KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY,

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COLLEGE OF HEALTH SCIENCES

SCHOOL OF PUBLIC HEALTH

IRON AND FOLIC ACID SUPPLEMENTATION AND COMPLIANCE AMONG PREGNANT WOMEN IN NANUMBA NORTH DISTRICT OF NORTHERN REGION, GHANA

.

By

MARK ATOOBEY

SEPTEMBER, 2019

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A DISSERTATION SUBMITTED TO THE SCHOOL OF GRADUATE STUDIES, KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY, KUMASI IN PARTIAL FULFILMENT OF REQUIREMENTS FOR THE AWARD OF

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DECLARATION

I Mark Atoobey, hereby sincerely declare that this piece writing was generated through my own effort from the results of the field work I have done and that no previous work of this kind has been forwarded for the award of a degree here or elsewhere. I also wish to acknowledge the fact that works of others which useful material for reference purpose has been duly acknowledged.

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DEDICATION

I dedicate this piece work to God Almighty God for His mercy and blessing bestow on me throughout my study period both on campus and outside.

I also wish to dedicate this work to the entire Atoobey family for the support and encouragement that has pushed me this far.

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To all who matter in this work I say a big thank you.

LIST OF ABBREVIATION/ACRONYMS

ANC	Antenatal clinic
IFA	Iron and Folic Acid
DHMT	District Health Management Team
GDHS	Ghana Demography and Health Survey
GHS	Ghana Health Service
KNUST	Kwame Nkrumah University of Science and Technology
Hb	Haemoglobin
HIV	Human Immunodeficiency Virus
G/DL	Gram per Decilitre
CHW	Community Health Worker
TBA	Traditional Birth Attendant
HPD	Hypertensive Pregnancy Disorders
IDA	Iron Deficiency Anaemia
ID	Iron Deficient
IFAS	Iron and Folic Acid Supplementation
TT	Tetanus Toxoid
CIP	Comprehensive Implementation Plan
CHPS	Community Health Planning and Services
WIFAS	Women Iron and Folic Supplementation
WRA	Women in Reproductive Age
SBCC	Social and Behavioural Change Communication
SAC	School Age Children
USAID	United States of America International Development
Kg	Kilogramme
LBW	Low Birth Weight
MCH	Maternal and Child Health

MCHP	Maternal and Child Health Programme
UNICEF	United Nations International Children‟s Emergency Fund
WHA	World Health Assembly
WHO	World Health Organization

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ABSTRACT

BACKGROUND: Available scientific evidence has shown that routine supplementation with iron and folic acid (IFA) during pregnancy is an effective way of preventing anaemia in pregnant women most especially in areas where its prevalence is high. Anaemia affects an estimated two billion people worldwide, thus 30% of the world‟s population mainly due to iron deficiency. Even though, several studies have been conducted with numerous recommendations, the implementation of iron and folic acid supplementation varies with the geographical and socioeconomic factors at the place of implementation. This research was therefore conducted to assess the compliance and utilization of iron and folic acid supplements in the Nanumba North district of Ghana.

METHODS: A cross-sectional study design was used for the study. Quantitative method was used to achieve the set objectives of this study. Data on IFA distribution and utilization was collected among pregnant women using semi-structured questionnaire in addition to the review of maternal child health record booklets. A total number of 290 pregnant women were recruited for the study using convenience sampling technique.

RESULTS: From the findings 51.4% the women booked for ANC within the first trimester whilst 43.8% and 4.8% commenced ANC visits in the second and third trimesters respectively. In addition, 67.9% of the respondents received IFA tablets during ANC services whilst 32.1% did not. However, 51.4% of the participants did not know the reason(s) why IFA is giving during pregnancy. The results also revealed that 53.8% had no form of education/counselling on IFAS.

The results pointed out that 23.4% have ever defaulted in taking their IFA with reasons such as forgetfulness, fed-up with taking the drug, lack of supplements, and deterred by

the inconvenience associated with the drug such as difficulty in swallowing due to the scent of the drug, feeling nauseous and vomiting. It was discovered that 53.5% of clients do not get regular supply of IFA. It was also revealed that women who have attained tertiary education were 8 times likely to adhere to IFA (OR: 7.97; CI: 1.38 - 45.8; p-value: 0.020) whereas women who knew the required number of IFA tablet required every month were 4.8 times likely to adhere to IFA tablets (OR: 4.79; CI: 2.15 - 10.68; p-value: 0.001).

CONCLUSION: Generally, the time mothers booked for ANC service is not good enough to be able to obtain the recommended four plus visits. Also the knowledge level of mothers on the importance of taking IFA was equally poor. Gains will be made in IFAS if there is an improvement in SBCC and logistical supply.

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background of study

Anaemia is a global condition of public health concern and evidence shows that two billion representing 30% of the entire human populace are anaemic chiefly owing to iron deficiency (Medical, 2015). Iron deficiency anaemia stands as the most prevailing and unheeded form of nutrient deficiency worldwide. Its prevalence is highest in developing countries particularly among children and women who are pregnant. It is estimated that about 50% of preschool children, pregnant women, and also approximately 33% of non-pregnant women worldwide are anaemic (Gebreamlak, Dadi and Atnafu, 2017).

Anaemia is defined as a reduced amount of haemoglobin in the blood. The level of Haemoglobin varies with age, sex, pregnancy, altitude (height above sea level), genetic makeup (sickle cell, glucose-6-phosphatedehydrogenese) and smoking status of the individual in question(Guide, 2017). Pregnant women can be classified as being anaemic when their haemoglobin level is below a cutoff point of 11.0g/dl (Imdad and Bhutta, 2012).

The World Health Organization (WHO) equally defines anaemia as blood hemoglobin concentration less than 11gm/dl or hematocrit less than 37% in pregnant women. According to WHO, approximately 58% of women in developing countries are anaemic thus ranging from mild to severe forms (Mithra *et al.*, 2013).

The worldwide prevalence of anaemia in pregnancy is estimated to be about 41.8% ranging between 5.7% in the United State of America to 75% in Gambia in Africa.

Some studies have shown that prior to pregnancy majority of women are anaemic whereas majority of them also develop the condition in the course of pregnancy . Although, inadequate dietary consumption of iron is generally the principal cause of anaemia, there are other diseases such as malaria, helminths infestations, profuse bleeding and genetic conditions such as sickle cells disease ,and Glucose-6phosphatedehydrogenese that have contributed greatly to the high prevalence of anemia in sub-Saharan Africa and the world as large (Anlaakuu and Anto, 2017).

Globally, the number of pregnant women who have develop anaemia primarily due to iron deficiency constitute 41.8% of the total (56 million). The proportion is very high in developing countries. For instance in South Asia the percentage is around 80%. Iron deficiency anaemia causes pregnant women to be vulnerable to infections. It again increases their risk of mortality as well as lessening their ability to work. Moreover, pre-eclampsia, perinatal mortality and low birth weight are found to be associated with anaemia. All over the world, it is the poorest, most vulnerable (pregnant women, children, aged) and least educated that are disproportionately affected by iron deficiency, and it is this category of people who benefit when appropriate and cost effective interventions are put in place towards the reduction of anaemia (Yakoob and Bhutta, 2011).

Anaemia in pregnancy has been a long known health condition that has serious health effects on the pregnant woman and her unborn child. It leads to death of both the pregnant woman and her unborn child, especially in developing world. Evidence shows that about half (50%) of anaemia resulting in developing countries is instigated by iron deficiency. During pregnancy this condition causes depletion in the iron within the body and hence put the unborn child at risk for poor growth as well as permanent cognitive damage (USAID-MCHP, 2019a).

The World Health Organization (WHO) has projected that anaemia affects about 47% of pregnant women in West Africa alone and out of that number, more than half of the affected women are anaemic because they are iron deficient (ID)(Seck and Jackson, 2007).

Regular supplementation with iron and folic (IFA) during the period of pregnancy, according to evidence, aids in curbing the development of anaemia in pregnant women in settings where there is even high prevalence of the condition. Despite this knowledge, anaemia continues to be high in several parts of the globe (USAIDMCHP, 2019a). This situation can be attributed to the challenge in getting access to IFA by most pregnant women coupled with ignorance with respect to the relevance behind taking IFA during pregnancy. Failure in putting in maximum efforts to ensure that IFA tablets are distributed to pregnant women coupled with poor sensitization of women on the relevance of taking IFA tablets has yielded stagnation in reducing iron deficiency anaemia in pregnancy (USAID-MCHP, 2019a). Unfortunately, several countries around the world continuously rely on facility based ANC for regular distribution of IFA which in turn inhibit access to the IFA tablets especially by women in very remote areas. In the face of the latter challenge, evidence shows that there is high coverage of IFA of when community-based approach is adopted to distribute the tablets. This is due to the reason that several women are able to get access to the IFA tablets compared to the facility based distribution of IFA (USAIDMCHP, 2019a).

Africa has the highest number of women with anaemia and followed by South and South East Asia. The inadequate consumption of Folic Acid and Iron during pregnancy are predisposing factors that results in anaemia, preterm delivery, low birth weight among children, contributes to poor neonatal health and increase maternal morbidity and mortality. Studies have shown that mothers who received comprehensive antenatal care

services including IFA supplementation throughout their gestation period give birth to infants with little or reduced risk of neonatal morbidity and mortality(Gebreamlak, Dadi and Atnafu, 2017).

Iron and Folic Acid supplementation with optimal adherence can effectively prevent anaemia in pregnancy. However, studies focused on the area of adherence to supplementation are very limited especially in the developing world(Gebreamlak, Dadi and Atnafu, 2017).

The World Health Organization (WHO) has recommended Iron and Folic Acid (IFA) supplementation as one of the major, safe and cost effective intervention that could be employed by all countries to prevent anaemia through routine supplementation. The World Health Organization (WHO) has recommended that all pregnant women should receive a standard dose of 30±60 mg of Iron and 400 μg of Folic acid daily through out pregnancy and six weeks postpartum(Gebreamlak, Dadi and Atnafu, 2017).

In many jurisdictions, IFA supplementation programme is adopted as an effective and the most suitable approach of fighting anaeamia among pregnant and nonpregnant women worldwide (Sununtnasuk, Agostino and Fiedler, 2015).

1.2 Problem statement

From the global perspective, it is estimated that 52% of pregnant women in developing countries are anaemic compared to 23% in the developed world. In addition, anaemia in pregnancy contributes up to 20% of all maternal deaths

(Kefiyalew *et al.*, 2014).

Anaemia is an issue of public health concern in Ghana and the world at large. Statistics from the 2014 Ghana Demographic Survey indicates that 66 percent of children under five years and 42 percent of women in their reproductive age are anaemic. The adverse

effects of anaemia on the country‟s economic development, morbidity and mortality among infants, young children, and pregnant women are issues that are well documented in several literatures that cannot be over looked (Ghana Demographic Survey, 2014).

