ANAEMIA PREVENTION AND FACTORS ASSOCIATED WITH USE OF IRON SUPPLEMENT AMONG PREGNANT WOMEN IN IBADAN NORTH LOCAL GOVERNMENT AREA, NIGERIA

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ABSTRACT

Anaemia is a public health problem affecting an estimated 3.5 billion people worldwide and at least 50% of pregnant women in Africa. Nigeria has a relatively high prevalence of anaemia in pregnancy despite ameliorating measures including use of iron supplementation as prophylaxis. This study was conducted to assess anaemia prevention practice and factors associated with use of iron supplements among pregnant women in Ibadan North Local Government Area of Oyo State, Nigeria

Six primary health centers were randomly selected from ten primary health centers in Ibadan North L.G.A. A total of 450 consenting pregnant women were interviewed from the six selected primary health centers based on the proportion of pregnant women that attended antenatal clinic in each PHC. An interviewer-administered semi-structured questionnaire which included knowledge score of 0-30 categorized into good (70-100 %) and poor (0-69 %.) and also practice score of 15-75 categorized into poor (15-33) and good (34-75). Among the practice scores, compliance to prescription was checked using a compliance score of 3-15 of the total score categorized into low (3-9) and high (10-15). Descriptive statistics, Chi-square and t-tests, and logistic regression were used for data analysis at 5% level of significance.

The mean age of the respondents was 26.7±4.6years. Majority (93.8%) were Yoruba, self-employed (79.1%) and Muslims (58.0%). Many (79.3%) had secondary education and (80%) earned less than N20, 000 monthly while few (4.0%) were unemployed. Most (65.3%) had 2 or more children (Multigravidas) while (34.7%) just had first pregnancy (primigravidas). Majority (84.7%) of respondents had good knowledge of anaemia prevention with a mean (±S.D) knowledge score of 23.5 ± 5.5. The unemployed were less (OR: 0.10; CI= 0.03-0.40, p-value 0.001) likely to have good knowledge of anaemia prevention than the employed while respondents with primary and secondary education were about five (OR: 4.70; CI= 1.05-21.11, p-value 0.044) and six times respectively (OR: 6.15; CI=1.49-25.45, p-value 0.012) more likely to have good knowledge of anaemia prevention than those without any formal education. The unemployed were less likely to have good anaemia prevention practices than the employed (OR: 0.04; CI = 0.003-0.46, p-value 0.010) and those with 2 or more children (multigravidas) were

about five times more likely to have good anaemia prevention practices than the primigravidae (OR: 5.01; CI= 1.56-16.09, p-value 0.007). Although majority of the respondents (93.3%) used iron supplements, compliance to prescription (57.3%) was relatively low. Respondents with secondary and tertiary education were about seven (OR: 6.65; CI= 1.15-38.57, p-value 0.035) and 24 times respectively (OR: 24.33; CI=2.06-287.9, p-value 0.011) more likely to use iron supplements than those without any formal education. And respondent with 2 or children (multigravidas) were about three times (OR: 3.10; CI=1.08-8.84, p-value 0.035) more likely to use Iron-Folic acid supplements than the primigravidae.

Socio-economic factors were determinants of anaemia prevention practice among pregnant women. There is therefore need for timely economic empowerment and educational interventions to address these challenges.

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Key words: Anaemia prevention, knowledge, attitude, practices, compliance, iron-folate supplements.

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CERTIFICATION PAGE

I certify that this research work titled anaemia prevention and factors associated with iron and folic acid prescription use among pregnant women in Ibadan North Local Government Area, Nigeria was carried out by NwankpaRomanusOkechukwu under my supervision in the department of Human Nutrition, Faculty of Public Health, College of Medicine, University of Ibadan.

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DEDICATION

This work is dedicated to the Almighty God who inspired me to enroll in this program and has helped me to completion. He is my shield, deliverer, my glory and the lifter of my head. To my Beloved wife Dr.Ugochi Patricia Okechukwu-Nwankpa who made sacrifices to support me and my children whose love encouraged me.

LIST OF ACRONYMNS

WHO - World Health Organization

MDG - Millennium Development Goal

ICPD - International Conference on Population and Development

IFAS- Iron-Folic Acid Supplementation

UNICEF - United Nation Child Education Fund

ITNs -Insecticide Treated Nets

IDA - Iron Deficiency Anemia

LGA- Local Government Area

PHCs- Primary Health Centers

n.a - not applicable

ANC - Antenatal Care

IEC - Information Education and Communication

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CHAPTER ONE
INTRODUCTION

1.1 Background

Anaemia is one of the major public health and nutrition challenges plaguing 21st century humanity. The World Health Organization (WHO) estimates that anemia affects between one-quarter to one-third of the world's population or up to 2 billion people (WHO 2000). It is a worldwide problem with an overwhelming burden particularly in pregnant women and young children. Anaemia in pregnancy is thought to be one of the commonest problems affecting pregnant women both in developed and developing countries as it is estimated that more than half of the pregnant women in the world have hemoglobin levels indicative of anemia (WHO 2000).

The Millennium Development Goal (MDG) to improve maternal health reinforces decades of international commitment and national efforts to address the problems associated with reproductive health, safe motherhood and family health. It builds on past global agreements such as the Program of Action of the International Conference on Population and Development (ICPD) held in Cairo in 1994. The global commitment to achieving the MDGs provides a unique opportunity to achieve not just the goal of improving maternal health, but also attaining the target in terms of reducing the maternal mortality ratio by three quarters between 1990 and 2015 (Elizabeth, Nandini and Joanne et al 2005).

However, despite great efforts and decades of intervention to improve maternal health through safe motherhood initiatives; maternal mortality and morbidity from complications of pregnancy and childbirth remain very high in the developing countries of the world. This is because the role of malnutrition in undermining maternal well-being have not been properly addressed since the cause of maternal death often has its roots in a woman's life before pregnancy—during infancy or even before her birth—when micronutrient deficiencies of calcium, vitamin D, or iron begin (Rush 2000).

Every day, 1500 women die from pregnancy- or childbirth-related complications. In 2005, there were an estimated 536 000 maternal deaths worldwide from pregnancy or childbirth-related complications (WHO 2007). As many as 99% of all maternal deaths occur in developing countries, with the highest maternal mortality rates in sub-Saharan Africa

(Freedman, Waldman & de Pinho et al 2005). Nigeria's maternal mortality rate continues at an unacceptably high level with best estimates for Nigeria suggesting that approximately 54,000 women and girls die each year due to pregnancy-related complications (WHO 2007).

Overall, about 20 percent of maternal and perinatal mortality in developing countries can be attributed to anaemia (World Health Report 2002). Anaemia in pregnancy is an important public health problem worldwide. World Health Organization estimates that more than half of pregnant women in the World have a haemoglobin level indicative of anaemia (< 11.0gldl), the prevalence may however be as high as 56 - 61% in developing countries(WHO 1994). On average, 45% of pregnant women and 49% of children under five years of age are anemic in developing countries (Mason, Rivers and Helwig 2005).

Micronutrient deficiency and especially iron deficiency is believed to be the main underlying cause for anaemia. It is generally assumed that 50% of the cases of anaemia worldwide are due to iron deficiency (WHO 2001). It is the most common micronutrient deficiency in the world today and is associated with 22% of maternal deaths worldwide with prevalence rates in Africa, Asia, and Latin America ranging from 35% to 75% (Brabin, Hakimi and Pelletier 2001). It is a major threat to safe motherhood as it contributes to lowered resistance to infection, low birth weight, poor cognitive development, and decreased work capacity.

Folic acid deficiency can lead to haematological consequences, pregnancy complications and congenital malformations (Black 2001). Adequate folate levels at conception are associated with reduced neural tube defects. Approximately 200,000 severe birth defects and 1 in 10 heart disease deaths in adults annually are a result of folate deficiency. Folate deficiency is associated with megaloblastic anemia, low birth weight, and potential fetal

anomaly (UNICEF 2004). The role of folate deficiency in anemia has been established in researches. This evidence has given impetus to interventions that promote iron-folic acid supplementation to prevent anaemia among pregnant women.

Also malaria contributes to the global burden of anaemia in pregnancy. Each year, more than 30 million African women become pregnant in malaria-endemic areas and are at risk for Plasmodium falciparum malaria infection during pregnancy (Steketee , Nahlen & Parise et al 2001).

In sub-Saharan Africa, Malaria in pregnancy is estimated to cause 400,000 cases of severe maternal anaemia and 75,000-200,000 infant deaths annually. Severe maternal anaemia increases the mother's risk for death, and malaria-related maternal anaemia is estimated to cause as many as 10,000 maternal deaths each year in Africa (WHO/AFRO 2004). In areas with stable malaria transmission, malaria during pregnancy contributes to approximately 2%-15% of maternal anaemia, 8%-36% of premature deliveries, 13%-70% of intrauterine growth retardation, and importantly maternal malaria infection accounts for almost 30% of all the causes of Low Birth Weight and 3%-8% of all infant deaths that can be prevented during pregnancy (WHO/AFRO 2004). Effective strategies to reduce the impact of Malaria in pregnancy must address the need to prevent the effects of malaria in asymptomatic pregnant women as well as the need to manage disease in women with clinical illness.

1.2 Problem Statement

Anaemia 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.Anaemia in pregnancy has a prevalence as high as 61% in developing countries with a high incidence and severity occurring among primigravidae living in malaria endemic areas of Africa with a significant impact on the health of the foetus as well as that of the mother. (Miaffo, Florent & Bocar et al 2004). About 20 percent of maternal and perinatal mortality in developing countries can be attributed to anaemia (World Health Report 2002). World Health Organization estimate shows that 50% of the cases of anaemia worldwide are due to iron deficiency (WHO 2001). Folate deficiency during pregnancy has also been documented to contribute to megablastic anaemia, often leading to a combined iron-folate deficiency anemia and birth defects (UNICEF 2004).

It is also widely recognized that malaria has a negative effect on the outcome of pregnancy and most women in Nigeria reside in areas of relatively stable malaria transmission, where the principal impact of malaria infection during pregnancy is associated with malaria-related anaemia, spontaneous abortion, premature delivery, stillbirth and delivery of babies with low birth weight (WHO/AFRO 2004). Anaemia prevention during pregnancy is a key public health intervention strategy utilized by various governments to promote safe motherhood and child survival through control of malaria and micronutrient deficiencies especially iron deficiency through iron-folic acid supplementation (IFAS).There is a knowledge gap in research about pregnant women's knowledge,attitude and practices on anaemia prevention as well as their compliance to recommended intervention strategies that control maternal anaemia in pregnancy especially use of Iron supplement prescription. .

1.3 Justification of the Study

Despite the success of food fortification, most women are not consuming adequate amounts of iron, folic acid and other micronutrient which are critically needed in the body during pregnancy due to food and nutrition insecurity in most households in Nigeria. In spite of the fact that most state ministries of health in Nigeria have policies to provide pregnant women with iron in a supplement form, maternal anaemia prevalence has not declined significantly in Nigeria. Iron-folic acid supplementation program are part of the WHO and UNICEF recommended interventions to control iron deficiency anaemia and improve pregnancy outcomes worldwide.

This study will assess acceptability, adherence and compliance to anamia prevention interventions through exploring knowledge, attitude and practices of pregnant women to use of iron supplements.This information will give insight to health policy makers and relevant agencies of government to the progress of anaemia control programs in the Oyo State.

1.4 Research Questions

1. Does pregnant women's knowledge of anaemia prevention and knowledge of IFAS have effect on their uses and compliance to IFAS?
2. What proportion of pregnant women use the recommended anaemia prevention practices and iron-folic acid supplements.
3. What socio-demographic factor affects anaemia prevention practices and use of IFAS.

1.5 General Objective

The broad objective of the study is to determine the level of knowledge, attitude and practices related to anaemia prevention and level of use of IFAS among pregnant women in Ibadan North Local Government Area of Oyo state.

1.6 Specific Objectives

The specific study objectives were to:

1. Determine the level of knowledge of anaemia prevention practices and knowledge of IFAS among pregnant women in Ibadan North Local Government Area.
2. Assess anaemia prevention practices and use of IFAS by pregnant women in Ibadan North Local Government Area.
3. Identify socio-demographic factors associated with anaemia prevention and use of IFAS among pregnant women in Ibadan North Local Government Area

1.7. Null Hypotheses

1. There will be no significant relationship between pregnant women's level of knowledge of anaemia prevention practices, their use and compliance to IFAS.
2. There will be no significant relationship between pregnant women's attitude towards anaemia prevention practices and their use or compliance to IFAS.
    1. There will be no significant relationship between socio-demographic factors, anaemia prevention practices and use of IFAS

CHAPTER TWO
LITERATURE REVIEW

2.1. Introduction

The primary focus of this study is anaemia prevention in pregnancy with emphasis on use of Iron and folic acid supplements prescription among pregnant women. This chapter explores some foundational issues about anaemia in pregnancy and also reviews relevant literatures related to anaemia prevention and use of Iron and folic acid supplements during pregnancy.

2.2. Anaemia in Pregnancy- Historical Background

In 1932, Castle together with Clark Heath and Maurice Strauss, treated seven patients with intramuscular injections of iron citrate and showed an intimate relationship between the iron injected and the haemoglobin formed (Heath, Strauss & Castle 1932) They showed an extraordinarily close relationship between the amount of iron injected into the iron-deficient patients and the amount of haemoglobin gained in the circulation: the average utilization of parenteral iron in all patients was 96%. This showed, for the first time, that iron promotes haemoglobin formation not as a catalyst but as an essential component of the newly formed haemoglobin. Later, a series of papers by Strauss and Castle explored anaemia in pregnancy, showing that the vast majority of pregnant women with anaemia have hypochromic anaemia due to iron deficiency, and that this anaemia resolves by effective doses of iron (Strauss & Castle 1932).

A historical summary of anaemia in pregnancy could also be deduced from the works of Lucy Wills who was among the first to observed an apparent correlation between the dietary habits of different classes of Bombay women and the likelihood of their becoming anaemic during pregnancy. Poor Muslim women were the ones with both the most deficient diets and the greatest susceptibility to anaemia. This anaemia was then known as ‘pernicious anaemia of pregnancy’ (Wills & Mechta 1930).

However, Lucy Wills was able to demonstrate that the anaemia she observed differed from true pernicious anaemia, as the

patients did not have achlorhydria, an inability to produce gastric acid. Furthermore, while patients responded to crude liver extracts, they did not respond to the 'pure' liver extracts (vitamin B12) which had been shown to treat true pernicious anaemia. She postulated that there must have been another nutritional factor responsible for this macrocytic anaemia other than vitamin B12 deficiency. For some years this nutritional factor was known as the 'Wills Factor', and it was later shown, in the 1940s, to be folate, of which the synthetic form is folic acid. (Wills & Talpade 1931).

2.3. Definition of Anaemia in Pregnancy

Anaemia is defined as a low haemoglobin concentration in blood, or less often, as a low haematocrit, the percentage of blood volume that consists of red blood cells which implies a reduction in circulating haemoglobin mass below the critical level. The normal haemoglobin (Hb) concentration in the body is between 12-14 grams percent. WHO has accepted up to 11gm percent as the normal haemoglobin level in pregnancy. Therefore any haemoglobin level below 11gm in pregnancy should be considered as anaemia (WHO 2000). The normal physiological changes in pregnancy usually result in plasma volume expanding by 46-55% (Letsky 1998) and also red cell volume expands by 18-25% (Letsky 1995). The mean minimum haemoglobin in healthy pregnant women living at sea level is 11-12g/dL (Van den Broek, Rogerson and Mhango et al 2000).The mean minimum acceptable haemoglobin level during pregnancy by WHO criteria is taken to be 11g/dL in the first half of pregnancy and 10.5 g/dL in the second half of pregnancy (WHO 1993). The World Health Organization further divide anaemia in pregnancy into: mild anaemia (haemoglobin 10-10.9g/dL), moderate anaemia (Hb 7.09.9g/dL) and severe anaemia (haemoglobin < 7g/dL) (WHO 1993).

