.6)	<0.05

95% CI, 95% confidence interval; EFW, estimated fetal weight; IVF, in vitro fertilization; OR, odds ratio; VBAC, vaginal birth after cesarean.

Note: Reprinted from "The impact of maternal obesity on maternal and fetal health," by Meaghan A Leddy, Michael L Power, and Jay Schulkin, 2008, Reviews in obstretics and gynecology, 1(4), 170.

Gap in Knowledge

Wide availability of caffeine in different types of food and beverages and popularity of caffeinated food and beverage items have made caffeine one of the most widely consumed stimulant in the general population. Unfortunately, variability of caffeine content in different food items and beverages make it difficult to estimate the daily caffeine intake in individuals. Previous data on daily caffeine consumption in the United States was collected by the National Purchase Diary (NPD) Group's Food Consumption surveys and the National Health and Nutrition Examination Survey (NHANES) surveys. NHANES survey did not specify source of caffeine and it did not include food items such as energy drinks and chocolates. The NPD survey only included a few caffeinated food items. Out of the two surveys, only NPD data contains information about caffeine intake among women of child-bearing age; however, data among pregnant women is nonexistent (Somogyi, 2010). Considering the possible negative health effect on pregnancy outcome with high consumption of caffeine and the lack of national data, further research and evaluation of caffeine intake during pregnancy is essential.

Obesity is another public health concern, especially during pregnancy where it significantly increases the risk of late life obesity in mothers and the newborns. SSBs are one of the contributing factors in maternal obesity yet there have not been many studies that focus on SSB consumption among pregnant women. To prevent maternal obesity and its lifelong consequences, it is crucial to study unhealthy nonalcoholic drinking habits among pregnant women and identify possible barriers associated with high SSB intake.

Goals and Objectives

Goal: Assess the caffeine and SSB consumption of adult pregnant women in an urban medical center in Nebraska.

Objective 1: Survey pregnant women aged >19 years using food frequency questionnaire.

Activity 1: Design a questionnaire to assess caffeine and SSB intake among pregnant women.

Activity 2: Survey 100 pregnant women receiving antenatal care at Nebraska Medicine.

Objective 2: Determine the adherence of surveyed women to established recommendations for caffeine consumption during pregnancy.

Activity 1: Perform descriptive analysis of data using statistical software SPSS

Activity 2: Identify factors and possible barriers associated with non-adherence to caffeine consumption recommendations.

Objective 3: Investigate factors that impact high SSB consumption among pregnant women.

Research methods

Research Question

The research question addresses whether pregnant women attending Nebraska Medicine adhere to the recommended guidelines for caffeinated and sugar sweetened beverages during pregnancy. I also intend to determine factors associated with high SSB consumption.

Study design and participants

This was a cross-sectional study. Participants were pregnant women over the age of 19 years visiting Nebraska Medicine for antenatal checkup. During the clinic visit, participants self-completed a questionnaire.

Inclusion criteria:

- Pregnant women aged ≥ 19 years visiting Nebraska medicine for antenatal check up.
- All races/ethnic groups
- Being able to read and write in English

Sampling strategy and Sample size

Convenience sampling was performed at the Olson Center for Women's Health at Nebraska Medicine. The total number of subjects needed to achieve the scientific objectives of the research problem was 100. Considering the study population from a clinic with limited population, the sample size was calculated to get 95% confidence level, with confidence interval of 10%, and standard deviation of 0.5. The necessary sample size obtained was 96 using the following formula:

$$N= (1.96)^2 (0.5*0.5)/ (0.1)^2$$

According to the Pregnancy Risk Assessment Monitoring System (PRAM), the response rate of women is almost 80% in Nebraska. Assuming a similar response rate in our study, the anticipated maximum number of pregnant women to be contacted was 120.

Assessment tool

The survey questionnaire consists of 30 questions which are divided into 4 sections. First section consists of 15 questions on demographics and antenatal history such as gestational age, number of children, nutritionist consultation, enrollment in WIC program, and knowledge on pregnancy weight gain. Second section contains a question about family history of diabetes, hypertension, heart disease, high cholesterol and cancer. Third section consists of 4 questions on smoking history. And the last section includes 10 questions on frequency, size and type of

caffeinated drinks and SSB consumption in last 30 days. The survey questionnaire is provided in appendix 5.

Data collection

The eligible pregnant women were approached by the researcher after their antenatal check up at the Olson center and the objectives of the study were explained. The potential participants were informed that this is an optional nutritional survey and they can refuse to answer any question or decide not to participate in the study at any time. Consent notification were read to those who agreed to participate. The validated questionnaire was administered to the participants in a private room.

Ethics

The study was approved by the Institutional Review Board (IRB) of UNMC under the exempt category 2 [IRB protocol #730-17-EX]. The survey was de-identified and anonymous. Consent notification was provided on the first page of the survey questionnaire. Verbal consent was obtained from all the participants. To ensure the privacy of the participants, the survey took place in private rooms and only research personnel involved in the study had access to the data. The electronic data were stored in the UNMC servers and hard copies of the data were locked in a file cabinet at the COPH to maintain confidentiality.