Available statistic shows that anaemia among ANC registrants and those at 36weeks of gestation has been on the increase since 2014 (Guide, 2017). It has been established that anaemia in pregnancy is a serious medical problem that contributes to LBW in children and both pre and post-partum haemorrhage and hence increasing the risk of death of the woman or her child (Gebreamlak, Dadi and Atnafu, 2017). In the Northern region of Ghana, the trend of anaemia among pregnant women has been on the increase over the past three year, thus in 2015 (32.8%), 2016 (43%) and 2017 (44.7%) (Ghana Health Service, 2016). The Nanumba North district equally recorded corresponding increases, in 2015 (33.7%), 2016 (54.4%) and 2017 (48.9%) making it one of the districts with high prevalence in terms of anaemia resulting from pregnancy in the Northern region (Ghana Health Service, 2016).

1.3 Justification for the study

In Ghana, taking IFA supplements during period of pregnancy and even up to six weeks after delivery is a major intervention that has been adopted over the years to prevent and control anaemia in pregnancy and postpartum(Ghana Health Service, 2016). Issues of adherence to IFA and inadequate education and counselling have been outlined as contributing factors against anaemia prevention in the country, even though there is no empirical data to inform decision making(Ghana Health Service, 2016).

In addition, the Girls Iron and Folic Acid program that is introduced to ameliorate anaemia situation among females via sound social and behavioural change

communication (SBCC) (Ghana Health Service, 2016). Currently, efforts used to ameliorate anaemia in pregnancy and its adverse effects include appropriate education and counselling to enhance adherence to IFA dosage, and routinely restocking IFA. Indisputably, taking IFA supplements for a longer time, especially over three months, is a very effective approach to reducing anaemia caused by iron deficiency (Ghana Health Service, 2016).

1.4 Conceptual framework

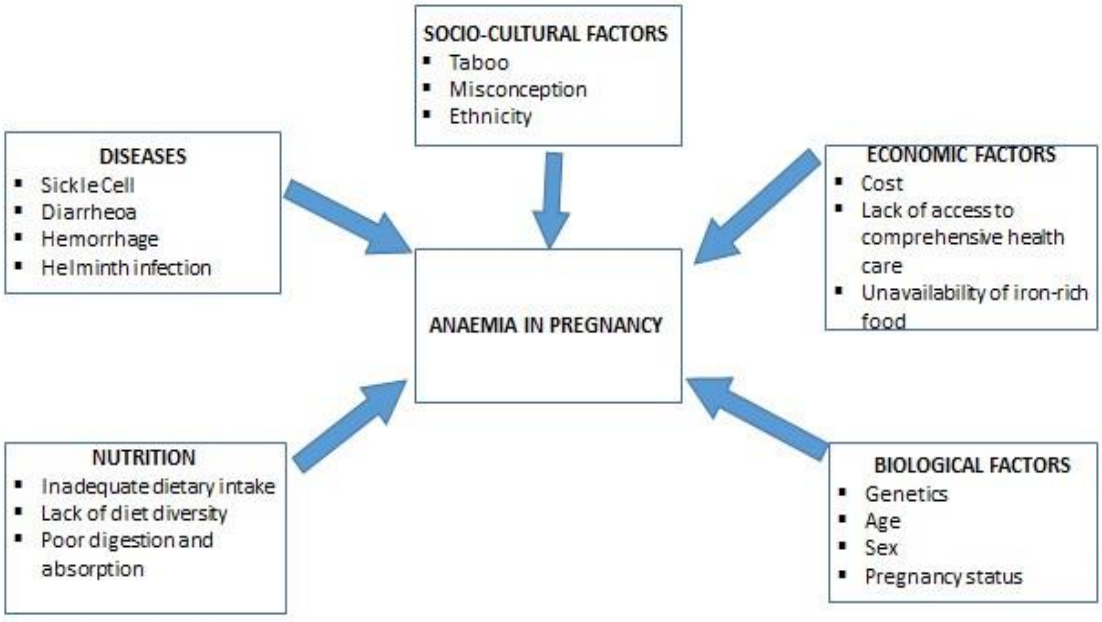

Figure 1.1: Causes of Anaemia in pregnancy Source: Author"s constructs, 2019.

Aneamia in pregnancy is cause by multifaceted factors ranged from socio-economic factors, economic factors, biological factors, diseases and nutritional status. In this regards socio-cultural factors (Taboo, misconception and ethnicity); Economic factors

(Cost, lack of access and unavailability of iron-rich food), Biological factors (genetics, age, sex, pregnancy status); Nutrition (inadequate dietary intake Lack of diet diversity,

poor digestion and absorption) and Diseases (sickle cell, diarrheoa, hemorrhage, helminth infection).

1.5 Research questions

a. How knowledgeable are pregnant women on issues regarding IFA?

b. Do pregnant women adhere/comply to IFA use?

c. What are the reasons behind the low access of IFA by pregnant women?

1.6 Main objective

To assess the level of compliance and utilization of Iron and Folic Acid tablets among pregnant women in Nanumba North District of Northern Region- Ghana.

1.7 Specific objectives

a. To assess the knowledge of pregnant women on Iron and Folic tablets utilization in Nanumba North district.
b. To determine IFA compliance among pregnant women in Nanumba North district.
c. To ascertain reasons that account for the low supply/distribution of IFA tablets to pregnant women in Nanumba North district.

1.8 Variables to be studied

a. Level of knowledge
b. Level of IFA compliance
c. Access to IFA tablets

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1.0 Knowledge on the intake of IFA during pregnancy

2.1.1 Awareness level

Maternal anemia has been estimated to contribute about 20 percent to maternal deaths worldwide and is also a major risk factor of mortality among women within the reproductive age, whether they are pregnant not(USAID-MCHP, 2019b). In addition, a study in Kenya among women within the reproductive age who are severely anemic were eight times more likely to die during pregnancy than those with higher concentration levels of red blood cells(USAID-MCHP, 2019b).

The high demand for elemental iron and folic acid during pregnancy due to the increased physiological needs by the foetus and maternal tissues has made it rarely impossible for expectant mothers to be able to obtain the requisite requirements of iron and folic acid with the normal diets the consume daily(Agegnehu *et al.*, 2019). Therefore, pregnant women are required to be put on daily iron and folic acid supplements. In view this, according to the WHO guidelines for control and prevention of anaemia in pregnancy, all pregnant women are required to take a standard oral supplemental dose of 60mg iron and 400 mg folic acid daily for throughout pregnancy to improve upon the outcome of the pregnancy(WHO, 2012).

According to Yakoob and Bhutta, (2011), effective and appropriate daily iron supplementation could reduce anaemia by 73% before a pregnant woman is due for delivery as well as contributing to a 67% reduction in iron specific deficiency anaemia before week 36 when the pregnant woman is at term.

According to (Allen, 2000) current knowledge indicates that iron deficiency anemia in pregnancy could be a precipitating factor that can result in preterm delivery, low birth weight, and a preceding poor neonatal health if not well managed during and after delivery.

A study in Californian has shown twice the risk of mothers with anemia within the second trimester given birth to preterm babies but not those who become anaemic in the third trimester (Allen, 2000). Similarly in Nepal, studies have shown that women who are anemic and also iron deficient in the first or second trimester were 1.87 times higher at risk of preterm delivery (Allen, 2000).

A study in Kenya has shown that more than half of the pregnant women interviewed (67.3%) have heard of iron and folic acid supplementation (IFAS) as against a third (32.7%) of those who have not heard of IFAS before(Kamau, Mirie and Kimani, 2019).

The study also revealed that less than half of the pregnant women had adequate knowledge on IFAS, which is an indication that quite a good number of the expectant mothers do not have sufficient and accurate information on IFAS. Majority of pregnant women do not know the associated side-effects of IFAS and even the few who knew do not know how to manage the side-effects should they occur following supplementation (Kamau, Mirie and Kimani, 2019).

2.1.2 Anaemia prevalence

Anemia is a complex health condition that is characterized by inadequate red blood cells (haemoglobin) in the blood to convey oxygen to body cells and organs. Globally, anemia is considered as a condition of public health concern and affects about 43 percent of children under five years, 38 percent of pregnant women, and 29 percent of non-pregnant women within the reproductive age thus women between the ages 15– 49 years(„Ghana Landscape Analysis of Anemia and Anemia Programming“, 2016).

A study conducted in Navrongo has shown that the prevalence of anaemia is much high among teenage mothers, late registration for ANC services where IFA is distributed especially in the third trimester and grand multiparous others (Nonterah, Yidana and

Kagura, 2019). It was found that the median gestational age at booking was 14 weeks (5–36 weeks) with the prevalence of anaemia among teenagers being 52% (Nonterah, Yidana and Kagura, 2019).

Currently in Ghana, about 73.6% and 44% of rural young children (<5 years) and women within the reproductive age are anaemic respectively, with an additional two thirds of adolescent girls and school age children (SAC) estimated as been anaemic (Azupogo *et al.*, 2019).

Anemia is the most common nutritional disorder in Central and West Africa, thus affecting 71 percent of children under five years, including 48 and 56 percent of nonpregnant and pregnant women respectively(„Ghana Landscape Analysis of Anemia and Anemia Programming“, 2016).

From available literature, pregnancy induced hypertension is five times prevalent among women who are severely anemic and a significant proportion of them end up with postpartum haemorrhage (Medical, 2015). Also, the World Health Organization (WHO) has estimated that about two billion people thus over 30% of the World“s populations are anemic, although the prevalence varies because of differences in geographical location, Socio-economic conditions, lifestyles, food habits, and the burden of communicable and non-communicable diseases(Medical, 2015). In addition, anemia contributes to about 1 15, 000 maternal deaths and 591,000 perinatal deaths every year worldwide. The prevalence of anemia in pregnancy in developing countries ranges between 33%-75%, and 15% among pregnant women are anemic in developed world(Medical, 2015).

2.1.1Common causes of anaemia among pregnant women

Elemental iron is a trace mineral that is required for optimal fetal growth and development(Kamau, Mirie and Kimani, 2019). Iron is found in red blood cells that carries oxygen to every part of the body. Iron and folic acid are vital nutrients that are essential for normal neuronal development and the synthesis of neurotransmitters particularly during the early stage of pregnancy (Agegnehu *et al.*, 2019).

Iron deficiency anaemia (IDA) is more prevalent among pregnant women and infants, thus periods where iron requirements are in high demand due to the rapid growth and development of tissues(Kamau, Mirie and Kimani, 2019).

