DIETARY DETERMINANT OF HYPERTENSIVE DISORDERS AMONG PREGNANT WOMEN ATTENDING ANTENATAL AND DELIVERY CARE IN PUBLIC HOSPITALS OF JIMMA ZONE, SOUTHWEST ETHIOPIA

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A THESIS SUBMITTED TO JIMMA UNIVERSITY, INSTITUTE OF HEALTH, FACULTY OF PUBLIC HEALTH DEPARTMENT OF HUMAN NUTRITION AND DIETETICS IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF SCIENCE IN HUMAN NUTRITION.

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Aug 2020

Jimma, Ethiopia

ABSTRACT

Background: Hypertensive disorders of pregnancy are a major contributor to maternal and perinatal morbidity and mortality.A recent review reported that in Ethiopia hypertensive disorders of pregnancy complicate around 6% of all and accounts for 19% of all maternal deaths. Eating pattern is one of the modifiable deteriminant of hypertension which gives synergestic effect than single nutrient. However, there is evidence gap in Ethiopia to see the association between dietary patterns and hypertensive disorders of pregnancy.

Objective: The aim of this study was to identify dietary determinants of hypertensive disorders of pregnancy among pregnant mothers attending antenatal and delivery care.

Methods: Institution based unmatched case control study was conducted from April 15 to July 10 in selected public hospitals of Jimma zone. A total of 333 participants (111 cases and 222 controls) were included. Data were collected using an interviewer administered questionnaire and entered to Epi data version 3.1 then analyzed using SPSS version 20. Variables in the bivariate logistic regression with p value < 0.25 were selected as candidate for multivariable analysis. Adjusted odds ratio with 95% confidence interval is reported. Significance was declared at P-value ≤ 0.05. Principal component analysis was used to identify wealth tertile and cluster analysis was used to derive dietary pattern. Finally, model fitness was tested using Hosmer-Lemshow goodness-of-fit test.

Result: On multivariable analysis after adjusting for confounders' plant based AOR =0.36 CI: 0.15-0.82] and balanced type of dietary pattern [AOR = 0.24 CI: 0.11-0.51] and folate intake [AOR=0.17 CI: 0.06-0.48] found to be significant protective factors from hypertensive disorders of pregnancy. Previous history of pregnancy induced hypertension [AOR=3.76 CI: 1.67-8.37], rural residence [AOR=5.12 CI: 2.45-10.79], twin pregnancy [AOR 3.69 CI: 1.52-8.96], history of abortion AOR=2.37 CI: 1.10-5.12], presence of anemia at the first visit [AOR=7.12 CI :2.30-21.98], advanced age [AOR=4.44 CI: 1.52-12.97], gestational diabetes [AOR=3.12 CI: 1.002-9.72] and highest wealth index [AOR 4.17 CI: 1.27-13.66] found to be significant risk factors for hypertensive disorders during pregnancy.

Conclusion: The findings showed that balanced food based dietary pattern and plant based food pattern had direct protective relationship with development of hypertension during pregnancy. The findings imply the need for promoting consumption of balanced diets and plant source foods high in fruit and vegetables specially focusing on those with twin pregnancies, anemia at first visit, previous history of pregnancy induced hypertension, rural residents and advanced age groups.

Key words: Dietary pattern, Hypertensive disorders of pregnancy, Jimma zone, Principal Component analysis, cluster analysis

ACKNOWLEDGEMENTS

My deepest gratitude goes to my advisors, Professor Tefera Belachew and Mrs. Rediet Kidane for their unlimited support and constructive comment throughout the preparation of my thesis. I would also like to thank Jimma University Institute of Health, Faculty of Public Health Department of Nutrition and Dietetic for giving me this opportunity to do my thesis. Finally I also like to thank my data collectors, study participants and my friends.

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ACRONYM AND ABBREVIATION

ACOG- American College of obstetrician and gynaecologist

AOR-Adjusted odds ratio

BMI- Body mass index

CI- Confidence interval

CSA- Central statistical agency

DNA - Deoxy-ribonucleic acid

FFQ- Food frequency questionnaire

HDP- Hypertensive disorders of pregnancy

ICD- International classification of disease

MNCH- Maternal, New born and Child health

MUAC- Mid upper arm circumference

PCA- Principal Component analysis

PI- Principal Investigator

PIH- Pregnancy induced hypertension

SDG- Sustainable development goal

VIF- Variance inflation factor

WHO- World health organization

CHAPTER ONE- INTRODUCTION

1.1 BACKGROUND

Hypertension during pregnancy is defined by the American College of Obstetricians and Gynecologists (ACOG) as systolic blood pressure greater than or equal to 140 mmHg and/or diastolic blood pressure greater than or equal to 90 mmHg in two measurements of at least 6 hours apart after 20 weeks of gestation for pregnancy-induced hypertension or before the fifth month of pregnancy for chronic hypertension(1).

Hypertensive pregnancy disorders (HDP) refers to a continuum of conditions characterized by high blood pressure and defined as chronic hypertension (of any cause diagnosed before 20 weeks of gestation), gestational hypertension, chronic hypertension with superimposed preeclampsia and preeclampsia – eclampsia (2).

Gestational hypertension is defined as a form of de novo hypertension that was first diagnosed after 20 weeks of gestation and usually resolves within six weeks of delivery(2). Pre-eclampsia/eclampsia syndrome is defined as gestational hypertension with significant proteinuria. It should also be suspected when symptoms such as headache, visual disturbances, abdominal pain, or abnormal laboratory tests are associated with hypertension during pregnancy, since proteinuria may be a late manifestation of pre-eclampsia. Eclampsia is a severe form of pre-eclampsia that is associated with a generalized tonic-clonic seizure. Pre-eclampsia may also develop in some cases during the early postpartum period (3).

The pathophysiology of HDP is still unclear, but many theories propose placental vascular insufficiency due to endothelial dysfunction, vasoconstriction, and micro-thrombosis. Oxidative stress of the syncytiotrophoblast (the epithelial covering of the placental villi in contact with maternal blood) is one of the explanations. When stressed, the syncytiotrophoblast releases many factors, including pro-inflammatory cytokines, anti-angiogenic agents, and exosomes, and cell-free fetal Deoxy-ribonucleic acid (DNA), into the maternal circulation. These disrupt maternal endothelial function resulting in a systemic inflammatory response and cause hypertension (4).

The relationship between diet and health can be assessed at the level of nutrients, foods, or dietary patterns. Dietary patterns analysis may give a more realistic description of data when individuals consume foods; they consume a combination of nutrients, not single nutrients. The whole diet with its expected synergistic effects may have a greater influence on the occurrence of health outcomes than single nutrients. Even though the etiologic factors of hypertensive disorders of pregnancy remain unclear and are sometimes described as a disease of theories it has been proposed to occur secondary to malnutrition and has shown that dietary patterns and role of single nutrients have an influence on the development of HDP (5-14).

1.2 Statement of the problem

HDP refers to a series conditions characterized by high blood pressure and classified as chronic hypertension, gestational hypertension, chronic hypertension with superimposed preeclampsia, and preeclampsia – eclampsia (2).

Hypertension is a major global threat to the global disease burden affecting about a billion adults around the world (15). Hypertensive disorders of pregnancy are a major contributor to maternal and perinatal morbidity and mortality. The global prevalence of hypertensive disorders of pregnancy ranges from 5.82-8.2% being the second most common direct cause of maternal mortality worldwide (16). In Africa, HDP affects about one in ten pregnancies (17). In Ghana, 30% of maternal mortality is due to hypertensive disorders of pregnancy (18). Studies indicated that hypertensive disorders of pregnancy complicated around 6% of pregnancies in Ethiopia and are responsible for 19% of all maternal deaths (19, 20).

Consequences of hypertensive disorders of pregnancy include placental abruption, pulmonary edema, thrombocytopenia, hemolytic anemia, stroke, recurrent seizure, kidney damage, and liver injury (21). Perinatal death is also high in women with preeclampsia/eclampsia syndrome and shows a three to fivefold increase(22). By the end of 2016, in Ethiopia, the perinatal mortality rate was 33 per 1000 pregnancies(23). The study indicates that there is a significant association of perinatal death with maternal death and eclampsia (24). Additionally, HDP has long-term health effects, like chronic hypertension, kidney failure, and nervous system disorders.

According to different studies conducted in different parts of the globe: socio-demographic, personal and lifestyle factors, obstetric related factors, familial history, and other medical conditions are identified as potential risk factors for the development of HDP. Specifically, primigravidae, extreme ages, obesity, family history of hypertension, previous history of hypertensive disorders of pregnancy, personal or family history of chronic hypertension, diabetes mellitus, high energy diet, gestational diabetes, mental stress during pregnancy, long inter-pregnancy interval, lower socioeconomic status, and inadequate antenatal care were found to be associated with a higher risk of developing hypertensive disorders of pregnancy (9, 11, 14, 25-28). Consuming vegetables or fruit during pregnancy is indicated as a protective factor of hypertensive disorders of pregnancy by different studies (8, 11, 12).

The world health organization (WHO) and ACOG develop guidelines for the prevention, early diagnosis, and management of preeclampsia and other HDP. Low dose aspirin and calcium are recommended for prevention and magnesium sulfate is used for the management of preeclampsia and its complications (1, 29).

Preventive measures such as expansion of health care facilities, maternal waiting area and health professional development, giving the service free of charge, implementation of a health extension program and including it as one of the components in national nutrition program are initiatives undertaken by the Ethiopian government to reduce maternal and perinatal mortality(30, 31). Given the progress made, maternal morbidity and mortality in the country remain unacceptably high. Unlike abortion and other immediate obstetrical causes, maternal and perinatal mortality due to HDP especially preeclampsia is still rising (32).

Associations between various dietary components and HDP have been studied in case-control and prospective cohort studies and have shown an association between risk of preeclampsia with high consumption of energy, processed meat, salty snacks, sweet drinks, trans-fatty foods and decreased risk of HDP with consumption of fruit and vegetables, plant foods, Seafood, whole grains and legumes including supplementation of calcium (8, 10, 13, 28, 33). To the best search of literatures, there is evidence gap in Ethiopia to see the association between dietary patterns and hypertensive disorders of pregnancy.

there is limited evidences on these factors have not been explored using dietary pattern analyses so far. Thus, the current study aimed to assess dietary determinants of hypertensive disorders of pregnancy in public health hospitals of Jimma zone, Southwest Ethiopia to generate evidence that is most relevant to support health policies and strategies to prevent hypertensive disorders of pregnancy.

1.3. Significance of the study

Reducing maternal mortality is one of the sustainable development goals (SDG) which is a top priority of Ethiopian government health policy. Maternal, Newborn, and Child Health (MNCH) programs are implemented in Ethiopia as a priority health agenda to reduce maternal and child morbidity and mortality. To achieve MNCH programs, it is imperative to identify modifiable risk factors for HDP such as dietary factors and the group of a population at risk.

The finding from this study is important for health programmers to design evidence-based intervention strategies for the prevention of maternal and perinatal morbidity and mortality related to hypertensive disorders of pregnancy. Similarly, the finding is also a key to providing evidence-based counseling for health professionals and interventions related to modifiable and non-modifiable disease risk factors. To prevent HDP, it is important to identify risk factors that can be modified, whereas determining non-modifiable risk factors is useful for early diagnosis and timely intervention to reduce maternal and perinatal complications. In addition to this having a good understanding of the dietary factors will help the general public to choose a healthy diet for preventing HDP. The study finding could also serve as a baseline for future studies as HDP is a multifactorial disease with unclear etiology.

CHAPTER TWO

2. Literature review

Hypertensive disorders of pregnancy (HDP) are a major contributor to maternal and perinatal morbidity and mortality. Even though the disease has no defined causes and is called a disease of theories several studies focusing on risk factors have been conducted in different parts of the world to identify potential risk factors.

2.1. Determinans of hypertensive disorder of pregnancy

2.1.1. Socio-demographic factors

A study conducted in India on Socio-Demographic and Other Risk Factors of Pre Eclampsia identified lower socio-economic status as a predictor for the occurrence of preeclampsia (34). A case-control study conducted in Nigeria to assess factors associated with severe preeclampsia and eclampsia identified occupation as a housewife (26). A similar study conducted in Ghana involving 216 participants identified advanced maternal age of 35-39 years as significant risk factors for pregnancy-induced hypertension (28).

A facility-based case-control study conducted in Nekemete to assess risk factors associated with hypertensive disorders during pregnancy indicated rural residential areas as risk factors for HDP (35). Similarly, a case-control study conducted in the Tigray region also identified that rural residents were at greater odds of suffering from hypertensive disorders (9).

Another facility-based case-control study conducted in Kombolcha indicated that the risk of developing hypertensive disorders of pregnancy among mothers who could not read and write was 2.66 and 4.4 higher than those who can read and write, attending their primary education respectively (25).

An institution-based case-control study conducted on pregnant women who have antenatal follow up in the Public Health facility of Derashe Woreda identifies; the age of mothers between 25-30 and $\geq$30 years as a significant risk factor for pregnancy-induced hypertension(14).

2.1.2. Obstetric Related Factors

A case-control study conducted in Nigeria to assess factors associated with severe preeclampsia and eclampsia identified personal history of preeclampsia, being primigravidae, and fewer than four antenatal care visits as significant risk factors(26).Another case-control study conducted in Ghana involving 216 participants identified a history of previous preterm delivery as significant risk factors for pregnancy-induced hypertension (28).

A case-control study conducted in Addis Ababa to assess dietary factors associated with preeclampsia or eclampsia among women attending delivery service investigated nulliparity as a risk factor for preeclampsia or eclampsia (11). Another facility-based case-control study conducted in Nekemete to assess risk factors associated with hypertensive disorders during pregnancy indicated that being primigravidae, nulliparity, history of abortion, twin pregnancy, lack of ANC as risk factors for HDP (35).

A facility-based case-control study conducted in Kombolcha indicated that women who have a previous history of preeclampsia were 4.4 times more at risk of developing hypertensive disorder of pregnancy than their counterparts(25). An institution-based case-control study conducted on pregnant women who have anti-natal follow up in Public Health facility of Derashe Woreda also identifies; being Primigravidae and history of previous pregnancy-induced hypertension as significant factors for the development of pregnancy-induced hypertension(14)

2.1.3. Family history, medical history, and anthropometric risk factors

A case-control study conducted in Colombia to assess risk factors for pre-eclampsia identified being primigravidae as a risk factor for the development of PE(36). Another study conducted in Southern Brazil identified family history of preeclampsia, diabetes, and chronic hypertension as significant risk factors(27).

A case-control study conducted in Nigeria and Kenya to assess factors associated with severe preeclampsia and eclampsia identified personal history of preexisting hypertension as significant risk factors(26).Similarly, a study conducted in Ghana identified family history of hypertension as a significant risk factor for pregnancy-induced hypertension (28).

A facility-based case-control study conducted in Nekemete to assess risk factors associated with hypertensive disorders during pregnancy indicated a family history of hypertension and a history of diabetes mellitus as risk factors for HDP (35). Another case-control study conducted in the Tigray region also identified that mothers who are overweight (BMI > 25 Kg/m2) were at risk of developing hypertensive disorders of pregnancy as compared with the normal and underweight mothers. The risk of developing hypertensive disorders of pregnancy was 5.4 times higher among diabetic mothers (9).

A case-control study conducted in public health facilities of Bahir Dar City Administration revealed that women having a MUAC value ≥ 25.6 cm were two times more likely to have preeclampsia and those who had anemia during the first-trimester pregnancy were three times more likely than their counterparts to have an incidence of preeclampsia(12).

An institution-based case-control study conducted on pregnant women in Public Health facility of Derashe Woreda identifies; lack awareness on the risk of hypertension, absence of chronic disease and body mass index >30 mg/kg2 as significant factors for pregnancy-induced hypertension(14)

2.1.4. Dietary Factors

Results from the longitudinal study conducted on Australian women to assess pre-pregnancy dietary patterns and risk of developing hypertensive disorders of pregnancy showed that the Mediterranean-style dietary pattern (characterized by vegetables, legumes, nuts, tofu, rice, pasta, rye bread, red wine, and fish) was inversely associated with risk of developing HDPs. In contrast, there was no association between meat, high-fat, and sugar, fruit, and low-fat dairy and cooked vegetable dietary patterns and risk of HDP (5). Similarly, another study conducted in Canada to assess dietary Patterns Before Pregnancy and Associations with Pregnancy Complications showed healthy dietary patterns before pregnancy was associated with lower odds of developing gestational hypertension during pregnancy (33).