TABLE 1: Haemoglobin (Hb) Limits Recommended by WHO/UNICEF/UNU (2001)

Age or gender group	Hb below (g/L)	Haematocrit below (%)
Children 6 months - 5 years	110	33
Children 5 - 11 years	115	34
Children 12 - 13 years	120	36
Nonpregnant women	120	36
Pregnant women	110	33
Men	130	39

Source: **WHO/UNICEF/UNU (2001)**

2.4. Global Estimates of Prevalence of Anaemia in Pregnancy

Anaemia in pregnancy is thought to be one of the commonest problems affecting pregnant women both in developed and developing countries as it is estimated that more than half of the pregnant women in the world have hemoglobin levels indicative of anemia and the World Health Organization estimates that 52% of all pregnant women are anemic (WHO 2000). The World Bank ranked anaemia as the 8th leading cause of disease in girls and women in the developing world. Although only 18% of pregnant women are anemic in developed countries (WHO 1993), the prevalence may be as high as 56 - 61% in developing countries (WHO1994). In the south-east Asia the prevalence of anaemia among pregnant women is as high as 60–70% (United Nations ACC 1992). Published rates of prevalence for other regions in developing countries range from 35% to 72% for Africa and 37–52% for Latin America (WHO 2000).

Table 2: Estimated prevalence of Anaemia in women

	Pregnant women Hb below norm		Non-pregnant women Hb below norm	
Region	%	(000s)	%	(000s)
World	52	58270	36	407780
Developing Countries	61	55750	44	372320
Developed Countries	18	2520	12	35460
Africa	72	11450	42	47940
Eastern	47	3380	41	13540
Middle	54	1290	43	5330
Northern	53	2240	43	11450
Southern	35	380	30	2500
Western	56	4170	47	15120
Asia	70	40140	44	294960
Latin America	52	4030	30	28640
Nothern America	17	570	10	7050
Europe	17	920	10	12100

Source: **WHO (2000).**

Specifically, studies of anaemia prevalence during pregnancy in Asian countries have recorded the following prevalence: 77% (Bangladesh), 59% (Bhutar), 65% (Nepal), 60% (Sri Lanka) and 87.6% (India) with haemoglobin less than 11.0g/dl (Seshadri 1997),(Kapil, Pathak and Tandon et al 1999).

Across the middle east, studies, of anaemia prevalence in pregnancy have also recorded the following: 43.6% for Oman (Afifi 2003), 49.6% for Bahrain (Amine 2000), 41.3% for Saudi Arabia (Rasheed, Koura and Al-Dabal et al 2008), 36.8% for Kuwait (Dawood, Prakash and Shubber 1990).

2.5. Prevalence of Anaemia in Pregnancy in Nigeria

The greatest burden of anaemia in pregnancy is borne by Asia and Africa where it is estimated that 60–70% and 35% to 72% of pregnant women respectively are anaemic (WHO 2000). There are several studies related to anaemia in pregnancy that has been carried out in other countries in Sub-saharan Africa. Table 3 shows studies across African countries have recorded the following prevalence: 57.1% in Malawi (Schulman, Graham

and Jilo et al 1996), 41% in Tanzania (Bergsjo, Seha and Ole King'ori 1996), 57.1% in Ghana (Mary, Owusu and Akanmori 2005) and 30% in South Africa (Hoque, Kader and Hoque 2007). Though the primary objective was not always to determine prevalence, most of these studies reported prevalence as a co-output.

Table 3: Prevalence of Anaemia in Pregnancy in Sub-Saharan Africa

Country	**Year**	**Anaemia overall % (Hb < 11g/dL)**
Malawi	1996	57.1
Tanzania	1996	41.0
Ghana	2005	57.1
South Africa	2007	30.0

Source: **WHO/UNICEF/UNU (2001)**

The public health significance of anaemia is a key to determing the severity of the disease through prevalence in an area as shown in Table 4. In Nigeria anaemia prevalence in pregnancy vary across the regions with a prevalence of 76.5% in Abeokuta, South Western region (Idowu, Mafiana and Stiloye 2005) and 40.4% in Enugu, South Eastern region (Dim and Onah 2007), 62.5% in Kano, Northern region (Imam and Yahaya 2008) and 23.2% in Portharcourt, South Southern region (Buseri, Uko and Jeremiah et al 2008).

Table 4: Public Health Significance of Anemia

Anemia Prevalence	Public Health Significance
≥ 40%	Severe
20-39%	Moderate
5-19%	Mild
0-4.9%	Normal

Source: **WHO/UNICEF/UNU (2001).**

2.6. Causes of Anaemia in Pregnancy

Anemia has multiple causes. The causes of anaemia could be determined by biological risk factors which include genetic factors, nutritional deficiencies, and infectious agents (Van den Broek 1996). In order of importance, the major causes of anemia are iron

deficiency; other nutritional deficiencies; malaria; helminth infections (particularly hookworm but also schistosomiasis); chronic infections including HIV/AIDS and tuberculosis; causes related to reproduction and contraception; and genetic conditions such as thalassemia and sickle cell (Rae Galloway 2003). These causes can be grouped into direct causes and contributing causes. Its direct causes can be broadly categorized as (a) poor, insufficient, or abnormal red blood cell production; (b) excessive red blood cell destruction; and (c) excessive red blood cell loss (Rae Galloway 2003).

(a) Poor, Insufficient, or Abnormal Red Blood Cell Production

2.7. Nutritional Deficiencies

Iron deficiency: Iron deficiency causes 50 percent of anemia worldwide, making it the single largest cause of anemia. It is estimated that iron deficiency anaemia affects as many as 200 million people in the world probably making this the commonest nutritional deficiency in the world (Mohamed 2003). Among pregnant women at least half of all anaemia cases have been attributed to iron deficiency. (Van den Broek and Letsky 2000). Iron deficiency causes anemia by reducing red blood cell production. Iron is an essential component of hemoglobin, which is needed to make red blood cells. The body obtains iron from dietary iron, recycled red blood cells, or stored iron and both quantity and quality of diet contribute to iron sufficiency (Rae Galloway 2003).

The prevalence of iron deficiency may be 2-3 times that of anaemia, ranging from about 50% in some countries to nearly 100% in parts of others, and as pregnancy proceeds, most women show haematological changes suggestive of iron deficiency especially if not receiving iron supplements, also if dietary iron is not increased or some other source of iron (such as supplements) is not available, anemia occurs (Mohamed 2003). Iron deficiency anaemia (IDA) in pregnant women is one of the most important public health problems in Nigeria (National Planning Commission/UNICEF 2001).

Table 5: Causes of Anemia

Table 5	**Causes of Anemia**
Direct Causes	**Components (in order of importance)**
Poor, insufficient, or abnormal red blood cell production	Poor dietary intake and/or absorption of iron Poor dietary intake and/or absorption of folic acid, vitamins (A, B-12, and possibly B-6, C, and riboflavin) and copper Increased needs for nutrients due to growth or disease (diarrhea) HIV/AIDS other infectious diseases tuberculosis,
Excessive red blood cell destruction	Malaria
Excessive red blood cell loss	Helminth (worms)infections (hookworm, schistosomiasis) Bacterial or viral infections (peptic ulcers, gastritis, diarrhea) Reproduction (excessive blood loss during menstruation, delivery, and postpartum period; too many pregnancies; shortened postpartum amenorrhea) Contraceptive methods
Contributing Causes	**Components**
Knowledge and behavior	Poor knowledge among health workers about anemia, iron supplementation, and other anemia prevention and control interventions Poor knowledge among vulnerable groups about the importance of anemia prevention and control interventions Cultural taboos or biases (e.g. women eating after others) Practices that restrict food intake, including poor infant
Environmental	Contamination by heavy metals (lead)
Lack of access to services	Low use of antenatal and other services providing iron supplements. Lack of trained birth attendants to manage bleeding during delivery. Lack of access to sanitation services that mitigate helminth infestation Lack of access to bednets to prevent malaria
Poverty	Lack of income to buy foods with adequate amounts of absorbable iron or to obtain iron supplements, malaria treatment, insecticide- treated bednets, shoes to prevent helminth infection, and other preventive commodities or services
Source: **Adapted from Gillespie and Johnston (1998).**	

2.8. Folate Deficiency

Anemia is also caused by poor dietary intake and poor absorption of other key nutrients needed for red blood cell production. Folates are a light sensitive family of water soluble vitamins essential to red blood cell maturation. Folate requirements approximately double during pregnancy, especially in the last trimester and the puerperium (Fleming, Ghatoura and Harrison 2000). Since body stores of folate are limited and dietary folate is likely to be insufficient in developing countries, anaemia may develop as a consequence. Many studies have demonstrated a steady fall in serum folate levels throughout pregnancy, especially in women from poor socio-economic groups, in multigravidae, in smokers, and in women with twin pregnancies. (Sujeevani and Nynkel 2000).

(b) Excessive Red Blood Cell Destruction

2.9. Malaria

Malaria due to *Plasmodium falciparum* may cause severe anaemia in pregnancy. It is estimated that in sub Saharan Africa 23 million pregnant women are exposed to malarial infection annually (Van den Broek 1996). Women in their first and second pregnancies living in an endemic area are at a higher risk of acquiring malaria than non-pregnant women or multi gravidae, due to reduction of an appropriate immune response to the malaria parasite (Van den Broek, Rogerson and Mhango et al 2000). Malaria parasites destroy red blood cells and suppress red blood cell production, and in areas with endemic malaria transmission, malaria infection is usually accompanied by iron deficiency (Rae Galloway 2003). There is evidence that malaria can induce iron deficiency by several mechanisms: possibly through immobilising iron in haemazoin complexes and loss of urinary iron, as well as reducing intestinal iron absorption during the acute illness period (Brabin, Hakimi and Pelletier 2001). Several studies have shown that protection against malaria contributes to the prevention of anaemia in pregnancy, thus highlighting the importance of chemoprophylaxis and other methods of malaria control (Rogerson, Van den Broek and Chaluluka et al 2000; Mkandala 2003).

(c) Excessive Red Blood Cell Loss

Helminth (worm) infections in developing countries, excessive red blood cell loss and resulting iron-deficiency anemia are caused by worm or helminth infections. The most important cause of pathological chronic loss of blood and iron in the tropics is hookworm and other soil-transmitted helminthes (Brooker, Hotez and Bundy 2008). The occurrence of helminth infection at high rates among pregnant women is mostly indicative of faecal pollution of soil and domestic water supply around homes due to poor sanitation and improper sewage disposal (Van Eijk, Lindblade and Odhiambo 2009). Impact of intestinal helminth infections on anaemia during pregnancy is aggravated by low nutritional status of subjects whose staple foods, such as rice, cassava, and maize are poor sources of folate, and iron (Ayoya, Spiekermann-Brouwer and Traore et al 2006). Viral and bacterial infections may also interfere with food intake, absorption, storage and use of many nutrients including iron. Repeated episodes of infection may thus contribute to the development of iron deficiency and anaemia (Pasricha, Caruana and Phuc 2008).

2.10. Anaemia Prevention and Control Strategy in Pregnancy

Anemia has been recognized as a major threat to health, survival and wellbeing of developing country with children and pregnant women being the most vulnerable populations. The success of any anaemia prevention and control strategy must depend on three major program components. These include:

1. Increasing iron and folic acid intake
2. Malaria control
3. Reducing parasitic worm loads.

1. Increasing iron and folic acid intake

Inadequate consumption of absorbable iron and folate are the major causes of anemia worldwide. In many populations, the amount of iron absorbed from the diet is not sufficient to meet many individuals' requirements. This is especially true during pregnancy, when physiological iron requirements are the highest. There are three major intervention strategies which can be used to improve iron and folate intake of a population and prevent anaemia. These include:

(a) ***Iron and folic acid supplementation program****:* This is a medical approach to preventing and controlling iron deficiency and anaemia through administration of

iron and folic acid tablets. It is a method of choice especially among vulnerable population when access to regular intake of iron from food is limited and there is high risk of severe iron deficiency and anaemia. Iron and folic acid Supplementation for pregnant women should be an integral component of strengthened antenatal care as an anaemia prevention strategy.

(b) *Dietary diversification:* This approach is aimed at correcting dietary behaviors that lead to iron deficiencies among pregnant women and other vulnerable population through nutrition education for dietary change to ensure access to food rich in absorbable iron and reduce consumption of inhibitors in the diets.

(c) *Food fortification:* This is the addition of iron to foods that are regularly consumed so as to deliver iron to a large population through the daily diet. Fortification of processed staple foods or condiments with iron and other nutrients is often considered a good long-term strategy to address inadequate iron intake.

2. Malaria control

Plasmodium falciparum malaria causes a profound anemia during and after acute infection. The anemia is caused by hemolysis of red cells combined with suppression of erythropoiesis. Consequently, body iron is shifted from hemoglobin to storage forms. The increased red cell turnover may bring about folate deficiency, especially during pregnancy when folate requirements are already high (Stoltzfus and Dreyfuss 1998).

Malaria control is essential anemia prevention and control strategy especially among populations where *Plasmodium falciparum* malaria is endemic. The two major program components in malaria control during pregnancy includes:

1. Use of insecticide treated net (ITN) by pregnant women
2. Intermittent Preventive treatment for pregnant women

These malaria control strategies are presently an integral part of antenatal care aim at preventing anaemia during pregnancy.

2.11. Anemia Control

3. **Reducing parasitic worm loads.**

Several species of parasitic worms particularly hookworms and schistosomes cause blood loss and hence iron loss. Parasitic worm infections in pregnant women are likely to

contribute strongly to anemia. WHO recommends a single-dose, oral anti-helminthic treatment for hookworm infection for all pregnant and lactating women in areas of high hookworm prevalence (WHO 2002)

2.12. Knowledge, Attitude and Practice Related to Anaemia Prevention

In a study on Anaemia in pregnancy: perceptions of patients in Dar-es-Salaam, Tanzania, Massawe S et al(1995) reported that the study assessed pregnant women's knowledge and attitudes towards anemia, its causes, prophylaxis, and treatment and found out that of the 310 pregnant women interviewed from three MCH-clinics in suburban Dar-es-Salaam, anemia was considered a major problem by 88% and 75%, respectively, in the two peripheral MCH clinics, but by only 44% of attenders in the hospital MCH clinic.

Over 85% of interviewees were aware of the causes of and ways of preventing anemia. The most frequently mentioned causes of anemia were related to nutrition, while intestinal parasites were mentioned by a few women. None of the mothers had received iron supplements from the health facilities during the current pregnancy, and only a minority (38%) did in the previous pregnancy, though 40% of them said they were informed they had anemia in the previous pregnancy.

Galloway (2002) in a study on Women's perceptions of iron deficiency and anemia prevention and control in eight developing countries reported that during the period 1991-98, the Mother Care Project and its partners conducted qualitative research to determine the major barriers and facilitators of iron supplementation programs for pregnant women in eight developing countries. Across-region results were examined and some differences were found but the similarity in the way women view anemia and react to taking iron tablets was more striking than differences encountered by region, country or ethnic group. Contrary to the belief that women stop taking iron tablets mainly due to negative side effects, only about one-third of women reported that they experienced negative side effects in these studies. During iron supplementation trials in five of the countries, only about one-tenth of the women stopped taking the tablets due to side effects. The major barrier to effective supplementation programs is inadequate supply.

A similar study on maternal knowledge and practices related to anaemia and iron supplementation in rural Malawi by Kalimbira (2007) reported that out of the 629

pregnant women studied, results showed that 96.6% of the women were aware of anaemia, with at least two thirds knowing its causes, ways of prevention and treatment. As expected, health facilities are the primary source of iron supplements (97.1%). On whether or not pregnant women actually take the supplements, the study found that 22.5%, 29% and 33.8% of women from the Central, Northern and Southern regions, respectively reported taking the supplements for one month only during their most recent pregnancy (χ^2=6.79, p=0.009) and overall, only 9% reported taking the supplements throughout pregnancy. The single most important reason for non-compliance was nausea (43.6%), with 34.9% of those reporting nausea resorting to withdrawal. One in five women (20.7%) reported that they experienced problems with iron supplements, mostly nausea (43.6%). As a consequence of the side effects, slightly over a third (34.9%) of women in the present study reported that they stopped taking the supplements altogether. By stopping to take the supplements means that anaemia prevention and treatment are compromised.