Pregnancy increases the risk of maternal anemia (specifically iron deficiency anemia) as there is an increase requirement in maternal iron to meet the growing needs of the mothers and foetus as the pregnancy progresses(USAID-MCHP, 2019b). Anemia is a most common medical condition associated with pregnancy and has a varied prevalence, etiology and degree of severity among different populations but is more common in developing countries (Medical, 2015).

Studies worldwide have shown that iron deficiency is the main cause of anaemia most especially in the developing countries thus contributing to about 50% in pregnant women and also leads to a rapid reduction of the iron stores in infants that may result in an irreversible growth and development challenges, for example retarded growth, brain damage among many others (USAID-MCHP, 2019a).

Other essential micro-nutrients equally contribute to the anaemia situation in the world. Diseases such as malaria, helminthic infections, HIV, and tuberculosis all impact on anaemia(Balarajan *et al.*, 2011).

Even though anaemia is primarily associated with iron deficiency and infections, other factors including drinking water, sewage system as well as geographical location, contribute substantially to its cause (Azupogo *et al.*, 2019).

Table 2.1: Types of anaemia

Category	Hb level	Clinical sign
Normal	>11 - >12 g/dl	None
Moderate/Mild anaemia	7-10.9 g/dl	Slight pallor
Severe anaemia	4-6.9 g/dl	Pallor/ some palmar pallor in child
Very severe anaemia	Below 4 g/dl	Severe pallor / severe palmar pallor in child

Source: Health workers training manual for anaemia control Ghana 2017

Table 2.2: Standard Haemoglobin, Haematocrit and Tallquist levels below which an individual can be said to have anaemia.

Age or Gender Group	Haemoglobin g/dL	Haematocrit l/L	Tallquist %
Children 6-59 months	11.0	0.33	75
Children 5-11 years	11.5	0.34	80
Children 12-14 years	12.0	0.36	80
Non-pregnant women (above 15 years	12.0	0.36	80
Pregnant women	11.0	0.33	75
Men (above 15 years)	13.0	0.39	90

Source: Health workers training manual for anaemia control Ghana 2017

2.1.2 Effects of anaemia on the pregnant woman and the foetus

Severe maternal anemia leads to poor outcome of neonates in the form of low birth weight, prematurity, intrauterine growth retardation, intrauterine death and birth asphyxia (Medical, 2015).

In mild and moderate anaemia cases patients often may not complain of any problem but with severe anaemia, the most common complains may be the feeling of weakness, exhaustion and lassitude, indigestion and loss of appetite, palpitation, dyspnoea, giddiness, oedema and in very rare situations, generalized anasarca and even congestive cardiac failure can occur(Sharma and Shankar, 2010)

Severe anaemia also increases the incidence of pre-term labour by 28.2%, preeclampsia by 31.2% and sepsis(Sharma and Shankar, 2010).

2.1.3 Control and prevention of anaemia in pregnancy

Iron and folic acid supplementation is an effective and sustainable intervention that can be used to reduce the risk of anemia in pregnant women by 70 percent at term and 27 percent reduction in non- pregnant women(USAID-MCHP, 2019b).

Apart from the routine iron and folate supplementation, currently, there are other integrated recommended interventions that are adopted globally towards the fight against anemia which include comprehensive management of malaria and prevention, helminth prevention and control, improved diagnosis and management of all infectious disease, improve diet and with a well-coordinated social and behavior change communication strategies(Balarajan et al. 2011).

In addition, food fortification with iron is tested and proven as other nutrition preventive measure that is more sustainable and cost effective and could be adopted in the fight against anaemia in a on a permanent basis. In certain parts of the world, such as South -East Asian and Latin American countries, salt which is widely used by every household is fortified with iron and is accepted and approved by some Governments(Sharma and Shankar, 2010).

Iron supplementation is an efficacious intervention for the control and management of anemia in pregnant women by 70% and non-pregnant by 27% percent and as a result WHO has recommended that in areas with high prevalence of iron deficiency, women should receive 6 months of daily iron supplementation during pregnancy with an increased dietary diversity and regular consumption of iron-rich food stuffs or ironfortified food (USAID-MCHP, 2019b).

2.2.3 Knowledge gap

Studies have shown that women who had good knowledge of iron supplementation and the associated benefits are 5.4 times more likely to comply with iron and folic acid supplementation compared to those who had low knowledge(Theng and Yusof, 2017).

The prevention and control of any disease is generally better than its subsequent treatment and management than when it‟s allowed to manifest. Therefore, the knowledge level and behavior of people is very critical to consider for the successful planning and implementation of programmes and interventions that are health related (Theng and Yusof, 2017).

When the knowledge of mothers is enhanced in relation to the use and benefits of Iron/Folic Acid supplementation, would greatly impact on their choice and proper utilization of the supplements when they become pregnant(Gebreamlak, Dadi and Atnafu, 2017)

According to Mbhenyane and Cherane,(2017) compliance can be improved through the provision clear instructions, motivation and awareness creation on high impact nutrition services as well as supportive and sensitive antenatal care services such as regular education and counseling with regards to adherence to IFA regimen and eating balanced diet.

In the developing world, IFA supplements are distributed to expectant mothers through antenatal care. This is the best strategy of reaching out to good number of the women taking into consideration the growing numbers that are recorded at ANC(WHO, 2016). Yet many countries have low IFAS coverages than what is expected (Sununtnasuk, Agostino and Fiedler, 2015).

Globally, it has been estimated that about 83 % of all pregnant women had at least one ANC visit, out of which 81 % received IFA tablets with only 8 % (consumed 180 or more IFA tablets) compliance to the recommended supplementation regimen, (Sununtnasuk, Agostino and Fiedler, 2015).

In Ghana almost all pregnant women (98%) have received antenatal care from a skilled provider, with 89% them making four or more antenatal care visits before delivery(Ghana Maternal Survey, 2017). Even though, a lot more women patronize ANC services in Ghana, however the challenges associated with adherence of IFA supplementation, wrong dosing of IFA tablets and poor counselling have been outlined as some the factors affecting anaemia prevention strategies in the country; although there is no empirical research data in place to inform decision making in this area(Ghana Health Service, 2016).

In a current report by (Gebreamlak, Dadi and Atnafu, 2017) it was found that coverage of IFA is 17% more among pregnant women who had obtained some kind of information through education or counselling as compared to those with no form of health education on the use of the supplements.

Women with high compliance to IFA supplementation are generally motivated by the fact that the supplements helps them to get an improved well-being, and also as a result of the continuous insistence by midwives for them to take the tablets, but on the contrary those with low compliance complained of the accompany side-effects, misunderstanding of messages, and forgetfulness(Seck and Jackson, 2007). Adherence to IFA, therefore, can be improved when pregnant women are provided with appropriate information with regards to IFA usage through effective health education and counseling (Seck and Jackson, 2007).

Ineffective and inadequate health education on the utilization and benefits of IFA supplementation during pregnancy was among the major reasons why mothers have little or less knowledge with regards to iron and folic acid use(Deepti *et al*., 2013).

2.2 Compliance on IFA utilization

2.2.1 Side effects of IFA supplements

There is abundant information on why IFA supplementation is needed by all pregnant women and the level of acceptance will have significantly improve if and only if the beneficiaries are well informed on the effects of iron taking on the health of the mother and baby, however the main challenge has to do with the effectiveness of supplementation strategies adopted in many developing countries(Theng and Yusof, 2017).

Some individuals experience gastrointestinal discomfort has the most common complaint as equally indicated by pregnant women who take heavy dose of supplemental iron, particularly on an empty stomach. This condition is considered as a serious adverse effect on what needs to be observed in every woman as the degree of tolerance for iron varies(WHO, 2012). High-dose iron supplementation often comes with constipation, nausea, vomiting and diarrhoea, with the frequency and severity dependent on the dose of the elemental iron consumed and released into the stomach(WHO, 2012).

Apart from the biological effects of the medicine, a lot of pregnant women also stop taking iron supplements when they feel better after illness, and others refuse to take because they harbor the perception that the medication will result in them having big babies which may result in obstetric complications during delivery(USAID-MCHP, 2019a). Also, in a recent study by (Gebreamlak *et al.*, 2017) recorded a relatively higher

proportion of women with low compliance (58%) who reported side effect as the main reason for their non-adherence to the IFA supplementation.

2.2.2 Socioeconomic factors

Anaemia is closely linked to the socioeconomic and cultural factors in society, by individuals, families and communities, and educational status(Balarajan *et al.*, 2011).The level of compliance on the utilization of IFA supplements increases with a corresponding increase in household wealth index, most particularly areas where women pay for the health services and cost of transport(Titaley *et al.*, 2015).

The level of maternal and husband education, family size, registration time, economic status, and early ANC visit are factors that significantly influence adherence to iron and folic acid supplement(Agegnehu *et al.*, 2019).

2.3 Factors that affect the supply/distribution of Iron and Folic to pregnant women

2.3.1 Logistical supply

Globally, the major barrier to the effective iron and folate supplementation programmes, has been the irregular and inadequate supply of the supplements in many countries(Mbhenyane and Cherane, 2017).

In many countries globally, antenatal care (ANC) services is used as the main strategy for distribution of IFA supplements to pregnant women, but the poor quality of the services has made it difficult for expectant women to get the required supplements(Siekmans *et al.*, 2018). The quality of IFA supply and use largely depends on both client centered and ANC service factors such as timing service and visit by clients, frequency, and the quality of services provided(Wendt *et al.*, 2015).

The provision of appropriate Information, Education and Communication (IEC) materials and the support of the Community Health Workers (CHWs) with logistics are basic requirements that are needed for effective antenatal iron and folic acid supplementation since that will empower both health staff and CHWs on IFAS interventions(Kamau *et al.*, 2019).

Community participation in programmes is a difficult concept that cannot be universally defined and accepted simply because of the way programme objectives are defined(Rifkin, 1986).The use of community based agents for the distribution of supplements to pregnant women through home visits, focus counseling, referrals and follow-ups to defaulted clients has proofed to be a very effective strategy as confirmed by a study in the Gambia in 1994 where iron supplementation by traditional birth attendants (TBAs) contributed to reduction of iron deficiency and increased average birth weight(USAID-MCHP, 2019a). Also, in Indonesia, a trial distribution of IFA by TBAs recorded a 40% increase of women reported taking the supplements with the average number of tablets consumed nearly tripled compared to the traditional health facility distribution(USAID-MCHP, 2019a).

2.3.2 Policy factors

At the Sixty-fifth World Health Assembly, participating countries pledged to reduce the global prevalence of anaemia in women of reproductive age by 50% by 2025. In order to achieve this laudable goal will require much more concerted efforts are needed to increase the current rate of progress so far (Sununtnasuk *et al.*, 2015).

