2022-08-17

Determinants Of Hyperemesis Gravidarum Among Pregnant Women Attending Antenatal Care At Public & Private Hospitals In Bahir Dar City, North-West Ethiopia,2022: Unmatched Case Control Study

Lakachew, Asrade

BAHIR DAR UNIVERSITY

College Of Medicine and Health Sciences, School of Medicine

Department of Obstetrics and Gynecology

Determinants of Hyperemesis Gravidarum Among Pregnant Women Attending Antenatal Care at Public & Private Hospitals in Bahir Dar City, North-West Ethiopia,2022: Unmatched Case Control Study

Principal Investigator: Lakachew Asrade (Md, Obgy Resident)

Thesis is Submitted to Obstetrics and Gynecology Department, College of Medicine and Health Sciences, Bahir Dar University in Partial Fulfillment of the Requirements for Specialty Certificate in Gynecology and Obstetrics

August, 2022

Bahir Dar

BAHIR DAR UNIVERSITY

College of Medicine and Health Sciences School of Medicine

Department of Obstetrics and Gynecology

Title	Determinants of Hyperemesis Gravidarum Among Pregnant Women Attending Antenatal Care at Public & Private Hospitals in Bahir Dar City, North-West Ethiopia,2022: Unmatched Case Control Study
Investigator	Lakachew Asrade (MD, OBGYN Final year Resident) Tel:+251918215172 Emails:llakachew88@gmail.com
Advisors	Daniel Misikir (Assistant Professor, MD, Obstetrician And Gynecologist) Tel: +251939633587 Emails:Danielmskir1@Gmail.Com
	Hunegnaw Almaw (BSC, MPH/Nutrition) Tel: +251-12-80-22-59 Email: Hunsew25@Gmail.Com
Duration of study	January 1-May 30/2022
Budget	35,500 ETB

August, 2022

Bahir Dar

Declaration

This is to certify that the thesis entitled "Determinants of Hyperemesis Gravidarum among pregnant women attending antenatal care at public & private hospitals in Bahir Bar city, north-west Ethiopia, 2022", submitted in partial fulfillment of the requirements for specialty certificate in Gynecology And Obstetrics in Bahir Dar University, is a record of original work carried out by me and has never been submitted to this or any other institution to get any other degree or certificates. The assistance and help I received during the course of this investigation have been duly acknowledged.

Principal investigator: Lakachew asrade (MD, OBGY Resident)

Signature…….Date…….

BAHIR DAR UNIVERSITY

COLLEGE OF MEDICINE AND HEALTH SCIENCES
SCHOOL OF MEDICINE

DEPARTMENT OF OBSTETRICS AND GYNECOLOGY

Approval of Thesis for Defense

I hereby certify that I have supervised, read, and evaluated this thesis titled "Determinants of Hyperemesis Gravidarum among pregnant women attending antenatal care at public & private hospitals in Bahir Bar city, north-west Ethiopia 2022"by LakachewAsrade (MD, Resident) prepared under my guidance. I recommend the thesis be submitted for oral defense

Daniel Misker		12/12/14 EC
Advisor's name	Signature	Date
Yihunesnaw Almaw		12/12/2014 EC
Advisor's name	Signature	Date
Dr. Engeu Asrate		
Department Head	Signature	Date

III

BAHIR DAR UNIVERSITY

COLLEGE OF MEDICINE AND HEALTH SCIENCES SCHOOL OF MEDICINE

DEPARTMENT OF OBSTETRICS AND GYNECOLOGY

Approval of Thesis for defense result

As members of the board of examiners, we examined this thesis entitled "Determinants of Hyperemesis Gravidarum among pregnant women attending antenatal care at public & private hospitals in Bahir Bar city, north-west Ethiopia 2022" by Lakachew Asrade (MD, Resident).We hereby certify that the thesis is accepted for partial fulfillment of the requirements for "specialty certificate in gynecology and obstetrics".

Board of Examiners

External examiner name	Signature	Date
_____	_____	_____
_____	_____	_____

Internal examiner name	Signature	Date
_____	_____	_____
_____	_____	_____

Chair person's name	Signature	Date
_____	_____	_____

ACKNOWLEDGEMENT

I would like to express my appreciations to Bahir-Dar University for giving this golden opportunity to do my thesis. My heartily appreciations goes to my advisors Dr Daniel Miskir (Assistant professor, MD, Obstetrician and Gynecologist) and Hunegnaw Almaw (BSc, MPH/Nutrition) for providing endless support ,supervision and constructive comments. Lastly, my acknowledge goes to data collectors, supervisors& study participants for their commitment throughout the data collecting process.

ABSTRACT

Background

Hyperemesis gravidarum is severe forms of nausea & vomiting in pregnancy characterized by more than 5% weight loss and ketonuria. Although there is cases in Ethiopia, there are insufficient information regards determinant factors, mainly no research done in Amhara region. The finding helps to decrease hyperemesis gravidarum for those at high risk by early interventions like to take ginger tea, to eat small, dry, frequent & non-fatty foods and to visit health institution early which will decreases hospitalizations & maternal complications.

Objective: To assess the determinants of Hyperemesis Gravidarum among pregnant women attending antenatal care at public & private hospitals, Bahir Dar city,North-West Ethiopia, 2022

Method: Facility based unmatched case control study were conducted on 444 (148 cases and 296 controls) from January 1-May 30. Women with diagnosis of hyperemesis gravidarum documented on the chart were considered as cases and women who attend antenatal care service without hyperemesis gravidarum were assigned as controls. Cases & controls were selected by a consecutive sampling technique. After the diagnosis of Hyperemesis gravidarum, the first two mothers come for antenatal care were taken as controls.Data were collected by interview using a structured questionnaire and check list also used that was adapted from reviewing different articles then coded and entered into EPI- Data version 3 and exported in to SPSS version 23 finally results were presented by using texts, tables and graphs. Multivariable logistic regression was performed to identify determinants of Hyperemesis Gravidarum at a p-value of less than 0.05.Adjusted odds ratio with 95% CI was used for direction of association.

Result: From urban (AOR=2.717, 95% CI 1.693,4.502) ,primigravida (AOR=6.185, 95% CI 3.135, 12.202), first& second trimester of pregnancy (AOR=9.301, 95% CI 2.877,30.067) & (AOR=4.785, 95% CI 1.449,15.805) respectively, family history of hyperemesis gravidarum (AOR=2.929, 95% CI 1.268,6.765),helicobacter pylori (AOR=4.881 , 95% CI 2.053, 11.606) & Depression (AOR=2.195, 95% CI 1.004,4.797) were determinants of hyperemesis gravidarum.

Conclusion: From urban, primigravida, being first and second trimester of pregnancy, family history of hyperemesis gravidarum, helicobacter pylori infection & depression were the determinants of hyperemesis gravidarum. Healthcare providers should decrease vomiting for mothers with primigravida & family history of hyperemesis gravidarum through psychological support & early treatment .Routing screening for helicobacter Pylori infection & mental health care for a mother with depression at the time of preconception care and counseling.

Key words: Hyperemesis Gravidarum, Determinant factors

Contents

List of Tables

List of figures

Acronyms and abbreviations

AGH Afilas General Hospital

ANC Antenatal care

AAPH Addisalem primary Hospital

DCGH Dream Care General Hospital

FHRH Felege Hiwot Referral Hospital

GA Gestational age

GC Gregorian calendar

GTH Gamby Teaching Hospital

HEG Hyperemesis Gravidarum

PUQE Pregnancy-Unique Quantification of Emesis

SPSS Statistical Package for Social Science

TGSH Tibebe Gihon Specialized Hospital

tt

1. Introduction

1.1 Background

Hyperemesis Gravidarum (HEG) is defined as persistent & frequent nausea and vomiting not related to other causes, an objective measure of acute starvation ketonuria on urine analysis, weight loss at least 5% of pre-pregnancy weight or weight loss of at least 3 kg if pre-pregnancy weight not known. It may also associated with electrolyte and acid-base abnormalities which includes hypochloremic alkylosis, hypokalemia, and hyponatremia (1). HEG is severe form of morning sickness that is one of the most common pregnancy-related complications (2).

HEG is common in first and second trimester which becomes peak at gestational age of 8-12 weeks and usually subsides at gestational age of 20 weeks. However, a small percentage of pregnant women may have prolonged course of symptoms until delivery (3).Severity of nausea & vomiting during pregnancy is measured by using Pregnancy-Unique Quantification of Emesis (PUQE) scale which is a self-reporting questionnaire consists of three questions about the symptoms of nausea, vomiting, and retching over the past 24 h (4).

The exact etiology of Hyperemesis Gravidarum has not well known and currently believed to be a multifactorial disease process. Increased levels of human chorionic gonadotropin , estrogen and leptin and environmental factors are associated with Hyperemesis Gravidarum(14).HEG has also reported to be associated with pronounced immune response during pregnancy (15).

A major challenge with Hyperemesis Gravidarum is how to management and its risk during embryogenesis (3).The current mainstay of treatment relies heavily on supportive measures

which involves modifications of risk factors until improvement of symptoms as part of the natural course of Hyperemesis Gravidarum (5).

1.2 Statement of the problem

The occurrence of hyperemesis gravidarum varies in different areas , approximately 0.5% to 4.8% of pregnant women developed HEG globally and it is one of the most common reasons for hospitalization in pregnant women (3). In Finland the prevalence is 1.3 % (6).In London the prevalence of HEG is 1.5% (7) . The prevalence in Northeast Nigeria is 44.9% (8). The prevalence of Hyperemesis Gravidarum in the Egyptian Women at the Health Center was 4.5% (9). In Ethiopia, the prevalence of Hyperemesis Gravidarum ranges from 4.8 (10) to 8.2 % (11).