Data analysis

Caffeine and SSB intake were determined from the questionnaire. The average caffeine and sugar consumption were estimated using standard caffeine and sugar content of different types of beverages provided in Appendix 2 and 3. By combining frequency, size of serving, and types of beverages, total daily intake of caffeine and SSB were calculated. For analyses,

continuous variables such as age, BMI and weeks of pregnancy were grouped. Age was grouped into three categories <25 years, 25 years-30 years, and >30 years. BMI was grouped into normal weight (BMI <25), overweight (BMI 25-29.9), and obese (BMI ≥30). Similarly, weeks of pregnancy was grouped into first trimester (week 1-week 12), second trimester (week 13- week 28) and third trimester (week 29 and above). As a small number of participants were of Asian, Latino and mixed origin, these races were grouped as "other race". Marital status was regrouped as "with partner" and "without partner".

The data analysis focused on the total caffeine intake per day and total sugar intake from SSBs per day. Further analysis determined the proportion of pregnant women not adhering to dietary guidelines for caffeine intake (<200 mg per day). Chi-square and independent sample t-tests were used to test for significant association of caffeine intake with other variables. For sugar intake from SSBs, more than 25 grams of added sugar per day was considered high in accordance with the recommendation of AHA. A linear regression model with total sugar intake from SSBs as dependent variable, and age, race, education, income, marital status, BMI before pregnancy, family history of diabetes, nutritionist consultation, and weeks of pregnancy as independent variables was used. Backward selection was performed to identify associated covariates. Interaction between the variables such as marital status, age group, and race were also evaluated. All statistical tests were two-tailed using alpha value of 0.05 and the data was analyzed using SPSS.

Results

Demographics and participation information

Out of 120 women approached during the survey period, 114 agreed to participate in the survey resulting in a response rate of 95%. The characteristics of the study population are

summarized in appendix 1. All the participants were English speaking pregnant women (6-41 weeks pregnant) over the age of 19 years. Mean age of participants in the survey was 27.32±0.5 years with most women (38.3%) in the age group 19-25 years. The majority of participants (63.2%) were Caucasian, and out of remaining participants, 20.2% identified as African American, 9.6% as Latino, 2.6% as Asian and 4.4% as mixed race. Most of the women (60.5%) in the survey had a college education. More than one-third of the participants (34.2%) had the annual income of less than $20,000 and only 12.3% had the annual income of more than $100,000. Almost half of the participants (45.6%) were married, 41.2% were single and remaining were divorced (4.4%), separated (3.5%) or living with the partner (3.5%).

Pregnancy and family history information

Almost half of the participants (48.2%) were in their third trimester of pregnancy and only 14% were in the first trimester. A nutritionist is available at the Olson center for pregnant women but only 27.4% had received nutritional consultation during their prenatal checkup. About one-third of the participants were enrolled in the Women, Infants, and Children (WIC) program. For 36% of participants, this was the first pregnancy and for 37.7% it was the second. Participants were asked about their knowledge of recommended weight gain during pregnancy. Initially, 68.4% reported to have knowledge on the subject but only 59.4% were, in fact, aware of appropriate weight gain during pregnancy.

The mean BMI of the participants before pregnancy was 27.84±0.84. A little less than half of the participants (45.6%) had normal BMI, 30.7% were obese and 23.7% were overweight. Around 51% of participants had a history of family diseases such as diabetes (17.5%),

hypertension (15.8%), heart diseases (7%), high cholesterol (14.9%) and cancer (17.5%). A vast majority of participants (93%) were nonsmokers but 7% still smoked during the pregnancy.

Consumption of caffeine and sugary drinks

Most participants reported consuming caffeine less than 200mg per day and only 10.5% reported to consume more than 200 mg caffeine per day. The mean of total daily caffeine intake was 72.49±7.86 mg. Coffee was the main source of caffeine among the participants followed by cola drinks. Sixty-two percent of total caffeine consumed by the participants was contributed by coffee followed by cola drinks (23%) and tea (8.89%). Hot chocolate and energy drinks contributed the least with less than 1% of total caffeine consumed. Table 3 compares the various characteristics of participants with the level of daily caffeine consumption. There was no significant association between total caffeine intake and demographic or health variables.

The mean of total sugar intake from the SSBs was 42.4±4.46 gm per day, which is 17.4 gm higher than the daily recommended value, with 51.8% of the participants consuming high sugar from beverages. The main source of sugar was cola drinks and fruit juices. Cola drinks and fruit juices contributed 36.47% and 36.43% of total sugar consumed from sugary beverages respectively. Sugar added by the participants in hot drinks such as coffee, tea, hot chocolate, and espresso contributed 14.59% of total sugar consumed. Table 4 compares the various characteristics of participants with the level of daily sugar consumption from beverages. The main sources of sugar and caffeine are shown in table 5. Energy drink consumption among the pregnant women was very low. Only 0.92% of total caffeine and 0.57% of total sugar was contributed by energy drinks.