Ejidokun (2000) in his study on community attitudes to pregnancy, anaemia, iron and folate supplementation in urban and rural Lagos, south-western Nigeria using focus group discussion with 23 pregnant women and two health-care providers. The result showed that maternal anaemia is not perceived as a priority health problem by pregnant women. Knowledge of the signs and symptoms of anaemia is limited among rural pregnant women. The recognition of maternal complications associated with anaemia is low among pregnant women and some health-care providers. Severe blood loss at or after delivery is sometimes attributed to the excessive use of iron and folate supplements. Sustaining the motivation to continue taking iron tablets and communicating the benefits of iron supplementation which could encourage compliance was also lacking.

Dairo (2004) in a study on Socio-demographic determinants of anaemia in pregnancy at primary care level: a study in urban and rural Oyo State, Nigeria reported that of the Five hundred and ninety seven pregnant women studied, one hundred and ninety six (32.8%) of the mothers were anaemic. Prevalence of anaemia decreased with increasing maternal age in both urban and rural areas. Regression analysis showed that urban mothers (P = 0.003) and those who booked late in pregnancy (P = 0.048) were significantly more likely to be anaemic. Mothers with birth intervals 24 -35 months and women between the ages 20-29 years (P = 0.011) had a lower risk for anaemia.

2.13. Iron and Folic Acid Supplements Prescription Use

In the Laos reproductive health survey 2000, questions were asked of all women who gave birth during the last 5years prior to the survey, about their usage of iron tablets during the most recent pregnancy. Out of the women whose most recent-born child was in the last 5years before the survey, 93% of them did not take iron tablets, while only 6% took less than 90% of the tablets given to them. The proportion of women who took iron tablets is large: at middle age group 25-34, at lower birth order(less than 3 children)at secondary or higher education and lives in urban areas (National Statistical.2001)

In a study titled; why do adult women in Vietnam take iron tablets? Aikawa R et al (2006) analyzed the factors in compliance with taking iron tablets, where daily doses of iron (60 mg) and folic acid (400 microg) were distributed in rural Vietnamese communities. The study population was adult women aged less than 35 years who delivered babies between August 1st 2001 and December 1st 2002 (n = 205), of which 159 took part in the study. The result showed that two major factors motivated the participants to continue taking iron tablets; their experience of fewer spells of dizziness (50%), and their concern for the health of their newborn baby (54%). When examining the reasons for taking iron tablets for at least 5-9 months, the most important factor was identified as 'a frequent supply of iron tablets' (OR = 11.93, 95% CI: 4.33-32.85).

Hyder (2002) went further to investigate compliance to iron supplementation in their study titled; Does side-effects reduce compliance to iron supplementation? A study of daily- and weekly-dose regimens in pregnancy, this study compared side-effects of iron supplementation and their impact on compliance among pregnant women in Bangladesh. These women were assigned to receive either weekly doses of 2 x 60 mg iron (one tablet each Friday morning and evening) or a daily dose of 1 x 60 mg iron. Fifty antenatal care centres were randomly assigned to prescribe either a weekly- or a daily-supplementation regimen (86 women in each group). Side-effects were assessed by recall after one month of supplementation and used for predicting compliance in the second and third months of supplementation. Compliance was monitored using a pill bottle equipped with an electronic counting device that recorded date and time whenever the pill bottle was opened. Of five gastrointestinal side-effects (heartburn, nausea, vomiting, diarrhoea, or constipation) assessed, vomiting occurred more frequently in the weekly group (21%)

than in the daily group (11%, p<0.05). Compliance (ratio between observed and recommended tablet intake) was significantly higher in the weekly-supplementation regimen (93%) than in the daily-supplementation regimen (61%, p<0.05). Overall, gastrointestinal side-effects were not significantly associated with compliance.

2.14. Factors Associated with Iron and Folic Acid Supplementation

In a study on Demographic factors determining compliance to iron supplementation in pregnancy in Oyo State, Nigeria, Dairo (2006) reported that of the Five hundred and ninety seven women studied, Compliance rate was 37.5%. Prevalence of anaemia was higher among noncompliant women than those complying (18% v 15%, chi2 7.5, p=0.006). Haemoglobin level was higher among women complying with iron supplements compared with those not complying (11.4 g/dl v 11.0 g/dl, t = 9.3, p = 0.002). Single and teenage mothers and those aged 35 years and above were less likely to be compliant. Married women, those in urban location, and those aged 20-29 years were more compliant with iron supplementation. Pregnancy among teenage and single mothers is associated with a significantly higher risk of non-compliance with iron supplementation.

Seck (2008) also studied determinants of compliance with iron supplementation among pregnant women in Senegal and reported that two hundred and twenty-one pregnant women, recruited from six health centres in Dakar during their first prenatal visit, were randomly assigned to receive either a prescription to purchase iron/folic acid tablets (control, n = 112) to be taken daily, according to official policy, or to receive free tablets (treatment, n = 109). Compliance was assessed 20 weeks after enrollment through interviews and pill count. Women with low or high compliance (<70% or >or=70%) were asked to explain what influenced their adherence to supplementation. : Overall compliance was 69%; it was significantly higher in the treatment than in the control group (86% vs. 48%; P < 0.0001). Women with high compliance (58%) were motivated by: (1) the perception of improved health upon taking the tablets (treatment = 24%, control = 10%); (2) the insistence by midwives that they take the tablets; and (3) the mention that the tablets would improve health. Women with low compliance (42%) reported: (1) the experience of side-effects that they associated with the tablets (treatment = 13%, control = 14%); (2) misunderstanding that they needed to continue taking the tablets throughout pregnancy (treatment = 0%, control = 18%); and (3) forgetfulness.

In a similar study on Iron supplementation compliance among pregnant women in Bicol, Philippines**,** Lutsey PL et al (2008) reported that they studied three hundred and forty-six pregnant women receiving iron supplements via the Philippine iron supplementation programme and found out that the women had a mean Hb concentration of 10.75 +/- 1.43 g dl-1, and 56.4% were anaemic (Hb < 11.0 g dl-1). Self-reported consumption of pills received was 85% (0.85 +/- 0.23), although pill counts suggested that consumption was 70% (0.70 +/- 0.35). Using multiple regressions, an earlier first prenatal visit and greater self-reported compliance were positively associated with Hb concentrations. Perceived health benefits from taking the supplements and higher health programme knowledge were positively associated with pill consumption, while experiencing side-effects and disliking the taste of the supplements were associated with lower pill consumption.

In a similar study on compliance of pregnant women regarding iron supplementation in Vientiane Municipality, Lao P.D.R, Phasouk Vongvichit (2004) reported that of the 340 pregnant women who received iron tablet from four hospitals in Vientiane Municipality in Laos, result shows that a low level of compliance among pregnant women regarding iron supplementation was at 65.6% while a high level of compliance was observed by only 34.4%.And using CHI-Square Test factors significantly related to compliance of pregnant women regarding iron supplementation at p-value <0.5% were knowledge about anaemia, perceived benefit and obstacle of taking action and perceived threat of anaemia.

CHAPTER THREE
METHODOLOGY

3.1 Study Design

The research design was a descriptive cross-sectional study design involving descriptive sample of a cross section of pregnant women.Their anaemia prevention practices and use of IFAS were investigated and determined at the same time.

3.2 Study Location

The study was carried out in Ibadan North Local Government Area in Oyo state. Oyo state has thirty-three Local Government Areas and eleven of them are in Ibadan, the state capital. Five of these are in Ibadan metropolis while the remaining six are at various locations at the outskirts of the capital city. Ibadan is acclaimed as the largest cosmopolitan city in West Africa. Ibadan North Local Government Area has a total population of 101,092 people and consists of twelve administrative wards (NPC 2006). The LGA is made up of people from different social, religious and cultural background with majority of dwellers being Yoruba. There are also other tribes like Hausa, Igbo, Fulani, Edo and other minority ethnic groups who live with their households in the forty-one localities in the LGA. Ibadan North LGA has three tertiary hospitals, two secondary hospitals and ten primary health centers. It also has women of reproductive age in all works of life that include farmers, traders, civil servants, students and professionals.

3.3 Inclusion Criteria

The study population were pregnant women age 15-49 years old, who received iron and folic acid tablets during antenatal clinics in the six selected primary health centers in Ibadan North Local Government Area.

3.4 Exclusion Criteria

Pregnant women who do not attend antenatal clinics in the six selected primary health centers in Ibadan North Local Government area.

3.5 Sample Size Determination

The sample size was calculated using the following formula;

$$N = \frac{Z^2 pq}{D^2}$$

Where N = the minimum sample size

Z = 1.96 (level of statistical significance for two sided test)

D = Desired precision or margin of error of the study = 0.05 (at 95% Confidence)

P = prevalence of anaemia among pregnant women in Ibadan, Oyo state is unknown hence 50% was used as prevalence.

p= 0.50

q=1-p= 1-0.50= 0.50

$$N = \frac{(1.96)^2 (0.50)(0.50)}{(0.05)^2} = 384.16$$ and adding 15% non-response, N becomes:

$$N = \frac{100 \times 384}{(100-15)} = 451$$

Minimum sample size required is 384

Allowing for 15% cases of non-response

The total minimum sample size was 451.

However 450 questionnaires were issued

3.6 Sampling Frame

The research sample was selected from pregnant women attending antenatal clinic in six primary health centers in Ibadan North L.G.A namely:

1. Primary Health Center, Agodi gate.
2. Primary Health Center, Basorun.
3. Primary Health Center, Agbowo.
4. Primary Health Center, Samonda.
5. Primary Health Center, Sango.
6. Primary health Center, Sabo.

3.7 Sampling Technique

Six out of ten Primary Health Centres (PHCs) in Ibadan North LGA were selected by simple random sampling technique using balloting.Then using stratified sampling technique, pregnant women in each PHC were selected proportionally to size of pregnant women attending antenatal clinic in the PHC.

Fig. 1.

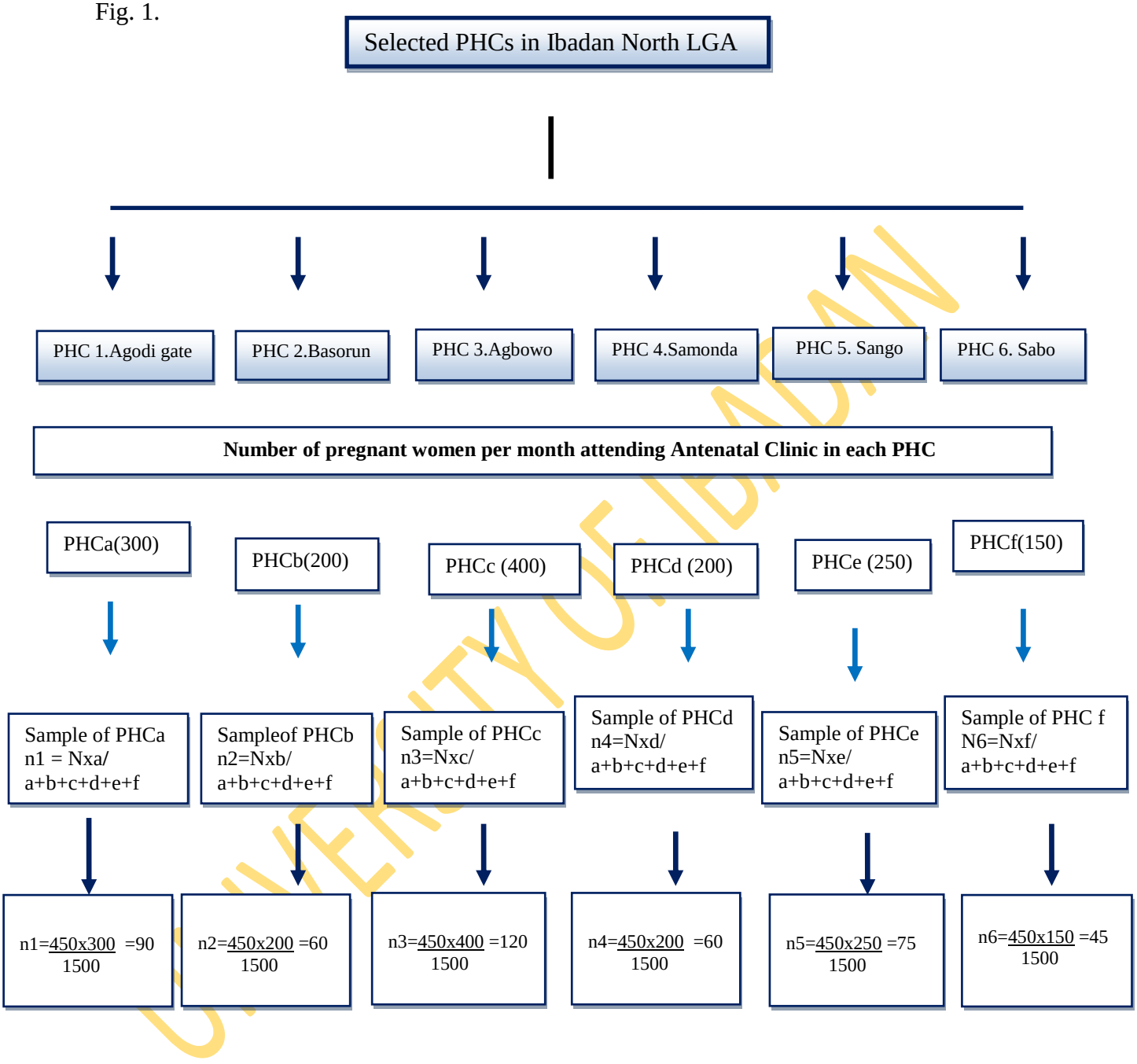

Figure 1: The sampling frame and technique

Note: a b c d e f = number of pregnant women attending ANC in one month at 6 PHCs

N = Total sample size needed.

Table 6: Number of Pregnant Women selected from six PHCs in Ibadan North LGA

Name of the PHC	Number of Sample
1. PHC Agodi gate	90
2. PHC Basorun	60
3. PHC Agbowo	120
4. PHC Samonda	60
5. PHC Sango	75
6. PHC Sabo	45
Total	**450**

3.8 Questionnaire Validation and Reliability

A pretest was conducted in a PHC in the same L.G.A (different from the ones selected for the research) to test the validity and reliability of the questionnaire. To test for validity, pregnant women were asked the questions contained in the questionnaire and their responses were compared. The research questionnaire was translated from English language to Yoruba language and content validity was checked by an experienced research (project supervisor).This also ensures that the questionnaire was well structured and that the research assistants understood the administration of the questionnaire properly.The questionnaire was pretested with forty pregnant women who met the criteria of the study in one of the PHCs in Ibadan North L.G.A. After the pretest, the data collected from the questionnaire related to knowledge,attitude and practice of anaemia prevention and Iron-folic acid supplement prescription use were analyzed using SPSS computer software for reliability Test with result (Cronbach's alpha) = 0.553,0.664 and 0.722 respectively

3.9 Data Collection

- An interviewer administered structured questionnaire was used for data collection. The questionnaire was translated into the local language (Yoruba) for easy

communication and administration. This was translated back to English to ensure accuracy of translation. The questionnaire was divided into 5 sections (A-E):

Section A: Socio-demographic Characteristics: This section had 8 questions which included personal characteristics such as age, occupation, education, ethnicity, religion, marital status, family income and number of children born by the participant.

