



Daffodil
International
University

Project Report
On
Assessment of Prevalence of Anemia
Among Literate Pregnant Women Attending in Tertiary Level
Hospital in Dhaka City

Submitted to:

Dr. Md. Bellal Hossain

Professor & Head

Department of Nutrition and Food Engineering

Faculty of Allied Health Sciences

Daffodil International University

Submitted by:

Fatema Hossain Takia

ID: 151-34-383

Department of Nutrition & Food Engineering

Faculty of Allied Health Science

Daffodil International University

Date of Submission: 23-12-2018

Letter of Transmittal

Date: 22-12-2018

Dr. Md. Bellal Hossain

Professor & Head

Department of Nutrition and Food Engineering

Faculty of Allied Health Science

Daffodil International University

Subject: Submission of project work report.

Dear Sir,

It is a great pleasure for me to have the opportunity to submit my project work report on “Assessment of Prevalence of Anemia among Literate Pregnant Women Attending in Tertiary Level Hospital in Dhaka City”.

I have prepared this report based on the acquired taste knowledge during my project period. Without your help, this report would have been impossible to complete. This report is based on “Assessment of Prevalence of Anemia among Literate Pregnant Women Attending in Tertiary Level Hospital in Dhaka City”. I have got the opportunity to work in your university under the supervision of Ms. Fouzia Akter, Senior Lecturer.

I, therefore, request and expect that you will be appreciate me with my sort of recommendation and valued suggestion and will cordially receive this report for your kind assessment.

Sincerely Yours,

Fatema Hossain Takia

ID: 151-34-383

Department of Nutrition and Food Engineering

Faculty of Allied Health Science

Daffodil International University

Approval Certification

I do hereby declare that the project report entitled "Assessment of Prevalence of Anemia among Literate Pregnant Women Attending in Tertiary Level Hospital in Dhaka City" is a record of original work carried out by the author under the supervision of **Ms. Fouzia Akter**, Senior Lecturer, Department of Nutrition and Food Engineering, Daffodil International University, Dhaka-1207, Bangladesh. This project work or any part thereof has not been submitted elsewhere for the award of any degree, diploma, associate ship or fellowship.

Dr. Md. Bellal Hossain
Professor & Head
Department of NFE
Faculty of Allied Health Sciences
Daffodil International University

Fouzia Akter
18-12-18

Supervisor
Ms. Fouzia Akter
Senior Lecturer
Department of NFE
Faculty of Allied Health Sciences
Daffodil International University

Abstract

In Bangladesh 30% of literate pregnant women are being anemic yearly. The main purpose of this study is to assess the prevalence of anemia and to identify the factors associated with anemia among literate pregnant women attending in the tertiary level hospital in Dhaka city. A hospital based cross sectional study was conducted at Maternal and Child Health Training Institute, Azimpur, Dhaka from 1st November to 7th November 2018. This cross-sectional study was conducted over 100 pregnant women who visited the Maternal and Child Health Training Institute, Azimpur, Dhaka for taking antenatal care services. Total 100 pregnant women's data was collected in which 52 were literate pregnant women and 48 were illiterate. According to the project title 52 literate pregnant women's are selected as targeted people. Demographic data and information on age, religion, gestational age, educational background and family income level, and socioeconomic status were collected from the subjects by using a questionnaire and hemoglobin level was also collected from hospital laboratory to measure the haemoglobin level and assess the level of anemia. The prevalence of anemia among literate women during pregnancy is 48.1% in which mild anemia 32.7%, moderate 11.5% and severe 3.08%. Several factors are associated with anemia among literate pregnant women's, such as inadequate diet, heavy menstruation, improper iron supplementation, vitamins and minerals malabsorption, early pregnancy, intestinal disorders, lack of nutritional knowledge etc.

Keywords: Anemia, Pregnancy, Hemoglobin, Factors, Antenatal care, Bangladesh.

Acknowledgements

All praises and gratitude to the almighty of Allah for the good health and wellbeing that were needed to complete this project work. The author would like to thank honorable teacher Dr. Md. Bellal Hossain, Professor and Head of the Department of Nutrition and Food Engineering, for giving the opportunity to conduct this project work. The author is also grateful to Course Adviser: Dr. Taherul Islam Khan, Head of Institute of Public Health and Nutrition. The author also would like to thank honorable teacher Ms. Fouzia Akter, Supervisor, Senior Lecturer, Department of Nutrition and Food Engineering, for his excellent guidance and patience and for being supportive throughout the period of this project work. Without their instruction, this project work could not be possible to conduct. Their encouragement has been a driving force during study period and their immense knowledge has massively contributed to the successes of this project work. The author also thankful to the women who participated in the studies that formed the foundation for this project and everyone who contributed in diverse ways to the realization of this project. Author took this opportunity to express gratitude and veneration to all who helped the author doing this report. At the event of report submission, author sincerely remembers all of them.

TABLE OF CONTENTS

Content		Page No.
Title		i-ii
Abstract		iii
Acknowledgements		iv
Table of Content		v-vi
List of Appendices		vii
List of Tables		viii-x
Acronym		xi
CHAPTER ONE		
Introduction		1-5
	Background	2
	Objective	3
	Related Definitions	3-5
	Significance of the Study	5
	Limitations of the Study	5
CHAPTER TWO		
Literature Review		6
CHAPTER THREE		
Methods and Materials		7-8
	Study Area Selection	7
	Study Design	7
	Study Population	7
	Sample Size	7

	Sampling Method	7
	Data Collection Procedure	7-8
	Data Analysis	8
CHAPTER FOUR		
Result and Discussion		9-28
	Result	9-26
	Discussion	26-28
CHAPTER FIVE		29
Conclusion		29
REFERENCES		30
APPENDICES		31-45

LIST OF APPENDICES

Appendix No.	Title	Page
Appendix 1	BD: Prevalence of Anemia in Pregnant Women %	31
Appendix 2	Pie Chart of Grading of Severity of Anemia	31
Appendix 3	Graphical Representation of Grading of Severity of Anemia	32
Appendix 4	Age Frequency	32
Appendix 5	Education Frequency	33
Appendix 6	Family Income per month Frequency	33
Appendix 7	Gestational Age Frequency	34
Appendix 8	Inter-pregnancy Interval Frequency	34
Appendix 9	Heavy Period Frequency	35
Appendix 10	Iron Supplementation Frequency	35
Appendix 11	Questionnaire	36-45

LIST OF TABLES

Table No.	Title	Page
Table 1	Socio-economic and Demographic Characteristics of the Literate Pregnant Women Attended ANC at MCHTI	9-10
Table 2	Reproductive History of the Literate Pregnant Women Attended ANC at MCHTI	11
Table 3	Antenatal Condition of the Literate Pregnant Women Attended ANC at MCHTI	11-12
Table 4	Nutritional Status and Dietary Pattern of the Literate Pregnant Women Attended ANC at MCHTI.	12-13
Table 5	Correlation between Family Income and Hemoglobin Level of the Literate Pregnant Women Attended ANC at MCHTI	13
Table 6	Correlation between Previous Anemia History and Hemoglobin Level of the Literate Pregnant Women Attended ANC at MCHTI	14
Table 7	Correlation between Menstrual History and Hemoglobin Level of the Literate Pregnant Women Attended ANC at MCHTI	14
Table 8	Correlation between Dietary Pattern and Hemoglobin Level of the Literate Pregnant Women Attended ANC at MCHTI	15
Table 9	Correlation between Iron Supplementation and Hemoglobin Level of the Literate Pregnant Women Attended ANC at MCHTI	15
Table 10	Correlation between Red Meat and Hemoglobin Level of the Literate Pregnant Women Attended ANC at MCHTI	16
Table 11	Correlation between Lentils and Hemoglobin Level of the Literate Pregnant Women Attended ANC at MCHTI	16
Table 12	Correlation between Banana and Hemoglobin Level	17

	of the Literate Pregnant Women Attended ANC at MCHTI	
Table 13	Correlation between Orange and Hemoglobin Level of the Literate Pregnant Women Attended ANC at MCHTI	17
Table 14	Correlation between Pomegranate and Hemoglobin Level of the Literate Pregnant Women Attended ANC at MCHTI	18
Table 15	Frequency of Participant's Age	18
Table 16	Frequency of Educational Background	18
Table 17	Frequency of Family Income per month	19
Table 18	Frequency of Family Member	19
Table 19	Frequency of Miscarriage or Abortion	19
Table 20	Frequency of Uses of Contraceptive	20
Table 21	Frequency of Gestational Age	20
Table 22	Frequency of Inter-pregnancy Interval	20
Table 23	Frequency of Previous Anemia History	21
Table 24	Frequency of Menstrual History (Heavy Period)	21
Table 25	Frequency of Menstrual History (Clots with Period)	21
Table 26	Frequency of Dietary History	21
Table 27	Frequency of Iron Supplementation	22
Table 28	Frequency of Body Mass Index	22
Table 29	Frequency of Nutritional Status	22
Table 30	Frequency of Severity of Anemia	23
Table 31	Frequency of Iron Rich Food (Red Meat)	23
Table 32	Frequency of Iron Rich Food (Liver)	23
Table 33	Frequency of Iron Rich Food (Banana)	24
Table 34	Frequency of Iron Rich Food (Pomegranate)	24

Table 35	Frequency of Vitamin C Rich Food (Orange)	24-25
Table 36	Frequency of Vitamin C Rich Food (Lemon)	25
Table 37	Frequency of Calcium Rich Food (Milk)	25
Table 38	Frequency of Drinking Tea	26
Table 39	Frequency of Drinking Coffee	26

ACRONYMS

ANC – Antenatal Care

BMI – Body Mass Index

HB – Hemoglobin

HD – Hematological Disorder

IDA – Iron Deficiency Anemia

ID – Intestinal Disorder

MCHTI – Maternal and Child Health Training Institute

SPSS – Statistical Package for the Social Science

WHO – World Health Organization

CHAPTER ONE

INTRODUCTION

Anemia is very well known public health problem, particularly in pregnant women. Around 38% of prevalence of being anemic in pregnant women are being found by a survey done by World Health Organization. They also found that women and young children are most vulnerable to anemia (WHO, 2018). This study only focuses on prevalence of anemia among the literate pregnant women in Bangladesh.