Table 3 Characteristics of the study population by caffeine intake

Variables		Total (n=114)	Daily caffeine intake				Mean ± SD	p-value
			Normal (≤200mg/d)					
			(n=102)	%	(n=12)	%		
Age	<25 years.	44	38	37.3%	6	50%	70.69±94.2	0.303
	25-30 years.	32	28	27.5%	4	33.3%	90.44±92.3	
	>30years.	38	36	35.3%	2	16.7%	59.46±60.0	
Race	Caucasian	72	63	61.8%	9	75%	79.17±83.9	0.236
	Black/African American	23	22	21.6%	1	8.3%	45.87±60.7	
	Others	19	17	16.7%	2	16.7%	79.37±103.9	
Education	High school or less	43	37	37%	6	50%	79.63±93.6	0.532
	College education	69	63	63%	6	50%	68.86±78.8	
Income	<$40,000	61	55	53.9%	6	50%	68.07±81.3	0.053
	$40,000-$79,000	30	24	23.5%	6	50%	101.15±106.2	
	>$80,000	114	23	22.5%	0	0%	46.81±37.7	
Marital status	Without partner	56	50	50%	6	50%	69.49±83.5	0.752
	With partner	56	50	50%	6	50%	74.56±85.5	
BMI	Normal	52	44	43.1%	8	66.7%	83.14±94.9	0.137
	Overweight	27	27	26.5%	0	0%	44.16±36.8	
	Obese	35	31	30.4%	4	33.3%	78.17±89.5	
Knowledge on pregnancy weight gain	No	46	40	39.2%	6	50%	75.54±87.9	0.755
	Yes	68	62	60.8%	6	50%	70.42±81.7	
WIC enrollment	No	77	69	67.6%	8	66.7%	71.29±82.1	0.832
	Yes	37	33	32.4%	4	33.3%	74.98±88.7	
Nutritionist consult	No	82	73	72.3%	9	75%	73.16±84.5	0.960
	Yes	31	28	27.7%	3	25%	72.27±84.6	
Weeks of pregnancy	1st trimester	16	13	12.7%	3	25%	86.28±112.9	0.053
	2nd trimester	43	37	36.3%	6	50%	92.33±92.7	
	3rd trimester	55	52	51%	3	25%	52.96±61.3	
Family history of diseases	No	58	54	52.9%	4	33.3%	65.29±78.9	0.355
	Yes	56	48	47.1%	8	66.7%	79.94±88.9	

Table 4 Characteristics of the study population by sugar intake

Variables		Total (n=114)	Daily sugar intake				Mean ± SD	p-value
			Normal (≤25gm/d)		High (>25gm/d)			
			(n=55)	%	(n=59)	%		
Age	<25 years.	44	9	16.4%	35	59.3%	63.84±49.1	0.000
	25-30 years.	32	17	30.9%	15	25.4%	41.76±54.2	
	>30 years.	38	29	52.7%	9	15.3%	18.19±22.4	
Race	Caucasian	72	44	80%	28	47.5%	30.57±41.2	0.001
	Black/African American	23	5	9.1%	18	30.5%	72.98±58.9	
	Others	19	6	10.9%	13	22%	50.27±37.3	
Education	High school or less	43	14	25.9%	29	50%	60.03±52.4	0.003
	College education	69	40	74. %	29	50%	31.07±40.7	
Income	<$40,000	61	18	32.7%	43	72.9%	59.84±54.7	0.000
	$40,000-$79,000	30	18	32.7%	12	20.3%	29.21±31.2	
	>$80,000	23	19	34.5%	4	6.8%	13.4±15.6	
Marital status	Without partner	56	17	30.9%	39	68.4%	60.67±55.8	0.000
	With partner	56	38	69.1%	18	31.6%	22.39±26.5	
BMI	Normal	52	27	49.1%	25	42.4%	39.19±45.1	0.397
	Overweight	27	13	23.6%	14	23.7%	36.89±31.6	
	Obese	35	15	27.3%	20	33.9%	51.46±59.9	
Knowledge on pregnancy weight gain	No	46	16	29.1%	30	50.8%	60.24±60.2	0.003
	Yes	68	39	70.9%	29	49.2%	30.35±32.0	
WIC enrollment	No	77	45	81.8%	32	54.2%	33.57±42.8	0.004
	Yes	37	10	18.2%	27	45.8%	60.81±52.4	
Nutritionist consult	No	82	46	85.2%	36	61%	33.33±40.1	0.004
	Yes	31	8	14.8%	23	39%	67.26±57.5	
Weeks of pregnancy	1st trimester	16	5	9.1%	11	18.6%	55.62±43.7	0.076
	2nd trimester	43	21	38.2%	22	37.3%	50.72±62.7	
	3rd trimester	55	29	52.7%	26	44.1%	32.67±30.7	
Family history of Diabetes	No	94	45	81.8%	49	83.1%	43.91±50.3	0.342
	Yes	20	10	18.2%	10	16.9%	35.39±32.2	

The result of multiple linear regression showed a significant association between daily sugar intake with variables such as age (age group <25 years. and 25 years-30 years.), race (African American race), weeks of pregnancy (first and second trimester) and marital status ($p<0.05$). There was an inverse association between daily sugar intake and age. Similarly, total sugar intake and weeks of pregnancy were also inversely associated. Sugar intake tended to increase among African American and decrease among married women. However, other variables such as annual income, education, WIC enrollment, knowledge on pregnancy weight gain, family history of diabetes, and BMI before pregnancy did not significantly affect total sugar intake from beverages. The estimated model of daily sugar intake was given by the formula:

