University of Hargiesa
Faculty of Applied science
Department of nutrition and food science

TITLE: FOLIC ACID AND ANEMIA IN PREGNANCY WOMEN

A Research paper to faculty of applied science
Department of nutrition and food science
Hargeisa, Somaliland

In partial fulfillment of requirement for the bachelor degree

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July 2017
Declaration A

“We here by declared that this research is our original work and has not been presented for a degree or any other academic award in any university or institution of learning”

Student’s name

Ayaan khadar mahamud: ______________________________
Jawahir Mohamed Ahmed: ______________________________
Hodan Saeed Ahmed : ______________________________

Signature

Date
DECLARATION

“I confirm that the work reported in this thesis was carried out by the candidate under my supervision”.

Mr. Hasan Husein Nouh

Supervisor

Signature

Date
Dedication
We dedicated to this book to the patients of Somaliland who suffer from this folic acid and anemia to our family, to our country of Somaliland, to university of Hargeisa especially faculty of applied science department of nutrition and food science.
Acknowledgement
First, we would like to thank ALLAH for the gift of life, wisdom, strength, blessing and being to MUSLIM.

We frankly thank all those who participate this study living in Ahmed Dhagah district and the entire group of respondents of this research. Especially we would like to thank our dear and honorable teacher MR. Hassan Hussein Nuoh who supervises us in a suitable, offering selfless, generous and important advice and guidance through all stages of this research. Also thanks as much who takes part and unforgettable role for written of this research because of utilizing his tool.

We hope to give blessing thanks for our family also We greatly thanking to our friends those supports us the Equipment of writing this book and always making encouragement to rich a bright future.

Finally we will also thankfully acknowledge the university of Hargeisa and its honorable administration, first the president of the university, dean of the faculty of Applied Science and other staffs of the university who allow us the joining and become members of highly appreciated university in Somaliland.
ABSTRACT
Anemia can be defined as a reduction in the hemoglobin, hematocrit or red cell number. In physiologic terms an anemia is any disorder in which the patient suffers from tissue hypoxia due to decreased oxygen carrying capacity of the blood. It is therefore possible for a patient to be physiologically anemic and still have a normal or even raised hemoglobin, hematocrit and or red cell number; this is referred to as a relative anemia.

A knowledge attitude and practice is important to determine the relationship folic acid deficiency in anemia pregnant women in Edna aden hospital.

This cross-sectional study design was conducted on the Edna Aden maternity medical staff. 27 of respondents were selected randomly.

A 27 questionnaire I prepared and mainly targeted medical stuff.

The highest estimated prevalence observed according to the gender where female (93%).

The highest estimated of the medical stuff according to the marital status where more in single but the number of married people where (8%).

The educational levels of the respondents were different, but most of them were university level represents to the percentage of (74%)

This study stays; the highest estimated that the folic acid deficiency in anemia pregnant women is high.
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1. CHAPTER ONE: INTRODUCTION

1.1 Background of the Study.

Globally Folic acid is an essential water soluble B vitamin which has been used for decades in the prevention of folate deficiency anemia of pregnancy. In 1991, folic acid taken prior to the start of pregnancy was shown unequivocally to prevent spina bifida and anencephaly—two of the most serious and common birth (neural tube) defects. Soon governments recommended that women of reproductive age consume folic acid daily to prevent these birth defects. Because compliance was low and since more than half of pregnancies are unplanned, the United States Food and Drug Administration mandated in 1998 that all enriched flour be fortified with folic acid at a concentration estimated to give the average woman an intake of 100 micrograms of folic acid a day. Canada and Chile followed with similar requirements for folic acid fortification of wheat flour. Now there is mandatory fortification in more than 50 countries globally.

In Africa the unified global efforts to mitigate the hidden hunger, in populations around the world are crucial to the achievement of most of the Millennium Development Goals (MDGs). A number of countries in sub-Saharan Africa, as well as India and Afghanistan, had an alarmingly high level of hidden hunger, with stunting, iron deficiency anemia, and vitamin A deficiency all being highly prevalent. In 36 countries, deficiencies of micronutrients were responsible for 1.5-12% of the total DALYs.

In Somalia Folic acid deficiency is caused by a range of factors including the consumption of predominantly cereal based diets, which are missing key vitamins such as vitamin B9 and minerals. Although children may seem healthy as they are not very thin, these underlying deficiencies mean these children are still malnourished. The required nutrient rich foods, such as meat, eggs, fish, vegetables and fruits foods are often too expensive for poor households to buy and the problem is further exacerbated by inadequate health care and sanitation, disease and a lack of appropriate infant and young child feeding”, said Grainne Moloney, Chief Technical Adviser of the FSNAU, adding that the levels of folic acid deficiency Somalia are amongst the highest in Africa”
Globally, anemia is a global public health problem affecting both developing and developed countries with major consequences for human health as well as social and economic development. It occurs at all stages of the life cycle, but is more prevalent in pregnant women and young children. In 2002, iron deficiency anemia (IDA) was considered to be among the most important contributing factors to the global burden of disease. Anemia is one of the most commonly encountered medical disorders during pregnancy. In developing countries, it is a cause of serious concern as, besides many other adverse effects on the mother and the fetus, it contributes significantly high maternal mortality.