In 2012, the World Health Organization (WHO) made some amendments to its policy documents for improve IFA supplementation during pregnancy with emphasis on the continuous daily oral IFA supplementation of 30–60 mg elemental iron and 400 μg of

folic acid throughout pregnancy yet programme implementation in many countries have not recorded any significant improvement (Siekmans *et al.*, 2018).

The WHO further recommended the following health strategies such as improve dietary diversity, food fortification with iron, folic acid and other micronutrients supplement distribution, and control of infectious diseases including malaria workable interventions (World Health Organization, 2014).

In Ghana, the major strategy to prevent anaemia in pregnancy is the provision of iron and folic acid (IFA) supplements to women during pregnancy till 6 weeks postpartum (Ghana Health Service, 2016).

In Ghana, antenatal care (ANC) is a package of services that are provided to pregnant women which includes iron-folic acid (IFA) supplementation, tetanus toxoid (TT) injection, blood screening, weight taking of pregnant women, education about possible complications during pregnancy, other diagnostic tests, focus counselling among others (Martin, 2014).

But there are suggestions that since anaemia is a severe public health problem in Ghana, an urgent attention is required and should be followed by development of context specific policies towards the prevention and control of anaemia (Azupogo *et al.*, 2019).

The Ministry of Health, the Government of India has now recommended intake of 100 mg of elemental iron with 500 mg of folic acid within the second trimester of pregnancy for a period of at least 100 days (Sharma and Shankar, 2010). It was indicated that women who receive daily antenatal dose of iron supplementation are less likely to have iron deficiency anemia at the point delivery (Sharma and Shankar, 2010).

In 2012, the World Health Assembly having recognized the devastating effect of anaemia came out with a Resolution that endorsed a Comprehensive Implementation Plan on Maternal, Infant and Young Child Nutrition (CIP), with six Global Nutrition Targets for 2025 among which the reduction of anaemia by 50% in women of reproductive age (WRA, 15-49 years) was the second (WHO, 2016).

In April 2016, at the United Nations General Assembly Meeting in Rome, there was a proclamation that 2016 to 2025 was going to be the United Nations Decade of Action on Nutrition, as well as the Framework for Action that that recommends Women Iron Folate Supplementation (WIFAS) as an action to address anaemia in women of reproductive age. This strategy is estimated to lead to about 27% reduction of anaemia on the average and is one of the core set of primary interventions earmarked for implementation towards the prevention and control of anaemia services. For the purpose of policy implementation much more efforts are required to be able to reach the 1.5 billion non-pregnant women of reproductive age in low- and middle- income countries, through increased availability and access to health services. In order to achieve a greater coverage on IFAS, there is need to expand policies at all levels that looks at the distribution of beneficiary centered IFAS IEC materials and formal involvement of CHWs in implementation of IFAS programme (Kamau *et al.*, 2019).

CHAPTER THREE

METHODOLOGY

3.1 Study design/type

A cross-sectional study design was used for the study. Quantitative method was used to achieve the objectives of this study. Data on IFA distribution and utilization was collected among pregnant women in the Nanumba North district using semistructured questionnaires and also the combined maternal child health record book. The study was carried out in all five sub-districts in the district namely Makayili, Bimbilla, Chamba, Bincheratanga and Juo.

3.2 Study area

The district is located in the eastern corridor of the Northern Region of the Republic of Ghana.

It is subdivided into five operational sub-districts for the purpose of health care delivery services, with five (5) Health Centers and ten (10) CHPS compounds and a projected population of 183,133 inhabitants from the 2010 population and housing census. The population is varied in terms of ethnicity; the dominant tribes are Nanumba‟s and Konkonba‟s with a few minority settlement tribes such as Akan‟s, Ewe‟s, Basare‟s, Chokosi‟s, Hausa‟s and Moshie‟s.

The population is largely rural. About 62% live in the rural areas while 38% are in the major towns. The population growth rate is approximately 2.8% per annum. The main religious groupings are Moslems, Christians and Traditionalist. Migration pattern is more pronounced among the youth especially the female girls who basically travel to the southern part of the country to be engage as „Kayaye‟ (head potters).

Out migration by young girls exposes them to all forms of sexual abuse and low female school enrolment.

The economy of the people is largely subsistence is agriculture being the main occupation. Over 80% of the people depend on Agriculture for their livelihood. Other economic activities include weaving, agro-processing (Shea butter extraction), meat processing, fish mongering, wholesale and retail of general goods, transport and many others. These activities are on a medium and small scale (Nanumba North Annual Report, 2018).

3.3 Study population

The study was focused on pregnant women receiving antenatal services in the district public health facilities, and had received ANC services for at least once. The district has about 7,325 estimated annual targeted pregnant women for the year 2019 with an approximate ANC coverage of about 78%.

3.4 Inclusion criteria

Those who were qualified and participated in the study were pregnant women residing in the Nanumba North district as at the time of the study.

3.5 Exclusion criteria

The exclusion criterion took care of women who were not pregnant and were equally non-residence of the Nanumba North district during the data collection period.

3.6 Sample size and sampling technique

With a large proportion size as indicated above, an appropriate sample size for the study was computed using the Cochran‟s formula for sample size determination;

$$N = z^2p(1-p)/d^2$$

Where

N is the required sample size **z** is 95% confidence level of standard value 1.96 from statistical table **p** is estimated proportion of pregnant women in the district which is 78% (0.78) **d** is the margin of error of 5% (0.05)

From the Cochran"s formula, the sample size (N) = $(1.96)^2$*0.78(1-0.78)/$(0.05)^2$

= 263.687

= 264 Non response factor of 10% of 264 = 26.4

=26

Therefore a total number of 290 pregnant women were recruited for the study Convenience sampling technique was used to select respondents visiting the various antenatal units within each of the five sub-districts in the Nanumba North district for the study.

3.7 Data collection strategy/tool

A standardized structured questionnaire comprising of open and closed ended questions was used to illicit the appropriate responses from the women. In addition, respondents Maternal ANC cards were reviewed to ascertain the quantity, type, and how IFA was issued to the pregnant women at ANC and in any case if purchased and was documented. Oral interview of respondents on the intake of IFA was equally employed as another strategy to obtain additional information from the women. Prior to the actual data collection, three research assistants were given a one day training on questionnaire administration, interviewing skills and research ethics in order to enhance the quality of the data captured.

3.8 Data management

The administered questionnaires were reviewed each day after the close of work by the supervisor and research assistants to check for completeness and proper coding of questionnaires. Questionnaires identified with issues were sorted out for the necessary action and follow ups before the end of the stipulated period.

3.9 Pretesting of data collection tool

The questionnaire for the data was pretested at Adibo Health Center a facility in the Yendi Municpality. This health center was used for the pretesting because it shares boundaries with two health facilities in Nanumba the study area and has similar social, cultural and economic characteristics. This was done to determine the suitability of the questionnaire. It was later on modified in response to the gaps identified before its final utilization.

3.10 Data analysis

Data was analysed into meaningful information using multi-purpose statistical software package known as STATA. Descriptive and inferential statistics were employed in the analysis of the data. The final work was represented graphically and with tables to add more meaning and clarity to the information.

3.11 Ethical clearance

Prior to the collection of data, ethical clearance was sought and obtained from the KNUST ethical review board before staffs were dispatched to the field. Inform consent was equally sought from all participants before interviews were conducted. Information obtained for the purpose of this research work is strictly kept confidential and no part of it will be shared with a third party for the purpose of the research.

CHAPTER FOUR

RESULTS

4.0 Introduction

This chapter presents analyzed data from the study. The results are structured and presented on the basis of socio-demographic characteristics of respondents and the specific objectives of the study. The findings are presented in frequencies, percentages in tables, bar graphs, pie charts and cross tabulations.

4.1 Socio-demographic characteristics of respondents

A total of 290 respondents who were eligible were enrolled in the study. The minimum and maximum age of respondents recorded was 16 and 50 respectively. In terms of age categories, majority of the respondents, 81 (27.9%), were between 26-30 years whereas minority of the respondents, 14 (4.8%), fell under 41years and above. The mean age was found to be 27.89 with a standard deviation of 7.17. From the study about 82.8% of the respondents were married. Moreover, on data collected for level of education, 152 (52.4%) had no formal education, 39 (13.5%) had primary education, 42 (14.5%) had junior high education, 39 (13.5%) had secondary education, and 18 (6.2%) had tertiary education. Majority of the respondents, 136 (46.9%) were Christians. Table 4.1 shows the socio-demographic characteristics of the respondents.

Table 4.1: Socio-demographic characteristics of Respondents

Variable		Frequency (N = 290)	Percentage (%)
Age (years)			
	16-20	61	21.0
	21-25	51	17.6
	26-30	81	27.9
	31-35	58	20.0
	36-40 40+	25	8.6
Mean±S.D = 27.89±7.17		14	4.8

Marital status			
	Single	31	10.7
	Married	240	82.8
	Divorced	15	5.2
	Widowed	4	1.4
Level of education			
	None	152	52.4 13.5
	Primary	39	14.5
	Junior high/Middle school	42	13.5
	Senior high	39	6.2
	Tertiary	18	
Religion			
	Christian	136	46.9 33.1
	Muslim	96	20.0
	Traditional	58	

Source: Field data, 2019

4.2 Knowledge on IFA utilization/consumption

On average, the gestational age (months) of pregnant women engaged in the study was found to be 5.42 with a standard deviation of 1.90. Only 60 (20.7%) of the pregnant women were having their first pregnancy. The remaining 230 (79.3%) who had been pregnant before had majority of them, 137 (59.6%), having between 1-3 children. With respect to their current pregnancy, majority of the respondent, 149 (51.4%), started attending ANC within the first and third months of their gestational period.

The study discovered that 197 (67.9%) of the respondents receive IFA tablets each time they go for ANC. The study also found quiet interestingly that only 110 (37.9%) of the respondents admitted to know the number of IFA tablets that they are require to take every month. However, out of the 110 (38.1%) who admitted to know the number of IFA tablets needed every month, only 46 (41.8%) could accurately give 28 as the required number of IFA tablets to be taken every month. More than half of the respondents, 149 (51.4%) were ignorant of the reason behind the use of IFA during pregnancy. On the other hand, among those who were cognizant, the associated reason

were prevent and treat anaemia 101 (34.8%), meet maternal nutritional requirements 21 (7.2%) and makes the child grow well 19 (6.6%). Majority of the respondents, 156 (53.8%), with regards to whether they have received any form of education/counselling on IFA use before, indicated "No". The major source of obtaining information on IFA use among those who indicated "Yes" was Health workers scored by 103 (76.9%) respondents.

On the whole, majority of the respondents, 81 (60.5%), rated the information provided to them on IFA use as adequate. The study also revealed that the 108 (54.8%) of respondents took one IFA tablet per day. Detailed description of these findings is presented in Table 4.2.