A prospective cohort study conducted in 23,423 Norwegian nulliparous pregnant women to estimate the association between dietary patterns during pregnancy and the risk of preeclampsia identified women with high scores on a pattern characterized by vegetables, plant foods, and

vegetable oils as having decreased risk and those with high scores on a pattern characterized by processed meat, salty snacks, and sweet drinks at increased risk of developing pre-eclampsia(13).

A prospective cohort study conducted in 55,139 Danish women to identify a dietary pattern that is responsible for HDP identifies that there is an inverse association between intake of seafood-based diet characterized by high consumption of fish and vegetables and odds of developing Gestational hypertension and pre-eclampsia. Increased odds of developing gestational hypertension and preeclampsia were also seen in those who were consuming western diet characterized by high consumption of potatoes (including French fries), mixed meat, margarine, and white bread(10).

A prospective cohort study conducted in Brazil on three gestational dietary patterns (healthy, common-Brazilian and processed) shows no association between any of the three dietary patterns and SBP in the multiple longitudinal linear regression models, whereas 1 SD increase in the common-Brazilian pattern was associated with a small change of diastolic blood pressure(37).

The result of a case-control study conducted in Isfahan, Iran to identify nutritional risk factors for preeclampsia revealed protein intakes were lower in women with PIH compared to subjects without PIH(7). Another similar study conducted to identify the association between the quality and quantity of dietary carbohydrate and pregnancy-induced hypertension showed a significant inverse association between total fiber intake and PIH (6). Another study conducted among Iranian pregnant women to assess major dietary patterns in relation to preeclampsia indicates that there is a decreased odd of preeclampsia with an increased score of healthy dietary pattern and increased odds of preeclampsia with an increased score of the western dietary pattern (38).

A systematic review and meta-analysis conducted to assess maternal dietary patterns and risk of adverse pregnancy (hypertensive disorders of pregnancy and gestational diabetes mellitus) and birth (preterm birth and low birth weight) outcomes on twenty-one observational studies revealed that adherence to a healthy dietary pattern (intake of vegetables, fruits, legumes, whole grains) was significantly associated with lower odds of pre-eclampsia (8).

A case-control study conducted in Ghana involving 216 participants consumption of trans fatty food as significant risk factors for pregnancy-induced hypertension (28).

A case-control study conducted in Addis Ababa to assess dietary factors associated with preeclampsia or eclampsia among women attending delivery service investigated that Fruit, vegetable intake, and receiving nutritional counseling during antenatal care as protective for preeclampsia or eclampsia (11). Another case-control study conducted in the Tigray region identified mothers who consume less amount of fruits in their diet had 5 times higher odds of developing hypertensive disorders than those who consume fruits regularly (9).

Another case-control study conducted on 453 pregnant women attending antepartum or intrapartum care in public health facilities of Bahir Dar City Administration reported that higher odds of preeclampsia were found in women who reported to have taken coffee during pregnancy. Additionally, the study indicated that taking fruit or vegetables during pregnancy and folate intake during pregnancy was found to be protective of preeclampsia (12). Similar institution based case-control study conducted on pregnant women who have antenatal follow up in the Public Health facility of Derashe Woreda identifies; frequent salt consumption as significant factors for pregnancy-induced hypertension(14).

Gap identified from the reviewed literatures

The review of the literature has shown that several risk factors including dietary patterns are related to the occurrence of hypertensive disorders during pregnancy. Almost solely the majority of the studies that focus on the association between dietary patterns and HDP were mainly undertaken in the developed world. Despite the availability of the studies which are conducted on risk factors of HDP, in Ethiopia, these factors have not been explored using dietary pattern analyses so far. Additionally, even though it is proposed that the whole dietary pattern affects the development of the disease some of the studies conducted in our country only focus on the effect of fruit and vegetables, frequent salt and coffee consumption.

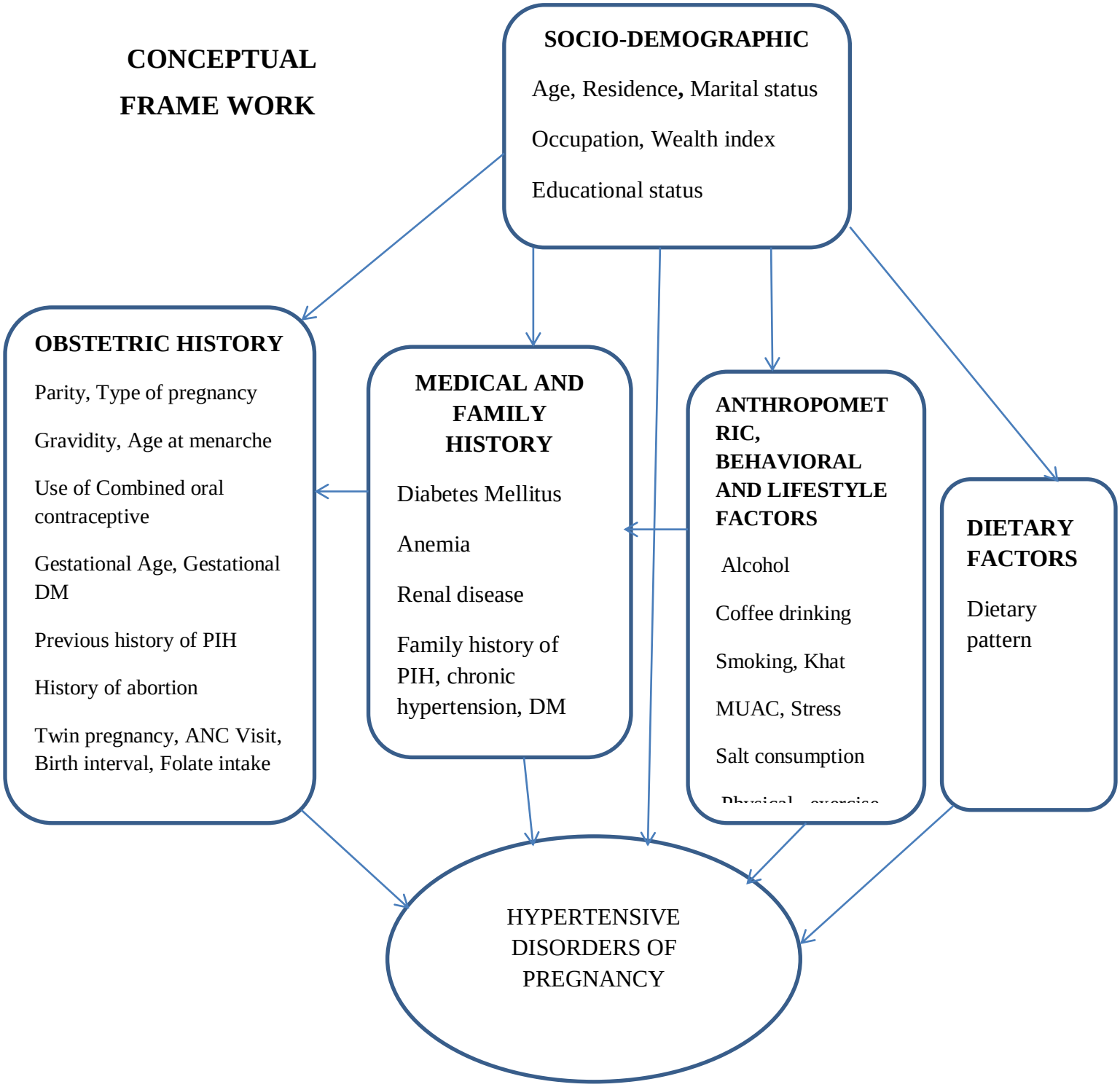

Figure 1: Conceptual framework on socio-demographic, obstetric, medical, family history, personal risk factors and Dietary factors affecting the development of hypertension during pregnancy developed after reviewing different literatures

CHAPTER THREE

3. Objectives

3.1 General objective

To identify dietary determinants of hypertensive disorders among pregnant women attending antenatal and delivery care in public hospitals of Jimma zone, Southwest Ethiopia, 2020

3.2 Hypothesis

HO: There is no association between dietary pattern and hypertensive disorders of pregnancy
HA: There is association between dietary pattern and hypertensive disorders of pregnancy

CHAPTER FOUR

4. Methods and materials

4.1. Study setting and period

The study was conducted from April 15 to July 10 in Jimma zone public hospitals, southwest Ethiopia. Jimma town is the capital town of Jimma zone and it is located 352 Km away from Addis Ababa in South West Ethiopia, Oromia National Regional State. Jimma zone has a latitude and longitude of 70 40'N 36050'E. The daily mean temperature ranges from 200c to 250c year-round and average annual rainfall is 1500mm. In Jimma zone, cereals contributed 88.9% of the grain crop area, and 93.08% of the production, pulses covers 8.35% of the grain crop area, red peppers, and kale covers 47.08% and 44.62% of the area under vegetables respectively. According to CSA (central statistical agency), the 2007 projection Jimma zone has 3,432,086 populations of which 1,767,525 are females in 2019/2020. The numbers of pregnant mothers are 119,094 in 2019/20. In Jimma town and zone there are 8 public hospitals including Jimma university medical center and 122 Health centers. The total number of midwives, IESO and specialists are 17, 3 and 0 for Agaro hospital, 18, 2 and 0 for Shenen Gibe hospital, 11, 3 and 0 for Seka hospital, 13, 1 and 0 for Nadda hospital, 11, 2 and 0 for Setema hospital respectively.

4.2. Study design

An institution-based unmatched case-control study was employed.

4.3. Source population

All pregnant women attending antenatal and delivery care in public hospitals of Jimma zone were considered as source populations.

4.4. Study population

Cases: Selected pregnant women diagnosed to have hypertensive disorders of pregnancy

Controls: Selected pregnant women who are not hypertensive (normotensive)

4.5. Eligibility criteria

4.5.1 Inclusion criteria

Cases: Pregnant women who are in gestational age of 20 weeks and above and diagnosed to have hypertensive disorders of pregnancy were included

Controls: Normotensive pregnant women who are in gestational age of 20 and above

4.5.2. Exclusion criteria

Pregnant women who are not able to communicate and severely ill

Cases: Pregnant women with a history of confirmed chronic hypertension or diagnosed before 20 weeks gestation and without superimposed preeclampsia

Controls: Pregnant women with a history of confirmed chronic hypertension

4.6. Sample size determination

The sample size of the study was determined using Epi Info 7 STAT CALC for unmatched case-control study using the following assumptions: 95% CI, 80% power, Percent of controls exposed (39.6%), Percent of cases exposed (57.3) with a minimum detectable odds ratio of 2.05 from the study conducted in Tigray which indicates not taking vegetables during pregnancy as risk factors (9). By taking the ratio of case to control (m) 1:2 the maximum sample size of 101 cases and 202 controls is obtained. Adding a 10% contingency for non-response, the total sample size of the study was 333 (111 cases and 222 controls).

Table 1 : Showing sample size determination for study on dietary determinants of hypertensive disorders during pregnancy in public health hospitals of Jimma zone, Southwest Ethiopia, 2020

Associated Factors	Reference	% of exposure among controls	Odds ratio	% of exposure among cases	Level of confidence	Power	Ratio	Sample size (cases)	Sample size (control)	Total sample size
Daily vegetable intake	(11)	21.60	0.29	7.41	95	80	2	86	171	257
Frequent Coffee Drinking	(12)	38.5	2.41	61.5	95	80	2	61	122	183
Daily Vegetable intake	(12)	71.7	0.31	28.3	95	80	2	18	36	54
Daily Fruit intake	(12)	72.9	0.34	27.1	95	80	2	16	32	48
Folate intake	(12)	74.1	0.13	25.9	95	80	2	15	29	44
Coffee consumption	(9)	67.7	3.08	84.5	95	80	2	86	172	258
Not taking Vegetable	(9)	39.6	2.08	57.3	95	80	2	101	202	302
Not taking fruit	(9)	12.3	5.3	45.5	93	80	2	25	49	74

4.7. Sampling techniques

From total of eight public hospitals which are found in Jimma zone four of them (Limugenet, Seka, Agaro and Jimma university medical center) were randomly selected to get adequate cases and controls in the specified study period. The calculated sample size was proportionally allocated to the selected four hospitals based on the previous average quarter report. According to the 2011 third quarter report the average total monthly number of pregnant women diagnosed to have hypertensive disorders of pregnancy in the selected hospitals was 189. At each hospital the total number of cases reported was 47, 35, 69 and 38 in Limugenet, Seka, and JUMC and Agaro hospital respectively. Hence, the calculated sample was proportionally allocated to the selected four hospitals based on the number of cases reported at each facility and by taking 189 as denominator. Based on this calculation the allocated sample was 28, 21, 40 and 22 for Limugenet, Seka, and JUMC and Agaro hospital respectively. All cases that fulfill the eligibility criteria were consecutively included until the desired sample size is obtained. For every case included, two controls were identified and studied.

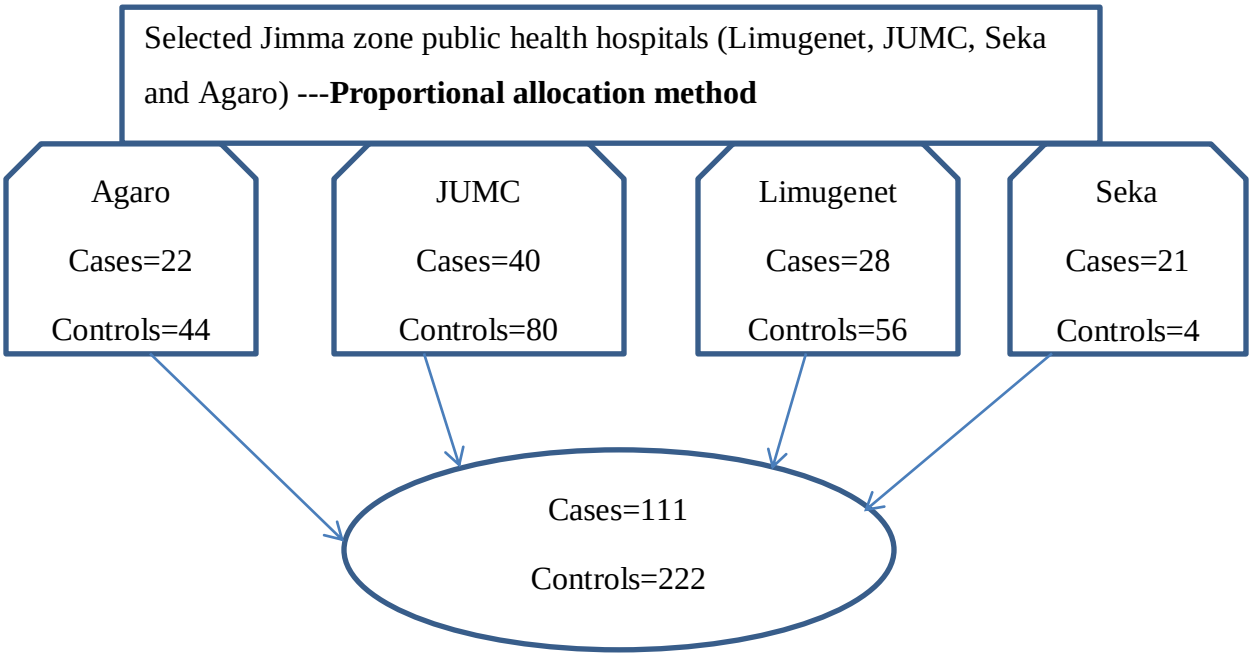

Figure 2: Schematic presentation of sampling procedure, Jimma town and zone public hospitals, Southwest Ethiopia, 2020

4.8 Data collection tool and measurement

Interviewer administered structured and pretested questionnaire was used to collect data. The questionnaire was initially prepared in English and translated to Amharic and Affan Oromo by experts after thorough review of literatures from different sources. The questionnaire was designed to capture the Socio-demographic, Family, Nutritional, behavioral and Life style variables, Obstetrics and medical related variables. In addition to the questionnaire, patient medical records were reviewed to abstract relevant variables related with laboratory, clinical and obstetrics data. Data was collected by trained diploma Midwives after the case confirmation by physicians using the diagnosis criteria.