Predicted Daily sugar intake = 21.20 - 22.77*marital status + 23.99* African American race + 28.03*age <25 years. + 21.83*age 25-30 years + 22.93*first trimester +17.52*second trimester

Table 5. Sources of caffeine and sugar in SSBs

Source of caffeine	Example	Percentage		SSBs	Example	Percentage
Coffee	Caffeinated, half-caffeinated, decaf	61.66%		**Cola drinks**	Coca cola, Pepsi	36.47%
Cola drinks	Coca cola, Pepsi	23.34%		**Fruit juice**	From concentrate, Sunny D	36.43%
Tea	Black tea, Green tea	8.89%		**Other beverages**	Lemonade, Slushy	11.95%
Chocolate	Dark chocolate, Milk chocolate	2.82%		**Coffee**	Caffeinated, half-caffeinated, decaf	8.49%
Espresso		1.56%		**Tea**	Black tea, Green tea	5.95%
Energy drinks	Red bull, Monster	0.92%		**Energy drinks**	Red bull, Monster	0.57%
Hot chocolate		0.82%		**Espresso**		0.08%
	Total	**100%**		**Hot chocolate**		0.06%
					Total	**100%**

Discussion

In this sample representing pregnant women of Nebraska attending Nebraska Medicine for antenatal visits, we found that 10.5% of women are consuming caffeine more than the recommended level. There was no significant association between other variables and caffeine intake. Similar to the previous studies, coffee was the main source of caffeine among these participants. On the other hand, total daily sugar intake was high in almost half of the participants which supports the findings of previous studies that SSBs are among the major source of calories for pregnant women. Total sugar intake was significantly associated with age, marital status, race and weeks of pregnancy. Women from African American decent are more likely to consume high sugar from beverages than women from other race. Women who are living with their partners or married tend to consume less sugar from beverages compared to single or divorced women. This relationship between sugar intake from beverages and marital status signifies the importance of support from partners during pregnancy.

With increasing age women are more likely to reduce sugar intake from beverages Women in age group <25 years tend to consume more sugar from beverage compared to older women. Similarly, women in age group 25-30 years also tend to take more sugar compared to women over 30 years. Gestational age is also significantly associated with total sugar intake from beverages. Women are likely to consume more sugar during early weeks of pregnancy and reduce the sugar intake with increasing gestational age. This association of daily sugar intake with age and weeks of pregnancy signifies that young and women in early weeks of pregnancy have a tendency to consume more sugar. Educational inventions are warranted for women who are at risk of consuming more sugar. Young women and newly pregnant women require more information and education about nutrition during pregnancy.

Another significant finding was the mean BMI of the participants before pregnancy. More than half of the participants were either overweight or obese. With all the risks associated with obesity and pregnancy, it is necessary to address the issue. Necessary actions are required from responsible authority to promote healthy lifestyle especially among young women who are planning to be pregnant. Another significant finding was the lack of knowledge about pregnancy weight gain among the participants and use of services available for the women at the Olson Center. Most of the women are unaware of the appropriate weight gain during pregnancy. Even though majority of women did not smoke during pregnancy, 7% of women reported smoking during pregnancy. Healthcare professionals should also focus on educating and providing necessary intervention to help these women refrain from smoking during pregnancy.

Some of the limitations of this study are possible misclassification of caffeine intake, recall bias, and desirability bias. Caffeine content in coffee, tea, and chocolates vary depending on the brand, brewing method, and type of coffee. Standard caffeine content in each item was chosen as the reference and we did not include other sources of caffeine such as ice-cream, baked goods and medicines so caffeine intake most likely is underestimated. Additionally, participants are also likely to underreport the intake of caffeine as caffeine consumption during pregnancy is considered unfavorable resulting in social desirability bias. Food frequency was assessed from 30 days dietary recall which made the study vulnerable to recall bias.

From the findings of this study, healthcare providers can identify pregnant women likely to consume high sugar from beverages and provide necessary information and provide further assistance on acquiring dietary knowledge. The educational programs can focus on pregnant women of African American decent, single or divorced women, young women and women during early pregnancy. Even though the nutritionist is available at the Olson Center for the

patients, the proportion of pregnant women who consulted the nutritionist is low. The findings will assist hospital administration to investigate the cause of low rates of service utilization at the clinic and make necessary changes in the system to allow more patients to receive services available to them.

Further research should rely on biological markers of caffeine and sugar to get more accurate information. Similar studies should be conducted in women of different age, race, and in different geographical settings. A similar concept can be utilized to assess consumption of other dietary items such as fish, dietary supplements etc.

Conclusion

In conclusion, our results suggest that majority of women in the study are following current guidelines for caffeine consumption during pregnancy. However, 10% of women reported consuming caffeine above the recommended level, which should be addressed. Sugar intake from beverages was considerably high among most of the women. Total sugar intake from beverages was significantly associated with young age, early gestational age, African American race, and single status. Interventions in clinical practice and on the individual level should be introduced to educate pregnant women at risk of consuming more sugar from beverages. Similarly, more effort and resources should be used to reduce excess caffeine intake and smoking during pregnancy as well.