The consequence of HEG if left untreated and not prevent it early is both Maternal and fetal complications. Maternal complication includes shock, electrolyte abnormalities like hypokalemia nutritional deficiencies, psychological disease, GI trauma and neurological damage (5). Sometimes it could be one reason for elective termination of the pregnancy (17).Fetal complications occur more frequently in pregnant women with HEG who do not gain adequate weight of at least 7 kg. Smaller head circumference, higher rate of spontaneous preterm labor, low five minutes Apgar score and higher risk of depression, bipolar disorder, and anxiety disorders during adulthood are some of the complications (21).

It is one of the health problems in the community during pregnancy and it affects daily activities of women's life. Women with Hyperemesis Gravidarum require hospitalization; so that, patients will lose time & money from paid employment or private work with a significant economic

burden to the country at large (5).Hyperemesis Gravidarum has also a negative impact on quality of life and daily life functioning. It also affects physical, social and emotional functioning, bodily pain, general health perception, vitality and mental health (6).

By reviewing different literatures, the determinants of HEG from Socio-demographic factor includes younger age, unmarried, low educational status, low social support, loss to work are associated with Hyperemesis Gravidarum and obstetric and medical factor includes primigravida, nulliparity, multiple pregnancy, history abortion, history of dysmenorrhea, self or family history of Hyperemesis Gravidarum, history of pre-pregnancy motion sickness ,helicobacter pylori infections and history of depression are significantly associated with Hyperemesis Gravidarum (2, 3, 7, 11-20).

Knowing determinant factors of HEG will help to reduce maternal and fetal complications by providing active screening for pregnant women who are at risk, close follow-up and initiations of early management. By doing this the progression of HEG can be slowed down significantly (3).

Despite a lot of research done on Hyperemesis Gravidarum, mechanism of the disease is largely unknown and the other thing regarding the risk factors still debated in literature having conflicting results. Determinant factors of hyperemesis gravidarum are different in different areas, so that having local data is important for counseling and also for interventions like to drink ginger tea, to have good environmental sanitations, avoid fatty foods to eat small, dry and frequent diets that will significantly decrease the occurrence of HEG. In Ethiopia, despite, we do case with sever forms, there is no research done in Amhara region.

1.3. Significance of the study

Assessing determinant factors of Hyperemesis Gravidarum during ANC provides a cost-effective way of minimizing complications associated with HEG. With early identification of risk factors and early intervention, the progression of HEG can be slowed down significantly. Knowing determinant factor in our setup helps to reduce maternal and fetal morbidity by early identification who is at risk and close follow-up for those at risk. Moreover it serves as baseline work for other researchers interested to work on further researches on this topic.

2. Literature review

2.1 Determinant factors of Hyperemesis Gravidarum

2.1.1 Socio-demographic factors

Different determinant factors are associated with Hyperemesis Gravidarum. Younger age from 20–24 years were becomes positively associated with HEG and age above 45 years were negatively associated with HEG in population-based cohort study done in England among 8.2 million pregnancy from 1997-2012 (7). A National register-based study in Finland, 2005-2017 showed that younger maternal age were positively associated with the occurrence of HEG (6). Younger age from 21-35 years is also increased risk for HEG from institutional based study done in 2019 at Nigeria (21). Younger age is also positively associated with HEG in a study done in Egypt in 2012 (9).

Women who graduated from high school or university are highly associated with HEG in a case control study done at turkey (14).In a qualitative comparative analysis study done at Canada to compare between immigrants and Canadian-born women in 2019 showed that immigrants with HEG were having loss of social support, social isolation, and loss of female family members than Canadian born women (22).Loss to work had positively associated with hyperemesis gravidarum in a study done at Addis Ababa, Ethiopia (11). Employed in government and private sector were also positively associated with HEG in a study done in 2018 at Bale Zone, Ethiopia (16).

A study done Egypt in 2012 stated that living in rural area and being housewife were positively associated with HEG (9). Being housewife was a determinate factors of HEG in a case control study done in Mekele city ,Ethiopia in 2019 (18). Being unmarried had positively association with HEG but no association between religion and HEG in a cross sectional study done at Addis Ababa, Ethiopia(11). Living in urban areas were also positively associated with HEG in a study done in 2018 at Bale Zone, Ethiopia (16).

2.1.2 Obstetric & Gynecologic factors

Population based cohort Study done in 2021 at korea showed, that primiparity and multiple pregnancy were significantly associated with hospital admission due to Hyperemesis Gravidarum (15)..A cross sectional observational study done in Paropakar Maternity and Women's Hospital, Nepal, most women were nulliparous had increased risk of HEG (21). Population-based cohort study of pregnancies using prospectively recorded secondary care records (Hospital Episode Statistics) from England, over 5.3 million women between 1997 and 2012 showed that nulliparity was independent risk factors of HEG (7). A systematic review and meta-analysis study done from 2000-2018 GC showed that prmigravidty was main risk factors of HEG (13) but there was no association between HEG and gravidity and parity in a systematic review study (20).A study done in Nigeria showed that multiparty was positively associated with HEG but grand multipara was protective factors for HEG (8).

Population-based cohort study of pregnancies using prospectively recorded secondary care records (Hospital Episode Statistics) from England, over 5.3 million women between 1997 and 2012 showed that HEG become high in multiple pregnancy (7). A systematic review and meta-

analysis study done from 2000-2018 GC in low income & middle income countries showed that multiple pregnancies and unplanned pregnancies were the main risk factors of HEG (13). A case control study in 2019 at Ethiopia, Mekele city stated that unplanned pregnancy was positively associated with HEG (18).

A systematic review used pre-defined eligibility criteria from any country, study year, and publication language stated that history of hyperemesis gravidarum in a previous pregnancy found to be risk factors for hyperemesis gravidarum (20).A systematic review and meta-analysis study done from 2000-2018 GC in low income & middle income countries showed that genetic susceptibility and previous history of Hyperemesis, were the main risk factors of HEG (13). A prospective institutional based study design done among 452 pregnant mothers in Northeast Nigeria showed that previous history of HEG and family history of HEG were identified as important risk factors for HEG (8).Family history of Hyperemesis Gravidarum were associated with Hyperemesis Gravidarum in a case control study done Uganda in 2019 (3).A study done in Ethiopia showed that family history of Hyperemesis Gravidarum were determinants of HEG (18)

Cross sectional study in Nepal stated that having history of dysmenorrhea was positively associated with hyperemesis gravidarum (21).A systematic review and meta-analysis study done from 2000-2018 GC in low income & middle income countries showed that history of dysmenorrhea were positively associated with hyperemesis gravidarum (13). Having previous history of abortion was associated with Hyperemesis Gravidarum in a case control study done at Uganda in 2019 (3).

Population-based cohort study of pregnancies using prospectively recorded secondary care records (Hospital Episode Statistics) from England, over 5.3 million women between 1997 and 2012 showed that HEG become peaked at eight weeks of gestation (7).A prospective institutional based study design done among 452 pregnant mothers in Northeast Nigeria showed that gestational age less than 13 weeks were less likely to develop HEG (8).A study done in Ethiopia showed that 1st and 2nd trimester of pregnancy were associated with HEG (18).Unmatched case-control study conducted in 2018 at Bale zone hospitals, Ethiopia showed that being in first and second trimester , were positively associated with HEG (16).

2.1.3 Medical and Psychiatric factors

According to a comparative study in USA to asses risk factors, treatments, and outcomes associated with HEG conclude that patient with prolonged Hyperemesis Gravidarum develops motion sickness up to 31% (17). A study done in turkey on Assessment of anxiety and depression levels of Pregnant women with Hyperemesis Gravidarum in a case-control study conclude that patients with Hyperemesis Gravidarum had significantly higher depression level than control (2).Depression or psychiatric illness are the main risk factors of HEG in systematic review and meta-analysis study done from 2000-2018 GC in low income & middle income countries (13).

Helicobacter pylori infection is one of the commonest risk factors of HEG in review of articles in 2018 (5).A case control study done in Addis Ababa, Ethiopia on Association of Helicobacter pylori Infections and Hyperemesis Gravidarum in 2021 GC, suggested that there was a strong

association between Helicobacter pylori infection and HEG (12).There is also a strong association between Helicobacter pylori infection and Hyperemesis Gravidarum in a case control study done at Mekele city, Ethiopia in 2019 (18).