In Bangladesh, people often suffer from this kind of nutritional disorder who lives in rural area along with urban areas as well (Bellal Hossain, 2018). Anaemia in pregnancy is regarded as a risk factor for the poor gestational consequence. Some women are being anemic even before they become pregnant and others become anemic during pregnancy (Faruk Ahmed, 2018).

Anemia occurs in people of all ages due to many reasons which includes blood loss, decreased red blood cell production and destruction of red blood cells. However, certain factors that increase the risk of anemia includes- heavy menstruation, early pregnancy, inadequate diet, intestinal disorders that affects absorption of nutrients such as iron etc. (Anemia Prevalence, Causes, and Consequences, 2018).

This study outlines the effects of anemia and its continuing prevalence among the pregnant women. This report is basically an assessment on the literate pregnant women who attended in MCHTI for antenatal check-up and their subsequent anemic condition along with their dietary habits is also determined by surveying the patients. This report is designed in five different chapters where each chapter reflects distinct and well informative data. Chapter Two is followed by a brief overview on anemia and it presents necessary literature reviews related to the study. Each of the chapter will certainly help the audience to get to understand the later chapters of the report in a constructive way. Chapter Three starts with the methods and materials that using to conduct this project work. Chapter four discusses the observatory data collected by the author while the study. It provides case study oriented knowledge at this chapter. At last the paper concludes identifying the prevalence of anemia as an emerging need to be focused.

Background

Anemia is known as a state of nutritional problem that indicates lower number of hemoglobin (Hb) level and this disorder compounds with experiencing fewer number of red blood cells in the body (Anemia Prevalence, Causes, and Consequences, 2018). The number of being anemic is near about two billion worldwide. It is the most familiar nutritional problem associated with hematological disorder among pregnant women in Bangladesh as well. Anemia affects more than 1.62 billion (25%) people of the world's population and of them the majority consisting circa 56 million are pregnant women. Majority of women in Bangladesh start their gestational life with anemia. In both the rural and urban area, majority of pregnant women was 54% and 42% moderate anemic; 24% and 42% mild anemic; 16% and 9% severe anemic; 6% and 11% non-anemic. The study also shows that, urban pregnant women were well nourished than rural pregnant women (Bellal Hossain, 2018). Anemia is one of the most dangerous complications related to pregnancy that contributes to higher rate of maternal mortality. It increases the chances of maternal morbidity as well. Moreover, Anemia affects almost majority of pregnant women in developing countries and also signifies low birth weight. It remains a prevalent factor that determines poor condition of maternal health in public health sector. Among the affected anemics, pregnant women considered to be the most vulnerable as their health condition is associated with the fetus. It occurs when blood lacks sufficient red blood cells or hemoglobin to carry adequate oxygen to the body's tissues and cells for normal body function. Normal physiologic changes in pregnancy affect the hemoglobin and there is a relative or absolute reduction in hemoglobin concentration. In most of the cases, iron deficiency anemia were found in approximately 75% of the anemics and folate deficiency megaloblastic anemia also indicates a significant percentage, and they are more frequent to women having inadequate diets and also those are not receiving prenatal iron and folate supplements. Anemia associated with hemoglobin levels less than 6 g/dL indicates poor gestational consequence. Hemoglobin levels of 11 g/dL in the late first trimester and also of 10 g/dL in the second and third trimesters are suggested as lower limits for hemoglobin concentration (Naila Baig-Ansari, 2018).

Objective

General Objective

This study tries to shed light to determine the prevalence of anemia and the dietary and socioeconomic factors associated with living in both rural and urban area of Dhaka.

Specific Objective

The main objective of this current study was specified to assess the prevalence of anemia and to identify factors associated with it among literate pregnant women attending in the tertiary level hospitals in Dhaka city.

Related Definitions

Anemia

Anemia is known as shortage of hemoglobin in the blood, also associated by inadequacy of red blood cells (Anemia Prevalence, Causes, and Consequences, 2018).

Types of anemia

Common types of anemia in pregnancy includes-

- Iron Deficiency Anemia
- Folate Deficiency Anemia
- Vitamin B-12 Deficiency Anemia

Here, Iron Deficiency Anemia is one of the most common one and Folate Deficiency Anemia also be seen. A few may experience Vitamin B-12 deficiency Anemia as well (Mayo Clinic Staff, 2018).

Symptoms of anemia

The symptoms of anemia may differ in accordance to its type. During pregnancy if anemia is in the mild stage, and remains untreated it could be turned into moderate or severe in its form. Symptoms of anemia are given in the following-

- Weakness
- Headache
- Fatigue
- Dizziness
- Pale skin

- Cold hands and feet
- Fast and rapid heartbeat (Mayo Clinic Staff, 2018)

Causes of anemia

Anemia can be affected by wide range of factors such as socio-economic condition, heavy menstruation, pregnancy history, inadequate diet and lack of nutritional knowledge and awareness etc. Anemia may also be caused by several factors such as excessive blood loss due to heavy period or any accident, miscarriage, still birth, early pregnancy, improper supplementation, inadequate diet, intestinal disorder, vitamins and minerals malabsorption and many others.

Nutritional deficiency disorders of iron, folate, and vitamin B12 are also responsible for Anemia during pregnancy. Anemia can lead to a wide range of problems during pregnancy as well (Mayo Clinic Staff, 2018).

Grading of anemia

Anemia is range from mild to severe according to the level of haemoglobin concentration. Anemia is grading into three classes on the basis of concentration.

- Mild anemia (Hb concentration is 10-10.9 g/dl)
- Moderate anemia (Hb concentration is 7-9.9 g/dl)
- Severe anemia (Hb concentration <7 g/dl)

Mild anemia

When hemoglobin concentration is between 10-10.9 g/dl it is considered as mild anemia. During pregnancy mild anemia is common and cannot affect the infant. But it can be moderate and severe if not treated properly.

Moderate anemia

When hemoglobin concentration is between 7-9.9 g/dl it is considered as moderate anemia. If it is untreated for long times it may leads to various complications and may affect the mother and foetus as well.

Severe anemia

Severe anemia occurs when hemoglobin concentration is less than 7 g/dl. It may leads to serious complications and has a negative impact on both the mother and foetus. It may dangerous if untreated as soon as possible.

Balanced diet

A balanced diet includes adequate amounts of essential nutrients. It is made up of all necessary nutrients and well balanced with right amounts. A balanced diet should provide

sufficient energy to sustain a healthy life. To combat nutritional disorder a balanced diet is important. During pregnancy a healthy and well balanced diet is needed that results in successful pregnancy with positive outcomes. Adequate and well balanced diet associated with well performing physical activities is a cornerstone of satisfactory healthy life. Though micronutrients and macronutrients provide sufficient energy to regulate normal body function and sustain healthy life so pregnant women should take all of these essential nutrients for successful pregnancy. Macronutrients are carbohydrates, proteins fats and micronutrients are water, vitamins minerals.

BMI

The body mass index (BMI) was calculated as the weight in kilograms divided by the square of the height in meters. BMI Categories are as follows: BMI (<18.5 indicate underweight, 18.5–24.9 indicate normal weight, 25–29.9 indicate overweight and BMI of 30 or greater indicate obesity).

Significance of the Report

The report would be helpful indeed for the students, researchers working in this field. As the report presents case study oriented knowledge, the authenticity of the paper is highly maintained. Therefore, someone working in this field will find the information necessary. Notably, the report would be of inexhaustible value to the students of Nutrition, Food Science, Health and Allied Science students.

Limitations of the Report

Though this report is carefully done, but the author is still aware of its limitations and shortcomings.

CHAPTER TWO

LITERATURE REVIEW

In a study conducted in Ethiopia found that the cause of Anemia in most of the developing countries are multifactorial and is also associated with nutritional deficiencies. In Ethiopia, the prevalence rate of anemia found to be 14.9 % among 319 respondents. Iron supplementation and the presence of PICA were significantly associated with anemia. Both long term and short term strategies are recommended in alleviating the rate of anemia rate in anemic pregnant mothers (Bizuneh Ayano, 2018).

Having more than three cups of tea before becoming pregnant, consumption of dirt or clay in the time of pregnancy, not having eggs at a stretch or having eggs less than two times per week during pregnancy were found to be significantly associated with anemia, Consumption of red meat less than two times per week in the time of pregnancy is also regarded as affecting and associated with becoming anemic at a marginal rate. Women with child bearing age were referred to be provided with adequate nutritional knowledge to stop becoming anemic (Naila Baig-Ansari, 2018).

A study conducted in Bangladesh found that over the past three decades becoming anemic were given serious attention and policy focus. It found that the rural peoples are most vulnerable ones and the pregnant women in rural areas are the worst sufferers. In Bangladesh, the rates of severe anemic were less significant though the rate of mild and moderate were quite alarming. Iron deficiencies were regarded as a substantial cause of being anemic. Among the dietary factors, parasite infestations were found to be also significantly affecting the prevalence of anemia (Ahmed, 2000)

Proper information and interaction here forth, good nutritional diet associated with sufficient medications could result in decreasing the rate of being anemic and the maternal mortality rate as well. Being anemic is associated with low weight premature birth of infants and it also indicates severe morbidity and mortality rate as well (Srilatha, 2017).

CHAPTER THREE

METHODS AND MATERIALS

Study Area Selection

The study was conducted at the tertiary level hospitals in Dhaka city. On the basis of the project title author surveyed Maternal and Child Health Training Institute, Azimpur, Dhaka to conduct the project work.

Study Design

A hospital based cross sectional study was conducted at the tertiary level hospitals in Dhaka city from 1st November to 7th November 2018. This study was conducted on 100 pregnant women attending in the Maternal and Child Health Training Institute, Azimpur, Dhaka. The pregnant women who came for taking Antenatal Care (ANC) were selected as targeted population.