Section B: Knowledge of anaemia prevention; this section was composed of 7 close-ended questions about awareness, cause, symptom, effect and prevention of anaemia in pregnancy. Two of the questions were on awareness; three questions had 8 choices each while one question had 5 choices to choose from on knowledge of anaemia prevention. The correct answer was given one score and incorrect answer was given 0 score. The total score was 30 marks.The knowledge of anaemia was classified into 2 groups.
Good knowledge = 21-30 scores represented in percentage = 70-100% of total.
Poor knowledge = 0-15 scores represented in percentage = 0-50% of total

Section C: Attitude to anaemia prevention. This section was composed of 10 questions about severity, susceptibility of pregnant women and benefits of iron supplements and malaria prevention methods in reducing anaemia. The answer of each question had five rating scales: Strongly Agree, Agree, Strongly Disagree, Disagree and Unsure. The positive attitude questions were given the scores as follows:
Strongly Agree =5scores
Agree = 4scores
Not sure = 3scores
Disagree = 2score
Strongly Disagree= 1score

The negative attitude questions will be vice versa. The total score was 10-50 scores. The attitude to anaemia prevention was classified into 2 groups.
Positive attitude = 25-50 score = represented in percentage 50-100% of total (70% and above)
Negative attitude = 10-20 score= represented in percentage 20-40% of total (less than 70%)

Section D and G: Practice of anaemia prevention and practice of iron-folic acid supplement use respectively. These sections were consisting of 5 questions each about practice of anaemia prevention strategies and iron-folic acid supplement use respectively. The answer of each question had five rating scales: always, sometime, rarely, never and unsure. The total score was 5-15. The practice questions were given the scores as follows:

Always = 5scores

Sometimes = 4scores

Rarely = 3score

Never = 1score

Unsure = 2 score

The practice of anaemia prevention was classified into 2groups with total score of 10-50:

Good practice = 30-50score = 60-100% of total

Poor practice = 10-25 score = 20-50% of total

And iron-folic acid supplement use was classified into 2 groups with total score was 5-25:

Good practice = 15-25score = 60-100% of total

Poor practice = 5-12 score = 20-48% of total

3.10 Data Management and Analysis.

The data was entered daily after collection. Data collected on the questionnaire was analyzed using Statistical Package for Social Science (SPSS) version 21 software. Summary statistics was done to generate frequency counts and percentages.

3.11 Confidentiality

Instrument was anonymously administered without identification of participant's name and other information supplied by participants were kept strictly confidential and participants were assured of such repeatedly.

3.12 Ethical considerations

Approval was sought from the ethical committee of the state ministry of health, Ibadan, Oyo state secretariat. Consent was also sought from the head of each of the PHC. The confidentiality aspect was emphasized to ensure that participants reveal information that answers research questions.

3.13 Informed Consent

Informed consent was sought and obtained from each respondent. A written informed consent containing full description of what research is all about- the procedures, benefits, risks and discomfort. Also the confidentiality step was made known.

3.14 Benefits:

Health education was given with emphasis on regular antenatal checkup, importance of using iron folic acid and sleeping under insecticide treated nets. However there is no direct financial benefit to the participants, only verbal appreciation was given to the clinics management and study respondents.

3.15 Risks and Discomforts.

The research participants were not exposed to unnecessary risk. However there may be little discomfort in answering some of the questions and the research participant had right to withdraw at any point she felt uncomfortable

3.16 Voluntary Participation

There was no form of any inducement as participation was strictly voluntary.

Pregnant women who willingly did not agree to participate were not coerced. Translation of protocol was done when needs arose for better understanding and communication.

3.17 Limitation of the Study-

The study was conducted only in primary health centers in Ibadan North L.G.A which is only one of the eleven Local government areas in Ibadan, hence it will limit generalization.

CHAPTER FOUR

4.1 Results

The results of the study are hereby presented in the sections as follows: 4.1 General characteristics of the respondents, 4.2 Anaemia prevention awareness, knowledge, attitude, practice and compliance, 4.3 Factors associated with anaemia prevention awareness, knowledge, attitude, practice and compliance

4.2 Socio-Demographic Characteristics of the Study Population

A total of 450 pregnant women participated in the study; out of which majority of the study subjects were in the age group of 20-29 (66.9%) years, with a mean age of 26.69 ± (4.6) years and very few were in the age group of 40-49 (0.6%). The largest proportion of the study group (79.1%) was self-employed and very few were unemployed (4.0%). More than two third (79.3%) of the women had not less than secondary school education and very few (2.2%) without any formal education. The major ethnic groups among the respondents were Yoruba (93.8%) and others were Igbo (4.7%) and Hausa (1.6%). There were more Muslims (58.0%) among the respondents than Christians (42.0%). Large majority (80%) of the women had average monthly income of less than ₦20, 000 while only 2.9% of the respondents earned a monthly income of ₦40, 000 and above. Concerning marital status of respondents, the majority (92.2%) was married and 7.1% were single and never married of the 450 women, (34.7%) just had first pregnancy, (47.8%) had not more than 2 children, while very few women (1.3%) had five or more childrenss(Table1).

Table 7: Demographic Characteristic of the Respondents

Factors	n	%
Age		
<20yrs	23	5.1
20-29	300	66.9
30-39	124	27.4
40-49	3	0.6
Occupation		
Civil servants	37	8.2
Self-employed	356	79.1
Private sector employee	39	8.7
Unemployed	18	4.0
Education		
No formal	10	2.2
Primary education	83	18.4
Secondary education	263	58.4
Tertiary	94	20.9
Ethnicity		
Yoruba	422	93.8
Hausa	7	1.6
Igbo	21	4.7
Marital status		
single never married	32	7.1
married	415	92.2
co-habiting	3	0.7
Religion		
Christians	189	42.0
Islam	261	58.0
Average family monthly income		
<₦10,000	220	48.9
₦10,000-<₦20,000	143	31.8
₦20,000-<₦30,000	41	9.1
₦30,000-<₦40,000	20	4.4
≥₦40,000	13	2.9
Don't know	13	2.9
Parity		
First pregnancy	156	34.7
1-2 children	215	47.8
3-4 children	73	16.2
5-6 children	6	1.3
Total	**450**	**100.0**

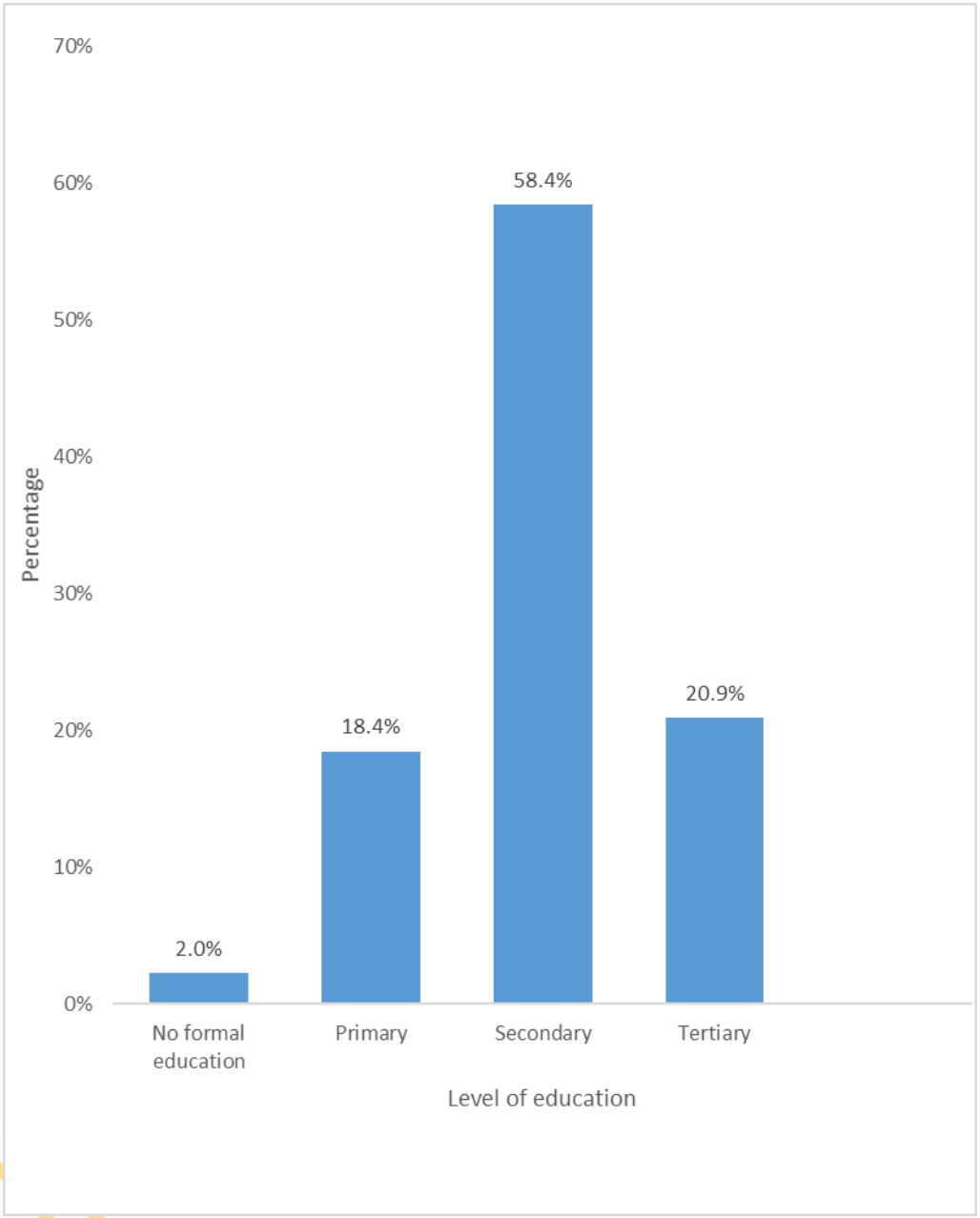

Figure 2: Highest level of education attained by Respondents

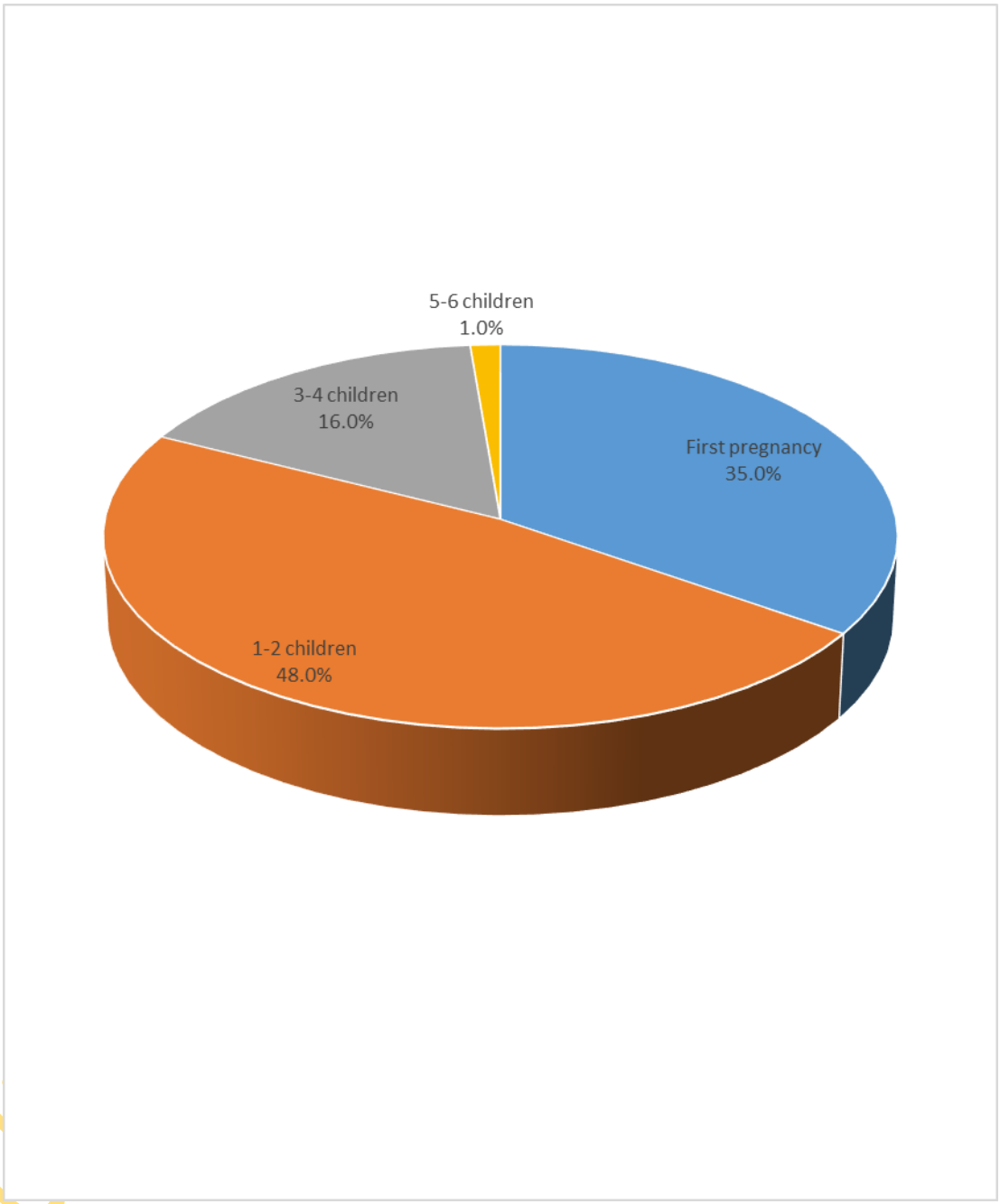

Figure 3: Parity of Respondents

4.3 Knowledge, Attitude and Practice of Anaemia Prevention and Iron-Folic Acid Supplement Prescription Use by pregnant women

Knowledge and awareness about anaemia prevention was composed of 6 close-ended questions about awareness, cause, symptom, effect and prevention of anaemia in pregnancy. Summary score was calculated for knowledge of anaemia prevention based on a total knowledge score of 0-30. The mean score for knowledge of anaemia prevention was found to be 23.5 (SD± 5.5) and those who scored above the mean were considered as having good knowledge, while those below the mean score as having poor knowledge of anaemia prevention. Also pregnant women's attitude to anaemia prevention was assessed using 10 questions about severity, susceptibility of pregnant women and benefits of iron supplements and malaria prevention methods in reducing anaemia. Summarized attitude score was calculated based on a total attitude score of 10-30 scores. The mean score for attitude to anaemia prevention was 16.1 (SD±3.4) and those who scored above the mean were considered as having good attitude, while those below the mean score as having negative attitude to anaemia prevention. Table 2 presents the levels of anaemia prevention awareness, knowledge, attitude, practice and iron-folic acid supplement prescription use. Although the levels of awareness (90.7%) and good knowledge of anaemia prevention (84.7%) were high respectively among the women, the proportions of women with positive anaemia prevention attitude (40.2%), good anaemia prevention practice (60.2%) and positive attitude towards Iron-folic acid supplement use (39.8%) were relatively low. Majority of the respondents had good knowledge of Iron-folic acid supplements (82.9%) and were regular users of iron-folic acid supplements (93.3%), although compliance (57.3%) with prescriptions were relatively low.