2.2. Conceptual Framework

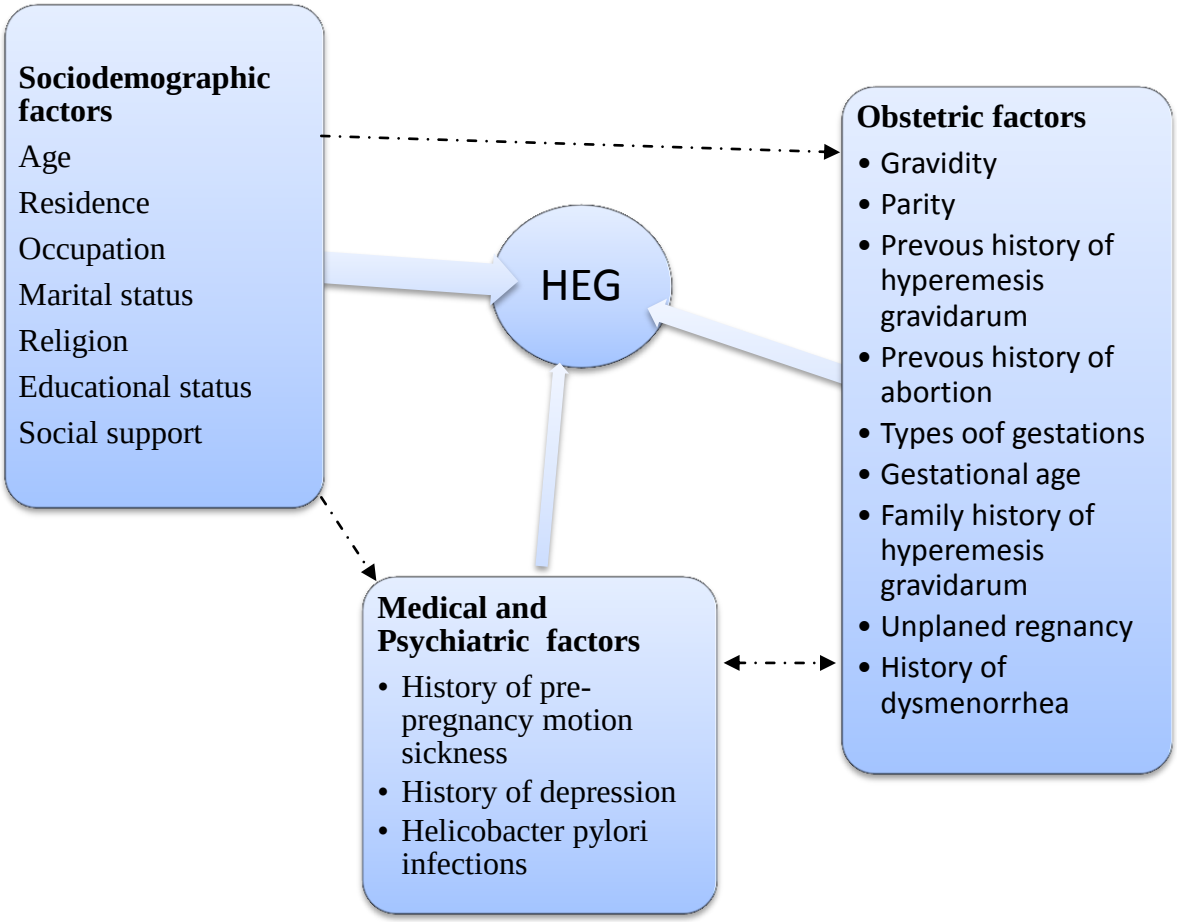

Figure Legend: HEG=Hyperemesis Gravidarum.

Figure 1 Conceptual framework shows determinant factors of Hyperemesis Gravidarum among pregnant women at public & private hospital in Bahir Dar city, North-West Ethiopia, 2022. (3, 6, 7, 17-20).

3. Objective of the Study

To assess determinant factors of Hyperemesis Gravidarum among pregnant women attending antenatal care at public & private hospitals in Bahir Dar city, Northwest Ethiopia,2022

4. Method

4.1 study area

Bahir Dar is the capital city of Amhara National Regional State, located 565 km Northwest of Addis Ababa with an altitude of 1799 meters above sea level with warm and temperate climate with estimated population of 168,899 as per 2018 world population review. There are three Government Hospitals which includes Tibebe Gihon Specialized Hospital (TGSH),Felege Hiwot Referral Hospital (FHRH) & Addisalem Primary Hospital (AAPH). There are four private hospitals Gamby teaching hospital (GTH), Afilas General Hospital (AGH), Addinas general hospital and dream care general hospital (DCGH). These hospitals are serving a population of more than 10 million people from Amhara & Benshangul Regions .FHRH one of Government Referral Hospitals which has big maternity ward which possesses around 74 beds. There are around 4500 deliveries per year. There are 5 obstetricians and 52 midwives currently working in the department of obstetrics. TGSH is one of the teaching specialized referral hospitals in Amhara region which has around 70 beds in Obstetrics & Gynecology ward. There are about 3400 deliveries per year. There are 20 obstetricians, 56 residents and 72 midwives currently working in the department of obstetrics. AAPH has one obstetrician and 11 beds are reserved for Obstetrics & Gynecology ward. In all private Hospital one obstetrician is assigned in working hours and duty time coved by on call obstetricians.

4.2 Study Design and period

Facility based unmatched case control study were conducted from January 1 to May 30, 2022 GC, in Public & Private Hospitals at Bahir Dar city, North West, Ethiopia.

4.3 Population

4.3.1 Source Population

For cases: Pregnant women who were admitted for the diagnosis of HEG in the study hospitals.

For controls: Pregnant women who visited antenatal care in the study hospitals without having HEG.

4.3.2 Study population

For cases: Pregnant women who were admitted for the diagnosis of hyperemesis gravidarum in the study hospitals during the study period.

For controls: Pregnant women who visited antenatal care in the study hospitals without hyperemesis gravidarum during the study period.

4.4 Sample Size Estimation and Sampling Technique

Sample size was calculated by Epi Info software version 7 using Fleiss with continuity correction formula after comparing three determinant factors using two researches done in Bale zone & Mekelle city, Ethiopia(16, 18). From determinant factors sample size obtained from nulliparous were manageable maximum sample size (18).

Table 1: Sample Size Estimation for determinants of Hyperemesis Gravidarum among pregnant women attending antenatal care at public & private hospitals in Bahir Dar city, North-West Ethiopia, 2022

Factors	Assumptions	Proportions	Odds ratio	Sample size	Adding 10% non-response rate	Reference
Employed	Power= 80% CI= 95%, Ratio= 2:1	P1=28 P0=7.2	0.2	control=98 cases=46	controls=108 cases=51 **Total=159**	(16)
Nulliparous	,,	P1=22.4 Po=36.2	1.97	control=269 cases=135	controls=296 cases=148 **Total=444**	(18)
Helicobacte Pylori Serostatus	“	P1=21.4 P0=45.6	3.09	control=10 cases=48	controls=110 cases=53 **Total=163**	(18)

P1=Percent of controls exposed P0=Percent of cases with exposure

The maximum sample size were 404 (135 case and 269 controls) then by adding 10% non-response rate the final sample size were 444 (148 cases and 296 controls).

4.5 Sampling technique and procedures

From the registered log book in average 28 HEG patients per month were managed from Public and Private Hospitals .From which 17 at Public & 11 at Private Hospitals. From public hospitals (8 at FHRH, 6 at TGSH and 3 at AAPH) and from private hospitals (4 at Addinas general hospital, 3 at GTH, 2 at AGH & 2 at DCGH). So sample frame were drawn based on this proportion.

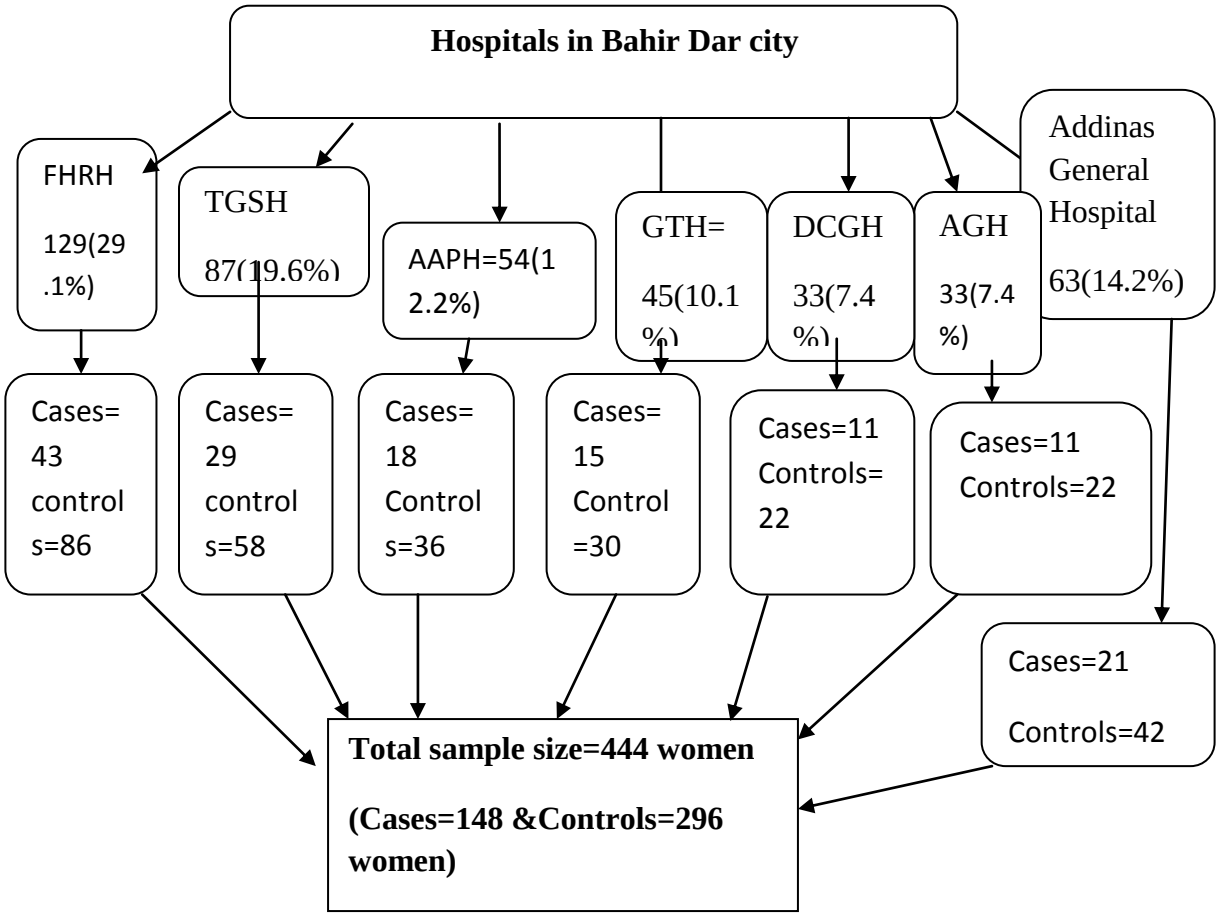

Figure Legend: AAPH=Addis Alem Primary Hospital, AGH=Afilas General Hospital, DCGH=Dream Care General Hospital, FHRH=Felege Hiwot Referal Hospital, GTH=Gamby Teaching Hospital, TGSH=Tibebe Ghion Specialized Hospital.