Study Population

The study population were selected as all the pregnant women who attended antenatal check-ups during the study period at MCHTI. The study was conducted among the literate pregnant women, aged in between less than 18 years of old to greater than 35 years of old who visited the Maternal and Child Health Training institute for routine antenatal check-up. The pregnant women who were seriously ill, unable to talk and/or hear, mental disorders were excluded from this study.

Sample Size

This hospital based cross-sectional study was conducted over 100 pregnant women attending in Maternal and Child Health Training Institute, Azimpur, Dhaka. The study was conducted among literate pregnant women, so those who are literate were selected as target people. Total 100 data was collected in which 52 women were literate and they were marked as study unit.

Sampling Method

The targeted population were selected by thoroughly studying their educational history to identify their literacy background. Based on that, literate pregnant women attended ANC department during study period were selected for assessment.

Data Collection Procedure

Data was collected from both primary and secondary sources. The study is mainly based on the primary data and it becomes more relevant by the associated literature reviews.

A questionnaire survey technique was used and it was an open ended interview questionnaire (See Appendix 1). The structure of the questionnaire was based on socioeconomic condition (educational level, occupation, husband's occupation, family income, etc.), reproductive history (no of child, use of contraceptive etc.), and antenatal information (gestational age, menstrual history, ANC, inter-pregnancy interval etc.), food security, number of meals, iron supplementation etc. Primary data resources include collecting hemoglobin concentration from the pathology department of MCHTI.

Data Analysis

Data were entered and analysed by using Statistical Package for the Social Science (SPSS) version 25. Here, data were entered, coded, cleaned, and analysed thoroughly. From the analysed data, the frequency of the different variables were calculated and noted thereby. Moreover, correlation between haemoglobin level and different variables were also being statistically calculated through SPSS.

CHAPTER FOUR
RESULT AND DISCUSSION

Result

From the total 100 participants, 48 were illiterate and 52 were literate. Among the literates, 27 were not anemic and 25 were anemic. The prevalence of anemia among literate women during pregnancy is 48.1% in which mild anemic were 17 (32.7%), moderately anemic were 6 (11.5%) and severely anemic were 2 (3.8%).

Socio-economic and Demographic History of Literate Pregnant Women

Out of a total 52 literate pregnant women attended ANC at MCHTI during this study where each of them responded in the interview. Among the study participants majority were aged in between 25 and 29 (38.5%). They all were housewife. In terms of educational background, 33 of them had a secondary level degree. In most of the cases, participant's husbands were the only earning member of their family and the majority income ranges were in between 10,000 and 20,000 Tk. The study found most of the 65.4% women's family were consists of 1-2 members. [According to Table 1]

Table 1: Socio-economic and Demographic Characteristics of the Literate Pregnant Women Attended ANC at MCHTI

Variable	Category	Frequency	Percent (%)
Age	<18	9	17.3
	18-24	12	23.1
	25-29	20	38.5
	30-34	8	15.4
	≥35	3	5.8
	Total	52	100.0
Educational Background	Secondary	33	63.5
	Above secondary	19	36.5
	Total	52	100.0
Family Income per month	<10000	1	1.9
	10000-20000	25	48.1

	20000-30000	17	32.7
	>30000	9	17.3
	Total	52	100.0
Occupation	Housewife	30	57.7
	Job holder	16	30.8
	Agriculture	1	1.9
	Other	5	9.6
	Total	52	100.0
Husband's Occupation	Job holder	17	32.7
	Business	20	38.5
	Day labour	1	1.9
	Rickshaw puller	1	1.9
	Other	13	25.0
	Total	52	100.0
Family Member	1-2 members	34	65.4
	4-6 members	16	30.8
	7-10 members	2	3.8
	Total	52	100.0

Reproductive History of Literate Pregnant Women

Among the literate women, 27 (51.9%) women were first time pregnant, 16 (30.8%) were having 1 child, 8 (15.4 %) had 2 child and the rest 1 (1.9%) had 3 child. It indicates majority of the literate women were first time pregnant. Among the participants, the rates of miscarriage were 21.2% and abortion rate were 1.9% and the majority of them 76.9% experienced none of them. The usages of contraceptives were 55.8% and the rest 44.2% didn't use contraceptives. [According to Table 2]

Table 2: Reproductive History of the Literate Pregnant Women Attended ANC at MCHTI

Variable	Category	Frequency	Percent (%)
Number of Child	1 child	16	30.8
	2 child's	8	15.4
	3 child's	1	1.9
	No	27	51.9
	Total	52	100.0
Miscarriage or Abortion History	Miscarriages	11	21.2
	Abortion	1	1.9
	No	40	76.9
	Total	52	100.0
Contraceptive Use	Yes	29	55.8
	No	23	44.2
	Total	52	100.0

Antenatal Check-ups History of the Literate Women during Pregnancy

The check-up history found that the majority of gestational age group were from 2nd trimester participants. Most of the participants (96.2%) attended antenatal check-ups during current pregnancy. The study also found that 86.5% were not having anemia before pregnancy and the rest 13.5% experienced anemia before pregnancy. The rate of heavy period were experienced by 67.3% of participants and 32.7% didn't experience. [According to Table 3]

Table 3: Antenatal Condition of the Literate Pregnant Women Attended ANC at MCHTI

Variable	Category	Frequency	Percent (%)
Gestational Age	1 st trimester	16	30.8
	2 nd trimester	19	36.5
	3 rd trimester	17	32.7

	Total	52	100.0
Antenatal Check-ups History during Current Pregnancy	Yes	56	96.2
	No	2	3.8
	Total	52	100.0
Past Anemia History	Yes	7	13.5
	No	45	86.5
	Total	52	100.0
Heavy Period	Yes	35	67.3
	No	17	32.7
	Total	52	100.0

Nutritional Status and Dietary Habits of the Literate Women during Pregnancy

The study found majority of literate women's (73.1%) were having normal nutritional status in accordance with their BMI. The majority (65.4%) took 4-5 meals per day. The rates of not taking iron supplementation during pregnancy were 59.6% among the literate women. [According to Table 4]

Table 4: Nutritional Status and Dietary Pattern of the Literate Pregnant Women Attended ANC at MCHTI.

Variable	Category	Frequency	Percent (%)
BMI	<18.5	8	15.4
	18.5-24.9	37	71.2
	25-29.9	7	13.5
	Total	52	100.0
Nutritional Status	Underweight	8	15.4
	Normal	38	73.1
	Overweight	6	11.5
	Total	52	100.0
Number of Meal	3 meals	18	34.6

taken per day	4-5 meals	34	65.4
	Total	52	100.0
Taking Iron Supplementation	Yes	21	40.4
	No	31	59.6
	Total	52	100.0

Correlation of Hemoglobin Level with Different Variables

The following tables show that the variables are positively associated with each other where the p value are respectively 0.001, 0.018, 0.009, 0.042, 0.001, 0.037, 0.050, 0.004, 0.006 and 0.001 for family income per month, previous anemia history, menstrual history, dietary history, iron supplementation, red meat, lentils, banana, orange and pomegranate accordingly. Correlations are significant at the level (2-tailed) as follows- 0.01, 0.05, 0.01, 0.05, 0.01, 0.05, 0.05, 0.01, 0.01 and 0.01. Therefore it means that the variables has strong impact on the haemoglobin level and statistically significant.

Table 5: Correlation between Family Income and Hemoglobin Level of the Literate Pregnant Women Attended ANC at MCHTI

Correlations		
Variables	Pearson Correlation	Sig. (2-tailed)
Family Income per month	.482**	.001
Hemoglobin Level		
**. Correlation is significant at the 0.01 level (2-tailed).		

This table shows that family income and haemoglobin level are positively associated with each other where the p value is 0.001. Correlation is significant at the 0.01 level (2-tailed). Therefore it means that family income per month has strong impact on the haemoglobin level and statistically significant.

Table 6: Correlation between Previous Anemia History and Hemoglobin Level of the Literate Pregnant Women Attended ANC at MCHTI

Correlations		
Variables	Pearson Correlation	Sig. (2-tailed)
Previous Anemia History	.327*	.018
Hemoglobin Level		
*. Correlation is significant at the 0.05 level (2-tailed).		

This table shows that previous anemia history and haemoglobin level are positively associated with each other where the p value is 0.018. Correlation is significant at the 0.05 level (2-tailed). Therefore it means that previous anemia history has strong impact on the haemoglobin level and statistically significant.

Table 7: Correlation between Menstrual History and Hemoglobin Level of the Literate Pregnant Women Attended ANC at MCHTI

Correlations		
Variables	Pearson Correlation	Sig. (2-tailed)
Heavy Period	.360**	.009
Hemoglobin Level		
**. Correlation is significant at the 0.01 level (2-tailed).		

This table shows that heavy period and haemoglobin level are positively associated with each other where the p value is 0.009. Correlation is significant at the 0.01 level (2-tailed). Therefore it means that heavy period has strong impact on the haemoglobin level and statistically significant.

Table 8: Correlation between Dietary Pattern and Hemoglobin Level of the Literate Pregnant Women Attended ANC at MCHTI

Correlations		
Variables	Pearson Correlation	Sig. (2-tailed)
Number of Meal taken per day	.283*	.042
Hemoglobin Level		
*. Correlation is significant at the 0.05 level (2-tailed).		

This table shows that the number of meal taken per day and haemoglobin level is positively associated with each other where the p value is 0.042. Correlation is significant at the 0.05 level (2-tailed). Therefore it means that the number of meal taken per day has strong impact on the haemoglobin level and statistically significant.

Table 9: Correlation between Iron Supplementation and Hemoglobin Level of the Literate Pregnant Women Attended ANC at MCHTI

Correlations		
Variables	Pearson Correlation	Sig. (2-tailed)
Taking Iron Supplementation	-.455**	.001
Hemoglobin Level		
**. Correlation is significant at the 0.01 level (2-tailed).		