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Service Learning/Capstone Experience reflection

The placement site for my service learning was at the Olson Center for Women's Health. During my placement, I learned that apart from general obstetrical and gynecological services, there are a number of other services available at the clinic such as physical therapy, genetic counseling, lactation counseling etc. Social workers and financial consultation for low-income patients are also available there. To facilitate patients who cannot speak English, interpreters are present at the clinic. If the interpreter is not available in person, they can always be reached through the phone. One thing that I did not expect at the clinic was people not showing up for their appointments. Due to lack of any form of compensation, instead of canceling the appointment many patients don't show up at the clinic. I only had experience of working in the hospital of my home country so it was a great experience to learn about the medical system in the United States. I realized that here in the U.S., midwives and nurse practitioners are trained more and are actively involved in patient care. They are mainly responsible for the antenatal care of normal pregnancies and high-risk pregnancies are referred to the doctors.

My main service learning activity was to assist my preceptor, Dr. Kinney, in the cervical cancer study. My responsibilities were to evaluate patient's eligibility, consent, and recruit patients in the study. I did that almost every day of my two months placement at the clinic. I also worked with other residents and oncologists during this period which improved my communication skills and public relation. I performed other activities when patients eligible for cervical cancer study were not present. I also assisted as an interpreter for patients from Bhutanese refugee population as interpreters for the Nepali language is not present at the clinic. My language skills contributed to this service learning activity. Another service learning activity was to assist and observe the nutritionist while she enrolls patients in the WIC program. This

experience gave me an opportunity to understand how federal programs are conducted efficiently in a clinical setting. While working with the nutritionist, I realized that the brochures available at the clinic were too long and complex for many women. So after discussing with her, I decided to create a simple and concise educational brochure on breastfeeding for new mothers to relay the importance of breastfeeding efficiently. The brochure is short and is written in simple language to make it easily understandable.

During my SL/CE period, I had a good relationship with the nurses, midwives, and residents of the clinic. Due to my good relation and my communication skills, I was able to recruit more patients in my survey and in the cervical cancer study. My medical skills helped me to focus on important aspects of breastfeeding to create the educational brochure. Similarly, my epidemiology and public health knowledge assisted me to explain the important public health issues to a different audience.

In my opinion, my greatest contribution was to create the educational brochure. Breastfeeding is an important issue as it has o many health benefits for both mother and the child. However, it is also challenging for new mothers to initiate and continue breastfeeding. Additionally, there are so many barriers to breastfeeding such as social norm, financial issues, lack of knowledge etc. The brochure will educate many women regarding breastfeeding and I believe it can change the perspective of new mothers on breastfeeding.

One of the challenges that I faced was to create the brochure in two languages. Since all the educational materials at the clinic are available in English and Spanish, I was also asked to do the same. To overcome this issue, I asked my friends to help me translate the brochure into Spanish. Another challenge for me was to prevent surveying the same participant twice for my capstone project. The survey of my capstone was de-identified to maintain the confidentiality of

the participants. And pregnant women visit the clinic for their antenatal checkups at least once a month and depending on the weeks of pregnancy, complications, and health issues some pregnant women come for follow-ups more frequent. So, it was likely to survey the same women twice. To prevent this from happening, I needed to be extra careful while surveying. So, after I introduced myself, I used to ask the patients if they have already met me or filled the dietary questionnaire on their previous visits. Since I used to meet a lot of patients every day, it was convenient to ask the participants.

For my capstone project, my committee chair and I worked together from the beginning to shape the project. Public health courses that I took as an MPH student helped me in every aspect of my project from designing the study, to calculate the sample size, developing a questionnaire, conducting statistical analysis etc. Knowledge gained from classes such as epidemiology applied research was used to design the study. Similarly, biostatistics, applied epidemiology helped me in data analysis.

My service learning and capstone project allowed me to interact with pregnant women and cervical cancer patients. Working with the vulnerable population gave me an opportunity to understand the sensitivity of my work. It was difficult to approach women who recently had a colposcopy, a procedure to diagnose cervical cancer, and are waiting for the results. As an MPH student, I took a class on ethical and regulatory aspects of clinical research offered by NIH. This class helped me to apply ethical principles while recruiting participants from these vulnerable populations.

Acknowledgement

I would first like to thank my SL/CE committee chair, Dr. Paraskevi Farazi, for supporting me throughout the project. She helped me in every aspect of my project from project designing, statistical analysis to finalizing this project within the limited time frame. She also guided me to apply for IRB approval. She has been a constant mentor to me whose doors were always open to me.

I'd also like to express my sincere gratitude to my preceptor, Dr. Sonja R. Kinney, for agreeing to be my preceptor and for making my service learning experience successful and wonderful. The credit of the successful response rate in capstone project goes to her. I am also thankful to Dr. Christopher Wichman for providing his extensive knowledge on biostatistics and for his valuable feedbacks that improved my project.

I heartily thank my academic advisor, Dr. Monirul KM Islam, for supporting me throughout my MPH program. As a teacher, he has taught me more than I could ever give him credit for. My sincere thank also goes to Dr. Tubens Sean and Jamie Stevens, of the Olson Center, for helping me with my survey and with my service learning activities.