Figure 2: Shows sampling frame for determinants of Hyperemesis Gravidarum among Pregnant women attending antenatal care at public & private hospitals in Bahir Dar city, North-West Ethiopia, 2022.

Cases as well as controls were selected by a consecutive sampling technique. All cases that were diagnosed as HEG by physicians documented on the chart were selected with daily monitoring of all new admissions until the sample size were fulfilled in the study hospitals. Controls were selected from ANC unit with no documentation of HEG on the chart. For each case, two controls

were selected on the same day of HEG diagnosis. After the diagnosis of HEG, the first two pregnant mothers who come for ANC were taken as controls by consecutive sampling technique. The data were collected by three trained midwifes using Amharic version of questionnaire supervised by two residents.

4.6 Inclusion criteria

Cases: Pregnant mothers who were diagnosed to have HEG by physician who was admitted at private & public hospitals

Controls: Pregnant mothers who visited at ANC without HEG and shouldn't have nausea and vomiting due to other causes.

4.7 Exclusion criteria

Critically ill pregnant mothers were excluded from the study. The reason is difficulty of getting the necessary information.

4.8 Study Variables

4.8.1 Dependent variable

Hyperemesis Gravidarum /YES, NO/

3.8.2 Independent variable

Socio-demographic factors

Age

Residence

Occupation

Marital status

Religion

Educational status

Social support

Obstetric & Gynecologic factors

Gravidity

Parity

Previous history of HEG

Previous history of abortion

Types of gestations

Gestational age

Family history of HEG

Pregnancy status

History of dysmenorrhea

Medical and Psychiatric factors

History of pre-pregnancy motion sickness

History of depression

Helicobacter pylori infections

4.9 operational definitions

Hyperemesis Gravidarum: Pregnant mothers who had frequent nausea and vomiting not related to other causes with acute starvation, ketonuria on urine analysis and weight loss at least 5% of pre-pregnancy weight(1) .

Cases: Pregnant women who were diagnosed with hyperemesis gravidarum by the clinicians based on the clinical and laboratory parameters.

Controls: Pregnant mother who visited antenatal care without hyperemesis gravidarum and shouldn't have nausea and vomiting due to other causes.

Ketonurea: +2 and above ketone value on urine dipstick test

Critically ill: Pregnant mothers whose Glascow coma scale is less than 15 documented on the chart.

Depression: It was measured by using Edinburgh Postnatal Depression Scale (EPDS) which is a 10 item short multiple choice questions important for measuring depression during pregnancy or after giving birth and each question has four options scored with 0, 1, 2 or 3.The total score is found by adding together the scores for each of the 10 items. The Validation study shows that mothers who scored 12 & above are suffering from depression (23).

Social Support: It was assessed by using the Oslo Social Support Scale (OSSS-3) which is consists of 3 items. There are 3 categories of social support that includes score of 3–8 are poor social support ,9–11are moderate social support and 12–14 are strong social support (24).

4.10. Data collection

Data were collected from mothers using questionnaire by face to face interview and chart review for laboratory tests and ultrasound results. The questionnaire adapted from previous different literatures (3, 13, 14, 16-18, 20).Originally the questionnaire were prepared in English and translated to local language (Amharic) and translated back to English by two independent persons observe its consistency. Data were collected by trained midwifes.

4.11. Data Processing and Analysis

Data entered in to Epi Data version 3 and then exported to SPSS version 23 software packages for analysis. However, the data were checked for completeness before entered to Epi Info. Statistics summery like mean, percentage and standard deviation, were determined for case and controls. Determinant factors of HEG were cross-tabulated for cases and controls. Bi-variable

logistic regression & multivariable logistic regression were used for associations. Determinant factors that had association in the bi-variable logistic regression with enter model (p-value <0.2) were chosen for multivariable logistic regressions analysis. The variables with $p < 0.05$ in multivariable logistic regressions were considered as statistically significant determinants for HEG. The adjusted odds ratio (AOR) with 95% confidence interval (CI) was used to assess the strength of association. Model fitness were checked with Hosmer & Lemeshow model goodness of fit test (with p value=0.881). Multicollinearity test were done and all determinants had a variance inflation factor less than 10 indicating that no high correlation between the independent variable.

4.12. Data quality control

The questionnaire and check list were tested on 5% of mothers at Gondor University hospital to identify the gap at the time of pre-test interview. Training was given for one day for two hours on how to obtain informed consent, patient approach, good communication skills, and questionnaire and check list administration and to emphasize on research ethics. Daily meetings were held between the Principal investigator, supervisor and data collectors to share on experiences, challenges, performance and progress on data collection.

4.13. Ethical clearance

Ethical approval was obtained from the institutional review board of college of medicine and health sciences, Bahir Dar University. All the information was confidential throughout the study. Informed consent was taken from all study participants and for those who were less than eighteen years old, informed consent were taken from both study participants and from the family. The study participant had the right to refuse at any time of the study.

4.14. Dissemination of Results

Finally at the end of this study, finding will be disseminated to Public hospitals, Private hospitals, Bahir Dar University, Amhara Regional Health Bureau & Federal Ministry of health. It will be also submitted for scientific publications and peer review journals.

5. Results

5.1 Maternal socio-demographic characteristics

In this study, a total of 148 cases and 296 controls were successfully interviewed with a response rate of 100%.Majority proportion of cases 57 (38.5%) and controls 116 (39.2%) were in the age group of 25-29 years. The mean age of cases and controls were 26.7 and 28.5 respectively. About three-fourth of the cases and 155 (52.4%) of controls were living in urban and also 134 (90.5%) of cases and 275 (92.9%) of controls were married. From participates, 127 (85.5%) of cases and 257(86.8%) of controls were Orthodox. About 66 (44.6 %) of cases and 92 (31.1%) of controls had college and above educational status whereas 26 (17.6 %) of cases and 107 (36.1 %) of controls didn't attend formal educations. About 48 (32.4%) of case and 82 (27.7%) of controls were employed. Moreover 43 (29.1%) cases and 118 (39.9%) controls were house wife. Based on social support, 58 (39.2 %) of cases and 152 (51.4%) of controls were having moderate social support whereas 24 (16.2%) of cases and 23 (7.8%) of controls were having poor social support (Table 2).

Table 2: Socio-demographic characteristics of respondents among pregnant women who visit antenatal care at public & private hospitals in Bahir Dar city, North-West Ethiopia, 2022 (N=444).

Characteristics	Category	Cases		Controls	
		N	%	N	%
Age (N=444)	15-19	4	2.7	18	6.1
	20-24	30	20.3	85	28.7
	25-29	57	38.5	116	39.2
	30-34	42	28.4	56	18.9
	35-39	11	7.4	18	6.1
	40-44	3	2.7	3	1
Residency (N=444)	Urban	111	75	155	52.4
	Rural	37	25	141	47.6
Marital status (N=444)	Married	134	90.5	275	92.9
	Unmarried	14	9.5	21	7.1
Religion (N=444)	Orthodox	127	85.5	257	86.8
	Muslim	10	6.8	25	8.4
	Protestant	7	4.7	8	2.7
	Catholic	4	2.7	6	2
Educational status (N=444)	No formal education	26	17.6	107	36.1
	Primary school	31	20.9	49	16.6
	Secondary school	25	16.9	48	16.2
	College & above	66	44.6	92	31.1
Occupation (N=444)	Employed	48	32.4	82	27.7
	Merchant	27	18.2	38	12.8
	House Wife	43	29.1	118	39.9
	Student	6	4.1	9	3
	Farmer	24	16.2	49	16.6
Oslo social support scale(OSSS-3) (N=444)	Poor social support	24	16.2	23	7.8
	Moderate social support	58	39.2	152	51.4
	Strong social support	66	44.6	121	40.9

5.2 Obstetric and gynecologic characteristics

Out of the total interviewed, most of women with HEG (73.6%) and without HEG (93.6%) were multigravida, while one-fourth of cases were primigravida. Nearly forty percent of cases and

more than half (55.7%) of controls were multiparas .About 45 (40.9%) of cases and 12 (4.3%) controls were having history of previous history of HEG. From pregnant mothers, 42 (38.5%) of cases and 19 (6.9%) of controls had a history of abortion/pregnancy loss before 28 weeks. Most of the pregnancy 141 (95.3 %) among cases and 289 (97.6%) among controls were singletons. The mean gestational age of cases and controls were 11.1 (± 2.8) and 21.5 (± 2.6) weeks, respectively. About two-third of HEG (64.9%) were admitted during the first trimester and one-third (32.4%) of HEG cases were admitted during second trimester and 23 (2.7%) in third trimester. Around one-fourth (25.7%) of the cases and 20(6.8%) of controls were reporting a history of HEG in their mothers and sisters. A higher percentage of cases 134(90.5%) and 273(92.2%) of controls reported that the pregnancy was planned. From cases about one-fourth (25%) of mothers and only 63(21.3%) of controls had history of dysmenorrhea (Table 3).

Table 3: Obstetric and Gynecologic characteristics of respondents among pregnant women who visit antenatal care at public & private hospitals in Bahir Dar city, North-West Ethiopia, 2022 (N=444).