This table shows that iron supplementation and haemoglobin level are positively associated with each other where the p value is 0.001. Correlation is significant at the 0.01 level (2-tailed). Therefore it means that iron supplementation has strong impact on the haemoglobin level and statistically significant.

Correlation of Haemoglobin Level with Different Food Groups

Table 10: Correlation between Red Meat and Hemoglobin Level of the Literate Pregnant Women Attended ANC at MCHTI

Correlations		
Variables	Pearson Correlation	Sig. (2-tailed)
Red Meat	-.290 [*]	.037
Hemoglobin Level		
*. Correlation is significant at the 0.05 level (2-tailed).		

This table shows that red meat and haemoglobin level are positively associated with each other where the p value is 0.037. Correlation is significant at the 0.05 level (2-tailed). Therefore it means that red meat has strong impact on the haemoglobin level and statistically significant.

Table 11: Correlation between Lentils and Hemoglobin Level of the Literate Pregnant Women Attended ANC at MCHTI

Correlations		
Variables	Pearson Correlation	Sig. (2-tailed)
Lentils	-.274 [*]	.050
Hemoglobin Level		
*. Correlation is significant at the 0.05 level (2-tailed).		

This table shows that lentils and haemoglobin level are positively associated with each other where the p value is 0.050. Correlation is significant at the 0.05 level (2-tailed). Therefore it means that lentils have strong impact on the haemoglobin level and statistically significant.

Table 12: Correlation between Banana and Hemoglobin Level of the Literate Pregnant Women Attended ANC at MCHTI

Correlations		
Variables	Pearson Correlation	Sig. (2-tailed)
Banana	-.397**	.004
Hemoglobin Level		
**. Correlation is significant at the 0.01 level (2-tailed).		

This table shows that banana and haemoglobin level are positively associated with each other where the p value is 0.004. Correlation is significant at the 0.01 level (2-tailed). Therefore it means that banana has strong impact on the haemoglobin level and statistically significant.

Table 13: Correlation between Orange and Hemoglobin Level of the Literate Pregnant Women Attended ANC at MCHTI

Correlations		
Variables	Pearson Correlation	Sig. (2-tailed)
Orange	-.373**	.006
Hemoglobin Level		
**. Correlation is significant at the 0.01 level (2-tailed).		

This table shows that orange and haemoglobin level are positively associated with each other where the p value is 0.006. Correlation is significant at the 0.01 level (2-tailed). Therefore it means that orange has an impact on the haemoglobin level and statistically significant.

Table 14: Correlation between Pomegranate and Hemoglobin Level of the Literate Pregnant Women Attended ANC at MCHTI

Correlations		
Variables	Pearson Correlation	Sig. (2-tailed)
Pomegranate	-.450**	.001
Hemoglobin Level		
**. Correlation is significant at the 0.01 level (2-tailed).		

This table shows that pomegranate and haemoglobin level are positively associated with each other where the p value is 0.001. Correlation is significant at the 0.01 level (2-tailed). Therefore it means that pomegranate has strong impact on the haemoglobin level and statistically significant.

Frequency of Different Variables

Table 15: Frequency of Participant's Age

Variable	Category	Frequency	Percent (%)
Age	<18	9	17.3
	18-24	12	23.1
	25-29	20	38.5
	30-34	8	15.4

This table shows that the majority of participants were aged in between 25 and 29 (38.5%).

Table 16: Frequency of Educational Background

Variable	Category	Frequency	Percent (%)
Educational Background	Secondary	33	63.5
	Above secondary	19	36.5
	Total	52	100.0

This table shows that the majority of participant's educational background were secondary level (63.5%).

Table 17: Frequency of Family Income per month

Variable	Category	Frequency	Percent (%)
Family Income per month	<10000	1	1.9
	10000-20000	25	48.1
	20000-30000	17	32.7
	>30000	9	17.3

This table shows that the majority of participant's family income range per month in between 10,000 and 20,000 taka (48.1%).

Table 18: Frequency of Family Member

Variable	Category	Frequency	Percent (%)
Family Member	1-2 members	34	65.4
	4-6 members	16	30.8
	7-10 members	2	3.8
	Total	52	100.0

This table shows that the majority of participants family member were in between 1 and 2 members (65.4%).

Table 19: Frequency of Miscarriage/Abortion

Variable	Category	Frequency	Percent (%)
Miscarriage or Abortion History	Miscarriages	11	21.2
	Abortion	1	1.9
	No	40	76.9
	Total	52	100.0

This table shows that the majority of participants experienced none of miscarriage or abortion (76.9%).

Table 20: Frequency of Uses of Contraceptive

Variable	Category	Frequency	Percent (%)
Contraceptive Use	Yes	29	55.8
	No	23	44.2
	Total	52	100.0

This table shows that the majority of participant's usages of contraceptive were (55.8%).

Table 21: Frequency of Gestational Age

Variable	Category	Frequency	Percent (%)
Gestational Age	1 st trimester	16	30.8
	2 nd trimester	19	36.5
	3 rd trimester	17	32.7
	Total	52	100.0

This table shows that the majority of participant's gestational age was 2nd trimester (36.5%).

Table 22: Frequency of Inter-pregnancy Interval

Variable	Category	Frequency	Percent (%)
Inter-pregnancy Interval	1 year	8	32.0
	2 years	9	36.0
	3 years	6	24.0
	4 years	2	8.0
	No	27	
	Total	52	100.0

This table shows that the majority of participant's inter-pregnancy interval were 2 years (36.0%) and 27 of them were first time pregnant.

Table 23: Frequency of Previous Anemia History

Variable	Category	Frequency	Percent (%)
Past Anemia history	Yes	7	13.5
	No	45	86.5
	Total	52	100.0

This table shows that the majority of participant's were not anemic before becoming pregnant (86.5%).

Table 24: Frequency of Menstrual History

Variable	Category	Frequency	Percent (%)
Heavy Period	Yes	35	67.3
	No	17	32.7
	Total	52	100.0

This table shows that the majority of participants experienced heavy period (67.3%).

Table 25: Frequency of Menstrual History

Variable	Category	Frequency	Percent (%)
Clots with Period	Yes	27	51.9
	No	25	48.1
	Total	52	100.0

This table shows that the majority of participants experienced clots with period (51.9%).

Table 26: Frequency of Dietary History

Variable	Category	Frequency	Percent (%)
Number of Meal taken per day	3 meals	18	34.6
	4-5 meals	34	65.4
	Total	52	100.0

This table shows that the majority of participants used to have 4-5 meals per day (65.4%).

Table 27: Frequency of Iron Supplementation

Variable	Category	Frequency	Percent (%)
Taking Iron Supplementation	Yes	21	40.4
	No	31	59.6
	Total	52	100.0

This table shows that the majority of participants were not taking iron supplements (59.6%).

Table 28: Frequency of Body Mass Index

Variable	Category	Frequency	Percent (%)
BMI	<18.5	8	15.4
	18.5-24.9	37	71.2
	25-29.9	7	13.5
	Total	52	100.0

This table shows that the majority of participant's body mass indexes were in between 18.5 and 24.9 (71.2%).

Table 29: Frequency of Nutritional Status

Variable	Category	Frequency	Percent (%)
Nutritional Status	Underweight	8	15.4
	Normal	38	73.1
	Overweight	6	11.5
	Total	52	100.0

This table shows that the majority of participant's nutritional status was normal (73.1%).

Table 30: Frequency of Severity of Anemia

Variable	Category	Frequency	Percent (%)
Grading of Severity of Anemia	Mild anemia	17	32.7
	Moderate anemia	6	11.5
	Severe anemia	2	3.8
	No anemia	27	51.9
	Total	52	100.0

This table shows that the majority of participants were not anemic (51.9%). Among the anemic participants, majority were mild anemic (32.7%).

Table 31: Frequency of Iron Rich Food (Red Meat)

Variable	Category	Frequency	Percent (%)
Red Meat	3-6 times per week	1	1.9
	1-2 times per week	14	26.9
	2-3 times per month or less	29	55.8
	Never	8	15.4
	Total	52	100.0

This table shows that the majority of participants took red meat 2-3 times per month or less (55.8%).

Table 32: Frequency of Iron Rich Food (Liver)

Variable	Category	Frequency	Percent (%)
Liver	1-2 times per week	24	46.2
	2-3 times per month or less	26	50.0
	Never	2	3.8
	Total	52	100.0

This table shows that the majority of participants took liver 2-3 times per month or less (50.0%).

Table 33: Frequency of Iron Rich Food (Banana)

Variable	Category	Frequency	Percent (%)
Banana	>1/d	10	19.2
	1/d	26	50.0
	3-6 times per week	11	21.2
	1-2 times per week	4	7.7
	2-3 times per month or less	1	1.9
	Total	52	100.0

This table shows that the majority of participants took banana once per day (50.0%).

Table 34: Frequency of Iron Rich Food (Pomegranate)

Variable	Category	Frequency	Percent (%)
Pomegranate	3-6 times per week	1	1.9
	1-2 times per week	10	19.2
	2-3 times per month or less	33	63.5
	Never	8	15.4
	Total	52	100.0

This table shows that the majority of participants took pomegranate 2-3 times per month or less (63.5%).

Table 35: Frequency of Vitamin C Rich Food (Orange)

Variable	Category	Frequency	Percent (%)
Orange	3-6 times per week	6	11.5
	1-2 times per week	19	36.5
	2-3 times per month or less	25	48.1
	Never	2	3.8
	Total	52	100.0

This table shows that the majority of participants took orange 2-3 times per month or less (48.1%).

Table 36: Frequency of Vitamin C Rich Food (Lemon)

Variable	Category	Frequency	Percent (%)
Lemon	>1/d	16	30.8
	1/d	17	32.7
	3-6 times per week	8	15.4
	1-2 times per week	8	15.4
	2-3 times per month or less	3	5.8
	Total	52	100.0

This table shows that the majority of participants took lemon once per day (32.7%).