According to the United Nations declaration 1997, anemia is a major public health problem that needs total elimination. It is estimated that globally, two billion people suffer from anemia or iron deficiency. According to World Health Organization estimates, up to 56% of all women living in developing countries are anemic. In India, National Family Health Survey 2 in 1998 to 1999 shows that 54% of women in rural and 46% women in urban areas are anemic. The relative prevalence of mild, moderate, and severe anemia are 13%, 57% and 12% respectively in India (ICMR data). According to WHO, hemoglobin level below 11 gm/dl in pregnant women constitutes anemia and hemoglobin below 7 gm/dl is severe anemia. The Center for Disease Control and Prevention (1990) defines anemia as less than 11 gm/dl in the first and third trimester and less than 10.5 gm/dl in the second trimester. Serum Ferritin of 15 micro gm/L is associated with iron deficiency anemia.

Africa: The analysis performed (1) included 257 surveys conducted between 1990 and 2012, of which 232 (90%) were nationally representative sources. Two-hundred and five sources (80%) had data on women and 224 (87%) had data on children. Of the 194 WHO Member States, estimates of the prevalence of anemia were not made for nine countries because covariate data were not available. Of the remaining 185 countries, 95 (51%) and 101 (55%) had at least one data source for children and women, respectively, covering 82–85% of the global population of children and women. Data were most sparse in the WHO European Region. In contrast, all countries in the WHO South-East Asia Region had at least one data source, as did 78% of countries in the African Region. Data for non-pregnant women and pregnant women were summed and weighted by the prevalence of pregnancy, to generate one value for all women of reproductive age. Although data for non-pregnant women and all women of reproductive age are very similar, they are shown for all three groups of women separately in the tables. The
population covered by survey data at the regional and global level was calculated by summing the population (number of children and women) in countries with survey data and dividing by the total population in all countries in that region or globally. The proportion of the population covered by surveys, by WHO region, was over 90% in the African. Seventeen percent of Ethiopian women in the reproductive age group are anemic and 22% of these women are currently pregnant. Despite its known effect on the population, there is very little data available in the study area. Therefore, this study is aimed at determining the prevalence of anemia in pregnant women and identifying its associated factors in the Somali Region of Eastern Ethiopia.

Anemia in Somalia is caused by a range of factors including frequent exposure to diseases which are often untreated, and the consumption of predominantly cereal based diets, which are missing key vitamins and minerals. Although children may seem healthy as they are not very thin, these underlying deficiencies mean these children are still malnourished. The required nutrient rich foods, such as meat, eggs, fish, vegetables and fruits foods are often too expensive for poor households to buy and the problem is further exacerbated by inadequate health care and sanitation, disease and a lack of appropriate infant and young child feeding”, said Grainne Maloney, Chief Technical Adviser of the FSNAU, adding that the levels of anemia in Somalia are amongst the highest in Africa”. Anemia is a condition that develops when your blood lacks enough healthy red blood cells or hemoglobin. Hemoglobin is a main part of red blood cells and binds oxygen.

**Mortality**

There are a number of observational studies of anemia and maternal mortality from both Africa and Asia. None of these studies attempted to distinguish iron deficiency anemia from other causes of anemia, although several discussed the multiple causes of anemia within their Study population.

**Morbidity**

Which is a part of reproductive morbidity, is generally defined as any illness or injury caused by, aggravated by, or associated with pregnancy or childbirth. Maternal mortality, defined as death during pregnancy or childbirth, or within 42 days after giving birth, can include direct causes (acute problems such as obstetric complications) and indirect causes (problems that
necessarily caused by the pregnancy, but rather aggravated by the pregnant state, such as anemia or malaria).

1.2 Statement of the Problem
Anemia can be defined as a reduction in the hemoglobin, hematocrit or red cell number. In physiologic terms an anemia is any disorder in which the patient suffers from tissue hypoxia due to decreased oxygen carrying capacity of the blood. It is therefore possible for a patient to be physiologically anemic and still have a normal or even raised hemoglobin, hematocrit and or red cell number; this is referred to as a relative anemia.

Sign and symptoms of anemia weakness, anorexia, indigestion, palpitation, sores around the mouth, swelling legs, glossators, stomotitis, edema legs.

Anemia can cause nervousness reduce oxygen transport in the blood causing fatigue, organ dysfunction or damage include heart arrhythmia pregnant women with anemia have and increasing risk for poor pregnant outcomes.

The folic acid anemia is the most common cause in anemia in pregnant women.