Characteristics	Category	Case		Control	
		N	%	N	%
Gravidity (444)	Primigravida	39	26.4	19	6.4
	Multigravida	109	73.6	277	93.6
Parity(N=377)	Primipara	41	27.7	111	37.5
	Multipara	101	40.5	165	55.7
Previous history of HEG(N=386)	Yes	45	40.9	12	4.3
	No	65	59.1	264	95.7
Previous history of abortion (N=386)	Yes	42	38.5	19	6.9
	No	67	61.5	258	93.1
Types of gestation (N=444)	Singleton	141	95.3	289	97.6
	Multiple	7	4.7	7	2.4
GA in weeks (N=444)	First trimester	96	64.9	121	40.9
	Second trimester	48	32.4	134	44.3
	Third trimester	4	2.7	84	14.9
Family history of HEG (N=444)	Yes	38	25.7	20	6.8
	No	110	74.3	276	93.2
Pregnancy status (N=444)	Planned	134	90.5	273	92.2
	Unplanned	14	9.5	23	7.8
Dysmenorrhea history (N=444)	Yes	37	25	63	21.3
	No	111	75	233	78.7

5.3 Medical & Psychiatric history

Concerning medical characteristics, the proportion of history of Pre-pregnancy motion sickness was reported by 28(18.9%) of cases and 42(14.2%) of controls. About 28(18.9%) cases and 5.7(17 %) of controls were seropositive for Helicobacter pylori (H. pylori) infection (Table 4). Regarding history of depression about 21(14.2%) patients were having depression whereas only 21(7.1%) of controls had depression (Figure 3 and 4).

Table 4: Medical history characteristics of respondents among pregnant women with and without HEG who visit ANC at public & private hospitals in Bahir Dar city, North-West Ethiopia, 2022 (N=444).

Characteristics	**Category**	**Case**		**Control**	
		N	**%**	**N**	**%**
History of pre-pregnancy motion sickness (N=444)	Yes	28	18.9%	42	14.2%
	No	120	81.1%	254	85.8%
H.Pylori serostatus (444)	Positive	28	18.9%	17	5.7%
	Negative	120	81.1%	279	94.3%

History of depression

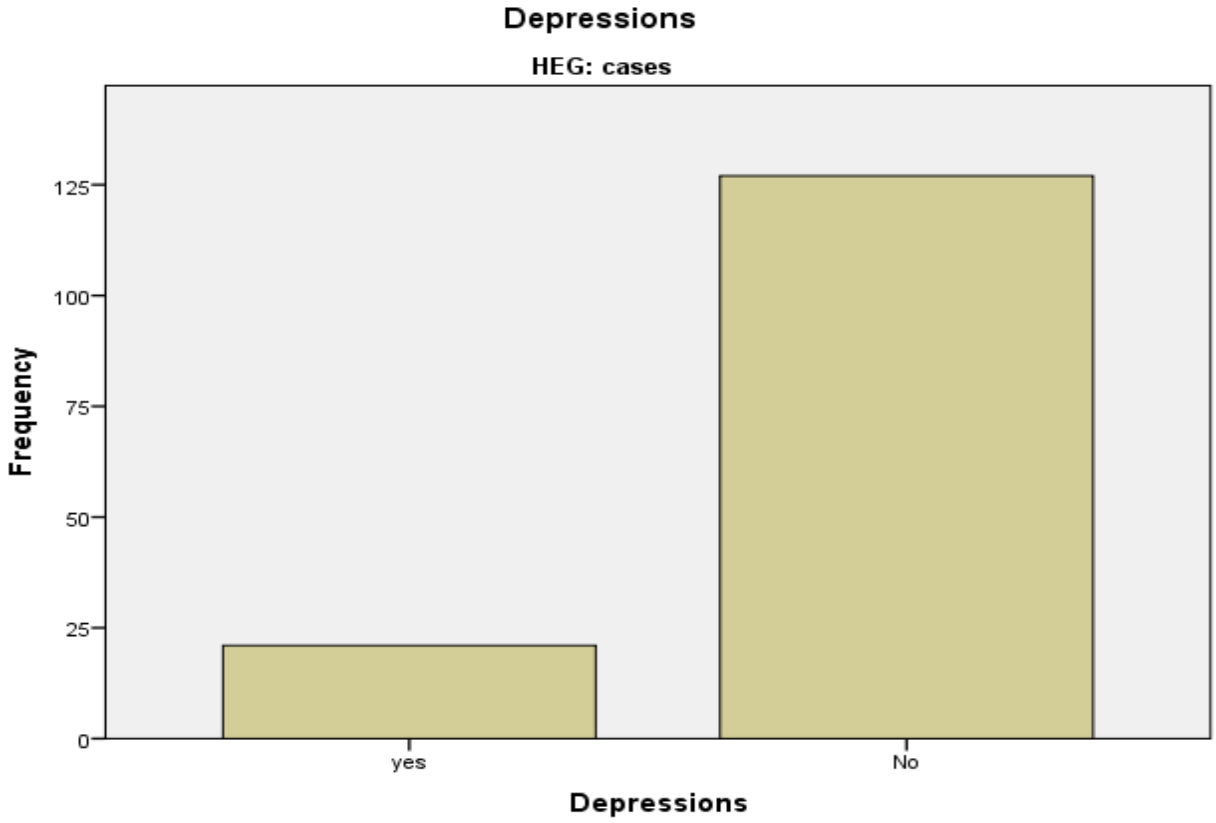

Figure 3: Shows history of depression among cases who visit ANC at public & private hospitals in Bahir Dar city, North-West Ethiopia, 2022 (N=444)

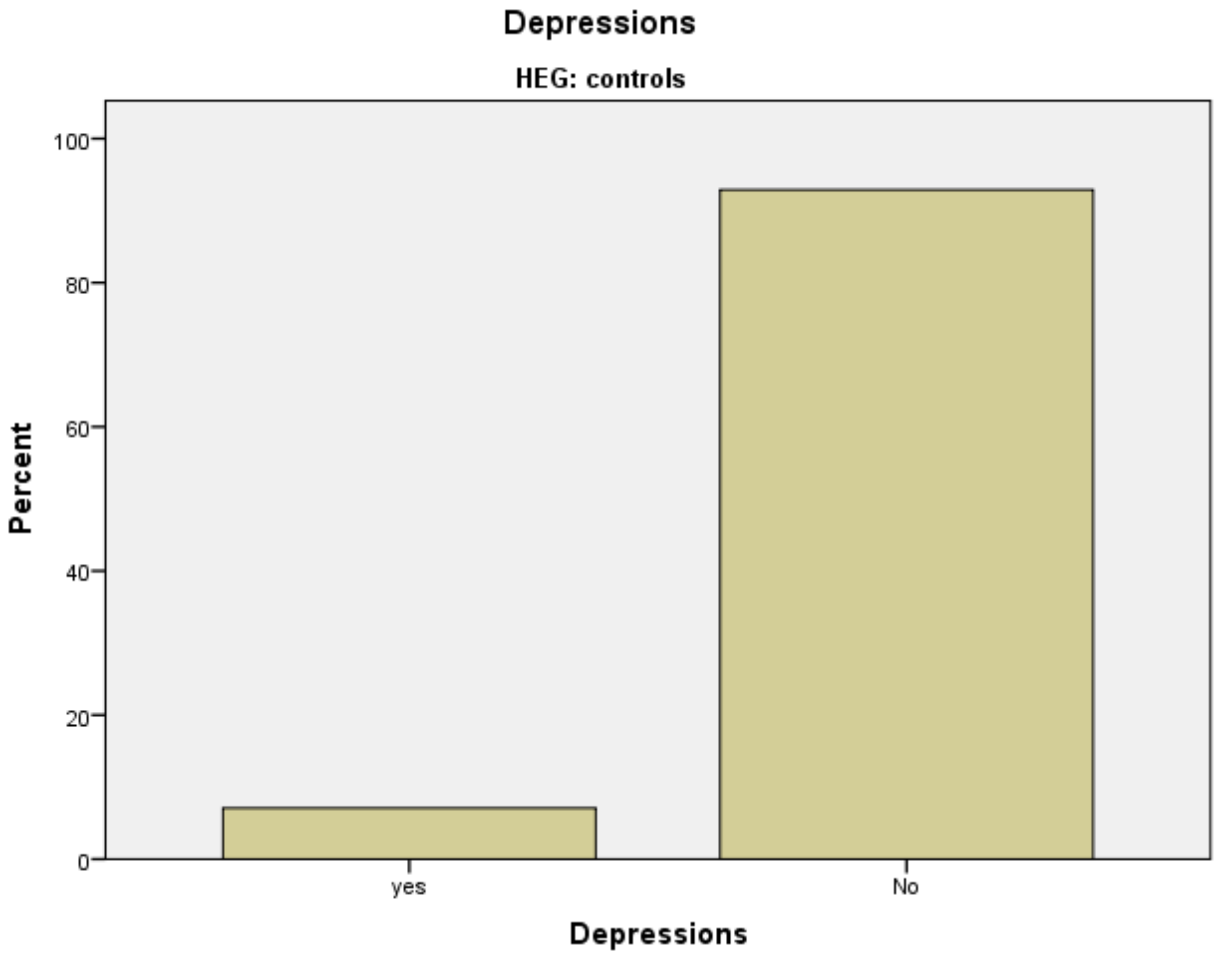

Figure 4:Shows history of depression among cases who visit ANC at public & private hospitals in Bahir Dar city, North-West Ethiopia, 2022 (N=444)

5.4 Determinant factors of hyperemesis gravidarum

First variables tested by using bivariable analysis between independent variables and HEG. This analyses revealed that residency, social support, gravidity, types of gestation, gestational age, having a family history of HEG, helicobacter pylori serostatus and depression were associated with the development of HEG at p-value <0.2 were entered into multi-variable logistic regression analyses.

After controlling the possible confounders, being from urban ,primigravidity, being first and trimester of pregnancy, family history of HEG, helicobacter pylori infection and depression history were the determinants of hyperemesis gravidarum in multi-variable logistic regression analysis at p-value <0.05. Direction of association was computed by using adjusted odds ratio with 95% CI.

The result showed that pregnant women from urban were significantly associated with HEG .The odds ratio were 2.717 higher odds ratio to develop HEG as compared to pregnant women from rural (AOR=2.717, 95% CI 1.639, 4.502).In the same manner mothers with primigravidity were 6.185 higher odds ratio to have HEG than multigravida pregnant mother (AOR=6.185, 95% CI 3.135, 12.202). Pregnant mothers in the first trimester and second trimester of pregnancy were 9.301 and 4.785 higher odds ratio of HEG compared to pregnant mothers who were in the third trimesters (AOR=9.301, 95% CI 2.877, 30.067) and (AOR=4.785, 95% CI 1.449, 15.805).Similarly pregnant women with family history of hyperemesis gravidarum were 5.020 higher odds ratio to develop HEG as compared to those who had no family history of HEG (AOR=5.020, 95% CI 2.599, 9.697).