My completion of this project could not have been accomplished without the support of all staffs and faculty of College of Public Health, UNMC. I would also like to acknowledge Laura Vinson for her support throughout my project. I would also like to thank my wonderful friend, Marcela Carvajal Suarez, for helping me translate the educational brochure in Spanish.

Finally, I would like to express my profound gratitude to my parents, grandparents, brother, and to my husband for continuous encouragement and support throughout my MPH program and the capstone project. This accomplishment would not have been possible without my family. Thank you.

Appendix 1. Characteristics of the study population

Variables	N	Mean±SD		Frequency	Percent
Age (years	114	27.32±0.49	<25	44	38.6%
			25-30	32	28.1%
			>30	38	33.3%
BMI before pregnancy	114	27.84±0.83	<25	52	45.6%
			25-29.9	27	23.7%
			≥30	35	30.7%
Race	114		Asian	3	2.6%
			Black/ African American	23	20.2%
			Caucasian	72	63.2%
			Latino	11	9.6%
			Mixed Race	5	4.4%
Marital status	112		Married	52	45.6%
			Single	47	41.2%
			Divorced	5	4.4%
			Life Partner	4	3.5%
			Separated	4	3.5%
Education	112		Grade school, Junior High	1	.9%
			Some high school	14	12.3%
			High school graduate	28	24.6%
			Some college	26	22.8%
			College graduate	28	24.6%
			Postgraduate	12	10.5%
			Technical, Vocational, Certificate	3	2.6%
Annual income	114		<$20,000	39	34.2%
			$20,000-$39,000	22	19.3%
			$40,000-$59,000	18	15.8%
			$60,000-$79,000	12	10.5%
			$80,000-$99,000	9	7.9%
			>$100,000	14	12.3%
Number of pregnancies	114		First	41	36%
			Second	43	37.7%
			Third	21	18.4%
			Fourth	5	4.4%
			Fifth	2	1.8%
			Sixth	1	0.9%
			Seventh	1	0.9%
Knowledge on pregnancy weight gain	114		No	46	40.4%
			Yes	68	59.6%
WIC enrollment	114		No	77	67.5%
			Yes	37	32.5%
Nutritionist Consultation	113		No	82	71.9%
			Yes	31	27.2%
Family History of diseases	114		No	58	50.9%
			Yes	56	49.1%
			Diabetes	20	17.5%
			Hypertension	18	15.8%
			Heart Disease	8	7%
			High cholesterol	17	14.9%
			Cancer	20	17.5%
Smoking currently	114		No	106	93%
			Yes	8	7%

Appendix 2.

Caffeine Content in beverages

Beverages	Serving size (Fl. Oz.)	Caffeine (mg)	
Coffee			
Regular caffeinated	8	95	((Mitchell, Hockenberry, Teplansky, and Hartman, 2015)
Decaffeinated	8	2	
Espresso	1	63	
Half caffeinated	8	47	
Hot Chocolate	8	16	
Tea			
Black (eg Earl Grey)	8	47	(Mitchell, Hockenberry, Teplansky, and Hartman, 2015)
Green	8	25	
White	8	15	
Decaffeinated	8	2	
Herbal	8	0	(CSPI, 2017)
Ice Tea (Lipton)	8	9	(PEPSICO, 2017)
Soft Drinks			
Pepsi	12	38	(CSPI, 2017)
Pepsi Zero Sugar	12	69	
Coca-cola, Coke Zero, Diet Pepsi	12	34	
Diet Coke	12	46	
Mountain Dew	12	55	
Dr. Pepper, Sunkist- diet or regular	12	41	
Mean		**47**	
Decaf soft drinks (Fanta, Fresco etc.)	12	0	(CSPI, 2017)
Energy Drinks			
RED BULL	8.3	75	(Somogyi, 2010)
Monster Energy	16	160	
Rockstar	16	160	
5-Hour shot	2	220	
Mountain Dew Kick Start	16	91	(CSPI, 2017)
Full Throttle	16	144	(Reissig, Strain, and Griffiths, 2008)
Chocolates			
Milk chocolate	42.5 gram	9	(The Hershey Company, 2017)
Dark chocolate	4.46 gram	2.2	

Appendix 3.

Sugar content in beverages

Beverages	Serving size (Fl. Oz.)	Sugar Content (g)	
Soft Drinks			
Pepsi	12	41	(PEPSICO, 2017)
Mountain Dew	12	46	
Mirinda	12	32	
Twist	12	39	
Coca-cola	12	39	(Coca-Cola, 2017)
Fanta	12	44	
Sprite	12	38	
Sunkist	12	43	(Dr Pepper Snapple Group, 2017)
Dr. Pepper	12	40	
7-Up	12	38	
Mean		**40**	
Diet coke, coke zero etc.	12	0	
Energy Drinks			
Red Bull	8	26	(Sugary Drinks Facts, 2013)
Monster Energy	8	25	
Rockstar	8	31	
5-Hour shot	8	0	
Full Throttle	8	24	
Sugar (1 teaspoon)		4	
Juices			
Minute maid from concentration	8	24	(Coca-Cola, 2017)
Sunny D	6	10	(SunnyD, 2017)
Capri Sun	6	10	(Capri sun, 2017)
Fruit Juice cocktail			
Gatorade	12	21	(PEPSICO, 2017)
Other sugary beverages			
Lemonade (Dole)	8	29	(PEPSICO, 2017)
Fruit punch (Dole)	8	15	
Kool-aid	6	20	(Harris, Schwartz, Brownell, Javadizadeh, & Weinberd, 2011)

Appendix 4.