No study has been conducted in hargeisa

1.3 purpose of the Study
The main of the study to asses’ folic acid and anemia pregnant women

1.4 Main Objective
The general objectives of this research to correlate the folic acid and anemia pregnant women.

1.5 Specific Object
1. To determine the demographic characteristics /profile of respondents in terms of
   1. Age
   2. Gender
   3. Marital status
   4. Education level
2. To determine level of folic acid
3. To evaluate level of anemia in pregnant women

4. To determine if there is significant relationship between folic acid and anemia

1.6 Research Questions
11. What are the demographic characteristics of the respondents as to:

1. Age?
2. Gender?
3. Marital status?
4. Educational background?
5. What is the level of folic acid?
6. How to evaluate the level of anemia?
7. Is there any significant relationship between the level of folic acid and anemia?

1.7 Scope of the study
This study will be conducted in Hargeisa, Somalia.

Area of study. The Edna Adan University Hospital is situated in Hargeisa, Republic of Somaliland.

1.8 Time scope
In terms of time, data collection for this study took four months from April to July of 2017.

1.9 Significance of the study
This study will have great benefit for many different parts of community in a different ways

To health workers this study will provide apriority to health workers as well as the hospitals find the facts about the folic acid and anemia in pregnant women to manage.

To the government because is the responsible to health of folic acid and anemia in pregnant women and its health by developing the strategy to reduce the incidence of anemia.

To the Future researchers This study will help to the future researchers by give them to the information and glues about their research studies for the matter using as reference This study
will benefit the researcher by helping him acquire practical research skills and will also serve as a partial fulfillment of the requirements for the award of A degree of Nutrition and food science at University of Hargeisa.

1.10 Definition of operation terms
Folic acid: Folic acid is a water-soluble vitamin belonging to the B-complex group of vitamins. Anemia: is a condition that develops when your blood lacks enough healthy red blood cells or hemoglobin.

Deficiency: lack or shortage; a condition characterized by the presence of less than the normal or necessary supply or competence.

Prevention: the keeping of something (such as an illness or injury) from happening.

Essential: indispensable; required in the diet, as essential fatty acids.

Mortality: rate of the death in given population

Morbidity: the number of people being hospitalized
2. CHAPTER TWO: LITERATURE REVIEW

2.1 Concepts, opinions, ideas from Authors/experts
Folic acid [also called folate] can decrease the occurrence of neural tube defects, such as spina bifida and anencephaly, in newborn. It may also help prevent cleft lip, cleft palate and some heart defects (CDC, 2010; peckenpaugh, 2010).

Folic acid deficiency represents a vitamin deficiency that may be due either to an inadequacy of the dietary supply or to an increased requirement. It leads to a number of abnormalities including haematological, neurological and cardiovascular disorders. (Philippe Durand Michel Prost 5 April 1996).

Fortification of food with folic acid to reduce the number of neural tube defects was introduced 10 years ago in North America. Many countries are considering whether to adopt this policy. When fortification is introduced, several hundred thousand people are exposed to an increased intake of folic acid for each neural tube defect pregnancy that is prevented. (A David Smith, HelgRefsum 2008).

Folic acid is an essential water soluble B vitamin which has been used for decades in the prevention of folate deficiency anemia of pregnancy. In 1991, folic acid taken prior to the start of pregnancy was shown unequivocally to prevent spina bifida and anencephaly—two of the most serious and common birth (neural tube) defects. Soon governments recommended that women of reproductive age consume folic acid daily to prevent these birth defects. Because compliance was low and since more than half of pregnancies are unplanned, the United States Food and Drug Administration mandated in 1998 that all enriched flour be fortified with folic acid at a concentration estimated to give the average woman an intake of 100 micrograms of folic acid a day. Canada and Chile followed with similar requirements for folic acid fortification of wheat flour. Now there is mandatory fortification in more than 50 countries globally.
2.2 Theoretical prospective

In the early 1970s Cockburn & Assad generated one of the earliest estimates of the worldwide burden of communicable diseases. In a subsequent review, Bulla & Hitze described the substantial burden of folic acid, with data from 39 countries, Leowski estimated that folic acid deficiency caused 4 million child deaths each year – 2.6 million in pregnant women and 1.4 million in children aged 1–4 years. In the 1990s, also making use of available international data, Garenne et al. further refined these estimates by modelling the association between all-cause mortality in pregnant ladies and the proportion of deaths attributable to anemia. Results revealed that between one-fifth and one-third of deaths in preschool children were due to or associated with anemia. The 1993 World Development Report produced figures showing that anemia caused 30% of all pregnant women deaths.

The increasing focus on the reduction of pregnant mortality arising from the Millennium Declaration and from the Millennium Development Goal (MDG) of “reducing by two-thirds, between 1990 and 2015, the pregnant women mortality rate”, has generated renewed interest in the development of more accurate assessments of the number of deaths in pregnant women by cause. Moreover, the monitoring of the coverage of interventions to control these deaths has become crucial if MDG 4 is to be achieved; thus a more accurate establishment of the causes of deaths in pregnant women becomes crucial. In 2001, WHO established the Child Health Epidemiology Reference Group (CHERG) – a group of independent technical experts, to systematically review and improve data collection, methods and assumptions underlying the estimates of the distribution of the main causes of death for the year 2000? In this paper, we summarize the findings of this group on the morbidity and mortality burden of anemic pregnant women. We also provide new regional and country anemia morbidity estimates for the year 2000, and review the current understanding of the distribution of the main etiological agents of anemia among pregnant women.