Having helicobacter infections were significantly associated with hyperemesis gravidarum with odds ratio of 4.369 higher odds ratio as compared with pregnant women without helicobacter infections (AOR=4.369 , 95% CI 2.014, 9.480).Similarly, having history of depression had also 2.195 higher odds ratio to develop hyperemesis gravidarum compared from pregnant mothers without depressions (AOR=2.195, 95% CI 1.004,4.797).

Table 5: Determinants of hyperemesis gravidarum among pregnant women who visit antenatal care at public & private hospitals in Bahir Dar city, North-West Ethiopia, 2022 (N=444).

Characteristics	Category	Case N (%)	Control N (%)	COR(95% CI)	AOR(95% CI)	P-value
Residency	Urban	111(75)	155(52.4)	2.729(1.764,4.222)	2.717(1.639,4.502)**	<0.001
	Rural	37(25)	141(47.6)	1	1	
Oslo social support scale(OSSS-3)	Poor social support	24(16.2)	23(7.8)	1.913(1.003,3.649)	2.008(0.935,4.312)	0.074
	Moderat social support	58(39.2)	152(51.4)	0.700(0.457,1.071)	0.754(0.453,1.254)	0.276
	Strong social support	66(44.6)	121(40.8)	1	1	
Gravidity	Primigravida	39(26.4)	19(6.4)	5.216(2.887,9.424)	6.185(3.135,12.202)**	<0.001
	Multigravida	109(73.6)	277(93.6)	1	1	
Types of gestation	Singleton	141(95.3)	289(97.6)	1	1	
	Multiple	7(4.7)	7(2.4)	2.050(0.705,5.958)	1.576(0.452,5.496)	0.475
GA in weeks	1st trimester	96(64.9)	121(40.9)	8.727(3.030,25.141)	9.301(2.877,30.067)**	<0.001
	2nd trimester	48(32.4)	134(44.3)	4.0331(1.375,11.817)	4.785(1.449,15.805)*	0.010
	3rd trimester	4(2.7)	84(14.9)	1	1	
Family history of HEG	Yes	38(25.7)	20(6.8)	1.411(0.835,2.386)	5.020(2.599,9.697)**	<0.001
	No	110(74.3)	276(93.2)	1	1	
History of pre-pregnancy motion sickness	Yes	28(18.9)	42(14.2)	2.387(1.418,4.018)	1.706(0.893,3.262)	0.106
	No	120(81.1)	254(85.8)	1	1	
H.Pylori serostatus	Positive	28(18.9)	17(5.7)	3.829(2.020,7.259)	4.369(2.014,9.480)**	<0.001
	Negative	120(81.1)	279(94.3)	1	1	
Depression	Yes	21(14.2)	21(7.1)	2.165(1.141,4.108)	2.195(1.004,4.797)*	0.049
	No	127(85.8)	275(92.9)	1	1	

*** = p-value<0.05; ** = p-value <0.001;** 1 = **Reference;** AOR = **Adjusted Odd Ratio,** COR= **crude odds ratio ,**CI = **Confidence interval**

6. Discussion

This study identified determinant factors that have been associated with HEG in Bahir Dar, Ethiopia .Identifications of determinant factors could reduce the adverse perinatal outcome, hospitalization, time lost from paid employment, and emotional and psychological problems.

This study showed that pregnant women lived in urban was significantly associated with HEG than pregnant mother lived in the rural area. This finding is similar in a study done in Bale zone, south Ethiopia (16). The possible explanation for this association could be difference in triggering factors. Living in the Urban might have environmental triggering factors for HEG smelling from wastes because of poor waste disposal system. Other explanation could be most pregnant mothers are overweight and obese in urban that will contribute for development of HEG.. In addition, urban women might be psychologically more sensitive which may contribute acid secretion in the stomach. This finding contradicts in a study done in Turkey where soscio-demographic parameters had no significant between case and control groups (2).The discrepancy could be explained due to different living standards between rural and urban compared with our setup. There is a difference in housing conditions, environmental sanitation, sewerage system and ventilation between urban parts of Turkey and Ethiopia.

Pregnant women with primigravida were significantly associated with hyperemesis gravidarum. This finding is similar in a study done in Addis Ababa, Ethiopia (11) , Egypt(9), Finland (6) and England (7). This may be due to stress which occurred because of no previous experience and exposure to high levels of HCG for the first time may increase the likelihood of hyperemesis

gravidarum. However, the contradicts in a study conducted in Nigeria in which average GA was 13-20 weeks with the highest occurrence at 17 to 20 weeks (8).

Pregnant mothers in the first trimester and Second trimester were at higher risk developing HEG compared to pregnant mothers who were in the third trimesters. This finding is consistent with a study done in Jimma (Southwest Ethiopia), Bale zone (south Ethiopia), Mekelle city (North Ethiopia) and the University of Michigan (16, 18, 25, 26).This could be explained by body's reaction to the pregnancy hormone especially human chorionic gonadotropin that is produced in higher amount in the first trimester and second trimester than in the third trimester and the other could be a woman's subconscious mind attempt to reject pregnancy that is adapted later in the third trimester pregnancy. This is in contrast to study done in Nigeria the possible explanation given in this study were most women in the study included were above 30 years in this age group women might have had 2 or more deliveries because of the cultural practice of early marriage and child bearing in Nigeria (8).

A family history of HEG was also discovered in this study which has strong association with the development of HEG. This finding is consistent with a study done in North Ethiopia which had a significant association with HEG (18). Similarly, a review article by Gabra A in 2018 found out that there were a strong association between family history and HEG (1). This finding also similar with a study done in Uganda, Nigeria and USA (3, 8, 27) , which shows that a significantly higher risk of hyperemesis in women whose sister's or mother's had Hyperemesis gravidarum .This could be because of familial aggregation gene mainly growth differentiation factor 15 genes and its action in the chemoreceptor trigger zone of the brain which has

genetically associations with HEG. However, this is contradicted in a study done in Bale zone, south Ethiopia in which no association were found between HEG (16). The possible reason for this contradicted result could be that the family history of hyperemesis gravidarum was based on self-report, which the patient might deny having family history.

In this study having H. pylori infection was also found to have a significant association with HEG .This finding is consistent in a study done in Addis Ababa Ethiopia, North Ethiopia, Egypt and Iraq (9, 18, 25, 28).A meta-analysis done in 2015 showed that it is important risk factor especially in the developing countries (29).The possible explanation for this could be having H. pylori infection may aggravate the hormone-induced changes in the chemoreceptor trigger zone in the brain stem including the vomiting center and electric functioning of the stomach, which could lead an infected pregnant woman to develop severe nausea and vomiting (30).

This study showed that having depression had significantly associated with hyperemesis gravidarum. Similarly study done in turkey showed that depression is significantly associated with nausea and vomiting in the early trimester of pregnancy (2).A study done in Norwegian also showed that depression was associated with higher odds for hyperemesis gravidarum (31). It may be due to inadequate food intake, loss of energy, poor socialization, no future and loss of hope as a result of depression will increase nausea and vomiting during pregnancy which is supported by psychosocial theory of hyperemesis gravidarum.

7. Conclusion

This study concludes that Being from urban, primigravidity, being first & second trimester of pregnancy, family history of hyperemesis gravidarum,helicobacter pylori infection and depression were the determinants of hyperemesis gravidarum.

Limitation of the study

- The study was conducted only in hospitals in bahirdar and probably a multicenter study including health centers would increase external validity of the study.

8. Recommendations

To the pregnant mother

Identification of the risk factors for HEG may be useful in determining risk factors and those women at risk should start ANC early and to visit health facilities' early whenever they have nausea and vomiting.

To the health care provider

Urban residents, although not easily modifiable Determinant factor, we can provide active screening for those who came from urban in the first trimester of pregnancy.

Giving psychological support and reassurance for primigravidas in the first ANC visit to decrease stressful conditions.

Pregnant women in the first trimester were significantly suffered from HEG. Therefore, health care providers should take into account HEG at first ANC visit.

For pregnant women with family history of HEG should visit health facility early for early active treatment of symptoms like nausea and vomiting that will decrease progression to HEG.

Routing screening for H. Pylori infection at the time of preconception counseling

Depression has to be treated in the preconception counseling and extra psychological support may be necessary during treatment and follow-up.

To the hospital and medical college

The hospital and the college should encourage preconception care to counsel and manage for those who is at risk of HEG.

Further study that includes the health centers needs to be done to determine more factors for HEG

Further studies focused on outcomes associated with hyperemesis gravidarum are needed.