Brochure created for the Olson Center for Women's Health

Diet for lactating mothers

Foods to avoid during lactation:

- Alcohol and tobacco
- Caffeine
- Illegal drugs
- Talk to the healthcare providers before taking over the counter medicines.

Always talk to your healthcare provider about breastfeeding and resources available at the clinic.

How can partners help?

- Help around the house.
- Take turns to give skin-to-skin care.
- Make mom feel relaxed and comfortable when breastfeeding.
- Make sure your partner gets enough rest.
- Care the baby in other ways such as burping, bathing, changing diapers etc.
- Once the mother starts using breast pump, feed the baby.
- Encourage and support your partner to breastfeed.

Storing breast milk

- Store breast milk in refrigerator or freezer in glass or BPA-free plastic bottles.
- Store milk in single serving size.
- Always label the date.
- If frozen milk thawed slowly in refrigerator, use within 24 hrs.
- If frozen milk thawed outside the refrigerator, use within 4 hrs.
- After thawing, never refreeze

BREASTFEEDING

Hey Mommy!! Do you know that breast milk contains special ingredients not available in the formula?

Olson Center for Women's Health
University of Nebraska Medical Center
Omaha, NE

Nebraska Medicine
SERIOUS MEDICINE. EXTRAORDINARY CARE.

Advantages of Breastfeeding

To the baby

- Strengthens baby's immune system reducing infections, asthma and allergies.
- Breast milk digests easily compared to formula resulting in less gas, less constipation and few feeding problems.
- Reduces the risk of Sudden Infant Death Syndrome **(SIDS).**
- Reduces the risk of obesity and diabetes in adult life.
- Comforts the baby quickly leading to less crying and a happier baby.

To the mother

- Breastfeeding hormones make mothers feel calm and connected to the baby.
- Help lose pregnancy weight.
- Reduces the risk of heart disease, Type II Diabetes, and breast and ovarian cancer.
- Saves time and money.

Breastfeeding in early weeks

The early weeks are the learning time for both mother and the newborn.

- Breastfeed the baby as soon as possible after birth.
- Colostrum, the breast milk produced for first few days after the childbirth, helps the newborn's digestive and immune system.
- Breastfeed **8-12 times a day** for first few weeks.
- When the baby stops feeding or unlatches from your breast, burp the baby and offer the other side.
- There is no need to worry if the baby won't feed on both sides. Start with the other side on the next feeding.
- Monitor baby's weight to ensure appropriate weight gain.
- Count diapers. Follow table 1.

Table 1

Diapers /day	D1	D2	D3	D4	D5	D6
Wet	1	2+	3+	5+	6+	6+
Dirty	1	2	3	4	4	4
Type of stool	Black, tarry, and thick		Greenish and loose		Yellow, seedy, and loose	

Breastfeeding positions

Cradle position

- Sit straight to support the baby's head in the crook of your arm.
- Baby's belly should be turned towards you.

Foot ball position

- Hold the baby along the side of your body.
- Useful for feeding twins and after cesarean delivery.

Laid-back position

- Recline at 45° angle and lay the baby on your body.

Side-lying positing

- Lie on your side and nestle your baby next to you.
- Good position for night feedings.

Appendix 5.

Survey Questionnaire

Date:

Assessment of caffeine and sugar sweetened beverage consumption among adult pregnant women in an urban medical center in Nebraska

Consent

This research is being conducted by the University Of Nebraska Medical Center College Of Public Health. The objectives of this study are:

- To determine the adherence of adult pregnant women to established recommendations for caffeine consumption.
- To investigate levels of Sugar sweetened beverages consumption in pregnant women

To participate in this study, you must be at least 19 years old and pregnant.

There are a total of 30 questions in this survey, which is divided into 4 sections. You can choose not to answer any question or decline to participate in the survey at any time. Your participation will be confidential and anonymous. The content of this survey will ONLY be used for the purpose of this research. If you have any questions regarding this survey, please feel free to contact any of the research personnel listed below.

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Demographic Information

1. Age _____

2. What is your race? (Check all that apply.)

- ☐ **American Indian/Alaska Native**
- ☐ **Asian**
- ☐ **Black/African-American**
- ☐ **Native Hawaiian / Other Pacific Islander**
- ☐ **White**
- ☐ **Other, Specify**_____

3. What is your current height? _____ feet _____ inches

4. What is your current weight? _____ pounds

5. What was your weigh prior to this pregnancy? _____pounds

6. What has been your maximum weight ever? (excluding pregnancy) _____ *pounds and when (age)*_____

7. Marital Status: (Circle one) Married / Single / Widow(er) / Divorced / Life Partner / Separated

8. Education (highest level of schooling): (Circle one) Grade school, Junior High / Some high school / High school graduate / Some college / College graduate / Postgraduate / Technical, Vocational, Certificate