Table 8: Level of knowledge, attitude and practice of Anaemia prevention and Iron-folic acid supplement Prescription use by pregnant women

Parameter	**Categories**	**n**	**%**	Reliability Cronbach's alpha
Awareness of anaemia prevention	*Not aware*	42	9.3	n.a
	Aware	408	90.7	
Anaemia prevention knowledge	*Poor*	29	6.4	0.553
	Good	421	93.6	
Anaemia prevention attitude	*positive*	269	59.8	0.532
	negative	181	40.2	
Anaemia prevention practices	*Poor*	179	39.8	0.628
	Good	271	60.2	
Knowledge of Iron-Folic acid supplements	*Poor*	77	17.1	0.014
	Good	373	82.9	
Attitude towards Iron-folic acid supplement use	*Poor*	271	60.2	0.664
	Good	179	39.8	
Iron-folic acid supplement use	*Regular users*	420	93.3	n.a
	Irregular users	30	6.7	
Compliance to Iron-folic acid prescription	*Low*	192	42.7	0.722
	High	258	57.3	

n.a: not applicable

4.4 Sources of Information and Collection of Iron Tablets by Pregnant women

Various sources of awareness listed by the respondents are summarized in Table 3. Large majority (80.0%) of the women claimed to become aware of anaemia prevention through health workers, while media (electronic and prints) and friends/relations accounted for 11.4% and 8.0% respectively of the sources of awareness of anaemia prevention among the women. Also respondent's sources of knowledge about the benefits of using iron and folic acid tablets during pregnancy was summarized in Table 4 and majority (87.6%) of the women reported that they learnt about the benefits of using iron and folic acid supplements tablets through health talks during antenatal care at health centers by health workers. Only about (4.7%) of the respondents reported learning about the benefits of using iron and folic acid supplements tablets from friends and other mothers while few respondents (0.4) learnt about the benefits of iron and folic acid supplements by reading posters and leaflets. Also the respondents' source of receiving iron and folic acid supplements tablets were shown in Table 5. Majority of the respondents (76.2%) who used iron and folic acid supplements during their pregnancy indicated that they received the supplements from health facilities during their antenatal care visit while the rest of other respondents who used the supplements bought them from local chemist shops (20.9).

Table 9: Sources of Information on Anaemia Prevention by pregnant women

Sources	**n**	**%**
Health workers	330	80.0
Friends/Relations	31	8.0
Electronic media (TV/Radio)	27	7.6
Print media (Posters, Notices, Newspapers, Magazine	14	3.8
Pharmacy	4	0.4
School	2	0.2
Total	**408**	**100.0**

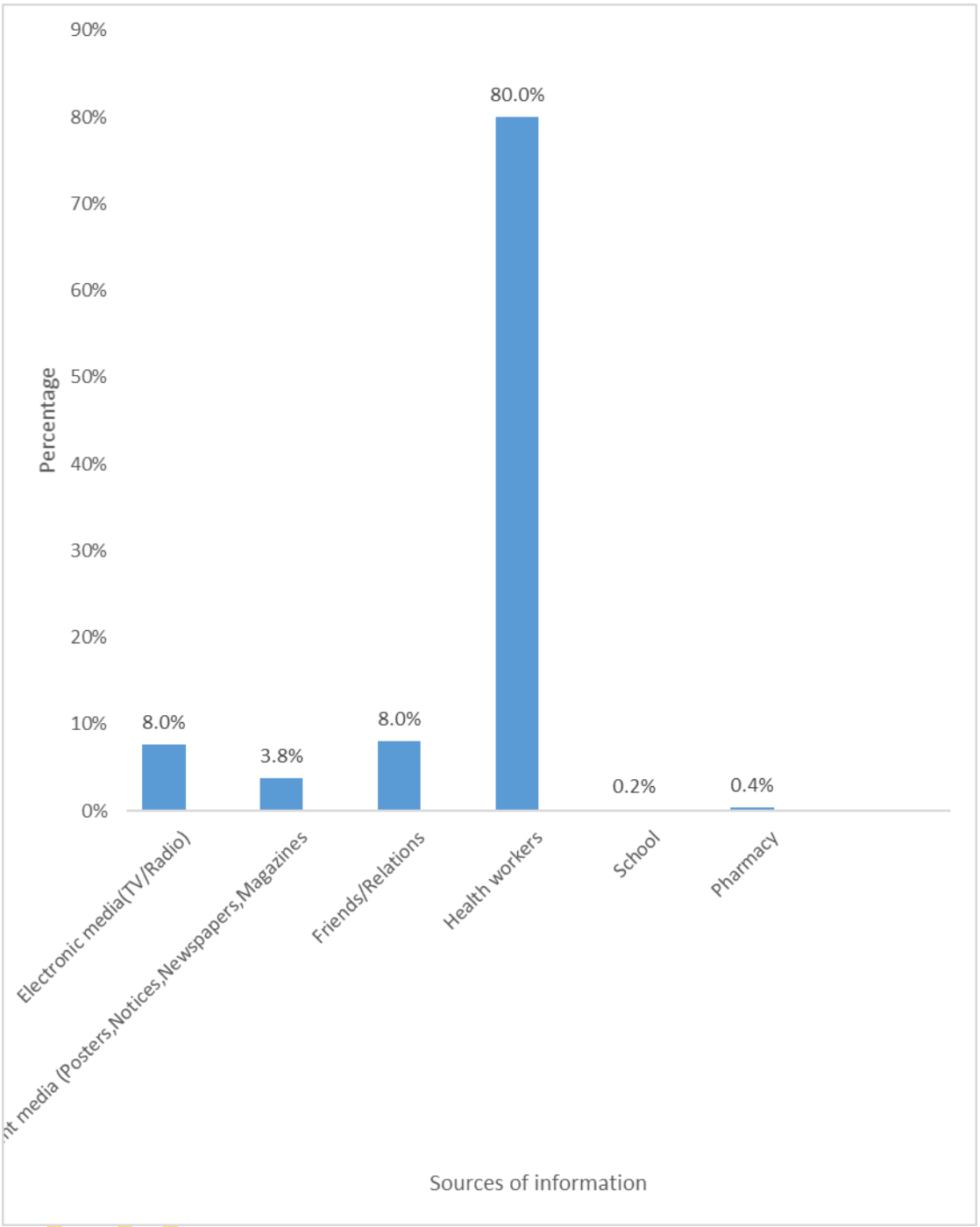

Figure 4: Sources of Information on Anaemia Prevention by the pregnant women

Table 10: Source of Information on the benefits of Iron tablets to the respondents

Sources	**n**	**%**
Health talks during antenatal at Health center	394	87.6
Other Mothers and Pregnant women	21	4.7
Don't know	16	3.6
Radio and Television	15	3.3
Posters/Leaflet	2	0.4
Missing	2	0.4
Total	**450**	**100**

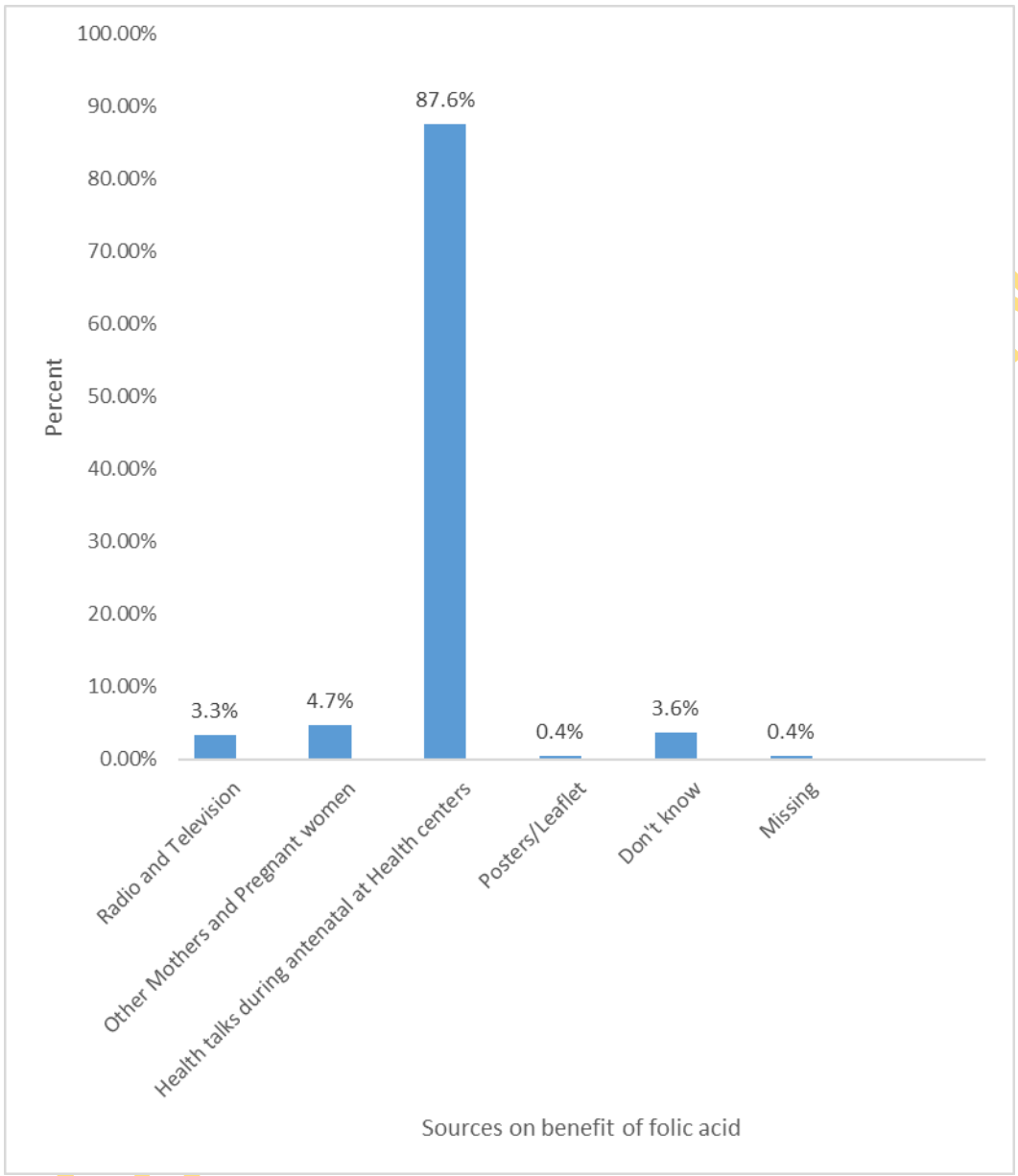

Figure 5: Source of Information on the benefits of Iron tablets to the respondents

Table 11: Source of iron-folic acid tablet by pregnant women?

Sources	**n**	**%**
At health center during antenatal	343	76.2
Buy from chemist	94	20.9
Never taken	11	2.4
Missing	2	0.4
Total	450	100.0

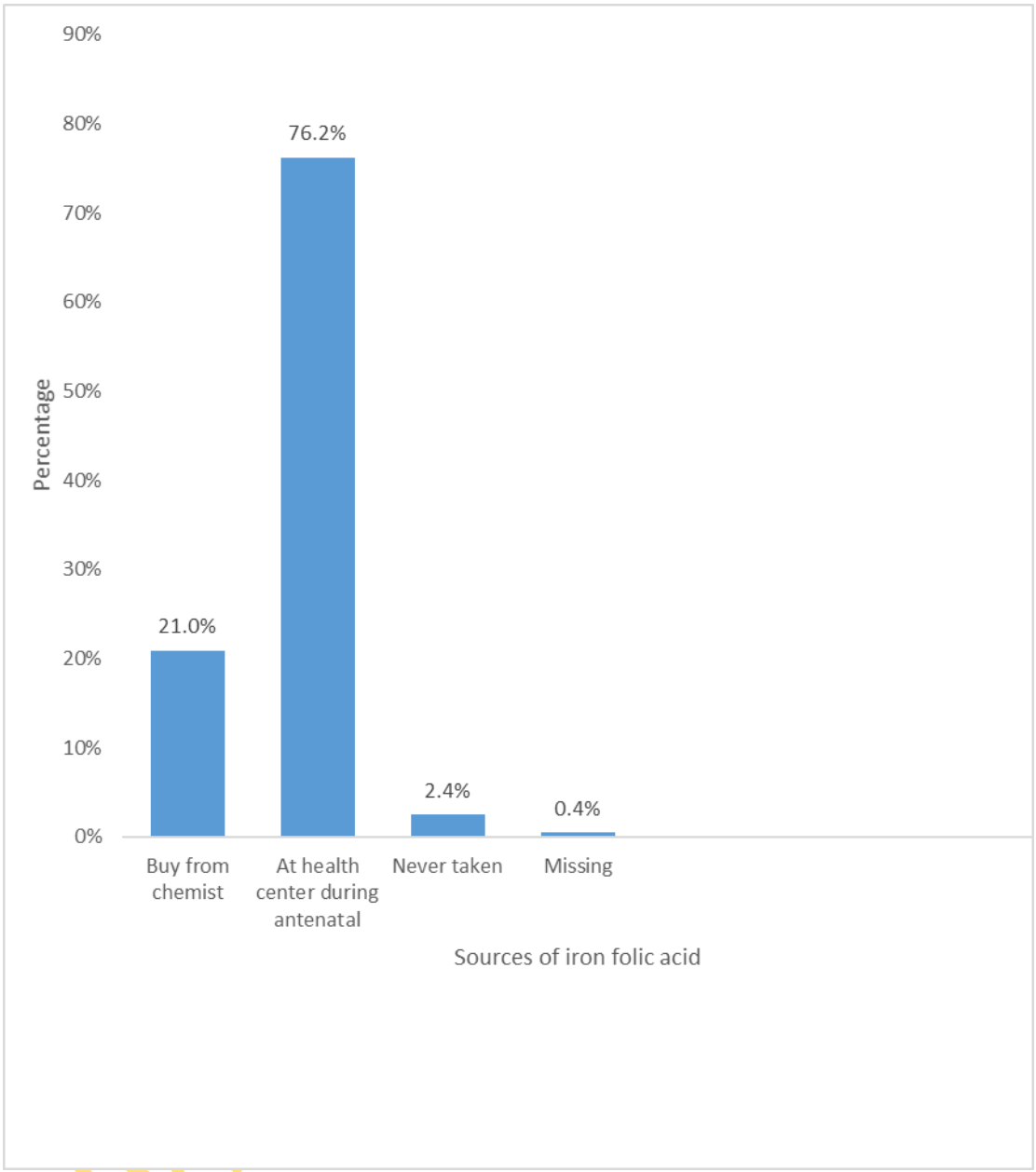

Figure 6: Source of iron-folic acid tablet by pregnant women.

4.5 Pattern of Intake of Iron and Folic Acid Supplements Tablet by Pregnant Women

The pattern of intake of Iron and folic acid supplements by the respondents are summarized in Table 6. Respondents were asked to indicate how often they took iron and folic acid supplement tablets during their last pregnancy. Overall, (59.6%) took iron-folic acid supplements tablets 1-2times daily during the entire period of their pregnancy while (33.8%) took the supplements only 2-3times weekly during their pregnancy period. When the respondents were asked how often they took the supplements weekly (52.2%) reported always taking iron and folic acid supplements tables weekly and (6.9%) rarely took the supplement in a week. A further probe to determine how often the respondents took iron and folic acid supplement exactly as prescribed by the doctor shows that only (53.1%) of the respondents took the supplements exactly as prescribed by their doctors.