Anthropometric Measurement

Mid Upper Arm Circumference (MUAC) was measured at the nearest 0.1cm at the midpoint between the tip of the acromion and the olecranon process on the back of the arm while the subject holding the forearm in horizontal position. The measurement was performed on the subject's left arm hanging freely along the trunk using inextensible MUAC tape.

Dietary data

A food frequency questionnaire (FFQ) composed of 45 items which is previously developed and used in studies conducted in the same study area was used to assess dietary pattern of pregnant mothers for the past one year(39). 24 hour recall method was conducted on 20 pregnant women who came for antenatal and delivery service at Shenen Gibe hospital. The aim of the 24-hour recall method was to modify the food frequency questionnaire based on commonly consumed food items. Participants were asked to recall their usual frequency of intake over the past one year.

4.9. Study variables

Dependent

Hypertensive disorders of pregnancy

Independent Variable

Dietary pattern

Covariate variables

Socio-demographic: Age, Residence, Marital status, Occupation, Wealth index and Educational status

Family and Medical history: Family history of hypertension, family history of diabetes mellitus, family history of chronic hypertension, Self history of diabetes mellitus, cardiac disease and Kidney disease

Obstetrics related variables: Parity, Gravidity, Gestational Age, Gestational DM, History of previous PIH, Having ANC follow up and Frequency of ANC visit, Twin pregnancy, Type of pregnancy, Folate intake, Use of combined oral contraceptives, History of abortion, Age at menarche and Birth interval

Anthropmetric, behavioral and lifestyle risk factors: Alcohol intake, physical exercise, Smoking, Coffee drinking, stress, salt consumption and MUAC

4.10. Operational definitions

Hypertensive disorders of pregnancy- According to ACOG criteria hypertensive disorders of includes gestational hypertension, preeclampsia-eclampsia syndrome, chronic hypertension and chronic hypertension with superimposed preeclampsia hypertension(1). In this study since hypertensive disorders of pregnancy represents gestational hypertension, preeclampsia-eclampsia syndrome and chronic hypertension with superimposed preeclampsia and were measured as single outcome.

Chronic hypertension was excluded as it can be an outcome and a risk factor at the same time.

Chronic hypertensive women superimposed with preeclampsia-eclampsia was included as an outcome because this category has common exposure as the rest of the categories.

Gestational hypertension- systolic blood pressure ≥ 140 mmHg and/or diastolic blood pressure ≥ 90 mmHg measured on two occasions at least 6 hours apart after twenty weeks of gestation in the absence of proteinuria or other systemic symptoms(1).

Preeclampsia- Characterized by new onset of hypertension after 20weeks gestation (systolic blood pressure ≥ 140 mmHg and/or diastolic BP ≥90) mmHg and proteinuria. However, in the absence of proteinuria other manifestations such thrombocytopenia (platelet count less than 100,000/μl), impaired liver function (elevated blood levels of liver transaminases to twice the normal concentration), the new development of renal insufficiency (elevated serum creatinine greater than 1.1mg/dl or a doubling of serum creatinine in the absence of other renal disease), pulmonary edema, or new onset cerebral or visual disturbances are used to diagnose the case(1).

Chronic hypertension superimposed with Preeclampsia - mothers known to have hypertension before pregnancy or before 20 weeks of gestation and who had developed signs of preeclampsia after 20 weeks of gestation. Proteinuria- a dipstick result of 1+ and above in a qualitative measurement(1).

Eclampsia- characterized by new onset grand mal seizures in a woman with preeclampsia(1).

The Wealth Index- is a composite measure of the cumulative living standard of a household. The wealth index will be calculated using easy-to-collect data on a household's ownership of selected assets, such as ownership of television, radio, and materials used for housing construction and types of water access and sanitation facilities. It will be generated with a statistical procedure known as principal components analysis; the Wealth Index places individual households on a continuous scale of relative wealth which was categorized in to 5 wealth quintiles.

Dietary pattern: Dietary patterns represent a broader picture of food and nutrient consumption, and may thus be more predictive of disease risk than individual foods or nutrients. Dietary pattern is derived by a multivariable analysis method called cluster analysis(40).

In this study dietary patterns which are derived using K mean cluster analysis are:

Animal source food based pattern- frequently consuming meat, poutry, dairy, eggs and organ meats

Plant based food based pattern- frequently consuming Vitamin A rich vegetables and fruits, other Fruit and vegetables, grains, dark green leafy vegetables and fruits

Balanced food pattern- consuming both animal and plant source foods

Mental distress: Level of mental distress was assessed using Self-Reporting Questionnaire-20 which was validated in Ethiopia**.** Those who score below 7 are considered as not stressed and those who scored above 7 are considered as having stress (41).

Moderate intensity activities- Activities which results in small increase in heart rate- e.g. brisk walking, gardening, swimming

Physically active: Those who do moderate intensity exercise for at least 150 minutes per week.

Sedentary behaviors: Time spent in sitting using Reading books, and or Watching TV, and or video playing or computer games.

Current smoker: Respondent who currently smokes cigarettes.

A daily smoker: Those who smokes any tobacco product at least once a day.

An occasional smoker: Those who smokes, but not every day

Non-smoker: Respondents who has never smoked

Alcohol drinking: consumption of at least one standard alcohol using local conventional measures during the reporting periods.

Alcohol current users- Those who consume alcohol in the past 12 months at least three times a week

Coffee: High risk- those who drink at least 4 cups of coffee per day

Current chewers: Those who chew khat in current pregnancy

Unwanted pregnancy: Pregnancy that occurred when women did not want to become pregnant then or at any time in the future

Mistimed pregnancy: pregnancy that occurs either when a woman wanted to become pregnant in the future but not at the time she became pregnant

Wanted pregnancy: The **pregnancies** where women conceive and had plans to become **pregnant**

Timed (planned): pregnancy that occurs when a woman wanted to become pregnant at the time.

4.11 Data processing and analysis

Data were coded and entered using Epi data version 3.1 and exported to SPSS version 20 for analysis. Descriptive statistics was used to summarize data. After checking normality continuous variables were described using mean and standard deviation. To identify factors associated with hypertensive disorders of pregnancy bivariate analysis was done for the outcome of interest by comparing the cases with controls. Moreover, crude odds ratio and their 95% confidence intervals along with their p values in logistic regression was calculated and those variables in the bivariate model with p value < 0.25 was selected as candidate variable for multivariable analysis. Adjusted odds ratio (AOR) and their 95% confidence intervals were reported. Significance was declared at P-value ≤ 0.05. Moreover, presence of Multicollinearity was checked using variance inflation factor (VIF). Finally, model fitness was tested by Hosmer-Lemshow goodness-of-fit test and its result was 0.102. Principal component analysis (PCA) was used to identify wealth index and cluster analysis to derive dietary pattern. To verify whether it is possible to apply the PCA, the Kaiser–Meyer–Olkin (KMO) test, Bartlett's test of sphericity, anti-image, Communality and Presence of a variable with complex structure was checked.

4.12. Dietary pattern

Dietary pattern was derived by using K means cluster analysis. After converting frequency of intake to week base individual food items were grouped to 10 major groups and 4 optional food groups by using FANTA III (Minimum Dietary diversity for women). Individuals were grouped to three cluster based on the Euclidian distance of each frequency of consumption from the

centroid of each cluster. The three patterns derived by K mean cluster analysis are animal source food based pattern (meat, poutry, dairy, eggs and organ meats), Plant based foods (Vitamin A rich vegetables and fruits, other Fruit and vegetables, grains, dark green leafy vegetables and fruits) and balanced food pattern (both plant and animal source food).

4.13. Data quality control

To ensure the quality of data to be gathered from the study subjects, first, the prepared questionnaire was translated to the Amharic language and Affan Oromo by experts. Then it was translated back to the English language to check its consistency. Data collection instrument was pretested on 5% of the population in "Seltema" hospital and necessary modifications were made based on the nature of gaps identified in the questionnaire. Data collectors and supervisors who are qualified with Diploma Midwives and BSc were recruited and trained based on qualification and previous data collection experiences. The data collectors and the supervisors were trained for two day on the objective of the study, data collection tool, approach to the interviewees, details of interviewing techniques, anthropometric measurement procedures, respect and maintaining privacy and confidentiality of the respondents to equip interviewers to collect high-quality data. On-site supervision was carried out during data collection by the supervisors. At the end of each day, questionnaires were reviewed and cross-checked for completeness, accuracy, and consistency by the principal investigator and corrective measures were taken.

4.14. Ethical consideration

Ethical clearance and approval was obtained from the Ethical Review Board of Jimma University institute of health. A support letter was obtained from the department of human nutrition and dietetics. The necessary permission was obtained from hospital administrative bodies. All the study participants were informed about the purpose of the study, their right to refuse and assured confidentiality and informed written consent was obtained before the interview. Besides, this study tries to protect individual identity as much as possible by concealing the actual name of the respondent (by using code number). Post interview health information was provided for participants who are practicing unhealthy behaviors. Additionally, due to current situation necessary materials like masks and sanitizer was provided for the data

collected to prevent spread of Covid 19. Moreover, strict follow up and advice was given for the data collectors to keep their physical distance from the study participants.

4.15. Dissemination of the finding

The study is a requirement for partial fulfillment of the degree of masters in human nutrition, the thesis will be presented and submitted to the Jimma University department of Human nutrition and dietetics and copies will be given to Jimma zone health bureau and Jimma Town health office as well as relevant health institutions and organizations. Further attempt will be done to publish the paper in scientific journals and to present in research conferences

CHAPTER FIVE

5. Results

5.1 Socio demographic characteristics

A total of 104 cases and 208 controls were participated in the study to identify dietary determinants of hypertensive disorders of pregnancy which results in response rate of 93.7%. The (Mean ± SD) or median age of the study participant was 29.08 ± 6.423 years. From the total of 104 cases and 208 controls, 59 (56.7%) of cases and 159 (76.4%) of the controls were urban residents. Forty (38.4%) cases and 87 (41.8%) of the controls were Muslim religion followers. Majority of the women were married, 95 (91.3%) cases and 176 (84.6%) controls respectively. Thirty six (34.6%) of cases and 74 (35.5%) controls had attend secondary level of education. Forty (39.42%) cases and 105(50%) of controls were housewife. Regarding house hold wealth, 27 (25.96%) of cases and 35 (16.83%) controls were in highest wealth quintiles (Table 2).

Table 2 Socio-demographic characteristics of cases and controls attending antenatal follow up or delivery care in Jimma zone, Ethiopia, 2020.

Variables	Cases (N=104)	Controls (N=208)	Total(percent)
	Number (%)	Number (%))	Number (%)
Age of mothers			
<20	11(10.6)	28(13.5)	39(12.5)
20-24	15(14.4)	41(19.7)	56(17.9)
25-29	14(13.46)	49(23.6)	63(20.2)
30-34	24(23)	71(34.1)	95(30.5)
≥35	40(38.5)	19(9.1)	59(18.9)
Residence			
Rural	45(43.3)	49(23.6)	94(30.1)
Urban	59(56.7)	159(76.4)	218(69.9)
Marital status		176(84.6)	271(86.9)
Married	95(91.34)	19(9.13)	20(6.41)
Single	1(0.96)	6(2.9)	12(3.85)
Divorced	6(5.8)	6(2.9)	6(1.92)
Widowed	0	1(0.48)	3(0.96)
Separated	2(1.9)		

Religion	0(38.5)	87(41.82)	127(40.7)
Muslim	34(32.8)	48(23.1)	82(26.3)
Orthodox	9(8.7)	50(24.03)	59(18.9)
Protestant	16(15.3)	17(8.17)	33(10.6)
Catholic	5(4.8)	6(2.9)	11(3.5)
Other			
Educational status	23(22.1)	12(5.8)	35(11.2)
Can't read/write	17(16.35)	38(18.3)	55(17.6)
Can read and write	18(17.31)	51(24.5)	69(22.1)
Primary education	36(34.62)	74(35.6)	110(35.3)
Secondary education	10(9.61)	33(15.9)	43(13.8)
College and above			
HHs Wealth quintiles	9(8.7)	41(19.7)	50(16.0)
Lowest	23(22.12)	43(20.7)	66(21.2)
Second	20(19.23)	59(28.4)	79(25.3)
Middle	25(24.04)	30(14.4)	55(17.6)
Fourth	27(25.9)	35(16.8)	62(19.9)
Highest			

Other; Religion= Jova

5.2 Obstetrics and Gynecologic Characteristics of the Participants

The study revealed that one fourth of, 26 (25%) cases and 62(29.8) of controls were prim-gravid. In addition, 52(50%) cases and 73(35.1%) of controls were nulliparous. 24 (23.1%) of cases and 20 (9.6%) of controls had multiple pregnancy. Twenty eight (35.9%) cases and 94 (64.4%) controls have greater than 2 year's inter-pregnancy interval. One fourth (26.9%) of cases and 38(18.3%) controls had previous history of PIH. About one-fourth of 28(26.9%) cases and 39 (18.7%) controls had history of abortion. Of the total study participants, 22 (21.3%) cases and 33 (15.8%) of controls had unwanted pregnancy. A high proportion, 84(80.7%) of cases and 197 (94.7%) of controls have reported as they take iron folate during pregnancy. Of the total study participants, 175 (84.1%) controls and 74 (71.2%) cases have reported as they use any modern contraceptive prior to recent pregnancy (Table 3).

Table 3 Obstetrics and Gynecologic characteristics of cases and control attending antenatal follow up or delivery care in Jimma zone, Ethiopia, 2020

Variables	**Cases (N=104)**	**Controls (N=208)**	**Total(percent)**
	Number (%)	Number (%))	Number (%)
Parity			
Nulliparous	52(50)	73(35.1)	125(40.1)
Multi parous	52(50)	135(64.9)	187(59.9)
Gravidity			
Primigravidae	26(25)	62(29.8)	88(28.2)
Multigravida	78(75)	146(70.2)	224(71.8)
Twin pregnancy			
Yes	24(23.1)	20(9.6)	43(13.7)
No	80(76.9)	188(90.4)	269(86.3)
Gestational DM			
Yes	20(19.2)	8(3.8)	28(10.3)
No	84(80.8)	200(96.2)	284(89.7)
Modern contraceptive use			
Yes	74(71.2)	175(84.1)	249(79.8)
No	30(28.8)	33(15.9)	63(20.2)
Previous history of PIH			
Yes	28(26.9)	38(18.3)	66(21.2)
No	76(73.1)	170(81.7)	246(78.8)
Pregnancy interval			
<2	41(52.5)	23(15.7)	64(28.6)
2	9(11.6)	29(19.9)	38(17)
>2	28(35.9)	94(64.4)	122(54.4)
History of abortion			
Yes	28(26.9)	39(18.7)	67(21.5)
No	76(73.1)	169(81.3)	245(78.5)
Anemia at first ANC			
Yes	18(17.3)	8(3.8)	26(9.1)
No	86(82.7)	200(91.2)	286(91.6)
Types of pregnancy			
Wanted	12(11.5)	16(7.7)	28(8.9)
Unwanted	22(21.3)	33(15.8)	55(17.7)
Mistimed	17(16.3)	15(7.3)	32(10.2)
Planned	53(50.9)	144(69.2)	197(63.2)
Iron folate			
Yes	84(80.7)	197(94.7)	281(90.1)
No	20(19.3)	11(5.3)	31(9.9)

5.3 Family and medical history of the study participants

Eighty (76.9%) of cases and 140 (67.3%) of controls had family history of hypertension. Only 9 (8.7%) of cases and 4 (1.9%) controls had renal disease (Table 4).