The causes of folic acid include the following

Inadequate indigestion of folate– containing foods Impaired absorption owing to villous atrophy seen in celiac disease tropical sprue or as a part of the aging process Impaired metabolism lead to inability to utilize absorbed folate, as seen in congenital enzyme deficiencies of folate pathway.
Increasing excretion or loss of folate seen in vitamin b\textsubscript{12} deficiency during the course of vitamin B deficiency methylenetetrahydrofolic acid (MTHFA) accumulates in the serum, leading to the folate trap phenomenon. In turn much folate filters through the glomerulus and excreted in the urine. Another mechanism of excess excretion occurs in people with chronic alcoholism who have increased excretion of folate in to the bile. Patients having hemodialysis also tend to lose folate during the filtration process.

**Symptoms of folic acid deficiency include:**

Fatiguemouth sores gray hair swollen tongue poor growth (also among the chief your doctor will examine you and ask questions about your past health and how you are feeling now. You will also have blood tests to check the number of red blood cells and to see if your body has enough folic acid.

The level of vitamin B\textsubscript{12} will be checked too. Some people whose folic acid levels are too low also have low levels of vitamin B\textsubscript{12}. The two problems can cause similar symptoms.

The recommended daily allowance for folic acid doubles during pregnancy, and some women have difficulty ingesting the amount needed even though folic acid occurs widely in foods. The best sources of folic acid are kidney beans, lima beans, and fresh dark green leafy vegetables. As a result of the increased demands for vitamin during pregnancy, supplementation with folic acid, 400 mcg (0.4 mg)/day, is recommended for all women of childbearing age, and 600 mcg (0.6 mg) is recommended when pregnancy is confirmed. Treatment is 1 mg folic acid daily and usually corrects megaloblastic anemia within a week, women who have had a previous child with a neural tube defect should take 4 mg of folic acid for 1 month before and during pregnancy the first trimester of pregnancy (American Academy of pediatrics [AAP] & American College of Obstetricians and Gynecologists [ACOG], 2007; Cunnindham et al 2010; strong & Rutherford, 2011).

Anemia is one of the most commonly encountered medical disorders during pregnancy. In developing countries it is a cause of serous concerning as, besides many other adverse effects on the mother on the fetus it contributes significantly high maternal mortality. According to the united nation degradation 1997, anemia is major public problem that needs total elimination. It is
estimated that globally two billion people suffer from anemia or folic acid deficiency. (J.B. Sharma, Meenaksi Shankar 2010).

Anemia has been recognized as the most prevalent nutritional deficiency in the world, and is a cosmopolitan endemic that is distributed in all continents, geo-economics blocks and social groups. Despite this trans-social and pan-geographical trait attributed to deficiency anemia, its occurrence is associated with inadequate socio-environmental conditions, so that in developed countries, prevalence in pregnant women has been estimated at 23%, while in developing countries this deficiency affects more than half of this group (52%).

In Brazil, although there are no national studies with consistent data, it has been reported that the size of the problem in pregnant women is around 30 to 40%. In women of reproductive age (15-49 years), the prevalence of anemia found by the National Demographic and Health Survey - PNDS was 30%, with significant regional differences.

The relevance of anemia control is due to the magnitude and deleterious effects it causes on the health of the pregnant woman and the fetus, since their occurrence during pregnancy has been associated with a higher rate of maternal and perinatal mortality; Higher risk of prematurity and low birth weight; And neonates with iron reserves below normal and therefore at higher risk for developing anemia in the first months of life (Elizabeth Fujimori in Dec 2009).

In the 1920s, scientists believed folate deficiency and anemia were the same condition. In 1931, researcher Lucy Wills made a key observation that led to the identification of folate as the nutrient required preventing anemia during pregnancy. Wills demonstrated that anemia could be reversed with brewer's yeast. In the late 1930s, folate was identified as the corrective substance in brewer's yeast.

This condition, called iron-deficiency anemia, can be dangerous to your pregnancy, especially if it occurs in the first or second trimester. As reported in the American Journal of Clinical Nutrition, iron-deficiency anemia early in a pregnancy can double or even triple the risk of having a premature delivery or a low birth weight baby. (Chris Woolston, M.S. in jan 20 2017).
In WHOanemia, defined as a low blood hemoglobin concentration, has been shown to be a public health problem that affects low-, middle- and high-income countries and has significant adverse health consequences, as well as adverse impacts on social and economic development (1, 4–6). Although the most reliable indicator of anemia at the population level is blood hemoglobin concentration, measurements of this concentration alone do not determine the cause of anemia. Anemia may result from a number of causes, with the most significant contributor being iron deficiency. Approximately 50% of cases of anemia are considered to be due to iron deficiency, but the proportion probably varies among population groups and in different areas, according to the local conditions (1, 7, 8). Other causes of anemia include other micronutrient deficiencies (e.g. folate, riboflavin, vitamins A and B12), acute and chronic infections (e.g. malaria, cancer, tuberculosis and HIV), and inherited or acquired disorders that affect hemoglobin synthesis, red blood cell production or red blood cell survival (e.g. hemoglobinopathies) (9, 10).