Conflict of interest: None

9. Reference

1. Gabra A. Risk factors of hyperemesis gravidarum. Health Science Journal. 2018;12(6):1-5.
2. Şimşek Y, Çelik Ö, Yılmaz E, Karaer A, Yıldırım E, Yoloğlu S. Assessment of anxiety and depression levels of pregnant women with hyperemesis gravidarum in a case-control study. Journal of the Turkish German Gynecological Association. 2012;13(1):32.
3. Muwonge C. Risk factors for hyperemesis gravidarum among pregnant women attending antenatal clinic at Kawempe Hospital: A case-control study: Makerere University; 2019.
4. Zhang H, Wu S, Feng J, Liu Z. Risk Factors of Prolonged Nausea and Vomiting During Pregnancy. Risk Management and Healthcare Policy. 2020;13:2645.
5. London V, Grube S, Sherer DM, Abulafia O. Hyperemesis gravidarum: a review of recent literature. Pharmacology. 2017;100(3-4):161-71.
6. Nurmi M, Rautava P, Gissler M, Vahlberg T, Polo-Kantola P. Incidence and risk factors of hyperemesis gravidarum: A national register-based study in Finland, 2005-2017. Acta obstetricia et gynecologica Scandinavica. 2020;99(8):1003-13.
7. Fiaschi L, Nelson-Piercy C, Tata LJ. Hospital admission for hyperemesis gravidarum: a nationwide study of occurrence, reoccurrence and risk factors among 8.2 million pregnancies. Human Reproduction. 2016;31(8):1675-84.
8. Aminu MB, Alkali M, Audu BM, Abdulrazak T, Bathna D. Prevalence of hyperemesis gravidarum and associated risk factors among pregnant women in a tertiary health facility in Northeast, Nigeria. International Journal of Reproduction, Contraception, Obstetrics and Gynecology. 2020;9(9):3558.
9. MAHMOUD G. Prevalence and risk factors of hyperemesis graviderum among Egyptian pregnant woman at the Woman's Health Center. The Medical Journal of Cairo University. 2012;80(2).
10. Kejela G, Getu S, Gebretsdik T, Wendimagegn T. Prevalence of Hyperemesis Gravidarum and Associated Factors in Arba Minch General Hospital, Gamo Gofa Zone, Southern Ethiopia. Clin Mother Child Health. 2018;15(10.4172):2090-7214.1000285.
11. Kuma T, Yusuf L, Negash S. Assessment of nausea and vomiting of pregnancy on antenatal clients of Addis Ababa. Ethiopian Journal of Health Development. 2013;27(3):200-7.
12. Akalu GT. Association of Helicobacter pylori Infections and Hyperemesis Gravidarum Women: A Case Control Study in Selected Healthcare Facilities in Addis Ababa, Ethiopia. EC Microbiology. 2021;17:66-76.
13. Dinberu MT, Mohammed MA, Tekelab T, Yimer NB, Desta M, Habtewold TD. Burden, risk factors and outcomes of hyperemesis gravidarum in low-income and middle-income countries (LMICs): systematic review and meta-analysis protocol. BMJ open. 2019;9(4):e025841.
14. Kamalak Z, KÖŞÜŞ N, KÖŞÜŞ A, Hizli D, Ayrim A, Kurt G. Is there any effect of demographic features on development of hyperemesis gravidarum in the Turkish population? Turkish Journal of Medical Sciences. 2013;43(6):995-9.
15. Kim HY, Cho GJ, Kim SY, Lee K-M, Ahn KH, Han SW, et al. Pre-Pregnancy Risk Factors for Severe Hyperemesis Gravidarum: Korean Population Based Cohort Study. Life. 2021;11(1):12.
16. Mekonnen AG, Amogne FK, Kassahun CW. Risk factors of hyperemesis gravidarum among pregnant women in Bale zone Hospitals, Southeast Ethiopia: unmatched case-control study. Clin Mother Child Health. 2018;15(300):2.
17. Mullin PM, Ching C, Schoenberg F, MacGibbon K, Romero R, Goodwin TM, et al. Risk factors, treatments, and outcomes associated with prolonged hyperemesis gravidarum. The Journal of Maternal-Fetal & Neonatal Medicine. 2012;25(6):632-6.
18. Tefera Z, Assefaw M. Determinants of Hyperemesis Gravidarum Among Pregnant Women in Public Hospitals of Mekelle City, North Ethiopia, 2019: Unmatched Case-Control Study. 2021.

19. Vikanes ÅV, Støer NC, Magnus P, Grjibovski AM. Hyperemesis gravidarum and pregnancy outcomes in the Norwegian mother and child cohort–a cohort study. BMC pregnancy and childbirth. 2013;13(1):1-8.
20. Y Fan L, H Jacobsen K. Risk factors for hyperemesis gravidarum. Current Women's Health Reviews. 2010;6(4):309-17.
21. Thakur M, Gautam J, Dangal G. Severity of Hyperemesis Gravidarum and Associated Maternal factors. Journal of Nepal Health Research Council. 2019;17(3):293-6.
22. Groleau D, Benady-Chorney J, Panaitoiu A, Jimenez V. Hyperemesis Gravidarum in the context of migration: when the absence of cultural meaning gives rise to “blaming the victim”. BMC pregnancy and childbirth. 2019;19(1):1-11.
23. Cox JL, Holden JM, Sagovsky R. Detection of postnatal depression: development of the 10-item Edinburgh Postnatal Depression Scale. The British journal of psychiatry. 1987;150(6):782-6.
24. Kocalevent R-D, Berg L, Beutel ME, Hinz A, Zenger M, Härter M, et al. Social support in the general population: standardization of the Oslo social support scale (OSSS-3). BMC psychology. 2018;6(1):1-8.
25. Segni H, Ayana D, Jarso H. Prevalence of hyperemesis gravidarum and associated factors among pregnant women at Jimma University medical center, South West Ethiopia: a cross-sectional study. EC Gynaecol. 2016;3(5):376-87.
26. Sharp BR, Sharp KM, Patterson B, Dooley-Hash S. Treatment of nausea and vomiting in pregnancy: Factors associated with ED revisits. Western Journal of Emergency Medicine. 2016;17(5):585.
27. Zhang Y, Cantor RM, MacGibbon K, Romero R, Goodwin TM, Mullin PM, et al. Familial aggregation of hyperemesis gravidarum. American journal of obstetrics and gynecology. 2011;204(3):230. e1-. e7.
28. Kazemzadeh M, Kashanian M, Baha B, Sheikhansari N. Evaluation of the relationship between Helicobacter Pylori infection and Hyperemesis Gravidarum. Medical journal of the Islamic Republic of Iran. 2014;28:72.
29. Li L, Li L, Zhou X, Xiao S, Gu H, Zhang G. Helicobacter pylori infection is associated with an increased risk of hyperemesis gravidarum: a meta-analysis. Gastroenterology research and practice. 2015;2015.
30. Sumona Saha M. NIH Public Access Nausea and Vomiting of Pregnancy. Gastroenterol Clin North Am. 2013;40(2):1-27.
31. Kjeldgaard HK, Eberhard-Gran M, Benth JŠ, Nordeng H, Vikanes ÅV. History of depression and risk of hyperemesis gravidarum: a population-based cohort study. Archives of women's mental health. 2017;20(3):397-404.

10. Annex

10.1 Information sheet

Bahir-Dar University College of Medicine and Health Sciences school of medicine

Department of obstetrics and gynecology

Hello! My name is ---------- and working in----------; I will ask you some questions that will take around 40 minutes to respond. I am collecting data from Bahir Dar University college of medicine and health sciences department of obstetrics and gynecology at public and private Hospitals in Bahir Dar city North West Ethiopia by Dr Lakachew Asrade from January 1-May 30 2022. The findings from the research will be an input for Amhara regional Health Bureau and Ministry of Health for future plans. So, that, by considering this please respond it honestly. I can assure you that every information is confidential as your name or card number will not be recorded on the questionnaire. You have the right to refuse and this will not affect any service you get.

Are you willing to participate?

If the answer is: YES: Please continue NO: Give thanks and skip

10.2 Questionnaire and check list

1. Socio- demographic and socio- economic characteristics

S.N	Questions	Response	Remark
101	What is your age in years?	Age in years…….	
102	Residence	**1**. Urban **2**.Rural	
103	Marital Status	1. Single **2**.Married **3**. Widowed **4.**Divorced **5.**Separated	

104	Religion	**1**. Orthodox **2**.Muslim **3**.Protestant **4**.Catholic **5**.Other	
105	Educational status	**1**.Illiterate **2**.Primary school **3**.High school **4**.College and above	
106	Occupation	**1.** Employed **2.** Merchant **3.** House Wife **4.** Student **5.** Farmer	
107	**Oslo Social Support Scale (OSSS-3)**		

1	How many people are so close to you that you can count on them if you have serious personal problems?	None 1 or 2 3 to 5 6 or more	1 2 3 4
2	How much concern do people show in what you are doing?	A lot of concern and interest Some concern and interest Uncertain Little concern and interest No concern and interest	5 4 3 2 1
3	How easy is it to get practical help from neighbours if you should need it?	Very easy Easy Possible Difficult Very difficult	5 4 3 2 1

2. Obstetrical and Gynecological Factors

S.N	**Questions**	**Response**	**Remark**
201	Number of previous pregnancies?	1 prmigravida 2 multigravida	
202	Parity of pregnant women?	1 Primipara 2 multipara	
203	Previous history of Hyperemesis Gravidarum	**1**.Yes **2.**No	

204	What is the type of gestation?	**1.** Singleton **2.** Multiple **3.** Molar	
205	Gestational age in weeks	……Weeks	
206	Family history of hyperemesis gravidarum	**1**.Yes **2.**No	
207	What is the Pregnancy status?	**1**. Planned **2.** Unplanned 3.	
208	Any history of dysmenorrhea?	**1**.Yes **2.**No	
209	Any history of abortion?	**1**.Yes **2.**No	

3. Medical &psychiatric history

S.N	Questions	Response	Remark
301	History of pre-pregnancy motion sickness	**1**.Yes **2.**No	
302	Helicobacter Pylori Serostatus	**1.** positive **2.** Negative	