Table 4.2: Knowledge on IFA utilization/consumption

Variable		Frequency (N = 290)	Percentage (%)
Gestational age (months)			
	2	13	4.5
	3	48	16.6 16.9
	4	49	10.3 17.6
	5	30	16.9
	6	51	15.2
	7	49	2.1
	8	44	
	9	6	
Mean±S.D = 5.42±1.90			
Is this your first pregnancy?			
		60	20.7
	Yes No	230	79.3

How many times have you become pregnant including this current pregnancy? **(*n* =230)**		
2	65	28.3 20.4
3	47	13.9 12.6
4	32	11.7
5	28	7.4 3.5
6	27	2.2
7	17	
8	8	
9 Mean±S.D = 4.06±1.93	5	
How many children do you have? **(*n* =230)**		
No child	5	2.2
1-3 children	137	59.6
4-6children	82	35.7
7+ children	6	2.6
At what gestational age did you start attending ANC with reference to your current pregnancy?		
1-3 months	149	51.4
4-6 months	127	43.8
7-9 months	14	4.8
Do you receive IFA tablets each time you go for ANC?		
Yes	197	67.9
No	93	32.1
Do you know the number of IFA tablets that you are require to take every month?		
Yes	110	37.9
No	180	62.1
What number of IFA tablets is needed for every month? **(*n* =110)**		
28	46	34.1
Variable	**Frequency (N = 290)**	**Percentage (%)**
<10	4	2.9
<20	4	2.9
<28	56	44.9
Why do you take the IFA tablets?		
Prevent and treat anaemia	101	34.8
Meet maternal nutritional requirements	21	7.2
Makes the child grow well	19	6.6
I don‟t know	149	51.4

Have you receive any form of education/ counselling on IFA use before?		
Yes	134	46.2
No	156	53.8
From what source did you get the information on IFA use? **(*n* =134)**		
Health worker	103	76.9
Health volunteer	31	23.1
How would you rate the information provided to you on IFA use? **(*n* =134)**		
Adequate	81	60.5
Partially adequate	53	29.9
Inadequate	13	9.7
How many IFA tablets do you take in a day? **(*n* =197)**		
1	108	54.8 14.2
2	28	25.9
3 More than	51	5.1
3	10	

Source: Field data, 2019

4.3: Level of IFA compliance among pregnant women

In order to ascertain the adherence of respondents to IFA dosage, the number of IFA tablets were counted and compared with the last ANC visit. It was found that 141 (68.8%) of the respondents correctly adhered to IFA dosage whereas 64 (31.2%) did not. This result is depicted in Figure 4.1 below.

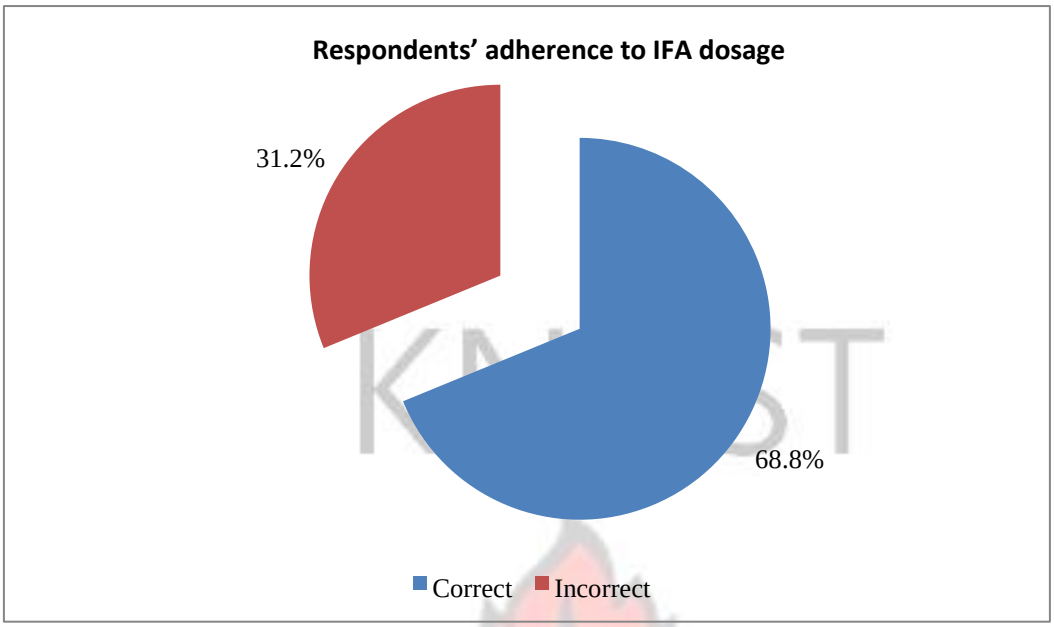

Figure 4.1:Adherence and non-adherence to IFA dosage

Source: Field data, 2019

Table 4.3 also explains the results that were derived from the respondents when queried whether or not there has been instances where they have missed taken their IFA tablets. Out of 205 respondents who responded to that question, 48 (23.4%) indicated "Yes" whiles 157 (76.6%) indicated "No". Reasons disclosed by respondents who have ever missed taken their IFA tablets included forgetfulness, fedup with taking the drug, when the health facility does not provide them, and deterred by the inconvenience associated with the taking the drug such as difficulty swallowing due to the scent of the drug, feeling nauseous and vomiting.

Table 4.3: Have you ever missed taken your IFA tablets?

Variable	Frequency (*n* =291)	Percentage (%)
Has there been instances where you have missed taken your IFA tablets?		
Yes	48	23.4
No	157	76.6

Source: Field data, 2019

As illustrated in Figure 4.2, respondents were probed to ascertain whether they have any difficulties in taking their IFA tablets as prescribed. On the whole, 205 of the interviewees responded to the question. By segmentation, 33 of those respondents asserted "Yes" representing 16.1% whiles 172 asserted "No" representing 83.9%. The difficulties that were highlighted by respondents who said "Yes" were the scent of the drug, feeling abdominal pains after taking the drug, feeling nauseous and vomiting out the drug after taking it.

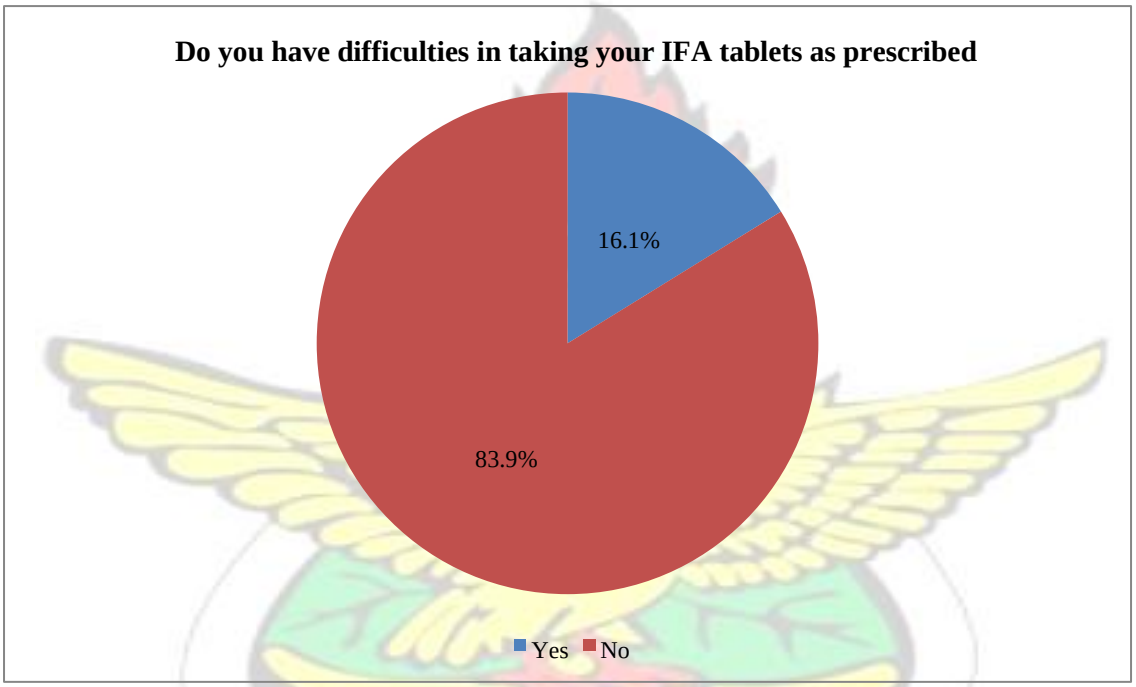

Figure 4.2: Do you have difficulties in taking your IFA tablets as prescribed?

Source: Field data, 2019

Furthermore, respondents were asked whether they have encountered any adverse effect from taking the IFA tablets. Out of the total respondents recruited for the study, 205 answered the question. Nearly three-quarters of the respondents, 151 (73.7%), who answered said "No". However, quite a few answered "Yes", 54 (26.3%). The various adverse effects outlined by respondents who said "Yes" included diarrhoea and

abdominal distress 14 (25.9%), nausea and vomiting 27 (50.0%), and constipation 13 (24.1%). This result is illustrated in Figure 4.3 below.

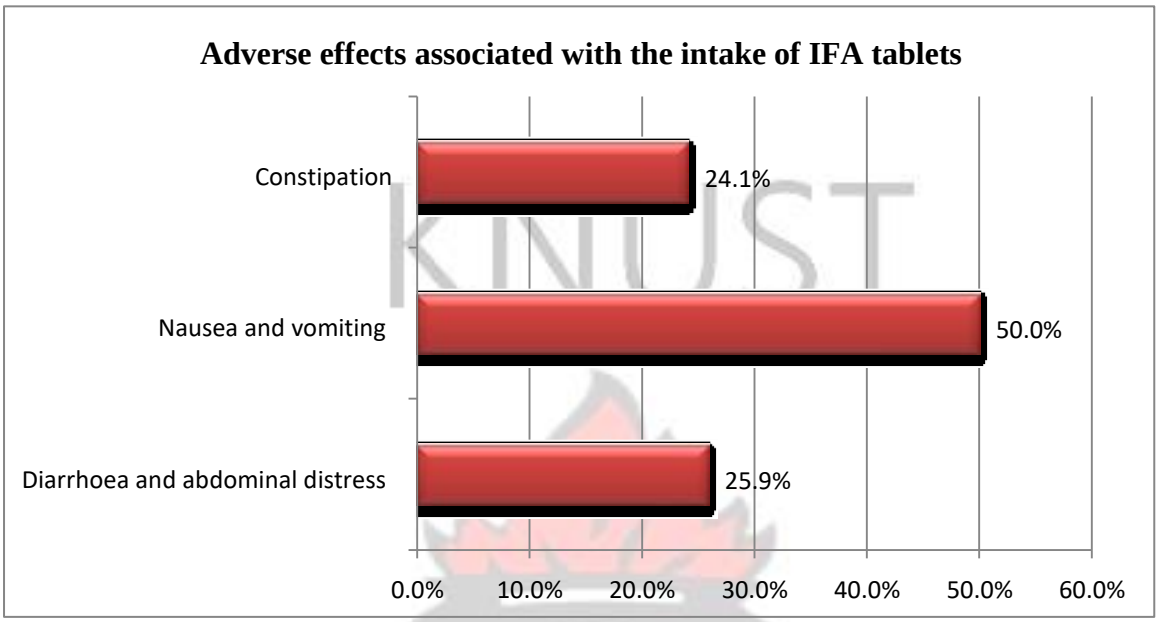

Figure 4.3: Adverse effects associated with the intake of IFA tablets

Source: Field data, 2019

The study also found that what community/family thinks about the utilization of IFA by pregnant women does not really influence the intake of IFA by pregnant women. In fact, 120 of the respondents making 60.3% said "No" when asked whether what their community/family think about the utilization of IFA by pregnant women has got an influence on their IFA tablets intake as prescribed. Only 79 (39.7%) of the respondents said "Yes".