Table 4 Family and medical history of cases and controls pregnancy attending antenatal follow up or delivery care in Jimma zone, Ethiopia, 2020

Variables	**Cases (n=104)**	**Controls (n=208)**	**Total(percent)**
	Number (%)	Number (%))	Number (%)
Family history of HTN			
Yes	80(76.9)	140(67.3)	220(70.5)
No	24(23.1)	68(32.7)	92(29.5)
Family history of HDP	29(27.9)	12(5.8)	41(13.1)
Yes	75(72.1)	196(94.2)	271(86.9)
No			
Family history of DM	43(41.3)	89(42.8)	132(42.3)
Yes	61(58.7)	119(57.2)	180(57.7)
No			
Renal disease	9(8.7)	4(1.9)	13(4.2)
Yes	95(91.3)	204(98.1)	299(95.8)
No			
Diabetes mellitus	24(23.1)	14(6.7)	38(12.2)
Yes	80(76.9)	194(93.3)	274(87.8)
No			

5.4 Behavioral, life style and nutritional characteristics of the study participants

With regards to behavioral characteristics, 46(80.7%) of cases and 61(63.5%) controls have reported as they drink alcohol in the past 12 months. Of total of 91 women who reported to have history of khat chewing in the past 12 months 30(100%) of cases and 53(86.8%) of controls chews khat during recent pregnancy. Out of total participants 20(19.2%) of cases and 79 (37.9%) of controls reported that they had engaged in moderate physical exercise during their pregnancy. Out of 99 participants reported to be engaged in moderate physical exercise 56 (70.9%) controls and 12 (60%) cases are physically active. Based on self-report of the study participants, 86(82.7%) of cases and 167(80.3%) of controls have reported that they drink coffee during pregnancy, out of them out of the 77(89.55%) cases and 167(100%) controls drink less than 4 cup of coffee per day (Table 5).

Table 5 Behavioral, life style and nutritional characteristics of cases and controls attending antenatal follow up or delivery care in Jimma zone, Ethiopia, 2020

Variables	**Cases (n=104)**	**Controls (n=208)**	**Total(perce**
	Number (%)	Number (%))	Number (%)
Ever chewed khat			
Yes	30(28.8)	61(29.3)	91(29.2)
No	74(71.2)	147(70.7)	221(70.8)
Chewed khat in the past 12 months			
Yes	30(100)	58(95.1)	88(96.7)
No	0(0)	3(4.9)	3(3.3)
Chew chat during recent pregnancy			
Yes			
No	30(100)	53(86.8)	83(91.2)
	0(0)	8(13.2)	8(8.8)
Consumed alcoholic drink ever			
Yes	57(54.8)	96(46.2)	153(49.0)
No	47(45.2)	112(53.8)	159(51.0)
Consumed alcoholic drink in past 12 months			
Yes	46(80.7)	61(63.5)	107(69.9)
No	11(19.3)	35(36.5)	46(30.1)
Drinking coffee during recent pregnancy			
Yes	86(82.7)	167(80.3)	253(81.1)
No	18(17.3)	41(19.7)	59(18.9)
Moderate intensity exercise			
Yes	20(19.2)	79(37.9)	99(31.7)
No	84(80.8)	129(62.1)	213(68.3)

Stress			
Stressed	11(10.6)	6(2.9)	17(5.4)
Not stressed	93(89.4)	202(97.1)	295(94.6)
MUAC			
Under nutrition	2(2)	4(1.9)	6(1.9)
Normal	77(74)	201(96.6)	278(89.1)
Over nutrition	25(24)	3(1.4)	28(9)

5.5 Salt consumption

A total of 88(84.6) cases and 190(91.3) controls mentioned that they added salt always before or during eating. About 60(57.7) cases and 176(84.6) controls felt that they the right amount of salt (Table 6).

Table 6; Salt consumption of cases and control attending antenatal follow up or delivery care in Jimma zone, Ethiopia, 2020

Variable	Cases (n=104) Number (%)	Controls (n=208) Number (%))	Total(percent) Number (%)
Add salt before/during eating			
Always	88(84.6)	190(91.3)	278(89.1)
Often	6(5.8)	1(0.5)	7(2.3)
Sometimes	4(3.8)	8(3.8)	12(3.8)
Rarely	6(5.8)	6(2.9)	12(3.8)
Never	0(0)	3(1.4)	3(1)
Salt consumption			
Far too much	0(0)	3(1.4)	3(1)
Too much	31(29.8)	3(1.4)	34(10.9)
Right amount	60(57.7)	176(84.6)	236(75.6)
Too little	10(9.6)	20(9.6)	30(9.6)
Far too little	3(2.9)	3(1.4)	6(1.9)
Do not know	0(0)	3(1.4)	3(1)

5.6 Dietary pattern

From total of 312 study participants 36(34.6%) cases and 96(46.1%) follow balanced food dietary pattern. Forty eight 48(46.2%) of cases and 48(23.1%) controls follow animal source food based dietary pattern. The rest 20(19.2%) cases and 64(30.8%) controls follow plant source food based dietary pattern (Figure 3).

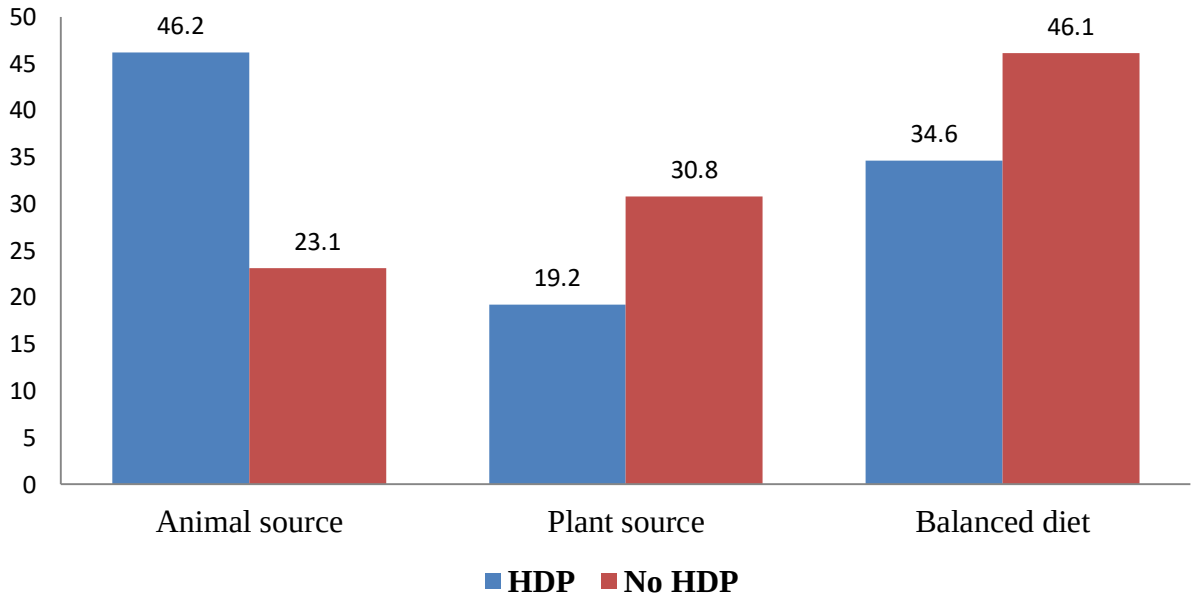

Figure 3 showing Dietary pattern of cases and controls attending antenatal follow up or delivery care in Jimma zone, Ethiopia, 2020

Determinants of hypertension during pregnancy

Bivariate logistic regression analysis Dietary pattern, previous history of pregnancy induced hypertension, residence, multiple pregnancy, history of abortion, presence of anemia at first visit, folate intake, gestational diabetes mellitus, wealth index, presence of mental stress, parity and age was identified as risk factors. On multivariable analysis after adjusting for confounders dietary pattern, previous history of pregnancy induced hypertension 3.759(1.688-8.368), rural residence 5.139(2.447-10.793), twin pregnancy 3.692(1.522-8.960), history of abortion 2.372(1.098-5.121), presence of anemia at the first visit 2.372(1.098-5.121)*, folate intake 0.172(0.061-0.484), advanced age 4.437(1.519-12.967), gestational diabetes 4.437(1.519-12.967) and wealth index found to be significantly associated to hypertensive disorders during pregnancy.

Those pregnant women who follow dietary pattern characterized by balanced food consumption have 0.236 times lower odd of developing hypertension during pregnancy as compared to those who follow dietary pattern high in animal source foods (AOR= 0.236 95%CI (0.110-0.506)). The odd of developing hypertension during pregnancy is 0.355 times lower (AOR=0.355 95% CI (0.154-0.820)) among pregnant women following plant based dietary pattern \ as compared to those who follow animal food based dietary pattern high in animal source foods.

Table 7 Bivariate and multivariable analysis for the predictors of hypertensive disorders of pregnancy among pregnant women attending antenatal follow up or delivery care in Jimma zone, Southwest Ethiopia, 2020

Variables	category	Cases	Control	COR(95%CI)	AOR(95%CI)	P-value
Dietary pattern	Animal source	48(46.2)	48(23.1)	1	1	
	Plant source	20(19.2)	64(30.8)	0.313(0.164-0.594)	**0.355(0.154-0.820)**	**0.015**
	Balanced diet	36(34.6)	96(46.1)	0.375(0.216-0.652)	**0.236(0.110-0.506)***	**<0.001**
Previous history of PIH	Yes	28(26.9)	38(18.3)	1.648(0.943-2.880)	**3.759(1.688-8.368)***	**0.001**
	No	76(73.1)	170(81.7)	1	1	
Residence	Urban	59(56.7)	159(76.4)	1	1	
	Rural	45(43.3)	49(23.6)	2.475(1.497-4.093)	**5.139(2.447-10.793)***	**<0.001**
Twin pregnancy	Yes	24(23.1)	20(9.6)	2.820(1.471-5.394)	**3.692(1.522-8.960)***	**0.004**
	No	80(76.9)	188(90.4)	1	1	
History of abortion	Yes	28(26.9)	39(18.8)	1	1	
	No	76(73.1)	169(81.2)	1.596(0.916-2.783)	**2.372(1.098-5.121)***	**0.028**
Anemia at the first visit	Yes	18(46.2)	8(3.8)	5.233(2.191-12.494)	**7.116(2.304-21.982)***	**0.001**
	No	86(53.8)	200(96.2)	1	1	
Folate intake	Yes	84(80.8)	197(94.7)	0.235(0.108,0.511)	**0.172(0.061-0.484)***	**0.001**
	No	20(19.2)	11(5.3)	1		
Age	<20	11(10.6)	28(13.5)	1	1	
	20-24	15(14.4)	41(19.7)	0.931(0.373-2.324)	0.755(0.247-2.310)	0.622
	25-29	14(13.5)	49(23.6)	0.727(0.291-1.818)	0.560(0.177-1.769)	0.323
	30-34	24(23.1)	71(34.1)	0.860(0.373-1.987)	0.682(0.247-1.883)	0.460
	>35	40(38.5)	19(9.1)	5.359(2.210-12.995)	**4.437(1.519-12.967)***	**0.006**
Stress	Stressed	11(10.6)	6(2.9)	3.982(1.429-11.09)	1.872(0.432-8.106)	0.402
	Not stressed	93(89.4)	202(97.1)	1	1	
Parity	Nulliparous	52(50)	73(35.1)	1.849(1.146-2.984)	1.363(0.697-2.666)	0.365
	Parous	52(50)	135(64.9)	1		
Gestational Diabetes mellitus	Yes	20(19.2)	8(3.8)	5.952(2.522-14.05)	**3.120(1.002-9.719)**	**0.050**
	No	84(80.8)	200(96.2)	1		
Wealth	Lowest	9(8.7)	41(19.7)	1		
	Second	23(22.12)	43(20.7)	2.437(1.009-5.883)	2.843(0.951-8.502)	0.062
	Middle	20(19.23)	59(28.4)	1.544(0.639-3.730)	1.439(0.448-4.617)	0.541
	Fourth	25(24.04)	30(14.4)	3.796(1.550-9.297)	**5.159(1.464-18.175)***	**0.011**

Highest	27(25.9)	35(16.8)	3.514(1.459-8.464)	**4.166(1.271-13.655)***	**0.018**

***** $p \leq 0.05$ *AOR = adjusted odds ratio COR = crude odds ratio, CI = confidence interval*.

CHAPTER SIX

DISCUSSION

The current study identifies dietary patterns, previous history of pregnancy-induced hypertension, place of residence, multiple pregnancies, and history of abortion, presence of anemia at the first visit, folate intake, advanced maternal age, gestational diabetes, and wealth index as a predictor variable for hypertensive disorders of pregnancy.

Dietary pattern derived by K mean cluster analysis identifies three dietary patterns namely Animal source food-based pattern (meat, poultry, dairy, eggs and organ meats), Plant-based foods (Vitamin A-rich vegetables and fruits, other Fruit and vegetables, grains, dark green leafy vegetables, and fruits) and balanced food pattern (fruit and vegetables, dairy, poultry, fish, meat, eggs, grains, and pulses).

As compared to those who are in animal source food pattern groups those who are taking a healthy balanced diet are at 0.236 times lower odds of developing hypertension during pregnancy. This result is supported by studies conducts in Canada and Iran which shows lower odds of preeclampsia with increased intake of a healthy diet (33, 38). This could be explained by the intake of a variety of foods that are a good source of all nutrients which are needed for a normal pregnancy. Additionally, a nutritious and well-balanced diet may enhance functionality and efficiency of maternal and fetal metabolism through substrate availability, reductive capacity, immunologic mechanisms, and insulin sensitivity, and the metabolic stress induced by disturbed placentation.

As compared to animal source food based food patterns those who are in plant-based food patterns have 0.355 times lower odds of developing hypertension during pregnancy. This might be due to the high intake of fruit and vegetable consumption was seen in plant-based food pattern. This result is supported by studies conducted in Australia, Norway, Danish, Addis Ababa, Tigray, and Bahirdar (5, 9-13) which shows the inverse association between high intake of fruit and vegetables and the occurrence of hypertension during pregnancy. This might be explained by a diet rich in vegetables and fruits that are rich in micronutrients such as antioxidants, vitamins, minerals, and dietary fiber. A diet rich in fruits and vegetables decreased

the risk of hyperhomocysteinemia which is one of the risk factors for the occurrence of hypertension during pregnancy.

The odd of developing hypertension during pregnancy is 3.8 times higher among participants who have the previous history of PIH as compared to those who do not have. This result is supported by studies conducted in with results of studies conducted in Nigeria, Kombolcha, and Derashe (14, 25, 26). This might be due to the existence of non-modifiable risk factors and the severe consequences of preeclampsia.

The current study indicated that those who are rural residents have 5 times higher odds of developing hypertension during pregnancy as compared to urban residents. This result is supported by studies conducted in Nekemete and Tigray(9, 35). This could be due to the fact that women from rural areas can start ANC follow up later in pregnancy which can be associated with a delay in healthcare-seeking behavior. In addition to this urban residents may have better access to information and for all food items to follow healthy and balanced food patterns.

The odds of developing hypertension during pregnancy are 3.7 times higher among pregnant women with multiple gestations as compared to a singleton pregnancy. This result is supported by a study conducted in Nekemete and Tigray (9, 35). This might be due to larger placental mass or relative placental ischemia in twin gestations compared with singletons. Moreover, relative placental hypoxia due to the increased size of the placenta is thought to play an important role for increased secretion of circulating anti-angiogenic particles could play a role in the increased risk of HDP in twin pregnancies.

The history of abortion was also found to be an independent predictor variable in other studies (35). his is also supported by the current study which shows that the odds of developing hypertension during pregnancy is 2.4 times higher among pregnant women who had a history of abortion. This might be due to disruption of endothelium by vigorous curettage which may lead to abnormal placentation.

Those who had a history of anemia at first ANC visit have 7 times higher odds of developing hypertension during pregnancy as compared to those who do not have. This result is consistent with the study conducted in Bahirdar(12). The susceptibility of pregnant women to anemia could

be explained by the occurrence of micronutrient deficiency which further may lead to the development of hypertension during pregnancy. This might leads to placental hypo perfusion which leads to the development of HDP.

In agreement with a previous study conducted in Bahirdar (12), the current study showed that those who are taking folate during pregnancy had 0.17 times lower odds of developing hypertension during pregnancy. This might be due to folic acid ability to decrease plasma homocysteine concentrations which is an amino acid released as the body digests dietary protein. It has been shown that its level increases during hypertension during pregnancy, especially during preeclampsia. Excessive homocysteine in pregnancy might damage the vascular endothelium of the developing placenta by promoting oxidative stress thereby increasing contractile response and the production of procoagulants and vasoconstrictors which lead to the development of preeclampsia.

As compared to lower age groups those who are >35 years have 4.4 times higher odds of developing hypertension during pregnancy. This result is consistent with studies conducted in Ghana and Derashe (14, 28) which shows higher odds of hypertension among advanced age groups. This might be explained by women with advanced age group are more likely to develop blood vessel/cardiovascular problem due to the decrement of elasticity of blood vessels mainly related to aging and arterial stiffness.