Table 12: Pattern of Intake of Iron and Folic acid Supplements by Pregnant Women

Pattern of Iron and Folic acid intake	**Categories**	**n**	**%**
How often do you take iron-folic acid since you got pregnant?	1-2 times daily	268	59.6
	2-3 times weekly	152	33.8
	2-3 times monthly <5 times in 3months Never taken	9 2 14	2.0 0.4 3.1
	Don't know	5	1.3
	Total	449	100
How often do you take iron-folic acid tablets in a week?	Never	19	4.2
	Rarely	31	6.9
	Sometime Always unsure	163 235 2	36.2 52.2 0.4
How often do you take iron- folic acid tablets as prescribed?	Never Rarely	23 31	5.1 6.9
	Sometime Always unsure	150 239 7	33.3 53.1 1.6

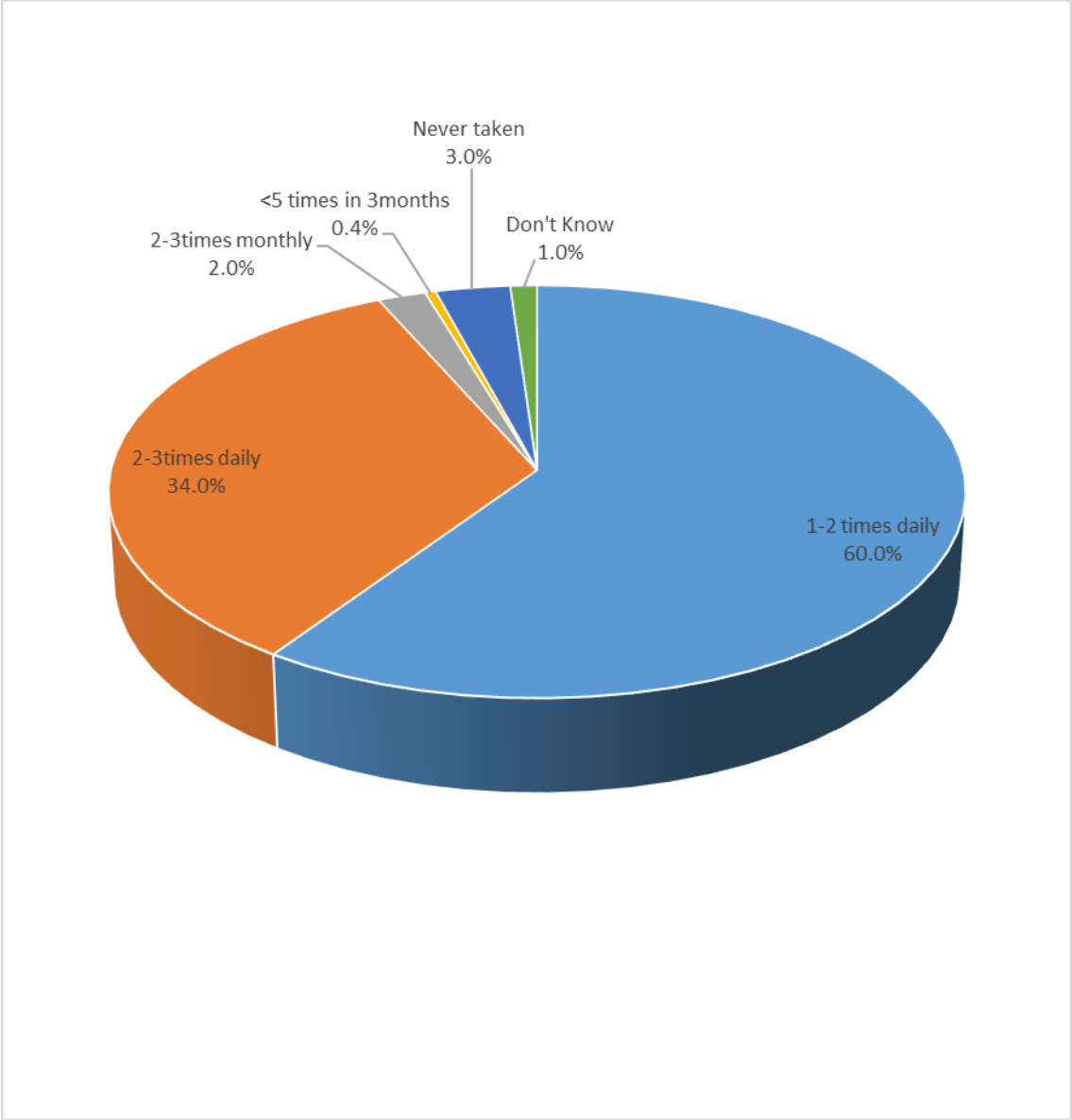

Fig. 7: Respondent's Pattern of Intake of iron-folic acid during period of Pregnancy.

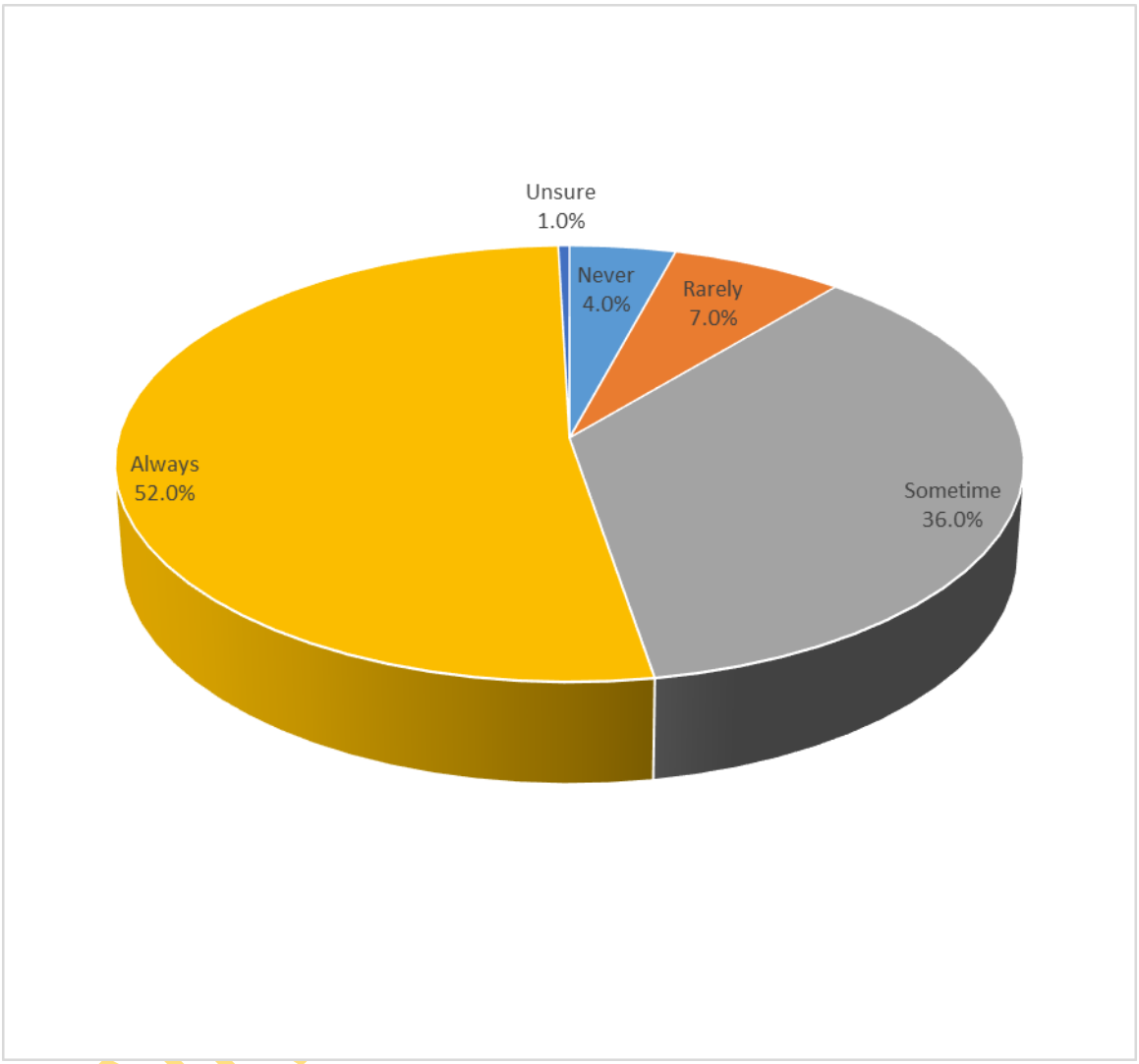

Fig. 8: Respondent's Pattern of Intake of iron-folic acid tablets weekly.

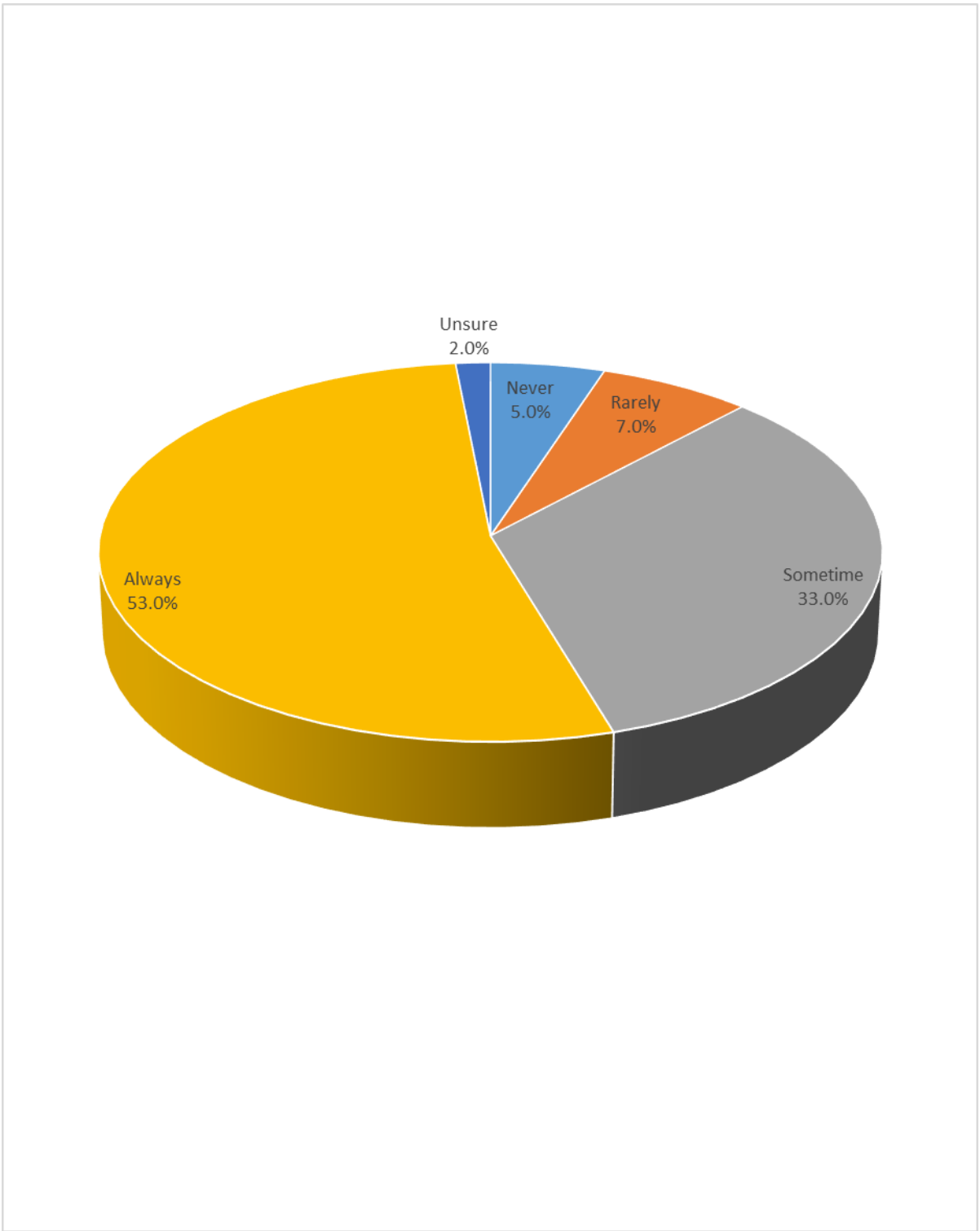

Fig 9: Respondents Intake of iron- folic acid tablets as prescribed

4.6. Reasons that motivated or discouraged intake of iron and folic acid supplement during pregnancy

The reasons given by the respondents as being the strong motivation for taking the iron folic acid supplement during pregnancy are summarized in Table 7. Among all the reasons listed below, over half (58.4%) of the respondents claimed that the reason for their use of the supplements was because the Midwife instructed them to take the tablets and explained that tablets would improve health. Also (12.9%) of the respondents reportedly felt well when they ingested iron and folic acid supplements. On the contrary, the reasons given by the respondents that strongly discouraged them from taking the iron folic acid supplement during pregnancy are summarized in Table 8.

Over half of the respondents (53.1%) reported that there was no reason that strongly discouraged them from taking the drugs on daily basis. However, the discouraging reason given by (18.0%) of the 450 respondents was that they did not remember to take the tablets on most days because they grew tired of taking the tablets; while another (9.8%) respondents claimed to have experienced gastro-intestinal side effects e.g. vomiting, diarhoea and constipation.

Table 13: Reasons that Strongly Motivated Respondents to take Iron Tablets

Reasons	n	%
Felt better when they ingested the tablets	58	12.9
Midwife instructed them to take the tablets to improve health	263	58.4
Always take prescribed drugs because of fear of illness	53	11.8
knew that the tablet will increase their blood	39	8.7
Husband or mother made sure she took the tablet daily	8	1.8
Knew that you lacked blood and need the tablet to increase your blood	10	2.2
No reason	19	4.2
Total	450	100.0

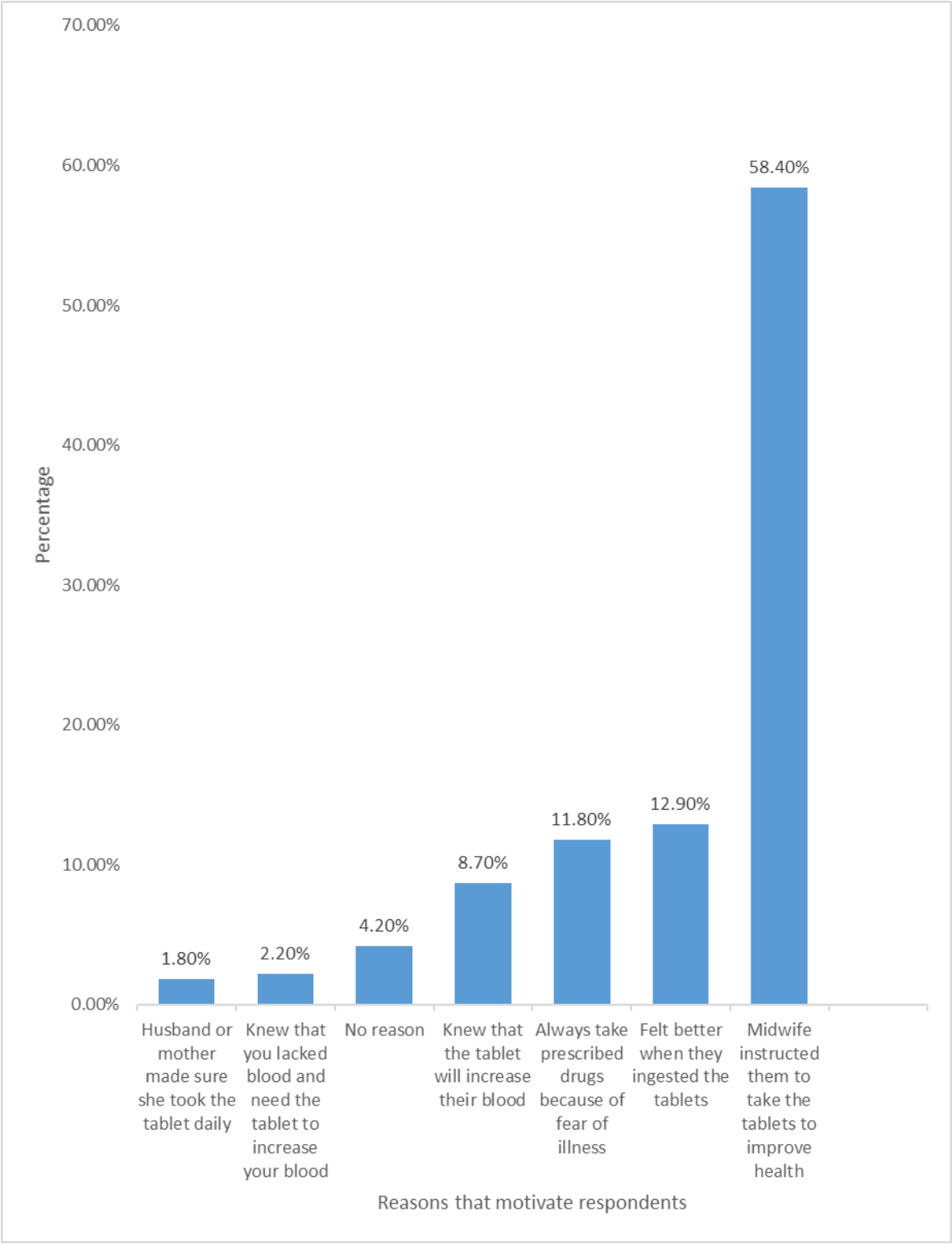

Fig. 10: Reasons that motivate respondents to take iron tablet daily.