4.4 Factors that influences adherence to IFA dosage

4.4.1.Bivariate analysis of factors associated with adherence to IFA dosage

Table 4.4 below demonstrates the association between respondents‟ sociodemographic characteristics vis-a-vis their adherence to IFA dosage. A chi square ($\chi 2$) test was

conducted to establish the association between these variables at a significance level of 0.05. It was revealed that a statistically significant association exits between adherence to IFA dosage vis-à-vis educational level (p-value = 0.001), religion (p-value = 0.006), gestational age (p-value = 0.004) and knowledge on the number of IFA tablets required every month (p-value = 0.001). However, the association was **"not"** statistically significant for age, marital status, first pregnancy and education/counselling on IFA use in relation to adherence to IFA dosage.

Table 4.4: Bivariate analysis of factors associated with adherence to IFA dosage

Variables	Adherence to IFA dosage (n = 290)		P - value
	Adherence n (%)	Non-adherence n (%)	
Age			
16-20 years	26 (12.68)	18 (8.78)	
21-25 years	27 (13.17)	12 (5.85)	
26-30years	48 (23.41)	13 (6.34)	0.395
31-35 years	23 (11.22)	12 (2.85)	
36-40 years	12 (5.85)	7 (3.41)	
41+ years	5 (2.44)	2 (0.98)	
Marital status			
Single	15 (7.32)	11 (5.37)	
Married	115 (56.10)	47 (22.93)	0.523
Divorced	8 (3.90)	5 (2.44)	
Widowed	3 (1.46)	1 (0.49)	
Level of education			
None	53 (25.85)	44 (21.46)	
Primary	24 (11.71)	8 (3.90)	
Junior high	22 (10.73)	6 (2.93)	**0.001***
Senior high	29 (14.15)	4 (1.95)	
Tertiary	13 (6.34)	2 (0.98)	
Religion			
Christian	78 (38.05)	20 (9.76)	
Muslim	43 (20.98)	31 (15.12)	**0.006***
Traditional	20 (9.76)	13 (6.34)	
Gestational age (month)			
2	12 (5.85)	1 (0.49)	
3	30 (14.63)	9 (4.39)	
4	25 (12.20) 12	15 (7.32)	
5	(5.85)	10 (4.88) 6	**0.004***
6	29 (14.15)	(2.93)	
7	12 (5.85)	15 (7.32)	
8	20 (9.76)	6 (2.93)	
9	1 (0.49)	2 (0.98)	
First pregnancy			
Yes	24 (11.74)	17 (8.29)	0.114
No	117 (57.07)	47 (22.93)	
Knowledge on number of IFA tablets required every month		13 (6.34)	
Yes	78 (38.05)	51 (24.88)	
No	63 (30.73)		**0.001***

Educated/counseled on IFA use			
Yes	82 (40.00)	31 (15.12)	
No	59 (28.78)	33 (16.10)	0.195

***Chi square significant at p<0.05**

4.5 Multivariable logistic regression of factors influencing adherence to IFA tablets

Result from bivariate analysis showed that level of education, religion, gestational age and knowledge on the number of IFA tablets required every month was found to have an association with adherence to IFA tablets. From further logistic regression analysis, it was ascertained that women who have attained tertiary education were 8 times likely to adhere to IFA (OR: 7.97; CI: 1.38 - 45.8; p-value: 0.020). Also, women who knew the required number of IFA tablet required every month were 4.8 times likely to adhere to IFA tablets (OR: 4.79; CI: 2.15 - 10.68; p-value: 0.001). The other variables which had association with adherence at the bivariate analysis were not statistically significant in the logistic regression analysis. This is shown in Table 4.5 below.

Table 4.5: Multivariable logistic regression of factors influencing adherence to IFA dosage

Covariates	OR	[95% CI]	P - value
Level of Education			
None	Ref		
Primary	2.98	[1.04 - 8.49]	0.041
JHS/Middle school	3.28	[1.04 - 10.37]	0.044
Senior High	5.36	[1.51 - 19.01]	0.009
Tertiary	7.97	[1.39 - 45.80]	0.020
Religion			
Traditional	Ref		
Christian	1.74	[0.63 - 4.79]	0.286
Muslim	0.51	[0.18 - 1.44]	0.206

Gestational age (months)				
	2	Ref		
	3	0.14	[0.01 - 1.41]	0.096
	4	0.47	[0.00 - 0.46]	0.009
	5	0.06	[0.01 - 0.63]	0.019
	6	0.16	[0.02 - 1.73]	0.132
	7	0.05	[0.00 - 0.48]	0.010
	8	0.17	[0.02 - 1.76]	0.136
	9	0.02	[0.00 - 0.83]	0.040
Knowledge on number of IFA tablets required every month				
	No	Ref		
	Yes	4.79	[2.15 - 10.68]	0.001*

***Chi square significant at p<0.05**

4.6 Access to IFA by Pregnant women

The study revealed among other things that 179 (87.3) of the respondents obtain their IFA supplies from Health facilities. The study also asked to know whether the point of service delivery was far from respondents‟ house or not and out of the 240 who responded 110 (45.8%) indicated “Yes”. Majority of the respondents, 147 (61.3%) indicated that they spend nothing on transportation to access the services. It was really unfortunate to discover that majority of respondents, 155 (53.5%) do not get regular supply of IFA tablets from their service providers. With regards to reasons accounting for irregular supply of IFA tablets, the predominating reason was that the district does not provide the IFA tablets to the service providers and also when the IFA tablets gets finished at the facility they are not restocked. Other respondents also gave reasons that they do not go for them. Moreover, respondents were further probed to ascertain whether they have any challenges getting regular supply of IFA any time they visit the

facility. Majority of the respondents, 176 (60.7%), answered “No” and minority, 114 (39.3%) answered “Yes”. The challenges cited by those who answered “Yes” included IFA tablets are not available at the facility, and also the health facility does not provide the IFA tablets.

According to the study 46 (18.6%) of respondents asserted that they pay for the IFA tablets which they receive from the facility whiles 202 (81.5%) said “No”. In terms of the amount paid by respondents who said “Yes” 43.5% indicated 1-5GH₵ , 26.1% indicated 6-10GH₵ whereas 30.4% indicated 11GH₵ and above. Out of the respondents who asserted that they pay for IFA tablets, 58.7% responded “Yes” whereas 41.3% responded “No” to the question “do you think the amount you pay is commensurate with the service?” Moreover, the study found that majority of the respondent, 178 (65.2%), estimated the time spent at ANC before getting supplies of IFA as 1-60 minutes. Interestingly majority of the respondents, 192 (66.2%), engaged in the study assessed the service rendered with regards to IFA distribution as satisfactory. Table 4.5 details the findings under this objective.

Table 4.6: Access to IFA by Pregnant women

Variable	Frequency (N = 290)	Percentage (%)
Where do you go for your IFA supplies? **(*n* =205)**		
Health facility	179	87.3
Pharmacy shop	26	12.7
Is the point of service delivery far from your house? **(*n* =240)**		
Yes	110	45.5
No	130	54.2
How much do you spend on transport in order to access the services? **(*n* =240)**		
Nothing	147	61.3 19.2
1-10GH₵	46	14.6
11-20GH₵	35	5.0
20+GH₵		

	12	
Do you get regular supplies of IFA as scheduled by the service providers?		
No	135	46.6
Yes	155	53.4
Do you have any challenges getting your supply of IFA any time you visit the facility?		
Yes	114	39.3
No	176	60.7
Do you pay for the IFA tablets you receive from the facility? **(*n* =248)**		
Yes	46	18.5
No	202	81.5
How much do pay for the IFA tablets? **(*n* =46)**		
1-5GH₵	20	43.5 26.1
6-10GH₵	12	30.4
11+GH₵	14	
Do you think the amount you pay is commensurate with the service? **(*n* =46)**		
Yes	27	58.7
No	19	41.3
How do you estimate the time spent at ANC before you get your supplies of IFA? **(*n* =273)**		
1-60minutes	178	65.2
61-120minutes	80	29.3
121+minutes	15	5.5
How do you assess the service providers with regards to IFA distribution?		
Satisfactory	192	66.2
Unsatisfactory	77	26.6
I don‟t know	21	7.2

Source: Field data, 2019 **CHAPTER FIVE**

DISCUSSION

5.1 Introduction

The high demand for elemental iron and folic acid during pregnancy due to the increased physiological needs by the foetus and maternal tissues has made it rarely impossible for expectant mothers to be able to obtain the requisite requirements of iron and folic acid with the normal diets the consume daily (Agegnehu *et al.*, 2019). Therefore, pregnant women are required to be put on daily iron and folic acid supplements. In view this, according to the WHO guidelines for control and prevention of anaemia in pregnancy, all pregnant women are required to take a standard oral supplemental dose of 60mg iron and 400 mg folic acid daily for throughout pregnancy to improve upon the outcome of the pregnancy (WHO, 2012). This present study therefore ascertained the level of compliance and utilization of Iron and Folic Acid tablets among pregnant women in Nanumba North District of Northern Region- Ghana. The findings from the study in accordance with relevant literature are explicitly discussed in this chapter.