Table 37: Frequency of Calcium Rich Food

Variable	Category	Frequency	Percent (%)
Milk	>1/d	14	26.9
	1/d	27	51.9
	3-6 times per week	4	7.7
	1-2 times per week	1	1.9
	2-3 times per month or less	2	3.8
	Never	4	7.7
	Total	52	100.0

This table shows that the majority of participants had milk once per day (51.9%).

Table 38: Frequency of Drinking Tea

Variable	Category	Frequency	Percent (%)
Tea	>1/d	23	44.2
	1/d	27	51.9
	2-3 times per month or less	1	1.9
	Never	1	1.9
	Total	52	100.0

This table shows that the majority of participants had tea once per day (51.9%).

Table 39: Frequency of Drinking Coffee

Variable	Category	Frequency	Percent (%)
Coffee	1/d	2	3.8
	3-6 times per week	10	19.2
	1-2 times per week	15	28.8
	2-3 times per month or less	19	36.5
	Never	6	11.5
	Total	52	100.0

This table shows that the majority of participants had coffee 2-3 times per month or less (36.5%).

Discussion

This report has been conducted to assess the prevalence and impact of anemia among literate pregnant women. From the study it has been found that the prevalence of anemia is 48.1% in the literate pregnant women. That means, almost half of the targeted participants were being anemic during pregnancy. Among these anemic pregnant women, most of them were suffering from mild anemia and then after moderate anemia were also be seen. A few of them also experienced severe anemia as well.

In Bangladesh most of the people are living under poverty line. Because of poverty they do not get proper food to regulate normal body function. Women who are literate are mostly suffering from anemia due to lack of adequate nutritional knowledge, poor diet as well. Though they are educated but they suffer from anemia due to intestinal disorder, inadequate diet, poverty, iron supplementation, vitamins and mineral malabsorption, heavy menstruation etc.

While conducting the study, the author found that the anemic pregnant women were being suffered mostly for two reasons. One is inadequacy of iron in the body and another one is malabsorption of iron in the body. Some of the participants were not taking sufficient foods and its results in lack of iron in their body that caused them being anemic. There are also some participants those were taking foods regularly but also being anemic due to malabsorption of iron in their body. The study found that most of the participants were not taking vitamin c enriched foods and as a consequence it hampers proper iron absorption. It is necessary to note that vitamin c enriched foods significantly helps iron absorption and it was unknown to most of the participants.

Having a poor socio-economic condition were the significant cause behind being anemic in most of the cases. It also associated with inadequate nutritional knowledge although half of the targeted participants were literate.

Inadequate iron supplementation is another prominent cause of anemia among literate pregnant women. Majority of the participants were not taking iron supplements which may result in being anemic.

Most of the participants used to have a tendency and gradually it became their habit to drink tea and coffee more often. They had lack of nutritional knowledge as they didn't know it may affect the absorption of iron.

In a study conducted in Ethiopia found that the cause of Anemia in most of the developing countries are multifactorial and is also associated with nutritional deficiencies. Alike Bangladesh, the study conducted on the literate pregnant women also signify the cause. Here, the anemic patients were suffering from poverty, heavy period, inadequate diet, lack of adequate nutritional knowledges etc. In Ethiopia, the prevalence rate of anemia found to be 14.9 % among 319 respondents. This paper indicates the prevalence rate of anemia in Bangladesh is 48.1% among the literate pregnant women. In both cases, iron supplementations were significantly associated with anemia.

CHAPTER FIVE

CONCLUSION

Conclusion

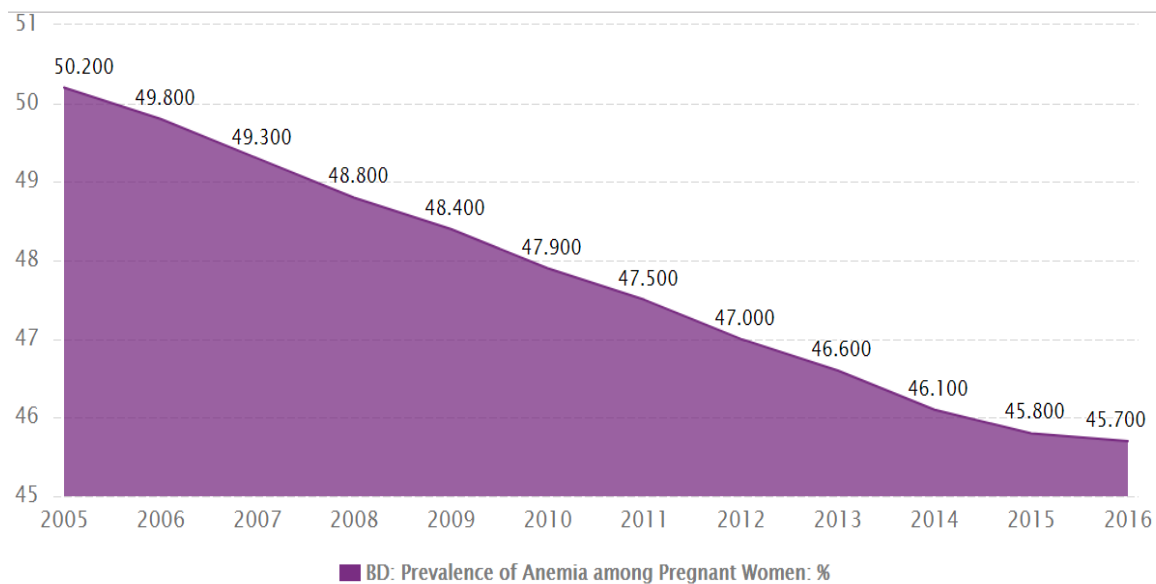
Anemia is one of the major sufferings of pregnant women in developing countries. This study was conducted particularly given much focus on the literate women in Bangladesh and the reasons of being anemic. The study found the reasons that affects and the causes that makes anemic is multifactorial and its consequences is even wide ranged. Moreover, as a developing country, Bangladesh has long been trying to improve the maternal health and to reduce the maternal mortality rate. Being Anemic has quite severe impact on the maternal health and therefore it needs serious attention. The government of Bangladesh has working on taking related policy framework in diminishing the rate of Anemia in both rural and urban areas. Though the study focused on urban population, it found the number of literate women has also been suffering quite severely. Therefore, it raises much attention regarding the probability of being suffering from Anemia of illiterate women during pregnancy in both rural and urban areas. This study could be helpful in getting attention to raise awareness and help taking government steps in alleviating Anemia and improving maternal health as well. Notably, the study would also help to get necessary information regarding the anemic patient's dietary patterns in Bangladesh that unleash the poor condition of the maternal health.

REFERENCE

- Ahmed, F. (2000). Anaemia in Bangladesh: a review of prevalence and aetiology. *Public Health Nutrition*, 385-393.
- Anemia Prevalence, Causes, and Consequences*. (2018, November 20). Retrieved from Toolkits: <https://www.k4health.org/toolkits/anemia-prevention/anemia-causes-prevalence-impact>
- Bellal Hossain, T. S. (2018). Nutritional Status of Pregnant Women in Selected Rural and Urban Area of Bangladesh. *Journal of Nutrition & Food Sciences*, 2.
- Bizuneh Ayano, B. A. (2018). Assessment of Prevalence and Risk Factors for Anemia Among Pregnant Mothers Attending Anc Clinic at Adama Hospital Medical Collage, Adama, Ethiopia, 2017. *Journal of Gynecology and Obstetrics*, 31-39.
- Faruk Ahmed, M. R. (2018). Anemia and iron deficiency in rural Bangladeshi pregnant women living in areas of high and low iron in groundwater. *Nutrition*, 46-49.
- Mayo Clinic Staff. (2018, November 23). *Anemia*. Retrieved from Mayo Clinic: <https://www.mayoclinic.org/diseases-conditions/anemia/symptoms-causes/syc-20351360>
- Naila Baig-Ansari, S. H. (2018, November 21). *Anemia prevalence and risk factors in pregnant women in an urban area of Pakistan*. Retrieved from NCBI: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3,917507/>
- Srilatha, J. (2017). Prevalence of anemia in pregnant mothers and their outcome: a study. *International Journal of Reproduction, Contraception, Obstetrics and Gynecology*, 4886-4889.
- WHO. (2018, November 25). *WHO recommendation on the method for diagnosing anaemia in pregnancy*. Retrieved from WHO Reproductive Health Library: <https://extranet.who.int/rhl/topics/preconception-pregnancy-childbirth-and-postpartum-care/antenatal-care/who-recommendation-method-diagnosing-anaemia-pregnancy>