9. What is your annual household income:

- ☐ Less than $20,000
- ☐ $20,000 - $39,000
- ☐ $40,000 - $59,000
- ☐ $60,000 - $79,000
- ☐ $80,000 - $99,000
- ☐ More than $100,000

10. At present, how far along are you in this pregnancy? _____weeks

11. How many times have you been pregnant besides your current pregnancy? (Exclude any miscarriages and/or abortions in this number.) _____

12. What are the ages of your children? _____

13. Do you know how much weight you should gain during pregnancy overall? ☐ Yes ☐ No

a. If yes, how much weight? _____pounds

14. Are you enrolled in the WIC program? ☐ Yes ☐ No

15. Have you had a meeting with the nutritionist during this pregnancy? ☐ Yes ☐ No

a. If yes, how many times? _____

16. Family History

Please complete the table below by putting a checkmark for each of your living and deceased first degree blood relatives (parents, siblings, and children) who have been diagnosed with the diseases listed.

Relative (Please write type of relative, e.g. mother)	**Diabetes**	**Hypertension**	**Heart Disease**	**High cholesterol**	**Cancer**

Lifestyle Information – Tobacco Consumption

17. Do you currently smoke?

Yes – daily	☐
Yes – several times a week	☐
Yes – several times a month	☐
No	☐

18. How many cigarettes do you smoke? *(provide number for only one of the 3 choices)*

_____ per day
_____ per week
_____ month

19. If you are ex-smoker, how frequently did you smoke?

Daily	☐
Several times a week	☐
Several times a month	☐
Nothing	☐

20. If you are ex-smoker, at what age did you quit smoking? _____

Lifestyle Information – Caffeine and SSB Consumption

(Q21-30). In past 30 days, how often did you consume the following items?

Food groups	How often do you consume the following products?	Size	Type	Added sugar
Coffee	○ Never or less than once a month ○ 1-3 days per month ○ 1 day per week ○ 2-4 days per week ○ 5-6 days per week ○ Every day	○ Small (8 oz) ○ Medium (16 oz) ○ Large (24 oz)	○ Regular ○ Half Caffeine ○ Decaf	_____ teaspoons ***1 sugar packet= 1 tsp***
Espresso	○ Never or less than once a month ○ 1-3 days per month ○ 1 day per week ○ 2-4 days per week ○ 5-6 days per week ○ Every day	_____ shots	○ Regular ○ Decaf	_____ teaspoons
Tea	○ Never or less than once a month ○ 1-3 days per month ○ 1 day per week ○ 2-4 days per week ○ 5-6 days per week ○ Every day	_____ cups ***1 cup= 8oz***	○ Herbal ○ Green Tea ○ Earl Gray ○ Decaf ○ Other_____	_____ teaspoons
Hot chocolate	○ Never or less than once a month ○ 1-3 days per month ○ 1 day per week ○ 2-4 days per week ○ 5-6 days per week ○ Every day	_____ cups ***1 cup= 8oz***	○ Regular ○ Low sugar	_____ teaspoons
Pop / Soda *(Coke, Pepsi, Dr. Pepper, Mountain Dew, Sprite, Fanta etc.)*	○ Never or less than once a month ○ 1-3 days per month ○ 1 day per week ○ 2-4 days per week ○ 5-6 days per week ○ Every day	○ Small (8 oz) ○ Medium (16 oz) ○ Large (24 oz) ○ Can ○ Bottle	○ Diet ○ Regular ○ Decaf	
Energy drinks	○ Never or less than once a month ○ 1-3 days per month ○ 1 day per week ○ 2-4 days per week ○ 5-6 days per week ○ Every day		○ Red Bull ○ Monster ○ Rockstar ○ 5 Hour Energy ○ Other_____	
Fruit Juice	○ Never or less than once a month	_____cups	○ 100% Fruit Juice	

	○ 1-3 days per month ○ 1 day per week ○ 2-4 days per week ○ 5-6 days per week ○ Every day	***1 cup= 8oz**	○ From Concentrate ○ Sunny-Delight ○ Capri sun ○ Fruit juice cocktail ○ Other _____	
Gatorade (except G2)	○ Never or less than once a month ○ 1-3 days per month ○ 1 day per week ○ 2-4 days per week ○ 5-6 days per week ○ Every day	○ 12 oz ○ 16.9 oz ○ 20 oz ○ 24oz ○ 28 oz ○ 32 oz ○ 64 oz		
Other sugary beverages	○ Never or less than once a month ○ 1-3 days per month ○ 1 day per week ○ 2-4 days per week ○ 5-6 days per week ○ Every day	_____cups ***1 cup= 8oz**	○ Slushy ○ Kool-aid ○ Lemonade	
Chocolate	○ Never or less than once a month ○ 1-3 days per month ○ 1 day per week ○ 2-4 days per week ○ 5-6 days per week ○ Every day	○ 25 g or less ○ 25-50 g ○ 50-75 g ○ More than 75 g	○ Milk chocolate ○ Dark chocolate ○ Other _____	• 1 chocolate truffle: 15 g • 1 bag of M&M's: 45 g • 1 chocolate bar, Mars, Snickers: 50 g