Anemia resulting from iron deficiency adversely affects cognitive and motor development, causes fatigue and low productivity (8, 9, 11) and, when it occurs in pregnancy, may be associated with low birth weight and increased risk of maternal and perinatal mortality (12, 13). In developing regions, maternal and neonatal mortality were responsible for 3.0 million deaths in 2013 and are important contributors to overall global mortality (14, 15). It has been further estimated that 90 000 deaths in both sexes and all age groups are due to iron deficiency anemia alone (16). Any strategy implemented to prevent or treat anemia should be tailored to local conditions, taking into account the specific etiology and prevalence of anemia in a given setting and population group.

**Anemia in Pregnancy**

When the pregnant women, may develop anemia. When she has anemia, her blood doesn't have enough healthy red blood cells to carry oxygen to her tissues and to her baby.

During pregnancy, your body produces more blood to support the growth of your baby. If you're not getting enough iron or certain other nutrients, your body might not be able to produce the amount of red blood cells it needs to make this additional blood.
It's normal to have mild anemia when you are pregnant. But you may have more severe anemia from low iron or vitamin levels or from other reasons.

Anemia can leave you feeling tired and weak. If it is severe but goes untreated, it can increase your risk of serious complications like preterm delivery.

Here's what you need to know about the causes, symptoms, and treatment of anemia during pregnancy.

2.3 Related Study
Anemia is one of the most frequent complications related to pregnancy. Normal physiologic changes in pregnancy affect the hemoglobin (Hb), and there is a relative or absolute reduction in Hb concentration. The most common true anemias during pregnancy are folic acid deficiency anemia (approximately 75%) and folic deficiency megaloblastic anemia, which are more common in women who have inadequate diets and who are not receiving prenatal iron and folic supplements. Severe anemia may have adverse effects on the mother and the fetus. Anemia with hemoglobin levels less than 6 gr/dl is associated with poor pregnancy outcome. Prematurity, spontaneous abortions, low birth weight, and fetal deaths are complications of severe maternal anemia. Nevertheless, a mild to moderate iron deficiency does not appear to cause a significant effect on fetal hemoglobin concentration. An Hb level of 11 gr/dl in the late first trimester and also of 10 gr/dl in the second and third trimesters are suggested as lower limits for Hb concentration. In a folic acid-deficient state, folic acid supplementation must be given and follow-up is indicated to diagnose iron-unresponsive anemias.
3. CHAPTER THREE: METHODOLOGY

3.1 Research Design
This study will employ the descriptive survey design specifically the descriptive comparative and descriptive correlation strategies. Descriptive studies are non-experimental researches that describe the characteristics of a particular individual, or of a group. It deals with the relationship between variables, testing of hypothesis and development of generalizations and use of theories that have universal validity. It also involves events that have already taken place and may be related to present conditions (Kothari, 2004). Further, descriptive surveys are used to discover causal relationships (descriptive correlational), differences (descriptive comparative), to provide precise quantitative description and to observe behavior (Treece and Treece, 1973).

3.2 Population
The population that researcher will target on are the Edna Aden maternity medical staff. The number of the population will be researched is 30 people available in Edna Aden maternity hospital.

3.3 Sample size
From the population of 30 small scale enterprises in Edna Aden hospital, a sample of 27 will be selected.

<table>
<thead>
<tr>
<th>Category</th>
<th>Population</th>
<th>Sample size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Doctors</td>
<td>8</td>
<td>7</td>
</tr>
<tr>
<td>midwifery staff</td>
<td>11</td>
<td>10</td>
</tr>
<tr>
<td>Nurse staff</td>
<td>11</td>
<td>10</td>
</tr>
</tbody>
</table>

This is computed using Slovenes Formula for computing samples, which is stated as follows

\[ n = \frac{N}{1+N(e^2)} \]

Where \( n \) = required sample size

\( N \) = population size
e=level of significance which is equal to 0.05. From this formula, the sample is computed as follows

\[
n = \frac{30}{1+30(0.05^2)} = \frac{30}{1+30(0.0025)} = 27
\]

3.4 Sampling Procedure
The sampling method that used in this study was simple random sampling to select the respondent for the questionnaire. We had done this to easily pinpoint the targets of this study which are the medical staff of hospital that are staffing from folic acid deficiency and anemia in pregnant women actual we were asked a few prequestionnaire verifying if the respondent meets the following conditions a patient with folic acid deficiency and anemia in pregnant women.

3.5 Data Collection Instruments
As aforementioned, the researcher will use both qualitative and quantitative approaches in the research paper. So that researcher should consider employing at least two methods of data collection, the questionnaire is the core dominant and interview is second supportive data collection element in the research paper be used in. This method questionnaire is important due to the research enhancement and quality reliability.