Table 14:Reasons that Strongly Discouraged Respondents from Taking Iron Tablets

Reasons	n	%
Experienced gastro-intestinal side effects e.g. vomiting and diarhoea	44	9.8
Took the tablets until the prescription ran out	38	8.4
Forgot to take the tablets on most days	81	18.0
Could not afford to purchase the prescription	1	.2
Was afraid that too many tablets could harm the baby	31	6.9
Never came for follow up antenatal visit to collect drugs	16	3.6
No reason	239	53.1
Total	450	100.0

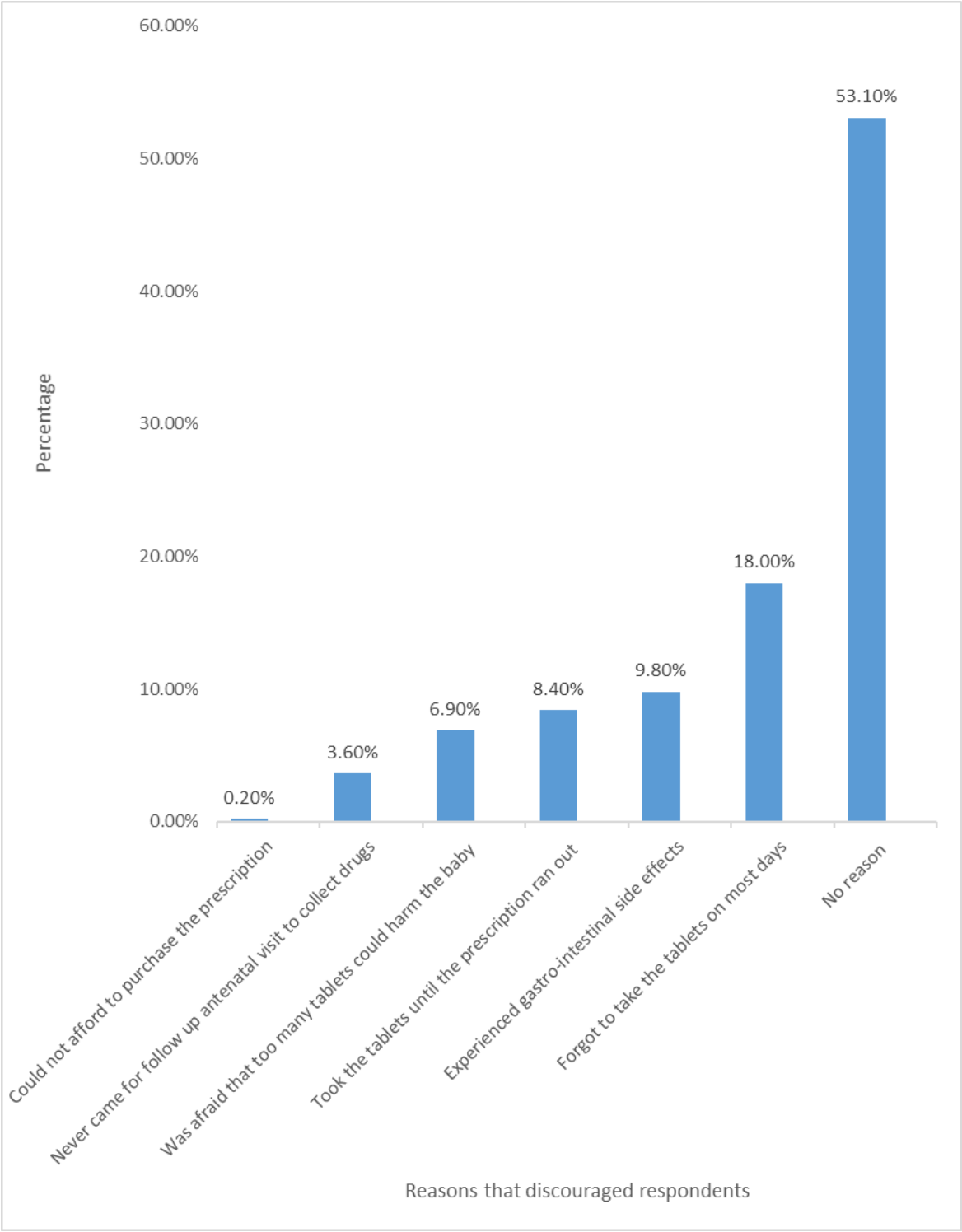

Fig.11 Reasons that discouraged respondents from taking iron tablets daily?

4.7. Factors Associated with Anaemia Prevention Practice of the respondents

The logistic regression model of the factors predisposing to good knowledge of anaemia prevention among the respondents were presented in Table 9. The respondents' occupation, education, ethnicity and parity were the significant predictors of the knowledge ($p<0.05$). The unemployed respondents were less (OR: 0.10; 95CI: 0.03-0.40) likely to have good knowledge of anaemia prevention than the salary earners; respondents with primary and secondary school education were respectively about five (OR: 4.70; 95%CI: 1.05-21.11) and six (OR: 6.15; 95%CI: 1.49-25.45) times more likely to have good knowledge of anaemia prevention than those without any formal education. The non-Yoruba respondents were also less (OR: 0.26; 95%CI: 0.10-0.64) likely to have good knowledge of anaemia prevention than the Yoruba respondents. Respondents having 1-2 children and those with 3 and above were also about two (OR: 2.11; 95%CI: 1.03-4.35) and six (OR: 5.59; 95%CI: 1.65-18.91) times respectively more likely to have good knowledge of anaemia prevention than the primigravidae.

Also the logistic regression model for anaemia prevention practices presented in the Table 10. shows that among the factors considered together, maternal occupation, ethnicity, family income and parity were the significant predictors of anaemia prevention practices. The unemployed were less (OR: 0.04; 95%CI: 0.003-0.46) likely to have good anaemia prevention practices than the salary earners; the non-Yoruba respondents were also less (OR: 0.23; 95%CI: 0.06-0.83) likely to have good anaemia prevention practices than the Yoruba respondents; respondents with family income of N10, 000-<N20, 000 were also about a third (OR: 0.29; 95%CI: 0.11-0.81) less likely to have good anaemia prevention practices than those with income of less than N10, 000; and those with 1-2children were about five times (OR: 5.01; 95%CI: 1.56-16.09) more likely to have good anemia prevention practices than the primigravidae.

4.8. Factors Associated with Iron & Folic Acid Prescription Use of respondents

The model in Table 17, presents the factors that significantly ($p<0.05$) predisposed the respondents to having good attitude towards Iron-Folic acid supplement use. The factors includes: maternal occupation, ethnicity, religion, family income and parity. The self-employed respondents were about two-third (OR: 0.29) less likely to have good attitude than the salary earning respondents; the non-Yoruba were also about a third (OR: 0.27)

less likely to have good attitude than the Yoruba respondents; the Muslim respondents were also less (OR: 0.43) likely to have good attitude than the Christian respondents.

Respondents with family income of ≥₦20, 000 (OR: 0.24; 95%CI: 0.11-0.53) and those with no idea of the amount of their family income (OR: 0.15; 95%CI: 0.03-0.80) were seen to be less likely to have good attitude towards Iron-Folic acid than those earning <₦10,000 monthly. Respondents with 1-2 children were also about three (OR: 2.77; 95%CI: 1.57-4.93) times more likely to have good attitude towards Iron-folic acid supplement use than the primigravidae.

Table 18 presents a logistic regression model that shows that maternal education, ethnicity and parity were the significant predictors of whether a respondent would use the Iron-folic acid supplements or not. Respondents with secondary education and those with tertiary education were respectively about seven (OR: 6.65; 95%CI: 1.15-38.57) and 24 (OR: 24.33; 95%CI: 2.06-287.9) times more likely to use the supplements than those with without any formal education. The non-Yoruba respondents were also less (OR: 0.20; 95%CI: 0.07-0.63) likely to use the supplement than the Yoruba respondents; while respondent with 1-2 children were about three (OR: 3.10; 95%CI: 1.08-8.84) more likely to use Iron-Folic acid supplement than the primigravidae.

Table 15: Factors Predisposing to Knowledge of Anaemia Prevention of respondents

	Odds ratio	95.0% C.I. for odds ratio		Logistic regression p-value
		Lower	Upper	
Age (years)	.941	.862	1.026	.169
Occupation				
Salary earners (ref)				.004
Self-employed	.399	.140	1.137	.086
Unemployed	.102	.026	.397	.001
Education				
No formal(ref)				.021
Primary education	4.698	1.046	21.106	.044
Secondary education	6.154	1.488	25.446	.012
Tertiary	2.480	.453	13.568	.295
Ethnicity				
Yoruba (ref)				
Others (Hausa, Igbo etc)	0.26	0.10	0.65	.004
Religion				
Christians (ref)				
Islam	.924	.493	1.732	.804
Marital status				
Single (ref)				
Married	.740	.256	2.142	.578
Family monthly income				
<N10, 000(ref)				.197
N10,000-<N20,000	1.463	.742	2.885	.272
N20,000 and Above	1.688	.636	4.476	.293
Don't know	.350	.088	1.390	.136
Parity				
First pregnancy (ref)				0.018
1-2 children	2.11	1.03	4.35	0.042
3 and Above	5.59	1.65	18.91	0.006
Constant	11.21			0.071

Table 16: Factors Predisposing to Anaemia Prevention Practices of respondents

	Odds ratio	95.0% C.I. for odds ratio		Logistic regression p-value
		Lower	Upper	
Age (years)	1.01	0.885	1.149	0.901
Occupation				
Salary earners (ref)				0.027
Self-employed	0.16	0.016	1.591	0.117
Unemployed	0.04	0.003	0.463	0.010
Education				
No formal(ref)				0.322
Primary education	1.724	0.164	18.073	0.650
Secondary education	3.367	0.346	32.798	0.296
Tertiary	8.369	0.471	148.799	0.148
Ethnicity				
Yoruba (ref)				
Others (Hausa, Igbo etc)	0.23	0.06	0.83	0.025
Religion				
Christians (ref)				
Islam	1.574	00.593	4.173	0.362
Marital status				
Single (ref)				
Married	0.425	0.082	2.207	0.309
Family monthly income				
<N10, 000(ref)				0.060
N10,000-<N20,000	2.90	0.11	0.81	0.017
N20,000 and Above	0.73	0.13	4.13	0.721
Don't know	0.23	0.04	1.23	0.085
Parity				
First pregnancy (ref)				0.020
1-2 children	5.01	1.56	16.09	0.007
3 and Above	5.19	0.90	30.08	0.066
Constant	41.03			0.095

Table 17: Factors Predisposing Respondents' Attitude towards Iron-Folic Acid Supplement Use.

	Odds ratio	95.0% C.I. for odds ratio		Logistic regression p-value
		Lower	Upper	
Age (years)	1.048	0.986	1.114	0.135
Occupation				
Salary earners (ref)				0.013
Self-employed	0.294	0.131	0.663	0.003
Unemployed	0.542	0.157	1.865	0.331
Education				
No formal(ref)				0.548
Primary education	1.37	0.29	6.354	0.688
Secondary education	1.13	0.25	5.000	0.875
Tertiary	0.69	0.13	3.763	0.663
Ethnicity				
Yoruba (ref)				
Others (Hausa, Igbo etc)	0.27	0.10	0.73	0.010
Religion				
Christians (ref)				
Islam	0.43	0.27	0.68	0.000
Marital status				
Single (ref)				
Married	1.962	0.758	5.077	0.165
Family monthly income				
<N10, 000(ref)				0.001
N10,000-<N20,000	0.75	0.47	1.21	0.240
N20,000 and Above	0.24	0.11	0.53	0.000
Don't know	0.15	0.028	0.80	0.026
Parity				
First pregnancy (ref)				0.001
1-2 children	2.77	1.57	4.93	0.000
3 and Above	1.920	0.87	4.25	0.107
Constant	0.338			0.336

Table 18: Factors Predisposing to Using Iron-Folic Acid among the Respondents

Factors	Odds ratio	95%CI Lower-Upper	Logistic regression p-value
Age (years)	0.99	0.88-1.11	0.823
Occupation			
Salary earners (ref)			0.492
Self-employed	0.97	0.20-4.69	0.972
Unemployed	0.39	0.06-2.56	0.329
Education			
No formal(ref)			0.019
Primary education	2.36	0.39-14.01	0.345
Secondary education	6.65	1.15-38.57	0.035
Tertiary	24.33	2.06-287.9	0.011
Ethnicity			
Yoruba (ref)			
Others (Hausa, Igbo etc)	0.20	0.07-0.63	0.006
Religion			
Christians (ref)			
Islam	1.54	0.63-3.72	0.343
Marital status			
Single (ref)			
Married	0.78	0.20-3.04	0.720
Family monthly income			
<₦10, 000(ref)			0.115
₦10,000-<₦20,000	1.02	0.39-2.68	0.971
₦20,000 and Above	0.89	0.21-3.72	0.871
Don't know	0.17	0.04-0.74	0.018
Parity			
First pregnancy (ref)			0.106
1-2 children	3.10	1.08-8.84	0.035
3 and Above	1.91	0.48-7.56	0.357
Constant			0.550

CHAPTER FIVE

5.1. Discussion

Anaemia is a significant public health problem worldwide. Anaemia in pregnant women in developing countries is generally presumed to be the result of nutritional deficiency and iron deficiency anaemia is the most nutritional deficiency problem affecting pregnant women. The greatest burden of anaemia in pregnancy is borne by Asia and Africa where it is estimated that 60–70% and 35% to 72% of pregnant women respectively are anaemic (WHO 2000). In Nigeria anaemia prevalence in pregnancy vary across the regions with a prevalence of 76.5% in Abeokuta, Southwestern Nigeria (Idowu, Mafiana and Stiloye 2005) seen as the highest among recent studies. To curb the situation, the various Ministries of Health and their partners implement four strategies for anaemia prevention in Nigeria which includes: iron and folate supplementation; fortification of commonly consumed foods with iron ; dietary diversification to include iron rich and animal-source foods; prevention, control and treatment of parasitic infections such as malaria, hookworms and schistosomiasis. In this study, the aim was to assess the level of knowledge and practices related to anaemia prevention and to determine factors associated with intake of iron and folic acid supplements prescription among pregnant women in Ibadan North in Southwestern Nigeria. The assessment of pregnant women use of iron and folic acid supplement in Nigeria has been performed in order to use the outcome of the study as a guideline in revising and improving the performance and quality of the iron supplementation programme in Nigeria. The population in this study was 450 pregnant women who were attending antenatal care in selected primary health centers in Ibadan North LGA. The discussion of the result of the findings will reveal the following important issues:

A. Relationship between awareness, knowledge of anaemia prevention and iron-folic acid supplementation.

B. Relationship between knowledge of iron folic acid supplement and use of iron folic acid among pregnant women.

C. Relationship between socio-demographic factors and use of iron-folic acid by pregnant women.

D. Relationship between perceived benefit and pregnant women's use of iron and folic acid supplementation.

5.2. Relationship between Awareness, Knowledge of Anaemia prevention and Iron-Folic acid supplementation

This study among other findings shows that although the level of awareness about anaemia prevention is high (90.7%), the level of good knowledge of anaemia prevention (93.6%) among the pregnant women were almost universal(Table 2) whereas the knowledge of iron and folic acid supplements were relatively low (82.8%).This study also revealed that health workers (Table 3& 4) were the major source of information about anaemia prevention (80%) and almost the sole source of knowledge of the benefits of iron and folic acid supplements (87.6%).This suggests that while other strategies that were put in place to increase awareness and knowledge of anaemia prevention and benefits of iron and folic acid supplement intake should be sustained, more emphasis should be placed of encouraging especially first time pregnant women to enroll and attend antenatal care clinics as that is the most effective forum by which health workers disseminate health information to pregnant women.