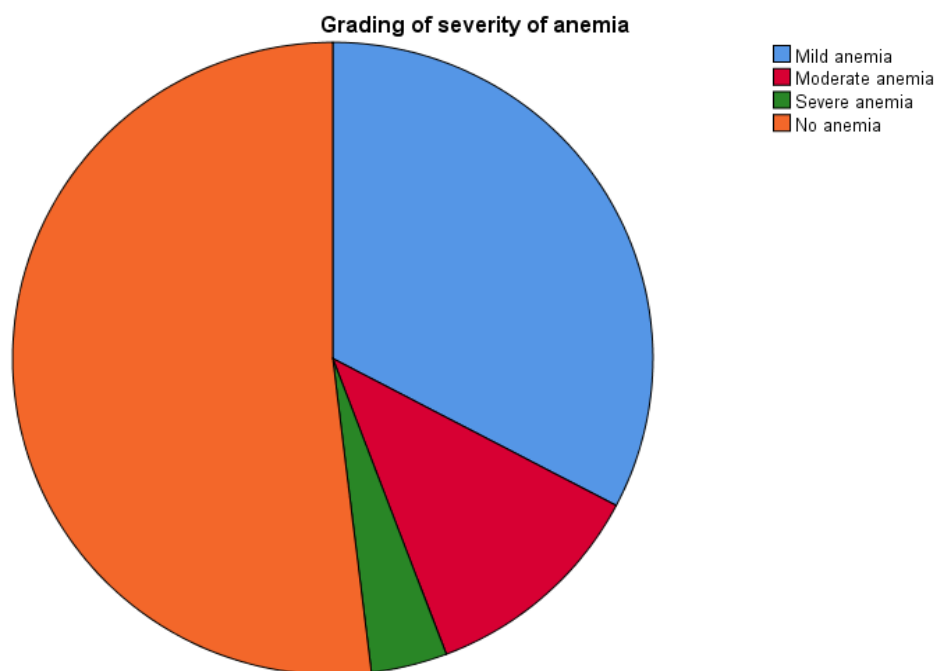
APPENDICES

Appendix 1

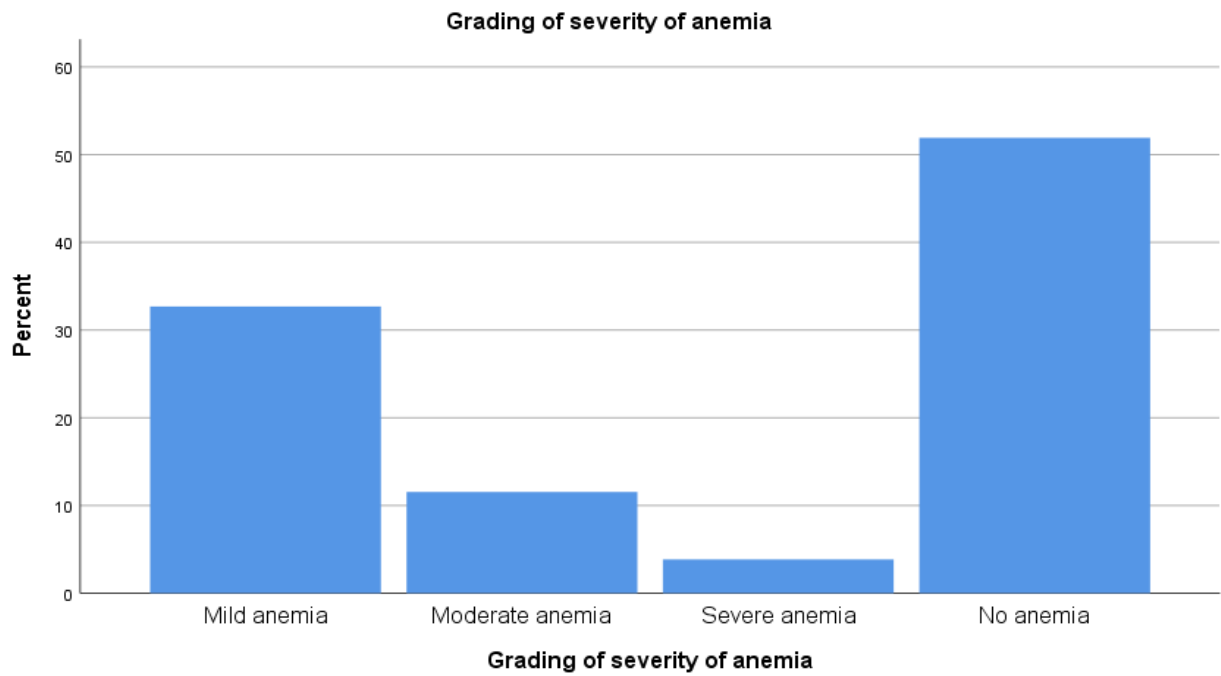


Source: Online Article.