Those who have gestational diabetes had 3 times higher odds of developing HDP as compared to other groups. This might be due to the reason that elevated glucose level in pregnancy may impair a cascade of vascular development that will predispose to the development of placental vascular compromise which is one of the explanations for the pathophysiology of HDP.

As compared to lower wealth quintile those who are at the highest wealth quintile had 4.2 times higher odds of developing HDP. This result is in contrast with the study conducted in India which indicated low socioeconomic status as a risk factor for preeclampsia (34). This difference may be due to differences in a study setting and participants. The occurrence of HDP among the highest wealth quintile may be explained by an increment of sedentary behavior and intake of an unhealthy diet.

Unlike other previous studies nulliparity, coffee intake, alcohol intake, exercise, type of pregnancy and stress shows no statistical significance with the dependent variable. This might be due to confounding variables, differences in lifestyle habits, study area, and sample size difference.

The above findings have implications on the need for inculcating key messages on nutrition behavior change communications at the ANC contact to emphasize the intake of a healthy balanced diet and plant source foods high in fruit and vegetables. Especially focusing on those who are in the advanced age of >35, have a history of anemia at first ANC visit, rural residents, did not take folate during pregnancy, history of previous PIH, gestational DM and history of abortion.

6.1 Strength and limitation of the Study

Strenght of the study

Even though the major objective of this study is to see the association between diet and risk of developing hypertensive disorders of pregnancy investigating the effect of multiple risk factors of hypertensive disorders of pregnancy simultaneously to avoid for rival explanations could be the strength of the study.

Cases and controls were recruited at the same facility to control for the context difference in the study participants.

The following limitations have to be taken in to account in this study:

Due to the retrospective nature of the study design, the data may subject to recall bias, especially for food frequency questionnaires.

Diagnosis of cases was dependent on physician decisions which may have individual variation in case diagnosis that leads to bias. The study was done in a hospital setting which might not be generalized to the general population.

For some of the variables may be under-reported since the assessment is self- reported e.g. renal disease

CHAPTER SEVEN

7. Conclusion and Recommendation

7.1. Conclusion

The finding of our study suggests that there are different risk factors and preventive factors for hypertensive disorders during pregnancy. According to the derived dietary pattern balanced food pattern and plant source food based food patterns found to be preventive from the development hypertension during pregnancy. Additionally, previous history of PIH, rural residence, twin pregnancy, history of abortion, presence of anemia at the first visit, folate intake, advanced age, wealth index and gestational DM were identified as significantly predictors for HDP.

7.2 Recommendation

Risk factors identified in this study can be used as a screening mechanism for HDP. The following recommendations are forwarded based on the finding of this study which provides an opportunity for prevention, early diagnosis, and management of HDP.

For the general public: Pregnant women should follow healthy balanced dietary pattern and plant source food high in fruit and vegetables

Health care providers: Health professionals should strength counseling women about the risk factors associated with HDP and consumption healthy and balanced specially focusing on those who are in advanced age of >35, have history of anemia at first ANC visit, rural residents, did not take folate, Previous history of PIH, gestational DM and history of abortion.

For government and non-governmental sectors: Multi-sectorial collaboration should be strength especially with the agricultural sector to improve diet of pregnant women by increasing production of different variety of foods to increase access.

Researchers: Further study should be done on HDP in a well-controlled manner and advanced methodology.

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ANNEX I- ENGLISH VERSION QUESTIONNAIRE

Jimma University

Institute of Health

Faculty of Public Health

ENGLISH VERSION QUESTIONNAIRE

Questionnaires to assess dietary determinants of hypertensive disorders of pregnancy among pregnant women attending antenatal and delivery care in public hospitals of Jimma zone, Southwest Ethiopia, 2020

Information sheet:

My name is _____ I am working as data collector in a study conducted by Tsion Sintayehu, a postgraduate student at Jimma University, Institute of Health, Faculty of Public Health, Department of human nutrition and dietetics. She is conducting research on dietary determinants of hypertensive disorders of pregnancy among pregnant women attending antenatal and delivery care in selected public hospitals of Jimma zone. You are selected to participate in the study from women who attend antenatal and deliver care at this hospital. If you are willing to participate, I will ask you questions with regard to socio-demographic, dietary, behavioral, lifestyle, obstetric, family and medical history. The interview will last no more than 20 minutes and your participation is voluntary. You can stop the participation, ask questions and skip questions at any time you want. Your participation in the study will not have any risk on you, other than your time. There will no financial benefits for you in participating in this research. However, the information you provide will be very helpful for prevention of the disease in the future. The information you provided will be kept confidential and your name will not be revealed in the study. The collected data will not be used for other purposes other than the study.

Do you have any question?

If you want to ask the principal investigator about the research at any time, you can contact him through: Tsionsintayehhu27@gmail.com/ **Phone number: 0973499260**

Consent form

I understand that Tsion Sintayehu, a postgraduate student Jimma University wants to assess dietary determinants of hypertensive disorders of pregnancy. I fully understand that they are going to ask me about socio-demographic, dietary, behavioral, lifestyle, obstetric, family and medical history in the recent pregnancy. The research will take place at selected public hospitals of Jimma zone and will not take more than 20 minutes of my time. I want to take part in the study because I have been told that; I can stop participation at any time, skip any question if I do not like to answer. No one will know my answers other than investigators and the information will not be used for other purposes other than study.

Are you willing to participate in the study?

Yes: Please sign here_____

No: Acknowledge and go to the next participants

Result of the questionnaire (to be confirmed by the supervisor)

Completely filled

Partially filled (missing)

Interviewer Name: _____signature _____date _____

Supervisor Name: _____signature _____date_____

Case ☐

Control ☐

Type of Hypertensive disorder

1. Gestational hypertension 2. Preeclampsia
3. Chronic hypertension on superimposed pre-eclampsia
4. Eclampsia

SECTION A- Socio- demographic characteristics

S.No.	Questions	Response	Remark
A01	How old are you?	_____(years)	
A02	Where do you live?	1. Urban 2. Rural	
A03	What is your marital status	1. Married 2. Single 3. Divorced 4. Widowed 5. Separated	
A04	What is your religion?	1. Orthodox 2. Muslim 3. Catholic 4. Protestant 5. Others(specify)_____	
A05	What is your level of education?	1. Can't read/write 2. Can read and write 3. Primary education 4. Secondary education 5. College and above	
A06	What is your occupation?	1. Housewife 2. Nongovernmental employee 3. Government employee 4. Daily labourer 5. Private organization 6. Student 99. Other (specify)_____	
A07	What is your spouse's education level	1. Can't read/write 2. Can read and write 3. Primary education 4. Secondary education 5. College and above	
A08	Household wealth index (specify whether the household lives in urban or rural) URBAN ☐ RURAL ☐		
	Does the household currently have any of the following items?		
	Electricity	0. No 1.Yes	
	Radio	0. No 1.Yes	
	Television	0. No 1.Yes	
	Refrigerator	0. No 1.Yes	
	An electric mitad	0. No 1.Yes	
	Table	0. No 1.Yes	
	Chair	0. No 1.Yes	
	Bed with cotton mattress	0. No 1.Yes	
	Bed with sponge mattress	0. No 1.Yes	

	Bed with spring mattress	0. No 1.Yes	
	Automobile like car, Bajaj, trunk motor cycle	0. No 1.Yes	
	Does any member of this household have a Bank account?	0. No 1.Yes	
	What is the main source of drinking water for members of your household?	1. Pipe water 2. Protected well 3. Protected spring 4. Unprotected well 5. Protected spring 99. Other(specify)_____	
	What kind of toilet facility do members of your household usually use?	1. Private 2. Shared 99.Other(specify)_____	
	What type of fuel does your household mainly use for cooking?	1.wood 2.Electricity 99.Other (specify)_____	
	What is the main material of the floor in your household?	1. Mud 2. Sand 3. Cement 99. Other(specify)_____	
	What is the main material of the exterior walls in your household?	1. Bamboo with mud 2. Cement block 3. Sand and stone 4. Bricks 99. Other (specify)_____	
	What is the main material of the roof in your household?	1. Metal/corrugated iron 2. Cement 99. Other (specify)_____	

SECTION B: Obstetrics history related factors

S.No	Questions	Response	Remark
B01	Parity	_____	
B02	Gravidity	_____	
B03	Multiple Pregnancy	0. No 1. Yes 2. Unknown	Check medical record
B04	Gestational diabetes mellitus	0. No 1. Yes	
B05	Did you use modern contraceptive before you get pregnant?	0. No 1. Yes	
B06	If yes for QD05 which type?	1. Oral contraceptive 2. Implant 3. IUCD 4. Injectable 99.Others (specify)_____	
B07	What was your age at menarche	_____age in years	
B08	Have you had history of hypertensive disorders of pregnancy in previous pregnancy	0. No 1. Yes	
B09	If the answer for Q. No D08 is 1or 0 what is		

	the pregnancy interval between this pregnancy and the immediate previous delivery	_____(years)	
B10	History of abortion	0. No 1. Yes	**If no go to B12**
B11	If the answer for Q. No D10 is yes, how many times?	_____Induced _____ spontaneous	
B12	Presence of anemia at first visit	0. No 1. Yes	**Check medical record**
B13	Gestational age?	_____(weeks)	
B14	When you got pregnant, did you want to get pregnant?	1. Yes 0. No	
B15	When you got pregnant, did you want to get pregnant at that time?	1. Yes 0. No	
B16	Did you attend antenatal care follow up during your current pregnancy?	1. Yes 0. No	**If no go to Section C**
B17	How many months pregnant were you when you first received antenatal care for the current pregnancy?	_____months	
B18	How many times did you receive antenatal care during the recent pregnancy?	_____	
B19	Have you received iron folate tablet during your antenatal care follow up?	0. No 1. Yes	
B20	For how long did you take iron tablets during the whole pregnancy?(in weeks)	_____weeks (completed)	

Section C: Family and medical history related factors

S.No	**Questions**	**Response**	**Remark**

C01	Family history of hypertension (parents, father, grandparents and siblings)	0. No 1. Yes	
C02	Family history of Diabetes (parents, father, grandparents and siblings)	0. No 1. Yes	
C03	Family history of hypertension during pregnancy?	0. No 1. Yes	
C04	Do you have any known Medical disease? (multiple answer is possible)	1. Diabetes Mellitus 2. Cardiac disease 3. Renal disease 99. Others(specify)_____	**Check medical record**

Section D: Behavioral and Life style factors

S.No.	Question	Response	Remark
D01	Have you ever smoked?	0. No 1. Yes	**If no go to D05**
D02	Do you **currently** smoke **<u>any tobacco products</u>**, such as cigarettes and shisha?	0. No 1. Yes	
D03	If yes to D02, do you currently smoke tobacco products **daily**?	0. No 1. Yes	
D04	In a typical week on how many days do you smoke?	_____days	
D05	Have you ever chewed Khat over the last 12 months?	0. No 1. Yes	**If no go to D09**
D06	If Yes, in a typical week **<u>how many days</u>** do you chew Khat?	_____days	
D07	Do you chew Khat during current pregnancy?	0. No 1. Yes	
D08	Have you **ever** consumed an alcoholic drink? (beer, tela, areki, wine etc)	0. No 1. Yes	**If no goto D11**

D09	Have you consumed an alcoholic drink within the **past 12 months**?	0. No 1. Yes	
D10	If yes for qD09, **how frequently** have you had at least one alcoholic drink?	1 .Daily 2 5-6 days per week 3 1-4 days per week 4 1-3 days per month 5 Less than once a month	
D11	Have you ever drink coffee during current pregnancy?	0. No 1. Yes	**If no go to D14**
D12	How often did you drink coffee during the recent pregnancy per week?	_____days per week	
D13	On average how many cups of coffee did you drink per day	_____cups	
D14	In a typical week, do you do a moderate-intensity activity that causes small increases in breathing or heart rate such as brisk walking, housework *[or carrying light loads]* as part of your work?	0. No 1. Yes	**If no goto D17**
D15	If yes for QD14 for in a typical week how many days you do moderate intensity activities?	_____ days	
D16	If yes for QD14 How much time do you spend doing moderate-intensity activities at work on a typical day?	_____minutes	
D17	How much time do you usually spend sitting on a typical day	_____	

D18- Self-Reporting Questionnaire-20 (to assess mental distress)

1	Do you have headache?	0. No	1. Yes
2	Is your appetite poor?	0. No	1. Yes
3	Do you have sleep disturbance?	0. No	1. Yes
4	Are you easily frightened?	0. No	1. Yes
5	Do your hands shake?	0. No	1. Yes
6	Do you feel nervous, tense or worried?	0. No	1. Yes
7	Is your digestion poor?	0. No	1. Yes
8	Do you have trouble thinking clearly?	0. No	1. Yes
9	Do you feel unhappy?	0. No	1. Yes
10	Do you cry more than usual?	0. No	1. Yes
11	Do you find it difficult to enjoy daily activities?	0. No	1. Yes
12	Do you find it difficult to make decisions?	0. No	1. Yes
13	Is your daily work suffering?	0. No	1. Yes
14	Are you unable to play a useful part in life?	0. No	1. Yes
15	Have you lost interest in things?	0. No	1. Yes
16	Do you feel that you are worthless person?	0. No	1. Yes
17	Has the thought of ending your life been in your mind?	0. No	1. Yes
18	Do you feel tired all the time?	0. No	1. Yes
19	Do you have uncomfortable feeling in your stomach?	0. No	1. Yes
20	Are you easily tired?	0. No	1. Yes

Section E.0 Food Frequency Questionnaire (for the last one year)

Now, I am going to ask you about your dietary consumption. Considering your experience during the past one year please tell me how frequently you consumed each of the following food items **ENTER 0 IF NEVER CONSUMED THE ITEM ONLY IN THE BOXES**					
Teff (Teff injera, Injera firfir)	Per day		Maize	Per day	
	Per week			Per week	
	Per month			Per month	
Barley including bread	Per day		Wheat (Bread, Ambasha Maccaroni and Pasta)	Per day	
	Per week			Per week	
	Per month			Per month	
Sorghum/millet	Per day		Rice	Per day	
	Per week			Per week	
	Per month			Per month	
Emmer Wheat (Kinche, Yeaja atemit, bread and Genfo)	Per day		Fish (Fish boiled, Raw fish meat and Roasted fish meat)	Per day	
	Per week			Per week	
	Per month			Per month	
Beef (Beef liver, Beef kidney, Boiled beef meat. Beef meat roasted/ Grilled, Kitfo, beef meat wot and raw beef meat)	Per day		Chicken	Per day	
	Per week			Per week	
	Per month			Per month	
Goat/Lamb (Goat meat fried, boiled goat meat, Goat meat wot)	Per day		Liver	Per day	
	Per week			Per week	
	Per month			Per month	
Milk (Raw Milk, Yoghurt and boiled milk)	Per day		Cheese	Per day	
	Per week			Per week	
	Per month			Per month	
Butter	Per day		Eggs (egg whole fried, and egg whole boiled)	Per day	
	Per week			Per week	
	Per month			Per month	
Nuts including Peanut Butter	Per day		Oil	Per day	
	Per week			Per week	
	Per month			Per month	
Beans, peas, Lentils	Per day		Sweet potato	Per day	
	Per week			Per week	
	Per month			Per month	
Potato (Potato wot, Boiled potato, Roasted Potato)	Per day		Carrot	Per day	
	Per week			Per week	
	Per month			Per month	
Beet root	Per day		Cabbage	Per day	
	Per week			Per week	
	Per month			Per month	
Tomato (Tomato sauce, Raw	Per day		Ethiopian Kale	Per day	

tomato)	Per week			Per week	
	Per month			Per month	
Lettuce	Per day		Swiss chard	Per day	
	Per week			Per week	
	Per month			Per month	
Snap pee	Per day		Green pepper	Per day	
	Per week			Per week	
	Per month			Per month	
Papaya	Per day		Banana	Per day	
	Per week			Per week	
	Per month			Per month	
Pineapple	Per day		Oranges	Per day	
	Per week			Per week	
	Per month			Per month	
Apple	Per day		Lemon	Per day	
	Per week			Per week	
	Per month			Per month	
Avocado	Per day		Mango	Per day	
	Per week			Per week	
	Per month			Per month	
Guava	Per day		Sugar	Per day	
	Per week			Per week	
	Per month			Per month	
Sugar cane	Per day		Honey	Per day	
	Per week			Per week	
	Per month			Per month	
Marmalate	Per day		Soft drinks (Mirinda, Coca cola, Sprite, Pepsi cola, Fanta…)	Per day	
	Per week			Per week	
	Per month			Per month	
Junk foods (Pizza, Burger, Chips (fried potato)…)	Per day			Per day	
	Per week			Per week	
	Per month			Per month	

Section E.1 Salt consumption

Dietary salt	
With the next questions, we would like to learn more about salt in your diet. The following questions are on adding salt to the food right before you eat it and how food is prepared in your home. Please answer the questions even if you consider yourself to eat a diet low in salt.	
How often do you **add salt** to your food right before you eat it or as you are eating it?	1. Always 2. Often 3. Sometimes 4. Rarely 5. Never 99. Don't Know
How often is **salt added** in cooking or preparing foods in your household?	1. Always 2. Often 3. Sometimes 4. Rarely 5. Never 99. Don't Know
How often do you eat **processed food high in salt**? By processed food high in salt, I mean foods that have been altered from their natural state including, salty food prepared at a fast food restaurant.	1. Always 2. Often 3. Sometimes 4. Rarely 5. Never 99. Don't Know
How much salt do you think you consume?	1. Far too much 2. Too much 3. Just the right amount 4. Too little 5. Far too little 99. Don't Know

Anthropometry	**Age**	**Measurement**	**Remark**
MUAC		_____._____	

THANK YOU!!