3.6 Data Presentation Tools
Data are presented many tools, so the researcher will need to present exhaust his research paper on graphical presentation manner, charts (bar& pie). Furthermore, tabulation of data presentation is very important for the investigator.

3.7 Data Analysis and Interpretation
The researcher will use frequencies and percentage distributions to analyze data on profile of respondents. Means & ranks will be used to determine the level of folic acid deficiency and anemia in pregnancy (obj. 2&3).

Item analysis will be used to determine the strengths and weaknesses of respondents on the folic acid deficiency and anemia in pregnancy women Based on these items means and ranks, recommendations will be made. The following mean ranges and descriptions will be used to interpret responses.
<table>
<thead>
<tr>
<th>Scale</th>
<th>Mean range</th>
<th>Response mode</th>
<th>Interpretations</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>3.26-4.00</td>
<td>Strongly agree</td>
<td>Very high</td>
</tr>
<tr>
<td>3</td>
<td>2.56-3.25</td>
<td>Agree</td>
<td>High</td>
</tr>
<tr>
<td>2</td>
<td>1.76-2.50</td>
<td>Disagree</td>
<td>Low</td>
</tr>
<tr>
<td>1</td>
<td>1.00-1.75</td>
<td>Strongly disagree</td>
<td>Very low</td>
</tr>
</tbody>
</table>

The t-test one way analysis of variance (ANOVA) will be used to test for significant differences in the level of the folic acid deficiency and anemia in pregnancy women according to profile characteristics of respondents (obj.4) and to test for first hypothesis. The Pearson’s linear correlation coefficient will be used to test the significant relationship between the level of the folic acid deficiency and anemia in pregnancy women (obj.5) and test the second hypothesis.

### 3.8. Ethical Consideration

This research paper will be consistent to and conformed with to social morals, and contextual values. It is guaranteed to be solely used as an academic purpose. It also assures not be harmed to any person, institution and/or any nation.
4. CHAPTER FOUR: DATA ANALYSIS AND INTERPRETATION

4.1 Introduction
This chapter focuses on presentations of data analysis and its interpretation. The interpretation and analysis emphasized here is based on research objectives stated in chapter one. Analysis of the data was made with reference to the research objectives.

Profile of the respondents
This was to gather the background information of the respondents under study. This section is going to determine the demographic characteristics of the respondents in terms of gender, age, education level and years of experience.

   Table 4.1 gender of the respondents

<table>
<thead>
<tr>
<th>Gender</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>2</td>
<td>7.4%</td>
</tr>
<tr>
<td>Female</td>
<td>25</td>
<td>92.6%</td>
</tr>
<tr>
<td>Total</td>
<td>27</td>
<td>100%</td>
</tr>
</tbody>
</table>
Table 4.1 and Figure 4.1 are about the sex distributions of the respondents. It is evident from this gender frequency distribution table that the majority of respondents were females at (93%) while (7%) were males. This tentatively implies that the Edna Adan Maternity Hospital in Hargaisa district employed mainly more female staffs than staffs.

**Table 4.2 age of the respondents**

<table>
<thead>
<tr>
<th>Age</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>20-24</td>
<td>13</td>
<td>48.1%</td>
</tr>
<tr>
<td>25-34</td>
<td>10</td>
<td>37.0%</td>
</tr>
<tr>
<td>35-44</td>
<td>4</td>
<td>14.8%</td>
</tr>
<tr>
<td>Total</td>
<td>27</td>
<td>100%</td>
</tr>
</tbody>
</table>
Regarding the age of respondents, table 4.2 and figure 4.2 indicates that 13% of the respondents were in the age group of 20 – 24 years while 10% of the respondents were 25 – 34 years of age. Another 4% of the respondents were 35 – 44 years of age while 15.9 of the respondents were 40 and above year’s age. This implies that the total 27 100.0 100.0.

Table 4.3 marital status

<table>
<thead>
<tr>
<th>Marital status</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single</td>
<td>20</td>
<td>74.1%</td>
</tr>
<tr>
<td>Married</td>
<td>5</td>
<td>18.5%</td>
</tr>
<tr>
<td>Divorced</td>
<td>2</td>
<td>7.4%</td>
</tr>
<tr>
<td>Total</td>
<td>27</td>
<td>100%</td>
</tr>
</tbody>
</table>
Table 4.3 figure 4.3 and table 4.3 shows the marital status of the respondents. 74% of the respondents were single, 19% of the respondents were married and 7% of the respondents were divorced. The most of the respondents single

<table>
<thead>
<tr>
<th>Table 4.4 what is your educational level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Educational level</td>
</tr>
<tr>
<td>university</td>
</tr>
<tr>
<td>Diploma</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

Figure 4.4 indicates that majority (75%) of the respondents had the university bachelor degree and (25) of the respondents were diploma

The level of folic acid deficiency

The first objective of this study was to determine the level of folic acid deficiency which is independent variable. The goal was to find out whether firms under study do manage their level of folic acid deficiency. As measurement tools, level of folic acid deficiency has been broken down into components that are indicators or measures of this variable.
Pregnant women are risk to be folic acid deficiency