5.2 Demographic characteristics of the respondents

A total of 290 respondents who meet the eligibility criterion were enrolled in the study. It was found out that the minimum and maximum age range of the respondents recorded after the analysis of the data was between16 to 50 years respectively. This results goes to confirm the fact that women in their reproductive age are between the ages 15–49 years as indicated in the Ghana Landscape Analysis of Anaemia Programming report (2016). Moreover, approximately 83% of the respondents were married women. More than half (52%) of the respondents with no formal education is indicative of the education challenges surrounding the Municipality. The reason could possibly be connected with the fact that education is not really patronized or made accessible to the inhabitants within the study area. Furthermore, respondents were found to belong to the three major religions in the country with majority 46.9% being

Christians. Indeed, the outcome of the results are in line with the fact that majority of Ghanaians are actually Christians as indicated in the GDHS report (GDHS, 2008).

5.3 Knowledge on IFAS utilization by pregnant women

The study discovered that 67.9% of the respondents receive IFA tablets each time they go for ANC services which is less than the Northern regional coverage of 69.0% as indicated in the Spring Nutrition Brief (Spring-Ghana, 2014). The study also found quiet interestingly that about 38% of the respondents admitted to know the number of IFA tablets they are required to take every month. When probed further of the 38% who claimed to know the number of IFA required to take every month, only 34% knew the actual number of IFA tablets needed every month; thus could mentioned 28 as the required number of IFA tablets to be taken every month. The study also revealed that the 54.8% of respondents took one IFA tablet per day.

Moreover, more than half of the respondents were ignorant of the reason behind the use of IFA during pregnancy. Among those who were cognizant, the associated reason were prevent and treat anaemia (34.8%), meet maternal nutritional requirements (7.2%) and makes the child grow well (6.6%). These results are not surprising because in a similar study, 36.6% of the respondents had heard about folic acid and out of that number, 33.3% were able to correctly mention the effect of folic acid when used periconceptionally (Deepti *et al*, 2013).

It was also divulged from the study that only 46% of the respondents received any form of education/counselling on IFAS before. In fact major percentage of the respondents have never been previewed to information regarding IFAS. This finding perfectly explains why majority of the respondents were not aware of the number of IFA required to take every month. It also serves as a strong basis for why high percentage of them

were ignorant about the reason behind the use of IFA during pregnancy. The major source of obtaining information on IFA use among those who have ever received education/counselling on IFA was from Health workers with a score of 76.9% respondents. In a similar study in Kenya, 67.3% respondents had heard of IFAS, with 40.9% of respondents having adequate IFAS knowledge (Kamau *et al.*, 2019). In that study, 63% of the respondents acknowledged to heard about IFAS from health workers but majority reported their source of information, thus 91% and 87% community health workers and print material respectively (Kamau *et al.,* 2019). On the whole, majority of the respondents, 81 (60.5%), rated the information provided to them on IFA use as adequate.

5.4 Level of IFAS compliance among pregnant women

The level of adherence to IFA among pregnant women interviewed is quite appreciative though, not all the pregnant women correctly adhere to the IFA tablets. Adherence to IFA is deemed relatively high among the respondents. This is because a study in Ethiopia revealed adherence to IFA supplementation as 28.7% (Agegnehu *et al.*, 2019), which is lower than 68.8% obtained in this study. The rate of nonadherence stems from pregnant women failing to take the IFA tablets given them due to reasons such as forgetfulness, fed-up with taking the drug, when the health facility does not provide them, and deterred by the inconvenience associated with taking the drug such as difficulty in swallowing due to the scent of the drug, feeling nauseous and vomiting.

Moreover, the study revealed that adverse effects such as diarrhoea and abdominal distress, nausea and vomiting, and constipation associated with IFA possibly instigate pregnant women to stop taking of IFA tablets and hence yielding non-adherence. According to WHO (2012), high-dose iron supplementation often comes with constipation, nausea, vomiting and diarrhoea, and the frequency and severity dependent

on the dose of the elemental iron consumed and released into the stomach. The current finding about the adverse effect causing non-compliance strengthens the study by Gebreamlak *et al.* (2017) who recorded low compliance (58%) of IFA with associated side effects as the main reason for their non-adherence to the IFA supplementation.

It was also revealed that compliance/adherence to IFA influenced by level of education and knowledge on the number of IFA tablets required. It has been concerted by Titaley *et al.* (2015) that education among other factors have an influence on IFA utilization. It can therefore be construed that through education people become cognizant and appreciate the relevance and indispensability of taking IFA during pregnancy. Certainly, a person poised with knowledge on the benefit of IFA will proceed taking it regardless the adverse effect she may experience. According to Theng and Yusof (2017) women who had good knowledge of iron supplementation and the associated benefits are 5.4 times more likely to comply with iron and folic acid supplementation compared to those who had low knowledge.

5.5 Reasons which account for the low supply/distribution of IFAS to pregnant women.

Approximately 54% of the respondents do not get regular supply of IFA tablets from their service providers. The dominating reason for this situation is that the many health facilities rendering the ANC services do not provided IFA supplements.

Additionally, shortage of IFA supplements at health facilities is also a reason which account for respondents been unable to get regular supply of IFA tablets. Siekmans *et al.*, (2018) have also enumerated shortage of supplements as a factor that affect IFA coverage. In addition, some respondents indicated that they have failed to go for the IFA supplements. This demand and supply issues identified in the study are not different

from similar ones cited in the Maternal and Child Health Journal(USAIDMCHP, 2019a).

The study also revealed among other things that 87.3% of the respondents obtain their IFA supplies from Health facilities with only 12.7% obtaining their supplies from the pharmacies. This explains the point that, in many countries anten atal care (ANC) service rendered at health facilities is used as the main strategy for the distribution of IFA supplements to pregnant women (Siekmans *et al.,* 2018). That notwithstanding, 45.8% of the respondents indicated that the point where they receive IFA was indeed far from where they reside. Far proximity as disclosed by some of the respondents cements an earlier finding that some respondents fail to go for IFA supplement. The transportation fee paid, as reported by some of respondents in far proximity from the service delivery point, is also an impediment to the access of IFA tablets.

The study further found that 18.6% of respondents pay for the IFA tablets which they receive from the facility. In terms of the amount paid by respondents, 43.5% indicated 1-5GH₵ , 26.1% indicated 6-10GH₵ whereas 30.4% indicated 11GH₵ and above. Although it was also found that majority of the respondents who pay for the IFA tablets considered the amount to commensurate with the service, the payment generally serves a barrier to those who cannot afford. A study by Titaley *et al.* (2015) divulged that payment for IFA has an impact on its coverage.

CHAPTER SIX

CONCLUSION AND RECOMMENDATION

6.1 Conclusion

The study revealed that 95.2% of pregnant women who participated in the study were within the reproductive age (WIFA). Interestingly 82.8% of the respondents were

married women and 52.4% had no form of formal education. It was also discovered that majority of the respondents were Christians.

In addition the study shows that 67.9% of the respondents received IFA tablets during ANC services. Also 55.8% of the respondents claim to know the required number of IFA tablets they are supposed to take every month. However, upon further interrogation only 41.8% know the actual number of IFA tablets per month, thus mentioned 28. Furthermore, a little above half of the participants did not know the reason(s) behind the use of IFA during pregnancy. Although health workers are the major educators with regards to IFAS, majority of pregnant women do not receive any form of education/counselling on IFAS.

A lesser percentage of respondents default in taking their IFA tablets owing to reasons such as forgetfulness, fed-up with taking the drug, and deterred by the inconvenience associated with the drug such as difficulty in swallowing due to the scent of the drug, feeling nauseous and vomiting. Adverse effects associated with IFA include diarrhoea and abdominal distress, nausea and vomiting, and constipation. Community/family do not greatly influence IFA intake.

The study reveals health facilities as the major source of IFA supply to respondents with just a few obtaining their supplies from the pharmacies. However, 53.5% of clients do not get regular supply of IFA tablets from their service providers. This is due to the fact that facilities often run out of supplies of IFA coupled with the fact that some beneficiaries sometimes failed to go for the supplements due to proximity to health facility and transportation fee involved, as well as amount needed to be paid to obtain IFA supplements. Such factors militate against regular supply/distribution of IFA to pregnant women.

6.2 Recommendations

Study findings provide a wealth of data and information that needs to be shared with all relevant stakeholders to improve the uptake of IFA by pregnant women.

6.2.1 The Nanumba District Health Directorate

- The shortage of IFA in the health facilities is contributory factor to the low IFAS coverage as well as the poor adherence and compliance. The DHMT is therefore entreated to ensure the regular supply of IFA supplies to all the facilities.
- The DHMT should provide relevant and appropriate SBCC materials for use in the district.

6.2.2 The health facilities/RCH units

- Paramount among the finding was the lack or poor health education and promotion services that are rendered to pregnant women. It is therefore recommended that more attention should be giving to health education and counseling.
- It is recommended to the facility staff to include community level agents in the distribution of IFA to expectant mothers.
- Much more is required at the facility level to improve upon early ANC attendance which has a direct impact on IFA use.

6.2.3 The district assembly

- It is recommended to the district assembly to place premium on the construction of more CHPS compounds to make health service delivery more accessible to the rural folks.

- The district assembly should also put in place more structures such as scholarships to promote female education to reduce the level of illiteracy.

6.3 Interest areas for further studies

- The effectiveness of the girls intake of IFA supplementation.
- Men as partners in ANC service delivery /IFA distribution.

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APPENDICES

APPENDIX 1: QUESTIONNAIRE

TOPIC: Iron and Folate tablets distribution and compliance among pregnant women in Nanumba North District of Northern Region, Ghana.

INTRODUCTION

I am **Mark Atoobey** a student of KNUST and I am carrying a research on Iron and Folate distribution and compliance among pregnant women. This exercise is an academic requirement for the attainment of MPH. Health Education and Promotion degree. In view of this, I would be grateful if you could participate by answering these questions to enable me prepare the report. Your responses will be used purely for the academic purpose and will be treated confidential. Thank you.

Sub-district: …… Health facility:……..……..

Date:…… …….. Questionnaire Code:……..