ANNEX II;UNKA GAAFANNOO AFAAN OROMOO

Uunkaa Afaan Oromoo

Odeeffannoo

Ani maqaan koo……..jedhama. As Kanaan dhufeef hoospitaala kanatti Tsiyoon Sintaayeew Kan jedhamtuu barattuun digrii lamaffaa jimmaa yunivaarsitii inistituyitii fayyaa dipartimantii sirna nyaataa waraqaa eebbaaf qorannoo godhamuuf ragaa funanuufi. Qorannoon kun kan taasifamuu hoospitaaloota zoonii jimmaa keessa jiran keessaa kan filatamaan irraatti yoo ta'uu, haalli soorataa hadhoolii yeroo ulfaa dhiibaa dhiigaa irratti dhiibaa/rakkoo geessisuu adda baasuufidha. Isiniis hadhoolii hordoffii ulfaa fi da'umsaaf hoospitaala kana dhufan keessaa qorannoo kana irratti akka hirmaataniif filatamtanii jirtu.Yoo hirmaachuuf fedha qabaatan ta'ee, odeeffanoo waa'ee hawwasummaa, ulfaa, da'umsaa, haala jireenyaa fi haala soorataan wal qabatan irratti yeroo daqiiqaa 20 hin caale keessatti siin gaafadha. Qorannoo kana keessatti kan hirmaatan fedhiin waan ta'eef, yeroon siin gaafadhuu gidduun gaaffii gaafachuun, gaaffii hin feene irra darbuun fi yeroo feetanitti dhaabsisuun ni danda'ama. Qorannoo kana keessatti hirmaachuu keessaniif dhunfaatti faayidaa qarshii qabaachuu baatus, odeeffannoon nu kennitan gara fuulduratti hadhooliin ulfaa dhibee dhiibaa dhiigaattiin dhufu ittisuuf faayidaa guddaa qaba. Qorannoo kana keessatti hirmaachuu keessaniif, yeroo nu kennitaniin alatti miidhaan sinirra gahu hin jiru. Odeeffannoon nu kennitan qorannoo kanaaf qofa kan oolu fi Iccitiin isaa kan eegamu waan ta'eef maqaan keessan qorannoo kana keessatti hin ibsamu.

Waa'ee qorannicha kanaa gaaffii akka sinii ibsamuu feetan yoo jiraate gaafachuu ni dandeessu.

Odeeffannoo dabalataatiif abbaa qorannicha kanaa iddoo armaan gaditti ka'ameen argachuu ni dandeessu.

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Uunkaa waliigaltee

Barattuun digrii lamaffaa yunivarsitii jimmaa inistiituyitii fayyaa Tsiyoon Sintayeew hoospitaaloota zoonii jimmaa keessa jiran keessaa warra filaman irratti qorannoo haalli soorata haadhoolii ulfaa dhiibaa dhiigaa irratti dhiibaa geessisuu qorachuuf akka dhufan hubadheera. Waan ta'eef,odeeffanoo waa'ee hawwasummaa, ulfaa, da'umsaa, haala jireenyaa fi haala soorataan wal qabatan akka funanan naa galeera. Yeroo gaaffiis daqiiqaa 20 kan hin caale ta'uu natti himamera. Dabalataniis, gaaffii gaafachuu, gaaffii irra darbuu fi yeroon fedheetti dhabsiisuu akkan danda'uu waan natti himameef, odeeffannoon kennuus qorannoo qofaaf kan oolu fi iccitiin isaa kan eegamuu ta'uu isaa waan natti himaanii fi hubadheef qorannoo kana keessatti hirmachuuf fedhii qabachuu kiyya siniifaan ibsa.

Qorannoo kana keessatti hirmachuuf fedhii qabduu….?

Eeyyeen hirmaachuu keessaniif iddoo kanatti nu mallatteessaa_____

Lakkii galateefachuun gara hirmaatoota itti ananitti deemuu

Qabxiin gaaffilee kan mirkaana'uu oggeessa to'ataa qorannichaattin

Guutummmaan guutuutti kan guutame

Haga tokko kan guutame

Maqaa gaafataa_____ mallattoo_____ Guyyaa_____

Maqaa to'ataa_____ mallattoo_____ Guyyaa _____

Garee . Odeffannoo haala haawaasaa waliin wal qabatee

Lakk	**Gaaffii**	**Deebii**	
A01	Umrii kee meeqa	_____	
A02	Bakka jireenyaa?	2. magaala 3. baadiyyaa	
A03	Haala gaa'eelaa	1. Kan fuudhee/heerumte 2. Kan hin fuune /heerumnee 3. Kan hikee/te 4. Kan jalaa du'ee/tee 5. Kan waliin hin jiraatanu	
A04	Amantaa	2. Ortodooksii 3. Muslima 4. Kaatooliiki 5. Proteestaantii 6. Ka biraa_____ 7. Ka biraa_____	
A05	Sadarkaa barnoota	1. mana barnoota hin galle/ barreessuf dubbisu hin danda'u 2. sadarkaa tokkoffa 3. sadarkaa lamaffaa 4. koolleejiif isaa oli	
A06	Haala hojii	2. Haadha manaa 3. Hojjetaa motummaa 4. Qootee bulaa 5. Daldalaa 6. Ka biraa_____	
A07	Sadarkaa barnootaa abbaa manaa kee	1. mana barnoota hin galle/ barreessuf dubbisu hin danda'u	

		2. sadarkaa tokkoffa 3. sadarkaa lamaffaa 4. koolleejiif isaa oli	

A08	Qabeenya manaa	Kanneen armaan gadii kana manni kun qabaa?		Baayina
		Electrikii	0. Lakki 1. Eeyyee	
		Reediyoo	0. Lakki 1. Eeyyee	
		Televzyiinii	0. Lakki 1. Eeyyee	
		Firiijii	0. Lakki 1. Eeyyee	
		Eelee eletirika	0. Lakki 1. Eeyyee	
		Tarapheezzaa	0. Lakki 1. Eeyyee	
		Barcuma	0. Lakki 1. Eeyyee	
		Siraa firaashii jirbiin	0. Lakki 1. Eeyyee	
		Siraa firaashii spoonjiim	0. Lakki 1. Eeyyee	
		Siraa firaashii shiboon	0. Lakki 1. Eeyyee	
		konkolaata, Bajaaji, kan fe'isaadoqdoqqee	0. Lakki 1. Eeyyee	
		Dabtara baankii qabduu?	0. Lakki 1. Eeyyee	
		Maddi bishaan dhugaatii miseensa mana kanaa eessayyu?	1. boombaa 2. biirii/eelaa egumsa qabu 3. burqituu eegumsa qabu 4. biiiri/eela eegumsa hin qabne	

			5. burqituu eegumsa hin qabne 6. kan biroo_____	
		Mana fincaani/boolii akkamii fayyadamu miseensi maatii kun?	1.dhuunfaa 2. waliin 3.kan birooibsi_____	
		Nyaata qoheessuuf maal fayyadamtu?	1.qoraan 2.Electriki 3.kan biraaibsi_____	
		Lafti manaa malirra hojjatame?	1.dhoqqee 2. biyyoo 3. simintoo 4. kan biroo (ibsi _____)	
		Bakkeen/alli manaa malirraa hiojjatame?	1.dhoqqeen 2. simintoo bilookkeettiin 3. biyyoof dhakaan 4. supheen 5. kan biro ibsi _____	
		Ijoon manaa malirra hojjatame?	1.sibiilaa/qorqorroo dibame 2. simintoo 3. kan biro ibsi_____	

Garee B. Gaafii waa'ee dhiphinna sammuu ilaalatu

Gaaffii	Gaaffii	deebii	Remark
B01	Haammam deesse	_____	
B02	Isa kana dabalatee yeroo meeqa ulfa gotee	_____	
B03	Ulfi kun toorban meeqaa	_____	
B04	Kiniini Qusannoo maatii ulfaa kanaan duraa fayyadamtee beektaa	0. Eyyee 0. Miti	
B05	Xurii laguu isa jaalqabaa yemmuu ilaaltuu umriin kee meeqa turee	_____	
B06	Ulfa isa duraanii irratti dhukkubni dhibbaa dhigaa yeroo ulfaa si qabee ture	1. Eyyee 0. miti	
B08	Yoo gaaffii lakk 7ffaaf deebiin kee eyyee/miti ta'e Ulfa isa kanaafi isa darbee irratti garaagarumma yeroo meeqa qabaa(waggaadhaan)	_____(waggaadhaan)	
B09	Ulfa gootachuu sii mudatee beeka	1. eyyee 0. miti	**Deebiin kee eyyee/miti yoo ta'ee gara gaaffii 11ffaa dabarfadhuu**
B10	Gaaffii lakk 09ffaaf deebiin kee,eyyee,yeroo meeqa?	_____ _____ ofuuma saatiin	
B11	Haala Ulfa kanaa	1. Kan barbaadamee 2.Kan hin barbaadamnee 3. Kan yeroo isaa hin eegne 4. Kan yeroo isaa eege	

B12	Ulfa kanaaf mana yaalaatti Hordoffii ulfaa gochaa jirtaa	1. eyyee 0. miti	**Deebiin kee eyyee/miti yoo ta'ee gara gaaffii 11ffaa dabarfadhuu**
B13	Ulfa kanaaf yeroo jalqabaaf hordoffii ulfaa yemmuu gotuu ulfa ji'a meeqaa turtee	Ji'a _____	
B14	Ulfa kanaaf hordoffi ulfaa yeroo meeqa gootee How many times did you receive antenatal care during the recent pregnancy?	_____	
B15	Kiniina aayranii/dhiigaa yeroo hordoffi ulfaa fuudhattee beektaa	1.eyyee 0. miti	
B16	Ulfa kanaaf yeroo meeqaaf kiiniina dhiigaa fuudhattee(torbeedhaan)	_____	

Garee C. Fayyaa keessanniif fayyaa maatii keessan waliin walqabatee

Lakk	Gaaffii	Deebii	Remark
C01	Maatii kee keessatti nama dhukkuba dhiibbaa dhigaa qabuu jira (haadha, abbaa , akaakayyuu fi ijoollee)	1. Eyyee 0. Miti	
C02	Maatii kee keessatti nama dhukkuba sukkaaraa qabuu jira (haadha, abbaa , akaakayyuu fi ijoollee)	1. Eyyee 0. Miti	
C03	Maatii kee keessatti nama dhukkuba	1. Eyyee	

	dhiibbaa dhigaa yeroo ulfaa qabuu jira	0. Miti	
C04	Dhukkuba biraa qabdaa **Deebii tokkoon caalaa ni danda'ama**	5. Dhukkuba hir'ina dhiigaa 6. Dhukkuba sukkaara 7. Dhukkuba onnee 8. Dhukkuba kalee 9. Ka biraa_____	Galmee isaa irraa mirkaneessi

Garee D Amalaa fi haala jireenyaa waliin walqabatee

lakk.	Gaaffii	Deebii	Remark
D01	Sijaaraa xuuxxee beektaa?	1. Eyyee 0. Miti	
D02	Oomisha sijaaraa kamiyyuu amma ni xuuxxaa fkn akka **sijaaraa,shiishaa**	1. Eyyee 0. Miti	**Yoo miti ta'ee gara gaaffii 5ffaa dabarfadhuu**
D03	Gaaffii 2ffaaf deebiin kee eyyee yoo ta'ee oomishaa siijaaraa guyyaa guyyaadhaan xuxxaa?	1. Eyyee 0. Miti	
D04	Torbeedhaan guyyaa meeqaaf siijaaraa xuuxxaa	_____guyyaadhaaf	
D05	Ji'a kudha lamaan darbee keessatti jimaa qamaate beektaa	1. Eyyee 0. Miti	**Yoo miti ta'ee gara gaaffii 8ffaa dabarfadhuu**
D06	Gaaffii 5ffaaf deebiin kee eyyee yoo ta'ee ,torbeedhaan guyyaa meqaaf jimaa qamaata?	_____guyyaadhaaf	
D07	Dhugaatii akka (biiraa,araqee,waayiini kkf) Duraan dhugdee beektaa	1. Eyyee 0. Miti	

D09	Ji'a kudha lamaan darbee keessatti dhugaatii dhugdee beektaa	1. Eyyee 0. Miti	
D10	Gaaffii lakk 09ffaaf deebiin kee eyyee yoo ta'ee,yeroo meeqaaf yoo xiqqaatee al tokkoo dhugdee	1. Guyyaa guyyaa dhaan 2. Guyyaa 5-6 torbeedhaan 3. Guyyaa 1-4 torbeedhaan **4.** Guyyaa 1-3 ji'aan ji'aan ala tokkoo	
D11	Ulfa kanaan Buna dhugdee beektaa	1. Eyyee 0. Miti	**Deebiin Yoo miti ta'ee gara gaaffii 14ffaa dabarfadhuu**
D12	Ulfa kanaan Guyyaa meeqaaf torbeedhaan Buna dhugdee beektaa	Guyyaa _____ torbedhaan	
D13	Gidduu galeessaan buuna siinii meeqa guyyaadhaan dhugda	_____siinii	
D14	Torbeedhaan sosocho'insa qaamaa gidduu galeessa ta'ee kan akka adeemuu,wanta salphaa ta'ee baattaa?	1. Eyyee 1. Miti	**Deebiin kee Yoo miti ta'ee gara gaaffii 16ffaa dabarfadhuu**
D15	Gaaffii lakk 14ffaaf deebiin kee eyyee yoo ta'ee toorbeedhaan guyyaa meeqaaf sosocho'insa qaama gidduu galeesssa ta'ee hojjettaa	_____	

D16	Gaaffii lakk 14ffaaf deebiin kee eyyee yoo ta'ee sosocho'insa qaama gidduu galeesssa ta'ee guyyaadhaan sa'atii meeqaaf hojjettaa	_____	
D17	Guyyaadhaan sa'ati meeqaa teesse ooltaa	_____	