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>There are symptoms that appears the patient for folic acid</td>
<td>3.56</td>
<td>.506</td>
<td>Very high</td>
</tr>
<tr>
<td>Nutritional problem are common cause of folic acid</td>
<td>3.67</td>
<td>.480</td>
<td>Very high</td>
</tr>
<tr>
<td>Folic acid deficiency is increased our country</td>
<td>1.74</td>
<td>.984</td>
<td>Very low</td>
</tr>
<tr>
<td>We can treat vitamins folic acid deficiency</td>
<td>3.41</td>
<td>.636</td>
<td>Very high</td>
</tr>
<tr>
<td>We can identify threatens of assessment of folic acid by using Bp</td>
<td>1.63</td>
<td>.792</td>
<td>Very low</td>
</tr>
<tr>
<td>Complication of folic acid beginning first trimester</td>
<td>3.52</td>
<td>.753</td>
<td>Very high</td>
</tr>
<tr>
<td>Overall mean</td>
<td>3.05</td>
<td>0.137</td>
<td>High</td>
</tr>
</tbody>
</table>

Source: primary data 2017 The average mean (3.05) of the responses shows that the level of folic acid deficiency in the studied is high. This reveals that level of folic acid deficiency at Edna Adan Maternity hospital in Hargaisa is high.

**The level of Anemia under study**

The second objective of the research involved determining the level of level of anemia in selected Edna Aden Maternity Hospital

Table 4.6 level of Anemia

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>The most reason that causes pregnancy women develop is anemia</td>
<td>2.56</td>
<td>.506</td>
<td>High</td>
</tr>
<tr>
<td>Poor diet can cause anemia in pregnant women</td>
<td>3.37</td>
<td>.792</td>
<td>Very high</td>
</tr>
</tbody>
</table>
Anemia can cause a complication with a pregnancy women | 2.63 | .792 | High
Anemia it may cause death | 2.85 | .662 | High
Anemia mostly occur poor people | 3.00 | .620 | High
Pregnancy women is important to know or checking her blood volume | 3.04 | .587 | High
It is important to treat the pregnant women in anemia | 3.56 | .506 | Very high
Anemia can cause health problem mother and baby | 3.74 | .447 | Very high
It is important to counseling Edna Adan maternity in anemia | 2.56 | .5064 | High
Overall mean | 3.03 | 0.134 | High

Source: primary data 2017

Finding: The average responses toward anemia with mean of the means (3.03) indicates that the level of anemia in Edna Adan Maternity Hospital studied is high.

Relationship between folic acid deficiency and anemia in a pregnant women at Edna Aden Maternity Hospital in Hargeisa Somaliland.

The third objective of this study was meant to establish relationship between folic acid deficiency and Anemia in Edna Adan maternity hospital

Relationship between folic acid deficiency and anemia in a pregnant women at Edna Aden Maternity Hospital in Hargeisa Somaliland.

The third objective of this study was meant to establish relationship between folic acid deficiency and Anemia in Edna Adan maternity hospital

<table>
<thead>
<tr>
<th>VARIABLE NAME</th>
<th>Sample size</th>
<th>Sample mean</th>
<th>Sample STD</th>
<th>R –value</th>
<th>Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 4.7, since the sig. or p-value (0.22) is greater than 0.05 then, at 0.05 or 5% level of significance, we accept the null hypothesis and reject the alternative one and we conclude folic acid deficiency and anemia in pregnant women are weak positively correlated ($r = 0.24$) and significantly co-related.

### 5. CHAPTER FIVE : FINDINGS, CONCLUSION AND RECOMMENDATIONS

#### 5.1 Introduction
This chapter contains three sections; discussion of the findings, conclusion and recommendation.

#### 5.2 Discussion of findings
In accordance with demographic characteristics of the respondents, 93 of the respondents were female. This reveals that mostly of respondents are female.

For the level of education the highest percentage 20% are university level. This shows that majority of those interviewed in EDNA has not reached Master degrees in education.

The first objective of this study was to figure out the level of folic acid deficiency. Findings related to this objective reveal that the average respondents agreed that positive occurrence of folic acid is large. The average responses with mean of the means (3.05).

Findings of the research objective two show that the Anaemia pregnant women are acceptable, according to the responses given by participants of the study. The average response Anemia with mean of the means (3.03) indicates that the level of anemia studied is high.

Results of research objective three shows that there is positive and significant folic acid deficiency in anemia pregnant women. Pearson’s correlation coefficient used in the analysis shows that ($r= 0.24$) which is strong and positive.
5.3 Conclusion
The general objective of study was to figure out folic acid deficiency in anemia pregnant women. Many indicators under health workers was analyzed to reach the specific objectives of the study.

However, the findings of the study accept the null hypothesis of that there folic acid deficiency in anemia pregnant women and conclude that the relationship exist with \( R=0.24 \) which shows positive and significant relationship. This implies that change in some variables of folic acid deficiency in anemia pregnant women.