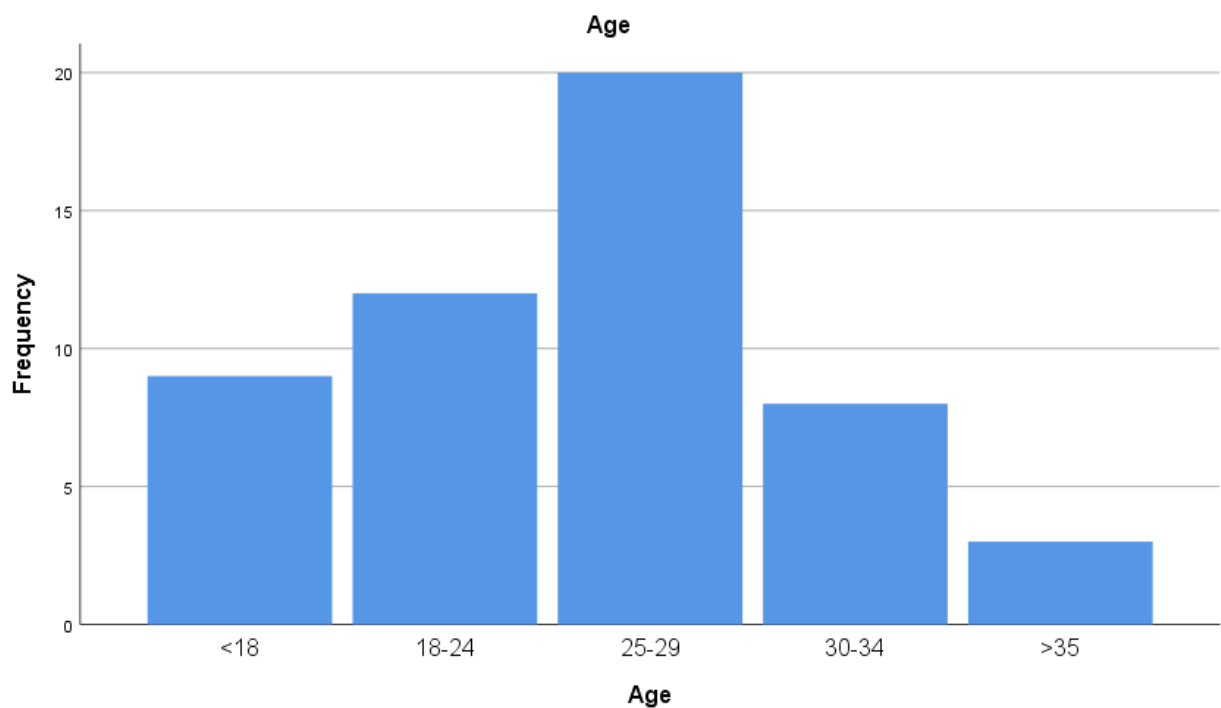
Appendix 2



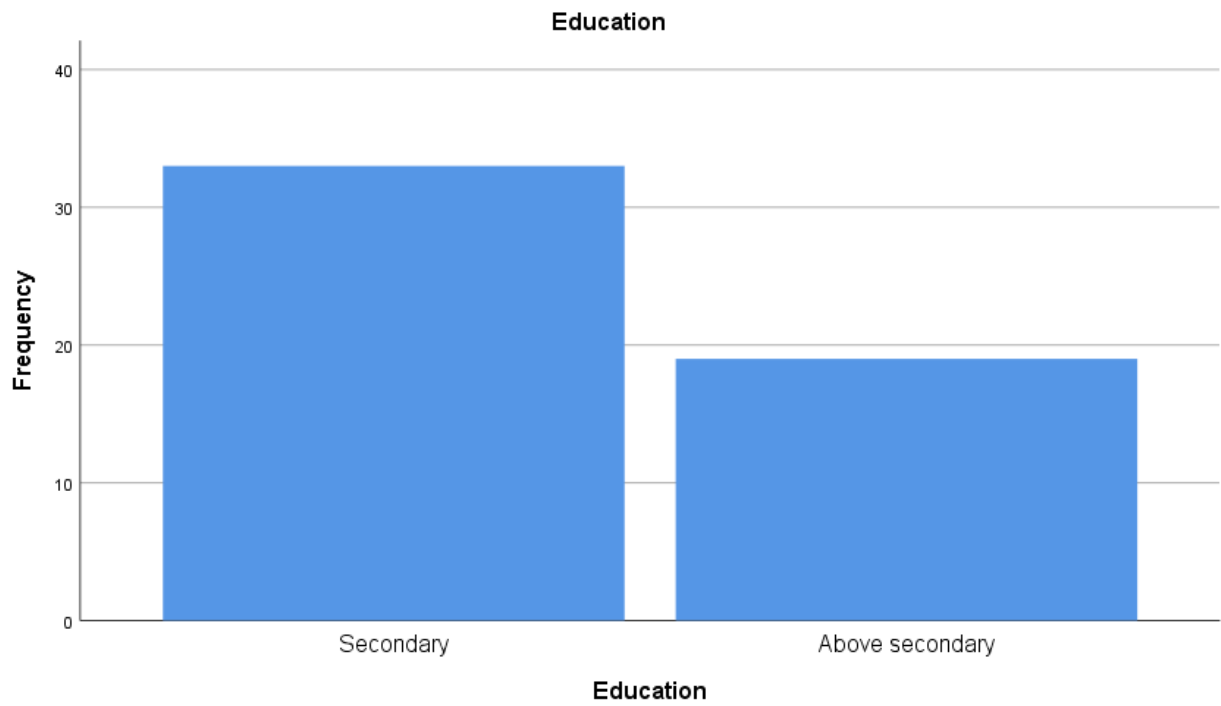
Appendix 3



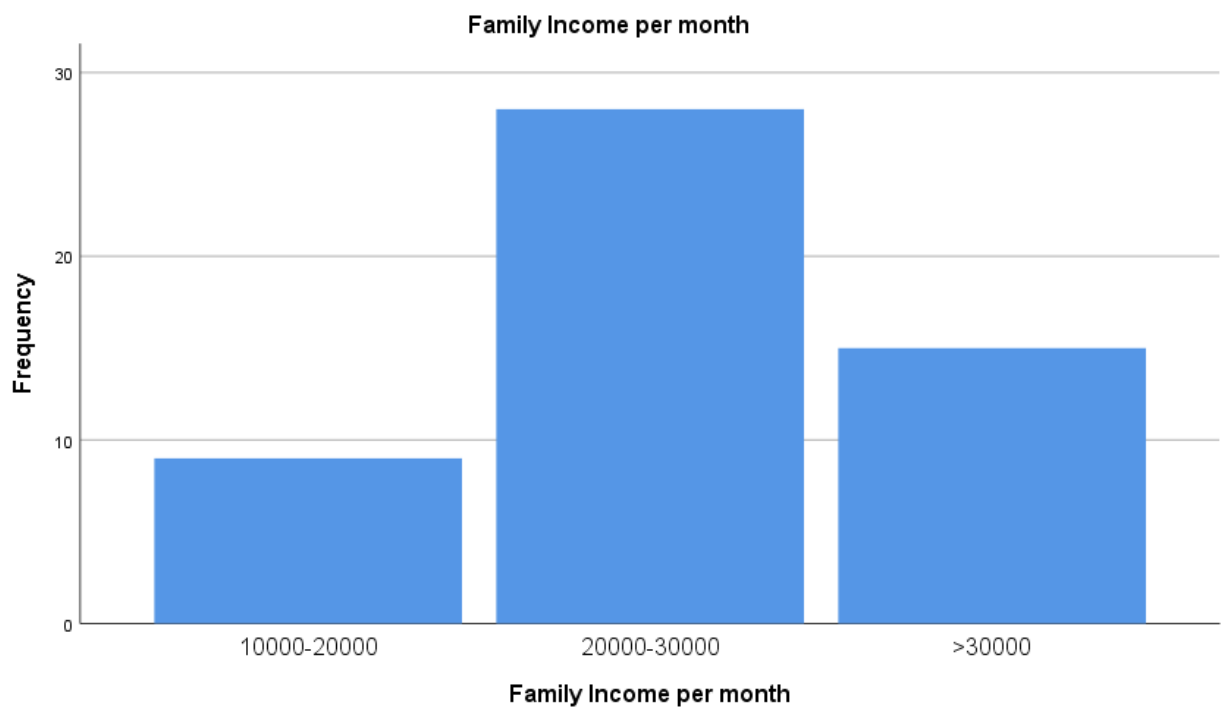
Appendix 4



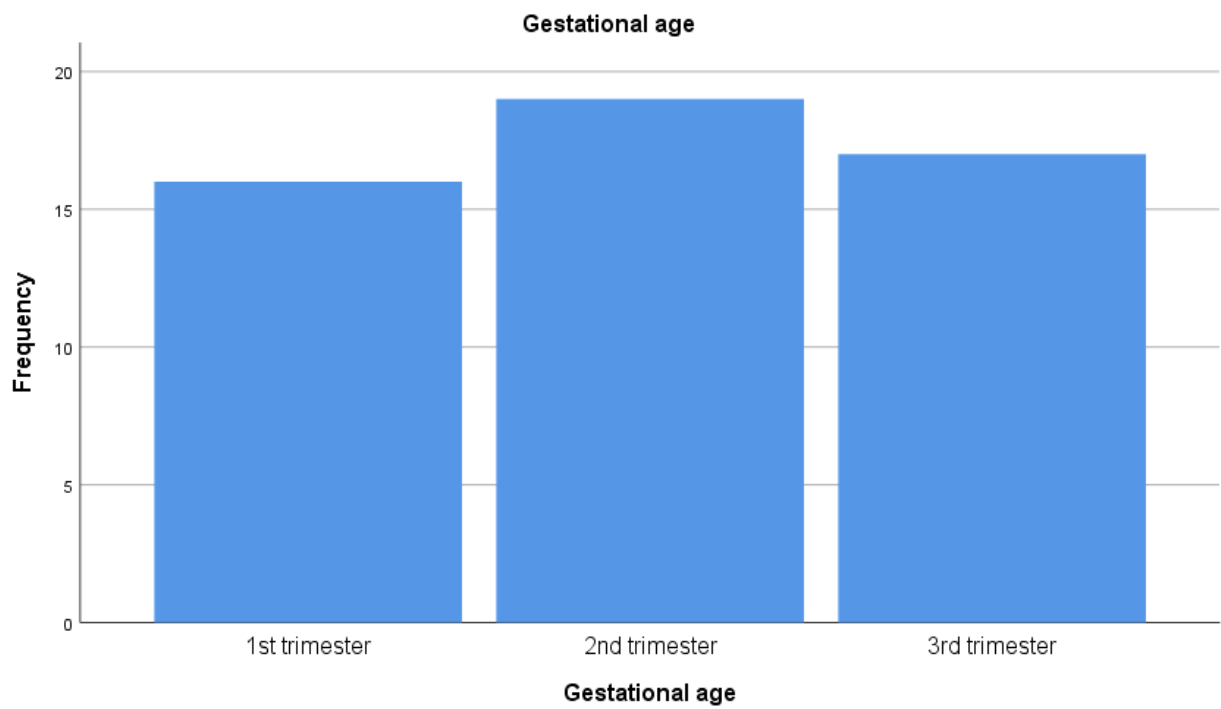
Appendix 5



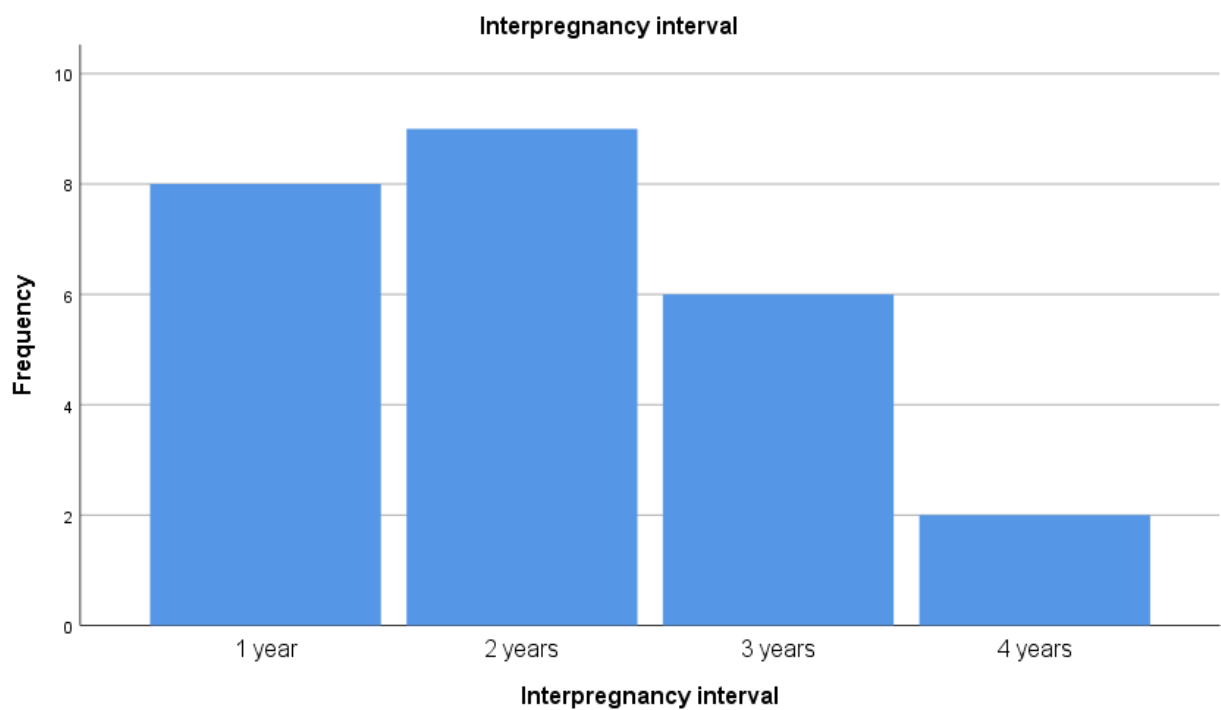
Appendix 6



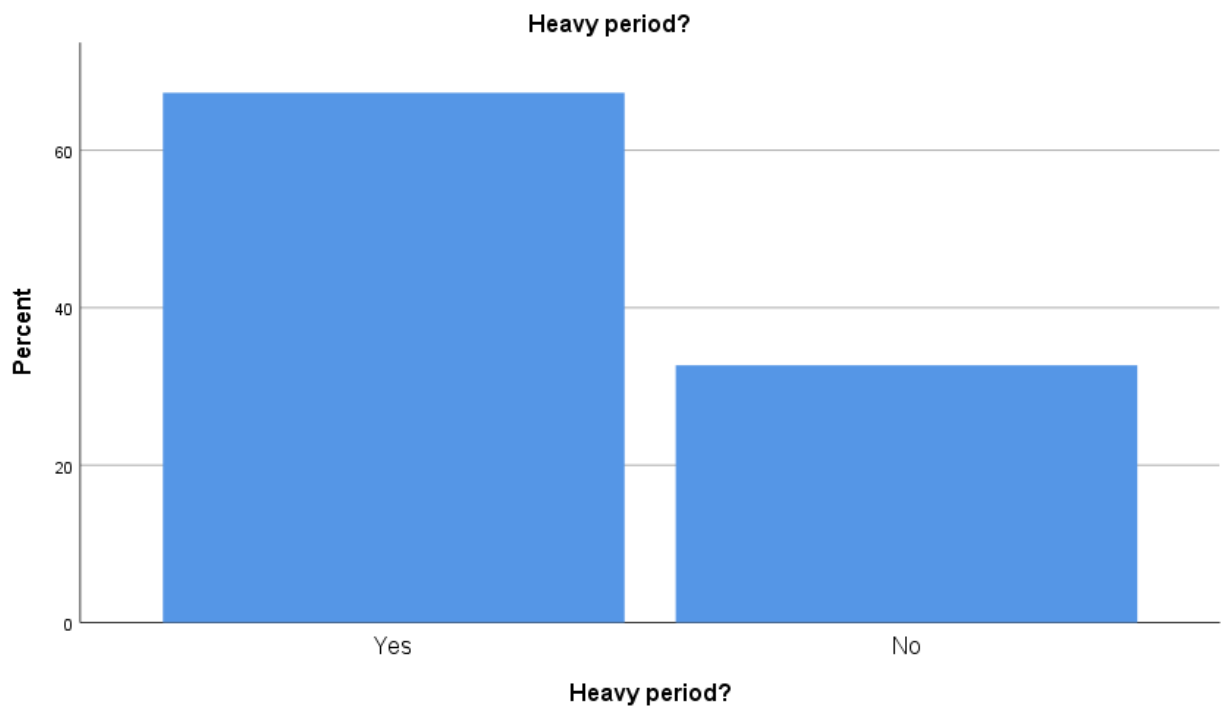
Appendix 7



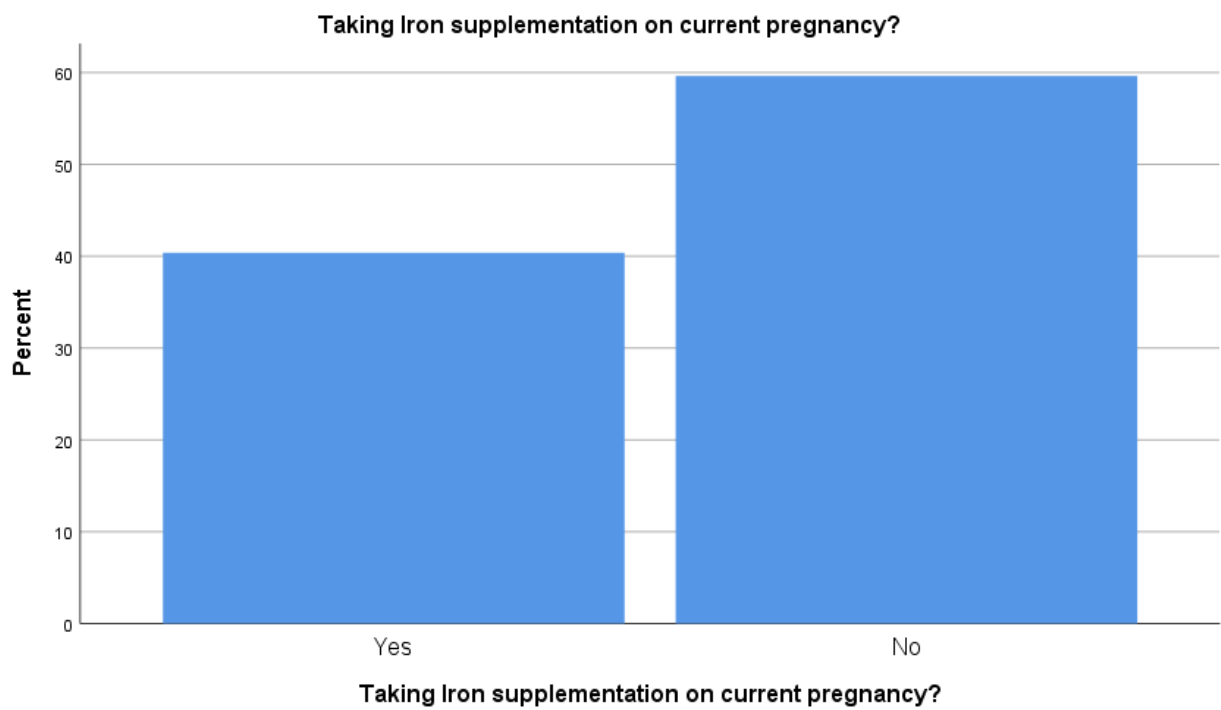
Appendix 8



Appendix 9



Appendix 10



Appendix 11

Questionnaire

**Assessment of the Prevalence of Anemia of Literate Pregnant Women Attending
Tertiary Level Hospitals in Dhaka City**

1. Interviewee and Interviewer Details:

1.1. Name of the Hospital: -----

1.2. Address: -----

1.3. Name of Interviewer: -----

1.4. Type of Resident: Slum / Non-slum

1.5. Start time of Interview: ----- : -----

(Use 24 hours format) HH : MM

1.6. Date of Interview: -----/-----/-----

 Day Month Year

2. Background characteristics and Socio economic characteristics:

2.1. Age: 16-20 years/21-25 years/26-30 years/>30 years

2.2. Religion (√): Islam / Hindu / Christian / Buddhism

2.3. Educational background: Illiterate/ Primary/ Secondary/Above secondary

2.4. Occupation (√): Housewife/Job holder/Agriculture/Other

2.5. Husband's occupation (√): Job holder/Business/Day labor/Rickshaw puller/Other

2.6. Is there any other earning member of your family?

- Yes
- No

2.7. Family Income per month: <10000/10000-20000/20000-30000/>30000

2.8. Family type (√): Joint/Nuclear

2.9. No. of Family members (√):

- 1-2 members
- 4-6 members
- 7-10 member
- More than 10 members

2.10. What is your socioeconomic condition? Good/Very good/Bad /Very bad

3. Reproductive history:

3.1. Marital status (√): Married / Unmarried / Widow / Other

3.2. How old were you when you got married: ----- (completed years)

3.3. Do you have any child?

- Yes
- No

3.4. If yes, then how many: -----

3.5. Did you ever?

- Miscarriages
- Abortion
- Still birth
- No

3.6. Contraceptive use?

- Yes
- No

4. Antenatal related information:

4.1. Gestational age (√): 1st trimester / 2nd trimester / 3rd trimester

4.2. Weeks of Pregnancy: 12-18 weeks/19-28 weeks/29-34 weeks/35-40 weeks

4.3. Do you have any antenatal checkups during current pregnancy?

- Yes
- No

If Yes,

4.4. How many times taken your antenatal checkups?

- 1 times
- 3 times
- 5 times
- 8 times

4.5. Inter-pregnancy interval (√): 1 year/2years/3years/4years/>5 years

4.6. Birth interval between the last and current Pregnancy (√):

- <2 year
- >2years

4.7. Place of delivery of previous pregnancy (√): Home/ Hospital

4.8. ANC follow-up in previous pregnancy?

- Yes
- No

4.9. Did you have anemia before pregnancy?

- Yes
- No

4.10. Do you ever donated blood?

- Yes
- No

4.11. Menstrual history:

a. Heavy period?

- Yes
- No

b. Clots with period?

- Yes
- No

4.12. Bleeding on current pregnancy?

- Yes
- No

4.13. Have Any Blood disorders?

- Yes
- No

4.14. Past history of IDA?

- Yes
- No

4.15. Chronic diseases?

- Yes
- No

4.16. Malaria infection?

- Yes
- No

4.17. Helminthic Infestation?

- Yes
- No

4.18. Immunized?

- Yes
- No