D18. Gaafii waa'ee dhiphinna sammuu ilaalatu

1	Mataa bowwuu qabdaa?	1. Eyyee 0. Miti
2	Nyaatnii siif hin nyaatamuu?	1.Eyyee 0. Miti
3	Hirriibnii haala ati barbaaduun si qabataa?	1.Eyyee 0. Miti
4	wantii callisee sodaa sodaa sitti dhagahamuu jiraa?	1.Eyyee 0. Miti
5	Haarka kee sii hollachisaa?	1.Eyyee 0. Miti
6	Dhiphachuu fi cinqamuun sitto ni dhagahamaa?	1.Eyyee 0. Miti
7	Nyaata nyaatee yoo kaatuu garaa sitaayee ykn daakamuu didee sii rakkisaa?	1.Eyyee 0. Miti
8	Yaada fafaca'aa fi jeeqamaa tayee sammuutti siitii dhufaa?	1.Eyyee 0. Miti
9	Gammachuun sitti hin dhagahaamuu?	1.Eyyee 0. Miti
10	Si boochisaa ykn bohii bohii sii hin jedhaa?	1.Eyyee 0. Miti
11	olmaa kee guyyaa guyyaa irratii wanti sitti hin tolle jiraa?	1.Eyyee 0. Miti
12	waa murteessuu dhaaf ni rakkataa?	1.Eyyee 0. Miti
13	Jiruu kee guyyaa guyyaa sirnaan hin raawwattuu?	1.Eyyee 0. Miti
14	waan hundaa feedhii dhabuun siitti hin dhagahaamaa?	1.Eyyee 0. Miti
15	nama faayidaa hin qabnee taatee sitti dxhagahamaa?	1.Eyyee 0. Miti
16	waan jiruun kee golabamuuf ka'ee sitti fakaaataa?	1.Eyyee 0. Miti
17	dadhabiin sitti hin dhagahamaa?	1.Eyyee 0. Miti
18	Calisee sidadhabsiisaa?	1.Eyyee 0. Miti

19	Do you have uncomfortable feeling in your stomach?	1.Eyyee 0. Miti
20	Are you easily tired?	1.Eyyee 0. Miti

Garree E. Gaaffii nyaataan walqabatee

Amma gaaffii nyaataan walqabatee si gaafachuufi ,turtii kee bara dabree yaadadhuuti yeroo meeqaaf nyaatoota armaan gadiitti ibsaman akka nyaatte natti himi			
Bifa nyaata	**guyyaadhaan**	**Torbeedhaan**	**Ji'aan**
Xaafii			
Boqqolloo			
Garbuu			
Qamadii			
Maashillaa			
Ruuzii			
Foon sangaa			
Qurxummi			
Foon lukkuu			
Foon ree'ee			
Tiruu			
Aannan			
Aybii			
Dhadhaa			
Hanqaaquu/buphaa			
Ochooloni			
Zayitii			
Baaqelaa,ataraa,misira			
Dinnichaa mi'aawaa			
Dinnichaa			
Kaarooti			

Timaatimii			
Muduraa			
Avokaado			
Paappaayaa			
Muuzii			
Anaanaasii			
Birtuukaana			
Dhugaati lallaafaa			
Appilii			
Shankooraa agadaa			
Loomii			
Nyaatawwan kan akka piizaa,bargarii,chiipsii dinchaa fi kkf			

Garee E.1 Akkaata sogidda nyaata

Amma gaaffi akkaataa sogiddaa fayyadama kee ilaalchisee si gaafachuufi	
sogidda nyaataa osoo hin nyaatiin dura ykn yemmuu nyaattu nyaata kee irratti yeroo meeqa goota	1.Yeroo hundaa 2. Darbe darbe 3. Yeroo tokko tokko 4. gonkuma 99. hin barree
mana keessaa osoo nyaata bilchessituu sogidda nyaataa yeroo meeqa goota	1. Yeroo hundaa 2. Darbe darbe 3. Yeroo tokko tokko 4. gonkuma 99. hin barree
nyaata adeemsa keessatti darbee sogidda baay'ee qabuu Yeroo meeqa nyaatte	1 .Yeroo hundaa 2 Darbe darbe

	3 .Yeroo tokko tokko 4 gonkuma 6. hin barree
Sogidda haammam nyaachuun qaba jeette yaaddaa	1.Baayyee,baayyee 2. . Baayyee 3. Just the right amount 4. Bicuu 5. Baayyee bicuu 6. hin barree

GALATOOMAA

ANNEX III- AMHARIC VERSION QUESTIONNAIRE

የመረጃ ቅጽ

ስሜ_____ ይባላል፤ የመጣሁት በዚህ ሆስፒታል ፅዮን ስንታየሁ የተባሉት በጅማ ዩኒቨርሲቲ፣ ጤና ኢኒስቲቱት ህብረተሰብ ጤና ትምህርት ክፍል የድህረ ምረቃ ተማሪ ለሁለተኛ ድግሪ መመረቂያ ለሚሰሩት ጥናትዊ ፅሁፍ መረጃ ለመሰብሰብ ነዉ። ጥናቱ የሚካሄደዉ በተመረጡ የጅማ ዞን ሆስፒታሎች ሲሆን የአመጋገብ ሁኔታ በእርግዝና ጊዜ በሚከሰት የደም ግፊት ላይ የሚኖረዉን ተፅዕኖ ለማጥናት ነው። እርሶም በዚህ ሆስፒታል የቅድመ ወሊድ እና የወሊድ አገልግሎት ለማግኘት ከሚመጡ እናቶች መካከል በጥናቱ ላይ ተሳታፊ እንዲሆኑ ተመርጠዋል። ለመሳትፍ ፈቃደኛ ከሆኑ፤ ስለማህበራዊ፣ እርግዝና እና ወሊድ፣ የአኗኗር ዘይቤ እና የአመጋገብ ሁኔታ ጋር የተያያዙ መረጃዎችን ከ20 ደቂቃ ላልበለጠ ጊዜ እጠይቅዎታለሁ። በዚህ ጥናት ላይ መሳተፍ ፣በፍቃደኝነት ላይ የተመሰረተ ስለሆነ፤ ስጠይቅዎት በመሃል ጥያቄ መጠየቅ፤ ጥያቄ መዝለል፤ ብሎም ማስቆም ይችላሉ። የእርስዎ ጥናቱ ላይ መሳተፍ አሁን ለግልዎ የገንዘብ ጥቅም ባይኖረውም ፤የሚሰጡት መረጃ ግን ወደ ፊት በእርግዝና ጊዜ የሚከሰት የደም ግፊት በሽታን ለመከላከል ትልቅ ጥቅም ይኖረዋል። እርስዎ በጥናቱ ላይ ስለተሳተፉ ከጊዜዎት በስተቀር የሚደርስብዎት ምንም ችግር የለም። የሚሰጡት መረጃ ለጥናቱ ብቻ የሚዉል ሲሆን፤ ሚስጥራዊነቱንም ለመጠበቅ ስምዎት ጥናቱ ላይ አይገለፅም።

ጥናቱን በተመለከተ ሊብራራልዎት የሚፈልጉት ነገር ካለ መጠየቅ ይችላሉ።

ለበለጠ መረጃ የጥናቱን ዋና መሪ በሚከተለዉ አድራሻ ማግኘት ይችላሉ።

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የስምምነት ቅጽ

በጅማ ዩኒቨርሲቲ፣ ጤና ኢኒስቲቱት ህብረተሰብ ጤና ትምህርት ክፍል የድህረ ምረቃ ተማሪ ፅዮን ስንታየሁ፤ በተመረጡ የጅማ ዞን ሆስፒታሎች የአመጋገብ ሁኔታ በእርግዝና ጊዜ በሚከሰት የደም ግፊት ላይ የሚኖረዉን ተፅዕኖ ለማጥናት መምጣታቸዉን ተረድቻለሁ። በመሆኑም ስለማህበራዊ፣ እርግዝና እና ወሊድ ሁኔታወች፣ የአኗኗር ዘይቤ እና የአመጋገብ ሁኔታ ጋር የተያያዙ ጥያቄዎችን እንደምጠየቅ ተገዝቤአለሁ፤ መጠይቁም ከ 20 ደቂቃ ያልበለጠ ጊዜ እንደሚወስድ ተነግሮኛል። በተጨማሪም በማንኛዉም ጊዜ ጥያቄ መጠየቅ፣ መዝለል፤ ብሎም ካልፈለግሁ ማስቆም እንደምችል የተነገረኝ ሲሆን፤ መረጃው ለጥናቱ ብቻ የሚዉል መሆኑ እና ሚስጥራዊነቱ የተረጋገጠ ስለ መሆኑ ግንዛቤ ስለ ተሰጠኝ፤ በጥናቱ ላይ ለመሳተፍ ፈቃደኛ ነኝ።

ጥናቱ ላይ ለመሳተፍ ፈቃደኛ ነዎት?

አዎ ፤እባኮ እዚህ ጋ ይፈርሙ _____

አይደለሁም፤ <u>አመስግኖ ወደ ቀጣይ ተሳታፊ መሄድ</u>

የመጠይቁ ዉጤት ማረጋገጫ (በጥናቱ ተቆጣጣሪ ባለሙያ መረጋገጥ አለበት)

ሙሉ በሙሉ የተሞላ

በከፊል የተሞላ

የጠያቂው ስም_____ ፊርማ_____ ቀን _____

የተቆጣጣሪ ስም_____ ፊርማ_____ ቀን _____

ክፍል ሀ- የኢኮኖሚ እና የማህበራዊ ሁኔታን የተመለከቱ ጥያቄዎች

ተ/ቁ	ጥያቄዎች	አማራጭ መልሶች	ምርመራ
A01	እድሜዎት ስንት ነዉ?	_____ዓመት	
A02	የመኖሪያ ቦታዎ አይነት ምንድንነ ዉ?	1. ከተማ 2. ገጠር	
A03	የጋብቻ ሁኔታዎ ምንድን ነው?	1.አግብቻለሁ 2.አላገባሁም 3.ተፋተናል 4.ባለቤቴ በህይወት የለም 5.ተለያይተናል	
A04	የምን ሀይማኖት ተከታይ ነዎት?	1.ኦርቶዶክስ 2.ሙስሊም 3.ካቶሊክ 4.ፕሮቲስታንት 5.ሌላ ካለ ይገለጽ……..	
A05	የትምህርት ደረጃዎ ምንድነው?	1. ማንበብ እና መጻፍ የማይችሉ 2 ማንበብ እና መጻፍ የሚች 3. አንደኛ ደረጃ [1-8 ክፍል] 4. ሁለተኛ ደረጃ [9-12 ክፍል] 5. ኮሌጅ እና ከዚያ በላይ	
A06	የእርስዎ ዋና ስራ ምንድ ነው?	1.የቤት እመቤት 2.የመንግስት ሰራተኛ 3.መንግስታዊ ያልሆነ ድርጅት ሰራተኛ 4.የግል ድርጅት 5.የቀን ሰራተኛ 99. ሌላ ካለ ይገለጽ…….	
A07	የትዳር ጓደኛዎ የትምህርት ደረጃ ምንድ ነው?	1. ማንበብ እና መጻፍ የማይችሉ 2 ማንበብ እና መጻፍ የሚችሉ 3. አንደኛ ደረጃ [1-8 ክፍል] 4. ሁለተኛ ደረጃ [9-12 ክፍል] 5. ኮሌጅ እና ከዚያ በላይ	

ክፍል A. 1. የቤት ሀብት መጠን መለኪያ ጥያቄዎች

በመጀመሪያ ተጠያቂዉ በገጠር አካባቢ ወይም በከተማ መኖሩን ይጠይቁ/ያረጋግጡ

ከተማ ☐ ገጠር ☐

A08.	ቤቱ ከታች የተጠቀሱትን ቁሳቁሶች ያካትታል?		
	የኤላክትሪክ አገልግሎት	1.አዎ	0.የለም
	ራድዮን	1. አዎ	0. የለም
	ቴሌቭዥን	1. አዎ	0. የለም
	ፍሪጅ	1. አዎ	0. የለም
	የኤሌክትሪክ ምጣድ	1. አዎ	0. የለም

	ጠረጴዛ	1. አዎ	0. የለም
	ወንበር	1. አዎ	0. የለም
	የጥጥ ፍራሽ ያለዉ አልጋ	1. አዎ	0. የለም
	የስፖንጅ ፍራሽ ያለዉ አልጋ	1. አዎ	0. የለም
	ስፕሪንግ ፍራሽ ያለዉ አልጋ	1. አዎ	0. የለም
	ተሸከርካሪ ለምሳሌ መኪና፣ሞተር ሳይክል፣ባጃጅ	1. አዎ	0. የለም
	የቤቱ አባላት የባንክ ደብተር አላቸዉ	1. አዎ	0. የለም
	የቤቱ የመጠጥ ዉሃ አቅርቦት	1.የጋራ ቧንቧ 2.የግል ቧንቧ 3.የተጠበቀ ምንጭ 4.ያልተጠበቀ ምንጭ 5. የተጠበቀ ጉድጓድ 6. ያልተጠበቀ ጉድጓድ 99. ሌላ[ይገለጽ] _____	
	የቤቱ የመፀዳጃ ቤት ሁኔታ	1.የጋራ 2.የግል 99. ሌላ[ይገለጽ] _____	
	ቤቱ ለማብሰል ምን ይጠቀማል	1.እንጨት 2.ኤሌክትሪክ 99.ሌላ [ይገለጽ] _____	
	የቤቱ ወለል ከምንድነዉ የተሰራዉ	1.አፈር 2.አሸዋ 3.ሲሚንቶ 99.ሌላ [ይገለጽ]_____	
	የቤቱ ግድግዳ ከምንድነዉ የተሰራዉ	1.እንጨት እና ጭቃ 2.ብሎኬት 3.ድንጋይ 4.ጡብ 99.ሌላ [ይገለጽ] _____	
	የቤቱ ጣርያ ከምንድ ነዉ የተሰራዉ	1. ከሳር 2.ቆርቆሮ 3.ሲሚንቶ 99. ሌላ [ይገለጽ]_____	

ክፍል B. የእርግዝና እና ወሊድን ሁኔታ የተመለከቱ ጥያቄዎች

ተ.ቁ	ጥያቄዎች	አማራጭመልሶች	ምርመራ
B01	ስንቴ ወለድሽ (ስንት ልጆች አሉሽ) ?	_____	
B02	ስንተኛ እርግዝናሽ ነዉ?	_____	
B03	ጽንሱ ከአንድ በላይ ነው?	0. አይደለም 1.አዎ 2. አላቅም	የሕክምና መዝገብን ይመልከቱ
B04	በእርግዝና ግዜ የሚከሰት የስኳር በሽታ አለብሽ (ተነግሮሽ) ነበር?	0. አይ 1.አዎ	
B05	ከማርገዝሽ በፊት የወሊድ መቆጣጠሪያ እየተጠቀመሽ ነበር?	0. አይደለም 1.አዎ	
B06	ለጥያቄ B05 መልሶ አዎ ከሆነ የትኛውን አይነት መቆጣጠሪ ነበር ምትጠቀሚው?	1. በአፍ የሚወሰድ እንክብል 2. በክንድ ላይ የሚቀበር 3. በማፀን ውስጥ የሚቀመጥ 4. በመርፌ መልክ ሚሰጥ 99. ሌላ [ይገለጽ]_____	
B06	መጀመሪያ የወር አበባ ስታዪ እድሜሽ ሰንት ነበር?	_____ዓመት	
B07	በበፊቱ እርግዝናሽ ወቅት የደም ግፊት ኣጋጥሞሽ ያውቃል?	0. አይደለም 1. አዎ	
B08	ለጥያቄ ቁጥር B07 መልሶ 0 ወይም 1 ከሆነ, በቀደመዉ እና በአሁኑ እርግዝናሽ መካከል የለዉ የአመት ልዩነት ስንት ነዉ?	_____አመት	
B09	የፅንስ መቋረጥ ገጥሞሽ ያውቃል?	0. አይደለም 1. አዎ	መልሱ 0 ከሆነ ወደ Bıı ይለፉ
B10	ለጥያቄ B09 መልሶ አዎ ከሆነ, ስንት ጊዜ?	_____ሆን ተብሎ _____ በራሱ ጊዜ	