303	**Depression**

ባህርዳር ዩኒቨርሲቲ ህክምና ጠ/ ሳይንስ ኮሌጅ የሚህጸንና ጽንስ ትምህርት ክፍል

ባህር ዳር

መግቢያ

ጠ/ ይስጥልኝ ስሜ----------ይባላል፡ ፡ የምሰራውም_____ነው፡ ፡ ወደ ዚህ የመጣሁበት ምክንያት በባህር ዳር ከተማየ መንግስትና የግል ሆስፒታሎች ወስጥ በእርግዝና ወቅት የሚከሰተውን ከፍተኛ ችግር አጋላጭመንስኤወች ምንድናቸዉእሚለውን ለማጥናትና መረጃ ለመሰብሰብ ነው፡ ፡ ጥናቱን የሚያካሄዱት በባህር ዳር ዩኒቨርሲቲ ህክምና ጠ/ ሳይንስ ኮሌጅ በሚህጸን ጽንስና ትምህርት ክፍል የስፔሻላይዜሽን ተማሪ የሆኑት ዶ/ር ላቃቻዉአስራደ ናቸው፡ ፡ ጥናቱምየሚከሄደውከጥቅምት /2014 እስከ ምያዚያ /2014 ዓ.ምነው፡ ፡ በጥናቱ የሚ ኘውውጤት ለሚመለከታቸውአካላት ግብዓት የሚሆንና የመፍትሄ እርምጃ ለመወሰድ አቅጣጫጠቋሚይሆናል፡ ፡ ስለሆነ ምጥያቄወን ለመመለስ ፈቃደኛ ከሆኑ በታማኝነት ለሚሰየቁት ጥያቄ ተገቢወን መልስ ይሰጠኛ ዘንድ በትህትና እጠይቃለሁ፡ ፡ የሚሰጡ ማ ኛወም አይነት መረጃ በሚስጢር እሚያዝ ይሆናል፡ ፡ መረጃ መሰተት ካልፈለጉምመበትወት ነዉነገር ግን ማ ኘት ያለብወትን ህክምና በስትክክል ያገኛሉ፡ ፡

ጥያቄወን ለመመለስ ፈቃደኛ ነዎት? አዎ…… አይደለሁም……

ስለተባበሩን አመሰግናለሁ፡ ፡

ፈቃደኛ ከሆኑ

1. ቀን ----------
2. መጠይቁን የሞላው ስም----------ፊርማ--------
3. የሱፐር ቫይዘር ስም----------ፊርማ--------

1. አጠቃላይ መረበራዊ መረጃ ጋር የተገናኙ መንስኤወች

ተራ ቁጥር	ጥያቄወች	መልስ

101	እድሜ	…….አመት
102	ሞሪያ	**1**. ከተማ **2**.ገጠር
103	የ ጋብቻ ሁኔታ	**1.** ያገባች **2**.ያላገባች **3**.የ ሞተባት **4**.የ ተፋታች **5**.አንድላይ የ ሚኖሩ
104	እምነ ትዎ	**1**. ኦርቶዶክስ **2**.ሙስሊም **3**.ፕሮቴስታንት **4**.ካቶሊክ **5**.ሌላ ከሆነ
105	የ ትምህርት ደረጃ	**1**.ያልተማር **2**.የ መጀመሪያ ደረጃ **3**.ሁለተኛ ደረጃ **4**.ኮሌጅና ከዛ በላይ
106	የ ስራ ሁኔታ	**1.** የ ተቀጠረች **2.** ነጋዴ **3.** የ ቤት እመቤት **4.** ተማሪ **5.** ገበሬ
109	የ ማህበረሰብ ድጋፍ የ ሚሞላከቱ ጥቄዎችን	

1	ከባድ ችግር ቢገጥሞት በፍጥነት ሊደርሱሎት የ ሚቻሉ ሰዎች ቁጥር ስንት ይሆናል ብለውይገምታሉ	ማንም 1 ወይም 2 ከ 3 እስከ 5 6 ና ከዚያ በላይ	1 2 3 4

	2	በሚያደርጉት እያነዳንዱ ነገር፤ ባከባቢው በሚኙ ሰዎች ምን ያክል ትኩረት ያገኛሉ	ብዙ ትኩረት ና የሚዳት ፍላጎት ያላቸውሰዎች አገኛለሁ የ ተወሰነ ትኩረት ና የሚዳት ፍላጎት ያላቸው ሰዎች አገኛለሁ እርግጠኛ አይደለሁም ትንሽ ትኩረት ና የሚዳት ፍላጎት ያላቸው ሰዎች አገኛለሁ ምንምአይነት ትኩረት ና የሚዳት ፍላጎት ያለቸው ሰዎች የሉም	5 4 3 2 1
	3	እርዳታ ቢፈልጉ ምንያክል በተግባር ከጎረቤትዎ ማገኘት ይችላሉ	በጣም በቀላሉ ማገኘት እችላለሁ በቀላሉ ማገኘት እችላለሁ ማገኘት እችላለሁ ማገኘት ይከብዳል ማገኘት በጣም ይከብዳል	5 4 3 2 1

2. ከማህጸንና ጽንስ ጋር የተገናኙ መጎሳኤወች

ተራ ቁጥር	ጥያቄወች	መልስ
201	ስንተኛ እርግዝናሽ ነዉ?	-------
202	ስንተኛ ልጅሽ ነዉ?	------
203	አርግዘሽ እምታቂ ከሆነ ከፍተኛ የሆነ ማእታወክና ማቅለሽለሽ ነበረ ወይ?	**1.**አዎ **2.**አልነበረም

204	የእርግዝናዉአይነት?	**1.** አንድ **2.** ሁለትነና ከዛ ብላይ **3.** ከእርግዝና ጋር የተያያዘ እጤ
205	እርግዝናዉበሳምንት	……ሳምንት
206	በቤተሰብ ከፍተኛ የሆነ ሞክታወክና ማቅለሽለሽ ነበረ ወይ?	**1.**አዎ **2.**አልነበረም
207	አቅደሽ ነዉያረገዝሽዉ?	**1.** አዎ **2.** ሳላቅድ ነዉ
208	የወር አበባ በምታይበት ወቅት ከባድ የሆነ የሆድ ህመምነበር?	**1.**አዎ **2.**አልነበረም
209	ከዚህ በፊት ወርጃ ነበረ ወይ?	**1.**አዎ **2.**አልነበረም

3. ከወሰጥ ደዌና ስነ -አእምሮ ጋር የተገናኙ መሰኤወች

ተራ ቁጥር	**ጥያቄወች**	**ሜልስ**
301	በመኪና ሲሄዱ ሞክታወክ ነበረ ወይ	**1.**አዎ **2.**አልነበረም
302	የጨራ ባክቴሪያ	**1.** አለ **2.** የለም

302	**በባለፉት 7 ቀናት የተሰሙት ስሜት ካለ ከዚያ ስሜት ጋር የሚስማማ አይነት ከተሰጥዎት ምርጫወስጥ ይምረጡ**	
	1. በባለፈውሳምንት፤ስቄአለሁም አስቂኝ ሁኔታዎችንም መለየት ችያለሁ፡	በፊት ሳደርግ እንደነበረው 3 እንደበፊቱ አይሆንም 2 በጫሯሽ እንደበፊቱ አይሆንም 1 በጫሯሽ አልስቅም 0
	2.በባለፈውሳምንት፤ ማጨውን ሁኔታ በደስታ መቀበል እችላለሁ፡	በፊት የሚደርገውን ያህል 3 በፊት ከሚደርገው አነስ ያ 2 በእርግጥ በፊት ከሚደርገው ያነስ 1 በጫሯሽ አልችልም 0
	3.በባለፈው ሳምንት፤ሁኔታዎች ሳይሳኩ ከቀሩ እራሴን እወቅሳለሁ፡	አዎን፤ ሁልጊዜ 0 አዎን፤ አልፎ አልፎ 1 እስከዚህም እራሴን አልወቅስም 2 በጫሯሽ እራሴን አልወቅስም 3
	4.በባለፈውሳምንት፤በሚረባ ነገር እጨነቃለሁ፤ አጠበባለሁ፡	በጫሯሽ 0 ከቁጥር ለሚገባ ጊዜ 1 አዎን፤ አልፎ አልፎ 2 አዎን፤ ሁልጊዜ 3
	5.በባለፈውሳምንት፤በሚረባ ምክንያት ፍርሃትና ድንጋጤ ይሰማኛል፡	አዎን፤ ሁልጊዜ 0 አዎን፤ አልፎ አልፎ 1 እስከዚህ አይሰማኝም 2 በጫሯሽ አይሰማኝም 3
	6 .በባለፈውሳምንት፤ሁኔታዎች ተደራርበውብኛል፡	አዎን፤ አብዛኛውን ጊዜ ሁኔታዎችን መቋቋም አልችልም 0 አዎን፤ አልፎ አልፎ ሁኔታዎችን መቋቋም አልችልም 1 አይ፤ አብዛኛውን ጊዜ ሁኔታዎችን መቋቋም ችያለሁ 2 አይ፤ በፊት እንደሚደርገው ሁኔታዎችን መቋቋም ችያለሁ 3
	7.በባለፈውሳምንት፤ደስታ ከማጣቴ የተነሳ እንቅልፍ አይወስደኝም፡	አዎን፤ ሁልጊዜ 0 አዎን፤ አልፎ አልፎ 1 እስከዚህም አልተቸገርኩም 2

	በጭራሽ አልተቸገርኩም 3			
8.በባለፈውሳምንት፤ ብስጭትና ሃዘን ተሰምቶኛል፡	አዎን፤ ሁልጊዜ 0 አዎን፤ አልፎ አልፎ 1 እስከዚህ አይሰማኝም 2 በጭራሽ አይሰማኝም 3		3 2 1 0
9.በባለፈውሳምንት፤ ደስታ ከሞጣዬ የተነሳ አለቅሳለሁ፡	አዎን፤ አብዛኛውን ጊዜ 0 አዎን፤ በየጊዜው 1 አልፎ አልፎ ብቻ 2 በጭራሽ አላለቀስኩም 3		3 2 1 0
10.በባለፈውሳምንት፤ ራሴን የመጉዳት/የማጥፋት ሃሳብ ደርሶብኛል፡	አዎን፤ ሁልጊዜ 0 አልፎ አልፎ ገጥሞኛል 1 እስከዚህም አልገጠመኝም 2 በጭራሽ አልገጠመኝም 3		3 2 1 0

.