4.19. Other Complications (√): Yes/No

If Yes,

4.20. What kind of disease you suffer from?

- Heart problem
- Hypertension
- Ulcer
- Kidney disease
- Diabetic
- Other

5. Food security:

5.1. In the past four weeks, did you ever worry that your household would not have enough food due to lack of resources or money to buy food?

- Yes
- No

5.2. How often did this happen?

- Once or twice in a week
- Three to ten times in a week
- More than ten times in a week

5.3. No of meal you taken per day?

- 1 meal
- 2meals
- 3meals

- 4-5 meals

5.4. Dieting?

- Yes
- No

5.5. Taking Iron supplementation on current pregnancy?

- Yes
- No

5.6. Do you face any food insecurity within last 12 months?

- Yes
- No

6. Physical activities:

6.1. Did you perform physical activity?

- Yes
- No

6.2. Physical Activity Level (√): Light / Moderate / Heavy

6.3. How did you spend your leisure time?

- Watching television
- Listening radio
- Social network
- Other(Specify)

6.4. Exercises?

- Yes
- No

6.5. Do you watch various health nutritional program on television?

- Yes
- No

7. Measurement:

7.1. Height: 4'9''-5'2''/5'3''-5'5''/5'5''-5'7''

7.2. Weight: <50/50-55/56-60/61-65

7.3. BMI: <18.5 / 18.5-24.9 / 25-29.9 / ≥ 30

7.4. BMR: -----

7.5. Nutritional Status (√): Underweight / Normal / Overweight / Obese

(Underweight: BMI is less than 18.5, Normal: BMI is 18.5 to 24.9, Overweight: BMI is 25 to 29.9, Obese: BMI is 30 or more)

7.6. Blood Group: A+/B+/O+/AB+/O- (ve)

7.7. Husband's Blood Group: A+/B+/O+/AB+/O- (ve)

7.8. Diagnosis Report of biochemical analysis:

- Hemoglobin level: _____g/dL

7.9. Grading of severity of anemia:

- Mild anemia (10-10.9 g/dL)
- Moderate anemia (7-9.9 g/dL)
- Severe anemia (<7 g/dL)

8. Food Frequency Questionnaire

For each item indicate with a check mark (√) the category that best describes the frequency with which you usually eat that particular food.

Food Item	>1/d	1/d	3-6 times/wk	1-2/wk	2-3/mth or less	Never
Red meat						

Poultry						
Fish(Shing, tuna)						
Liver						
Kidney						
Eggs						
Legumes						
Lentils						
Nuts and Seeds(Pumpkin seeds)						
Beans(Soybeans) & Peas(Chickpeas)						
Dried Fruits(Dates and Raisins)						
Whole-Grain (Oatmeal, Brown Rice. Bread, Cereals, Pasta)						
Baked Potatoes and Sweet Potatoes						
Spinach						
Broccoli						
Cauliflower						
Carrots						
Pumpkins						

Beetroot						
Dark Green Leafy Vegetables						
Apples						
Bananas						
Pomegranate						
Watermelon						
Figs						
Papayas						
Pears						
Oranges						
Grapefruits						
Berries						
Bell Paper						
Horlicks						
Yogurt						
Milk						
Tea						
Coffee						
Junk foods						
Vitamin C rich food items						
Citrus fruits and juices						

Strawberries						
Oranges						
Tomatoes						
Lemon						
Melon						
Leafy greens						

<i>Other foods not listed that are eaten regularly</i>						
1. -----						
2. -----						
3. -----						
4. -----						
5. -----						
6. -----						
7. -----						
8. -----						
9. -----						
10. -----						

Thanks for giving your valuable time