B11	በመጀመሪያው የቅድመ ወሊድ ክትትል ጊዜ የደም ማነስ ተገኝቶብሻል?	0. አይደለም 1. አዎ	የሕክምና መዝገብን ይመልከቱ
B12	የጸንሱ እድሜ?	_____(ሳምንት)	
B13	የእርግዝና ሁኔታ ?	1.በፍላጎት 2.ያለፍላጎት 3.በፍላጎት ነገር ግን ግዜውን ያልጠበቀ 4.በታቀደ ጊዜ	
B15	እንዳረገዝሽ ስታውቂ ማርገዝ ትፈልጊ ነበር?	0. አይደለም 1. አዎ	
B16	እንዳረገዝሽ ስታውቂ በዚያን ጊዜ ማርገዝ ትፈልጊ ነበር?	0. አይደለም 1. አዎ	
B17	በአሁኑ እርግዝናሽ የቅድመ ወሊድ ክትትል አድርገሻል?	0. አይደለም 1. አዎ	መልሱ 0 ከሆነ ወደ ክፍል C ይለፉ
B18	በአሁኑ እርግዝናሽ የቅድመ ወሊድ ክትትል በስንተኛ የእርግዝና ወርሽ ነበር የጀመርሽው ?	_____ወራት	
B19	በአሁኑ እርግዝና ስንት ጊዜ የቅድመ ወሊድ ክትትል አድርገሻል?	_____	
B20	በቅድመ ወሊድ ክትትልሽ ጊዜየ ደም ማነስ መከላከያ ኪኒን ወስደሻል?	0. አልወሰድኩም 1. አዎ	መልሱ 0 ከሆነ ወደ ክፍል C ይለፉ
B2ı	በእርግዝናዎ ጊዜ ለምን ያህል ሳምንታት የደም ማነስ ኪኒን ወስደዋል	_____(ሳምንታት)	

ክፍል C : ከጤና ችግር ጋር የተያያዙ ጥያቄዎች

ከዚህ ቀጥሎ ከእርስዎ እና ቤተሰብ ጤና ጋር የተያያዙ ጥያቄዎችን እጠይቀዎታለሁ

ተ.ቁ	**ጥያቄዎች**	**አማራጭ መልሶች**	**ምርመራ**
C01	በቤተሰብ ዉስጥ የደም ግፊት በሽታ ያለበት/ የነበረበት ሰዉ አለ? (ወላጆች፣አባት፣አያት፣ወንድም/ እህት)	1. አዎ 0. የለም	
C02	በቤተስብ ዉስጥ የስኪር በሽታ ያለበት ሰዉ አለ/ነበረ? (ወላጆች፣አባት፣አያትም፣ወንድም/እህት)	1. አዎ 0. የለም	
C03	ከቤተሰብ ዉስጥ በሃኪም የተነገረ በእርግዝና ጊዜ የሚከሰት የደም ግፊት የነበረበት ሰዉ ነበር/አለ?	1. አዎ 0. የለም	
C04	የታወቁ/ በሀኪም የተነገሮት በሽታዎች አሉበት? (ከአንድ በላይ መልስ መስጠት ይቻላል)	1. የስኪር በሽታ 2. የልብ በሽታ 3. የኩላሊት በሽታ 99. ሌላ ካለ ይገለጽ_____	የሕክምና መዝገብን ይመልከቱ

ክፍል D- ከባህሪ እና ከአኗኗር ዘይቤ ጋር የተያያዙ ጥያቄዎች

ተ.ቁ	ጥያቄዎች	አማራጭመልሶች	ምርመራ
D01	ሲጋራ አጭሰው ያውቃሉ?	1.አዎ 0.አላውቅም	መልሱ 0 ከሆነወደ D05 ይለፉ
D02	በአሁኑ ጊዜ እንደ ሲጋራ፣ሺሻ ያሉ ማንኛውንም የትምባሆ ምርቶች ያጨሳሉ?	1.አዎ 0. አላጨስም	መልሱ 0 ከሆነወደ D05 ይለፉ
D03	ለጥያቄ D02 መልሶ አዎ ከሆነ፣በአሁኑ ጊዜ የትምባሆ ምርቶችን በየቀኑ ያጨሳሉ?	1.አዎ 0.አላጨስም	
D04	በሳምንት ስንት ቀናት ያጨሳሉ?	_____ ቀናት	
D05	ባለፈዉ 12 ወራት ዉሰጥ ጫት ቅመዉ ያዉቃሉ?	1.አዎ 0.አላውቅም	መልሱ 0 ከሆነወደ D08 ይለፉ
D06	መልስዎ አዎ ከሆነ፣በሳምንት ውስጥ ስንት ቀናትን ጫት ይቅማሉ ?	_____ ቀናት	
D07	በአሁኑ የእርግዝና ወቅት ጫት ይቅማሉ?	1.አዎ o. አልቅምም	
D08	የሚያሰክር/ አልኮልነት ያለዉ መጠጥ ይጠጡ ነበር? (ቢራ፤ጠላ፤አረቄ፤ወይን ወዘተ)	1.አዎ 0.አይ	መልሱ 0 ከሆነወደ D11 ይለፉ
D09	በባለፉት 12 ወራትየአልኮል መጠጥ ጠጥተዉ ያዉቃሉ ?	1.አዎ 0.አላውቅም	መልሱ 0 ከሆነወደ D11 ይለፉ
D10	ለጥያቄ D09 መልሶ አዎ ከሆነ, ምን ያህል ጊዜ ቢያንስ አንድ የአልኮል መጠጥ ይጠጣሉ?	1.በየቀኑ 2.በሳምንት 5-6 ቀናት 3.በሳምንት ከ1-4 ቀናት 4.በወር ከ1-3 ቀናት 5.በወር ከአንድ ጊዜ በታች	
D1ı	በአሁኑ እርግዝና ወቅት፣ቡና ይጠጡ ነበር?	1.አዎ 0.አልጠጣም	መልሱ 0 ከሆነ ወደ D14 ይለፉ
D12	መልሶ አዎ ከሆነ፤በአሁኑ እርግዝና በሳምንት ምን ያህል ጊዜ ይጠጡ ነበር?	_____ቀናት	
D13	በአማካኝ በየቀኑ፣ምን ያህል ስኒ ቡና ይጠጡ ነበር?	_____ሲኒ	
D14	በሳምንት ውስጥ እንደ መደበኛ ስራዎ መካከለኛ እንቅስቃሴዎችን(እንደ መራመድ ወይም ቀላል ሸክም) ያደርጋሉ?	1.አዎ 0.አደርግም	መልሱ 0 ከሆነ ወደ D17 ይለፉ
D15	ለጥያቄ D14 መልሶ አዎ ከሆነ, በሳምንት ምን ያህል ቀናትን መካከለኛ እንቅስቃሴዎችን በማድረግ ያሳልፋሉ?	_____ቀናት	
D16	ለጥያቄ D14 መልሶ አዎ ከሆነ, በቀን ምን ያህል ደቂቃዎችን መካከለኛ እንቅስቃሴዎችን በማድረግ ያሳልፋሉ?	_____ ደቂቃ	
D17	በቀን ዉሰጥ ለምን ያህል ሰአት በመቀመጥ ያሳልፋሉ ?	_____ደቂቃ	

D18 ጭንቀትን የተመለከቱ ጥያቀዎች

1	እራስ ምታት አለዎት ?	0.አይደለም 1.አዎ
2.	የምግብ ፍላጎትዎ አነስተኛ ነው ?	0.አይደለም 1.አዎ
3.	የእንቅልፍ አለመኖር (ለመተኛት መቸገር) አለዎት ?	0.አይደለም 1.አዎ
4.	በቀላሉ የፍርሃት ስሜት ይሰማዎታል?	0.አይደለም 1.አዎ
5.	እጅዎ ይንቀጠቀጣል ?	0.አይደለም 1.አዎ
6.	የጭንቀት, ውጥረት ወይም የመደንገጥ ስሜት ይሰማዎታል ?	0.አይደለም 1.አዎ
7.	የምግብ መፈጨት ሁኔታዎ ደካማ ነው ?	0.አይደለም 1.አዎ
8.	በግልጽ ለማሰብ ይቸገራሉ ?	0. አይደለም 1.አዎ
9.	ደስተኛ አለመሆን ይሰማዎታል ?	0. አይደለም 1.አዎ
10.	ከወትሮው የበለጠ አልቅሰዋል ?	0.አይደለም 1.አዎ
11.	በዕለት ተዕለት እንቅስቃሴዎች መደሰት ከባድ ሆኖቦታል ?	0.አይደለም 1.አዎ
12.	ውሳኔን ለመወሰን ከባድ ሆኖቦታል ?	0.አይደለም 1.አዎ
13.	የዕለት ተዕለት ስራዎ እየተስተጓገለ ነው?	0.አይደለም 1.አዎ
14.	በህይወቶ ውስጥ ጠቃሚ ሚና መጫወት አልቻሉም?	0. አይደለም 1.አዎ
15.	ለነገሮች ፍላጎት አጥተዋል?	0.አይደለም 1.አዎ
16.	ዋጋ ቢስ ሰው እንደሆኑ ይሰማዎታል ?	0.አይደለም 1.አዎ
17.	ራስዎን የማጥፋት ሃሳብ በአዕምሮዎ ውስጥ አለ?	0.አይደለም 1.አዎ
18.	ሁልጊዜ ድካም ይሰማዎታል ?	0.አይደለም 1.አዎ
19.	በሆድዎ ውስጥ ምቾት የማይሰማዎት ስሜት አለ/ ኖሮ ያውቃል?	0.አይደለም 1.አዎ
20.	በቀላሉ ይደክሞታል?	0.አይደለም 1.አዎ

ክፍል E - የምግብ መጠይቅ (ላለፈውአንድዓመት)

ከዚህ በመቀጠል ስለአመጋገብ ሁኔታዎ እጠይቆታለሁ፤ያለፈውን አንድ አመት ልምዶን በማስታወስ የሚከተሉትን የምግብ አይነቶች ምን ያህል ግዜ እንደሚመገቡ / እንደተመገቡ ይነግሩኛል። የምግብ ዝርዝሮቹን ተመግበው የማያውቁ ከሆነ 0 ይሙሉ

ጤፍ(የጤፍ አንጀራ፤እንጀራ ፍርፍር)	በቀን		በቆሎ	በቀን	
	በሳምንት			በሳምንት	
	በወር			በወር	
ገብስ ዳቦን ጨምሮ	በቀን		ስንዴ(ዳቦ፣አምባሻ፤ማኮሮኒ እና ፓስታ)	በቀን	
	በሳምንት			በሳምንት	
	በወር			በወር	
ማሽላ	በቀን		ሩዝ	በቀን	
	በሳምንት			በሳምንት	
	በወር			በወር	
አጃ (ቅንጭጭ፣የአጃ አጥሚት፣ዳቦ እና ገንፎ)	በቀን		አሳ(አሳ የተቀቀለ፤ጥሬ አሳ እና የተጠበሰ አሳ)	በቀን	
	በሳምንት			በሳምንት	
	በወር			በወር	
የበሬ ሥጋ(የበሬ ጉበት፤የበሬ ኩላሊት ፤ የተቀቀለ የበሬ ሥጋ፤የተጠበሰ የበሬ ሥጋ፣ክትፎ፣ጥሬ ሥጋ)	በቀን		የዶሮ ስጋ	በቀን	
	በሳምንት			በሳምንት	
	በወር			በወር	

የፍየል / በግ ስጋ(የተቀቀለ የፍየል ስጋ፤ የፍየል ስጋ ወጥ)	በቀን		ጉበት	በቀን	
	በሳምንት			በሳምንት	
	በወር			በወር	
ወተት(ያልፈላ ወተት፤እርጎ፤የፈላ ወተት)	በቀን		አይብ	በቀን	
	በሳምንት			በሳምንት	
	በወር			በወር	
ቅቤ	በቀን		እንቁላል(የተጠበሰ እንቁላል፤ የተቀቀለ እንቁላል)	በቀን	
	በሳምንት			በሳምንት	
	በወር			በወር	
ለውዝ የኦቾሎኒ ቅቤን ጨምሮ	በቀን		ዘይት	በቀን	
	በሳምንት			በሳምንት	
	በወር			በወር	
ባቄላ, አተር, ምስር	በቀን		ስኳር ድንች	በቀን	
	በሳምንት			በሳምንት	
	በወር			በወር	
ድንች(ድንች ወጥ፤የተቀቀለ ድንች፤ የተጠበሰ ድንች)	በቀን		ካሮት	በቀን	
	በሳምንት			በሳምንት	
	በወር			በወር	
ቀይ ስር	በቀን		ጎመን	በቀን	
	በሳምንት			በሳምንት	
	በወር			በወር	
ቲማቲም (ቲማቲም ስልስ፤ ጥሬ ቲማቲም)	በቀን		የሃበሻ ጎመን	በቀን	
	በሳምንት			በሳምንት	
	በወር			በወር	
ሰላጣ	በቀን		ቆስጣ	በቀን	
	በሳምንት			በሳምንት	
	በወር			በወር	
ፎሶሊያ	በቀን		ቃርያ	በቀን	
	በሳምንት			በሳምንት	
	በወር			በወር	
ፓፓያ	በቀን		ሙዝ	በቀን	
	በሳምንት			በሳምንት	
	በወር			በወር	
አናናስ	በቀን		ብርትኳን	በቀን	
	በሳምንት			በሳምንት	
	በወር			በወር	
አፕል	በቀን		ሎሚ	በቀን	
	በሳምንት			በሳምንት	
	በወር			በወር	
አቮካዶ	በቀን		ማንጎ	በቀን	
	በሳምንት			በሳምንት	

	በወር			በወር	
ዘይቱና	በቀን		ስኳር	በቀን	
	በሳምንት			በሳምንት	
	በወር			በወር	
ሽንኮራ	በቀን		ማር	በቀን	
	በሳምንት			በሳምንት	
	በወር			በወር	
ማርማላት	በቀን		ለስላሳ መጠጦች(ሚሪንዳ፤ኮኮላ፤ስፕራይት፤ፔፕሲ፤ፋንታ)	በቀን	
	በሳምንት			በሳምንት	
	በወር			በወር	
(ፒዛ፤በርገር፤ችፕስ(የተጠበሰ ድንች)	በቀን			በቀን	
	በሳምንት			በሳምንት	
	በወር			በወር	

ክፍል E.1 የጨውአወሳሰድ

የምግብ ጨው	
የሚከተሉት ጥያቄዎች ምግብ ከመብላትዎ በፊት ጨው በምግብ ላይ እንዴት እንደ ሚጨምሩ እና ምግብ በቤትዎ ውስጥ እንዴት እንደ ሚዘጋጅ ላይ ናቸው	
ምግብዎን ከመብላቶ በፊት ወይም በሚመገቡበት ወቅት ምን ያህል ጊዜ ጨው ይጨምሩበታል?	1. ሁልጊዜ 2. ብዙውን ጊዜ 3. አንዳንድ ጊዜ 4. አልፎ አልፎ 5. በጭራሽ 99. አላውቅም
በቤት ውስጥ ምግብ ሲያበስሉ ወይም ምግብ ሲያዘጋጁ ምን ያህል ጊዜ ጨው ይጨመራሉ?	1. ሁልጊዜ 2. ብዙውን ጊዜ 3. አንዳንድ ጊዜ 4. አልፎ አልፎ 5. በጭራሽ 99. አላውቅም
ከፍተኛ የጨዉ መጠን ያላቸውን የታሸጉ ምግቾ ምን ያህል ጊዜ ይመገባሉ?ይህን ስል፣ከፍተኛ ጨው መጠን ያለባቸውን እና ተፈጥሮአዊ ጣእማቸውን የለወጡ በካፌ ና ሬስቶራንት የሚዘጋጁትን ጨምሮ	1. ሁልጊዜ 2. ብዙውን ጊዜ 3. አንዳንድ ጊዜ 4. አልፎ አልፎ 5. በጭራሽ 99. አላውቅም
ምን ያህል ጨው እመገባለ ብለው ያስባሉ?	1.እጅግ በጣም ብዙ 2. በጣም ብዙ 3. ትክክለኛውን መጠን ብቻ 4. በጣም ትንሽ 5. እጅግ በጣም ትንሽ 99. አላውቅም

Anthropometry	**Age**	**Measurement**	**Remark**
MUAC		_____._____	

አመሰግናለሁ።።

Section F. Medical Record Checklist

1. Previous Medical histories mark (X) if the condition exists

1.1 Family history of hypertension ☐

1.2 Family history of diabetes mellitus ☐

1.3 Family history of preeclampsia ☐

1.4 Self-history of diabetes mellitus ☐

1.5 Urinary tract infection in recent pregnancy ☐

2. Previous obstetrics and gynecologic record

2.1 Gestation at first ANC visit ☐

2.2 Gestational age at current birth ☐

2.3 History of abortion in previous pregnancies ☐

2.3.1 Spontaneous abortion ☐

2.3.2 Induced abortion ☐

2.6 Family planning method used before pregnancy ☐

3. Hematologic information

3.1 Blood group and Rh_____

3.2 Hemoglobin level _____