SECTION 1: SOCIO – DEMOGRAPHIC DATA

1. Age (in complete years) …….

2. Marital status [ ] single [ ] married [ ] divorced [ ] widow

6. Level of education

[ ] Nil [ ] Primary [ ] Junior high/Middle school [ ] Senior high [ ] Tertiary

7. Religion

[ ] Christian [ ] Muslim [ ] Traditional [ ] Others (specify)……

SECTION 2: KNOWLEDGE ON IF A UTILISATION/CONSUMPTION

2.0 Gestational age of pregnancy in months (check on ANC card) …….

2.1 Is this your first pregnancy? **[ ]** Yes **[ ]** No, **if yes skip to question 2.4**

2.2 How many times have you become pregnant including the current pregnancy? .....

2.3 How many children do you have?

[ ] No child **[ ]** 1-3children **[ ]** 4-6children **[ ]** 7+children

2.4 At what gestational age did you start attending ANC with reference to your current pregnancy?

[ ] 1-3months **[ ]** 4-6months **[ ]** 7-9months

2.6 Do you receive IFA tablets each time you go for ANC? **(Check physically or from the ANC card)** **[ ]** Yes **[ ]** No

2.7 Do you know the number of IFA tablets that you are require to take every month?

(If no skip to question 2.9) [ ] Yes **[ ]** No
2.8 **If yes to question 2.7**, what number of IFA tablets did you receive?
[ ] 28 **[ ]** <10 **[ ]** <20 **[ ]** <28 **[ ]** Do not know
2.9 Why do you take the IFA tablets? **Tick multiple responses**
[ ] Prevent and treat anaemia
[ ] Meet maternal nutritional requirements
[ ] Makes the child grow well
[ ] Others (specify) ……
2.10 Have you receive any form of education/counselling on IFA use before? **[ ]** Yes **[ ]** No
2.11 From what source did you get the information on IFA use?
[ ] Health worker **[ ]** Health volunteer **[ ]** Others (specify) …… 2.12 How would you assess the information you have received on IFA use?
[ ] Adequate **[ ]** Partially adequate **[ ]** Inadequate 2.13 How many IFA tablets do you take in a day?
[ ] 1 [ ] 2 [ ] 3 [ ] More than 3

SECTION 3: LEVEL OF IFA COMPLIANCE AMONG PREGNANT WOMEN

3.1 Has there been an instance where you have missed taken your IFA tablets? **If no skip to 3.3**

[ ] Yes **[ ]** No
3.2 **If yes to question 3.1**, what was the reason(s)?

……

3.3 Do you have difficulties in taking your IFA tablets as prescribed?

[ ] Yes **[ ]** No
3.4 If yes, what are those difficulties?

……
……

3.5 Have you encounter any adverse effect when you started taking the IFA tablets?

[ ] Yes **[ ]** No
3.6 **If yes to 3.5**, what are the adverse effects you associated with the intake of IFA tablets?

[ ] Diarrhoea and abdominal distress

[ ] Nausea and vomiting

[ ] Constipation

[ ]Others (specify) ……

3.7 What does your community/family think about the utilization of IFA by pregnant women?

……

3.8 Has that got an influence on your IFA tablets intake as prescribed?

[ ] Yes **[ ]** No

3.9 Physically count the number of IFA tablets and compare with the last ANC visit to confirm adherence to dosage.

[ ] Correct **[ ]** Incorrect

SECTION 4: ACCESS TO IFA BY PREGNANT WOMEN

4.1 Where do you go for your IFA supplies?

[ ] Health facility **[ ]** Pharmacy shop **[ ]** other(specify)…….

4.2 Is the point of service delivery far from your house?

[ ] Yes **[ ]** No

4.3 How much do you spend on transport in order to access the services?

[ ] Nothing **[ ]** 1-10GH₵ **[ ]** 11-20GH₵ **[ ]** 20+ GH₵

4.4 Do you get regular supplies of IFA as scheduled by the service providers?

[ ] Yes **[ ]** No

4.5 If "**No"** to question 4.4, what are the reasons that account for the irregular supply of IFA?

……
……
……

4.6 Do you have any challenges getting your supply of IFA any time you visit the facility?

[ ] Yes **[ ]** No

4.7 If "Yes**"** to question 4.6, what are those challenges?

……
……

4.8 Do you pay for the IFA tablets you receive from the facility?

[ ] Yes **[ ]** No

4.9 How much do pay for the IFA tablets?

[ ] 1- 5GH₵ **[ ]** 6- 10GH₵ **[ ]** 11+GH₵

4.10 Do you think the amount you pay is commensurate with the service?

[ ] Yes **[ ]** No

4. 11 How do you estimate the time spent at ANC before you get your supplies of IFA?

[ ] 1-60minutes **[ ]** 61-120minutes **[ ]** 121+minutes

4.12 How do you assess the service render to you with regards to IFA distribution?

[ ] Satisfactory **[ ]** Unsatisfactory **[ ]** Do not know

THANK YOU

APPENDIX II: CONSENT FORM

CONSENT FORM

Researcher's Details

Name: Atoobey Mark
Position: Master of public Health student in the Department of Health Education and Promotion, School of Public Health, Kwame Nkrumah University of Science and Technology
Student Reference Number: 20599986
Contact Address: P.O.BOX 48, Yendi Municipal Health Directorate
Email address: atoobeym@yahoo.com
Phone: 0246986730

Respondent Confirmation Form

Please tick a box

1. I confirm that I have read and understand the information sheet for the above study and have had the opportunity to ask question.

   Yes [ ] No[ ]

2. I understand my participation is voluntary and that I am free to withdraw at any time without giving reason.

   Yes [ ] No[ ]

3. I agree to take part in the above study

   Yes [ ] No[ ]

4. I agree to the interview being audio recorded

   Yes [ ] No[ ]

5. I agree to the use of anonymity quotes in publication

   Yes [ ] No[ ]

6. I agree that my data gathered in this study may be shared in a specialist data centre and may be used for future research

   Yes [ ] No[ ]

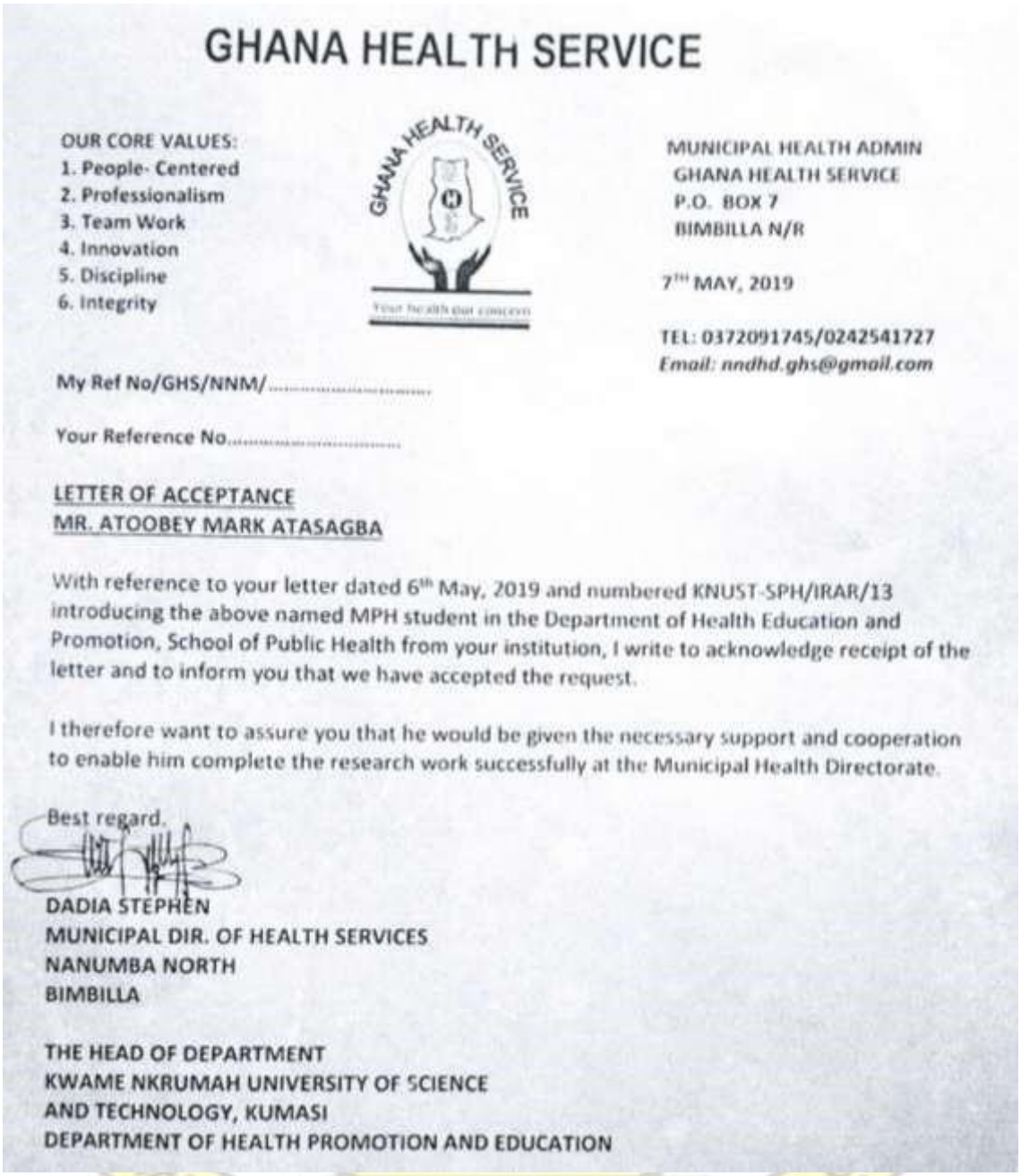
Name of Researcher……. Date……

Signature…….

Name of Respondent……. Date……

Signature…….

APPENDIX III: LETTER FROM STUDY AREA



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MUNICIPAL HEALTH ADMIN
GHANA HEALTH SERVICE
P.O. BOX 7
BIMBILLA N/R

7TH MAY, 2019

TEL: 0372091745/0242541727
Email: nndhd.ghs@gmail.com

My Ref No/GHS/NNM/.....

Your Reference No.....

LETTER OF ACCEPTANCE
MR. ATOOBEY MARK ATASAGBA

With reference to your letter dated 6th May, 2019 and numbered KNUST-SPH/IRAR/13 introducing the above named MPH student in the Department of Health Education and Promotion, School of Public Health from your institution, I write to acknowledge receipt of the letter and to inform you that we have accepted the request.

I therefore want to assure you that he would be given the necessary support and cooperation to enable him complete the research work successfully at the Municipal Health Directorate.

Best regard.

DADIA STEPHEN
MUNICIPAL DIR. OF HEALTH SERVICES
NANUMBA NORTH
BIMBILLA

THE HEAD OF DEPARTMENT
KWAME NKRUMAH UNIVERSITY OF SCIENCE
AND TECHNOLOGY, KUMASI
DEPARTMENT OF HEALTH PROMOTION AND EDUCATION

IRON AND FOLIC ACID SUPPLEMENTATION AND COMPLIANCE AMONG PREGNANT WOMEN IN NANUMBA NORTH DISTRICT OF NORTHERN REGION, GHANA

by Mark Atoobey

IRON AND FOLIC ACID SUPPLEMENTATION AND COMPLIANCE AMONG PREGNANT WOMEN IN NANUMBA NORTH DISTRICT OF NORTHERN REGION, GHANA

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