5.4 Recommendations:
- The MOH in Somaliland and international organization will increase the level of educational in health workers and decrease the risk anaemia to the pregnant women.
- The government and civil society organization should explore ways in which to educate families particularly in rural areas about the importance of good prevention anemia in pregnant women.
- To adopt all diets rich in iron in response of decreasing of folic acid deficiency of pregnant women in Edna among the community especially during pregnancy.
- By considering the findings from the study the researcher suggesting that deficiency of vitamin B9 can be prevented if and only the communities conventionally adopt all sorts of diets which are fortified folic acid in most of times during pregnancy.
- It is better to make more public orientation for convincing of community about the threatens of deficiency of folic acid in pregnant women in Edna Aden and upgrade how to decrease or prevent it.

Appendix A : QUESTIONNAIRE
Faculty of Nutrition and Food science
Research topic: folic acid and anemia in pregnancy women

Subject: Senior Graduating Student Questionnaire

Dear respondents;

Our names are Ayan khadar Mahamud, Jawahir Mohamed Ahmed and Hodan Saeed Ahmed; we a senior undergraduate student at the University of Hargiesa. We currently writing the graduate paper to obtain our first degree (Bachelor of Nutrition & Food Science). We required to fulfill all requirements of our study, so you can help us to complete this study by responding to the questionnaire attached to this paper.

All the information you provide will be confidential and will not be shared with other parts and also information will be only used for academic purpose.

Please read the questionnaire carefully and provide answers by marking to the box corresponding to your response, and if you have any further questions please do not hesitate to contact us to give you more clarification and further information.

Hence we kindly requested you to give answers to the following questions that asked you in honest and informative manner as much as possible and your cooperation is vital for us.

Best regards.......................hodansaed111@gmail.comjawaahir43@gmail.comcomayaankhadr128@gmail.com

University of Hargiesa
BSc, Nutrition & food science
Date of the interview: -----/-----/------- (Day/Month/Year)

Code Questionnaire No.: _________

Adna Aden maternity hospital

Dear respondents,

We are from Hargeisa University; our purpose of doing this research is to identify folic acid deficiency and anemia in pregnancy women

So dear respondent we are kindly requesting you to answer all questions that are presented in here.

We would like to inform you that all information you give will kept confidential.

Any information that you feel will harm your dignity can be left.

Your participation is highly valuable.

Thank you for your participation in this research, we really appreciate it, and it’s our honor to Interview you.

Instruction: please tick the suitable responses in space provided

Section A

1. Age
   20-24 [ ] 25-34 [ ] 35-44 [ ] 45 and above [ ]

2. Gender
   Male [ ] female [ ]

3. Marital status
   Single [ ] married [ ] divorced [ ] windowed [ ]

4. Educational level
   University [ ] Diploma [ ] secondary [ ] primary [ ] non educated [ ]

5. Occupational levels of the respondent
   Medical stuff [ ] medical student [ ] lecturer [ ] pregnant women [ ] others [ ]

Section B

7. Pregnant women are risk to be folic acid deficiency
4) Strongly agree 3) agree 2) disagree 1) strongly disagree
8. There are symptoms that appears the patient for folic acid
4) Strongly agree 3) agree 2) disagree 1) strongly disagree
9. Nutritional problem are common cause of folic acid
4) Strongly agree 3) agree 2) disagree 1) strongly disagree
10. folic acid deficiency is increased our country
4) Strongly agree 3) agree 2) disagree 1) strongly disagree

11. We treat vitamins folic acid deficiency
4) Strongly agree 3) agree 2) disagree 1) strongly disagree
12. We identify threaten of assessment of folic acid by using Bp
4) Strongly agree 3) agree 2) disagree 1) strongly disagree
13. Complication of folic acid began first semester
4) Strongly agree 3) agree 2) disagree 1) strongly disagree

Section C
14. the most reason that causes pregnancy women develop is anemia
4) Strongly agree 3) agree 2) disagree 1) strongly disagree
15. Poor diet cause anemia in pregnant women
4) Strongly agree 3) agree 2) disagree 1) strongly disagree
16. Anemia causes a complication with a pregnancy women
4) Strongly agree 3) agree 2) disagree 1) strongly disagree
17. Anemia it may cause death
4) Strongly agree 3) agree 2) disagree 1) strongly disagree
18. Anemia mostly occur poor people
4) Strongly agree 3) agree 2) disagree 1) strongly disagree
19. Pregnant women is important to know or checking her blood volume
4) Strongly agree 3) agree 2) disagree 1) strongly disagree
20. It is important to treat the pregnant women in anemia
4) Strongly agree 3) agree 2) disagree 1) strongly disagree
21. Anemia cause health problem mother and baby
4) Strongly agree 3) agree 2) disagree 1) strongly disagree

22. It is important to counseling Edna Aden maternity in anemia

4) Strongly agree 3) agree 2) disagree 1) strongly disagree

Appendix B: References:


13. World Health Organization 2013, guidelines

14. UNICEF, Multiple Indicator Cluster Surveys

15. WWW.WEBMED HEALTH TOPICs

16. WWW.WHO.int\nutrition\topics\en