The respondents' source of receiving iron and folic acid supplements tablets as presented in Table 5 shows that majority of the respondents (76.2%) who used iron and folic acid supplements during their pregnancy indicated that they received the supplements from health facilities during their antenatal care visit. This underscored the need for policy makers to put good primary healthcare facilities in place especially in rural areas. Kalimbira (2007) in his work in Malawi reported that poor health facilities which could not adequately supply iron supplement were a major discouraging factor for iron supplementation program in Malawi. This study also demonstrated the gap between knowledge and action since the level of good knowledge of anaemia prevention (93.6%) could not match with good anaemia prevention practice (60.2%) among the pregnant women. Similarly the study shows that majority of the pregnant women were regular users of iron and folic acid supplements (93.3%) but compliance with prescription (57.3%) were relatively low compared to compliance rate of 69% found by Seck BC, Jackson RT(2008) in Senegal, however, this compliance rate of 57.3% was an improvement when compared to the compliance rate of 37.5% found in a previous study in Ibadan by Dairo MD, Lawoyin TO (2006). This highlight the need to identify factors

associated with anaemia prevention practices and iron and folic acid supplement intake among pregnant women.

5.3. Relationship between knowledge of iron folic acid supplement and compliance to use of iron folic acid among pregnant women

Although the levels of awareness (90.7%) and good knowledge of anaemia prevention (84.7%) were high respectively among the women, the good attitude towards Iron-folic acid supplement use (39.8%) were relatively low. Majority of the respondents had good knowledge of Iron-folic acid supplements (82.9%) and were regular users of iron-folic acid supplements (93.3%), although compliance (57.3%) with prescriptions were relatively low. Among the compliant women, the four main reasons reported for taking the tablets as directed most of the time were: (1) that they perceived a health benefit when they took the tablets and therefore continued taking them (2) because the midwife directing them to take the tablets was a strong motivator to do so (3) because the midwife specifically indicated that the tablets would improve their health and (4) that they always take prescribed medications because they are fearful of sickness. Most of the women stated that they knew that the tablets would 'increase their blood' (remedy anaemia) or prevent them from 'losing blood' (prevent anaemia), which is what motivated compliance

This study shows that socio-demographic factors which include maternal education, ethnicity and parity were the significant predictors of whether a respondent would use the Iron-folic acid supplements or not. Respondents with secondary education and those with tertiary education were respectively about seven (OR: 6.65; 95%CI: 1.15-38.57) and 24 (OR: 24.33; 95%CI: 2.06-287.9) times more likely to use the supplements than those with without any formal education. The non-Yoruba respondents were also less (OR: 0.20; 95%CI: 0.07-0.63) likely to use the supplement than the Yoruba respondents; while respondent with 1-2 children were about three (OR: 3.10; 95%CI: 1.08-8.84) more likely to use Iron-Folic acid supplement than the primigravidae. Maternal education and parity is also the key determinant of iron and folic acid supplement prescription use among pregnant women. This study also shows that 59.6% of pregnant women used iron and folic acid supplement daily compared to 33.8% who claimed to use the supplement weekly (Table 6).

The study observed that pregnant women's occupation, education, ethnicity and parity were the significant predictors of good knowledge of anaemia prevention (Table 9).The

unemployed respondents were less (OR: 0.10; 95CI: 0.03-0.40) likely to have good knowledge of anaemia prevention than the salary earners; this highlights the role of women empowerment in anaemia prevention and control since food diversification cannot be achieved without economic empowerment of women for a sustained household food security. The findings of this study also showed that respondents with primary and secondary school education were about five (OR: 4.70; 95%CI: 1.05-21.11) and six (OR: 6.15; 95%CI: 1.49-25.45) times respectively more likely to have good knowledge of anaemia prevention than those without any formal education. This also underscores the important role girl child education plays in disease prevention and control. It is obvious that next to economic empowerment, maternal education is a key determinant of family food choices and since iron deficiency anaemia is a nutritional deficiency, investment in girl child education by policy makers will yield dividend in anaemia prevention during pregnancy. Also the study found out that respondents who have 1-2 children and those with 3 and above were also about two (OR: 2.11; 95%CI: 1.03-4.35) and six (OR: 5.59; 95%CI: 1.65-18.91) times respectively more likely to have good knowledge of anaemia prevention than the primigravidae. This shows that experience is the best teacher in knowledge of anaemia prevention among pregnant women.

The logistic regression model for anaemia prevention practices presented in the Table 15 shows that among the factors considered together, maternal occupation, ethnicity, family income and parity were the significant predictors of anaemia prevention practices. It shows that respondents with family income of N10, 000-<N20, 000 were also about three times (OR: 2.9; 95%CI: 0.11-0.81) more likely to have good anaemia prevention practices than those with income of less than N10, 000.This also emphasize the role of poverty eradication programmes and social safety nets in anaemia prevention and control in Nigeria.

5.4. Relationship Between Socio-demographic Factors and Use of Iron-Folic Acid by Pregnant Women

This study observed that socio-demographic factors which include maternal education, ethnicity and parity were the significant predictors of whether a respondent would use the Iron-folic acid supplements or not. Respondents with secondary education and those with tertiary education were respectively about seven (OR: 6.65; 95%CI: 1.15-38.57) and 24 (OR: 24.33; 95%CI: 2.06-287.9) times more likely to use the supplements than those with without any formal education. The non-Yoruba respondents were also less (OR:

0.20; 95%CI: 0.07-0.63) likely to use the supplement than the Yoruba respondents; while respondent with 1-2 children were about three (OR: 3.10; 95%CI: 1.08-8.84) more likely to use Iron-Folic acid supplement than the primigravidae. Maternal education and parity is also the key determinant of iron and folic acid supplement prescription use among pregnant women. This study also found out that 59.6% of pregnant women used iron and folic acid supplement daily compared to 33.8% who claimed to use the supplement weekly (Table 6).

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5.5. Relationship Between Percieved Benefit and Pregnant's women use of Iron and Folic Acid Supplementation

This study among other findings reported that the first motivating factor among pregnant women who used the iron and folic acid tablets during antenatal care was that the midwife instructed them to take the tablets and explained that the tablets would improve their health (58.4%) while the second motivating factor was that the women reportedly felt better when they ingested iron and folic acid supplements 58(12.9%).This report collaborate the findings by Seck BC, Jackson RT(2008) in Senegal which showed that midwives admonition to the patients during antenatal visits plays a key role in motivating pregnant women to use their drugs. Although, the discouraging factors for taking Iron and folic acid tablets by 81 (18.0%) of the 450 respondents was that they did not remember to take the tablets on most days because they grew tired of taking the tablets; while another 44 (9.8%) respondents claimed to have experienced gastro-intestinal side effects e.g. vomiting, diarhoea and constipation. over half of the respondents 239(53.1%) reported that there was no reason that strongly discouraged them from taking the drugs on daily basis.

5.6. Contribution to knowledge

The study has made the following contribution to knowledge: It shows

- That the level of awareness and knowledge of anaemia prevention among pregnant women were almost universal (Table 2) whereas the knowledge of iron and folic acid supplements were relatively.
- The need for adequate training of health workers as they were the major source of information about anaemia prevention and benefits of iron and folic acid supplements.
- That although majority of the pregnant women were regular users of iron and folic acid supplements but compliance with prescription were relatively low.
- The study highlights the need for empowerment of women as socio-demographic factors such as maternal education, occupation, ethnicity and parity were the significant predictors of good knowledge of anaemia prevention and use of Iron-folic acid supplements by pregnant women.
- This study established the importance of antenatal care as that the first motivating factor for used of iron and folic acid tablets among pregnant women was that the midwife instructed them to take iron-folic acid regularly during antenatal care

CHAPTER SIX
CONCLUSION AND RECOMMENDATION

6.1 Conclusion

In conclusion, the current findings indicate that despite a high level of awareness 408 (90.7%) and good knowledge of anaemia prevention 421 (93.6%) among the pregnant women, the knowledge of iron and folic acid supplements were relatively low 373 (82.8%) and compliance with prescription 258(57.3%) were relatively low despite the fact that majority of the pregnant women were regular users of iron and folic acid supplements 420(93.3%).The study revealed a relationship between maternal education,occupation ,parity and consumption of iron-folic acid supplements highlighting the role of girl child education and women empowerment in anaemia prevention and control in Nigeria.

This study also show that health workers (Table 3&4) were the major source of information about anaemia prevention, knowledge of the benefits of iron and folic acid supplements as well as source of receiving iron and folic acid supplements tablets. This important role demonstrates the importance of antenatal care and the need for resources to be channeled towards equipping facilities and capacity building of health workers at the primary healthcare level as an effective strategy in anaemia prevention and control in Nigeria. Socio-demographic factors has been demonstrated by this study as a significant predictors of whether a respondent would use the Iron-folic acid supplements or not and women with no formal education has the least knowledge of anaemia prevention and iron-folic acid supplement use, they are also mostly unemployed. This relationship established the need for government and policy maker to promote education and empowerment of women as a development need and as a maternal and child health strategy.

6.2 Recommendation

Based on the above findings of the study, it was therefore recommended that

1. Mothers awareness on the importance of antenatal care utilization during pregnancy be increased.Also intervention programs for anaemia prevention

which promote iron-folic acid supplementation should focus on enhancing the role of health workers in primary care level in encouraging pregnant women to use iron-folic acid supplements.

2. Women educational opportunities should be increased and encouraged from childhood since education was found to have positive impact on the use of iron folic acid supplement prescription. Also female health workers should be used to educate women with little or no education on health issues during antenatal care.
3. Women with first pregnancy (Primigravidae) should be encouraged and educated on the benefit of adherence to the use of iron-folic acid supplements. Therefore, it is important targeting this group in educational campaigns to promote sufficient intake of iron folic acid supplement during pregnancy. Promotion of suitable focused intensive IEC activity at health institutions and at community level at large.
4. Another major focus is on behavior change among pregnant women on areas of anaemia prevention practices through improvement of personal hygiene, good food habits and good health seeking behaviours.The government should invest on training of community health workers through workshops and seminars to improve the quality of healthcare services delivered during antenatal care.

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APPENDIX ONE

RESPONDENT'S QUESTIONNAIRE

ANAEMIA PREVENTION PRACTICES AND IRON-FOLIC ACID SUPPLEMENTATION USE AMONG PREGNANT WOMEN ATTENDING PRIMARY HEALTH CARE CENTERS IN IBADAN NORTH LOCAL GOVERNMENT AREA.

SECTION A - SOCO-DEMOGRAPHIC CHARACTERISTICS

1. Age: How old were you on your last birthday?……..... (Years)

2. Occupation: What type of work do you mainly do?

(1) Civil servant (2) Self-employed/Business

(3) Private sector employee (4) Unemployed

(5) Retired (6) others (pls. specify)…….....

3. Education: Highest level of education attained

(1) No formal education (2) Primary

(3) Secondary (4) Tertiary (5) others (pls. specify)…….....

4. Ethnic group: What is your ethnic group or tribe?

(1) Yoruba (2) Hausa

(3) Ibo (4) Others (pls. specify)

…….....

5. Religion: What is your Religion?

(1) Christianity (2) Islam

(3) Traditional worship (4) Others (pls. specify)…….....

6. Marital Status: What is your current marital status?

(1) Single never married (2) Married

(3) Divorced (4) Widowed

(5)Separated (6) Co-habiting

7. What is your average family Monthly income?

(1) Less than ₦10,000 (2) ₦10,000 - ₦20,000

(3) ₦20,000 - ₦30,000 (4) ₦30,000 - ₦40,000

(5) ₦40,000 - ₦50,000 (6) Above ₦50,000

(7) Others (pls specify)…….....

8. How many children do you have?

(1) First pregnancy (2) 1-2children (3) 3-4 children (4) 5-6children (5) 7-Above

SECTION B – KNOWLEDGE ON ANAEMIA PREVENTION

9. Have you heard of "Anaemia"? [1] Yes [2] No [98] Don't know

10. If yes, what was the source of information? (**DO NOT PROMPT**. Circle all positive answers).

[1] Radio/TV [2] Posters/notices [3] Friends/Relatives [4] Doctor/Health workers

[5] Newspapers/magazine [6] Church/Mosque [7] School [8] Pharmacy/chemist

[9] Other (please specify) _____

11. Do you think that a person can die from Anaemia? [1] Yes [2] No [98] Don't know

12. How can a person get Anaemia? (***DO NOT PROMPT***. *Circle all positive answers)*

[1] By eating poor diet lacking in protein and iron [2] By having Malaria infection

[3] By having Hiv/Aids disease [4] By having hookworm infestation [5] By having sickle cell disease [6] By having excess bleeding from injury [7] regular use of aspirin or other drugs for pain [98] *Don't know* [8] *Other (please specify)*

_____

13. Can you tell me the main symptom or sign of anaemia you know?

_____

_____

(PROMPT FOR MORE RESPONSES AND CIRCLE ALL CORRECT ANSWERS)

[1] Fatigue or tiredness (very common) [2] weakness (very common) [3] dizziness [4] headache [5] Numbness or coldness in your hands and feet [6] low body temperature [7] pale skin [8] Rapid or irregular heartbeat [9] shortness of breath [10] chest pain [98] Don't know

14. Which age groups are most affected by this disease (Anaemia)? (***DO NOT PROMPT)***

[1] Infants [2] *Children under 5* [3] *Young girls* [4] *Pregnant women* [5] *Lactating mothers* [6] *Men and Women living with Hiv/Aids* [98] *Don't know*

[1] *Other (please specify)*

_____

15. Which of these ways can one prevent Anaemia? (Read out to Respondent)

KNOWLEDGE ABOUT ANAEMIA	Yes	No	Don't know
Sleeping under ITN bednet daily			
Eat balanced diet including vegetables daily			
Take Iron-folic acid tablets daily			
Take deworming tablets from time to time			
Take fansidar tablets from time to time(IPT) to prevent malaria during pregnancy			

SECTION C – ATTITUDE TO ANAEMIA PREVENTIO

(Please tell me to what extent you agree or disagree with these statements I will read to you now)

ATTITUDE TO ANAEMIA PREVENTION	Strongly Agree	Agree	Strongly Disagree	Disagree	Unsure
16. Anaemia comes with every pregnancy normally and not harmful to mother and child.					
17. Taking malaria drugs occasional and iron-folic acid tablets daily can harm the baby.					
18. Vaccination during antenatal care is enough to prevent anaemia in pregnant.					
19. If woman suffers anaemia once in a Pregnancy, she won't get anaemia again.					
20. ITN bednets is not culturally acceptable so it is not effective in preventing malaria					
21. Taking Iron-folic acid tablets daily can be very beneficial to a pregnant women's health					
22. Deworming for hookworm is an evil thing to do once a woman is pregnant.					
23. Pregnant women who use good anaemia prevention methods are stronger and healthier					
24. A woman who uses antenal care, IPT, ITN and Iron-folic acid can still get anaemia					

25. The best prevention to anaemia during pregnancy is prayer and fasting					

SECTION D – PRACTICES ON ANAEMIA PREVENTION

26. What have you done to prevent anaemia in this pregnancy (Read out to Respondent)

KNOWLEDGE ABOUT ANAEMIA	Yes	No	Don't know
Sleeping under ITN bednet daily			
Eat balanced diet including vegetables daily			
Take Iron-folic acid tablets daily			
Take deworming tablets from time to time			
Take antimalaria tablets from time to time(IPT) to prevent malaria during pregnancy			

Please tell me how often you do the following things I will ask you now.

PRACTICES OF ANAEMIA PREVENTION	Never	Rarely (Once)	Sometime (2 or 3times)	Always (5 or more times)	Unsure
27. How often do you attend antenatal care?					
28. How often have you collected antimalaria and Iron-folic acid tablets during antenatal care?					
29. How often do you do laboratory blood test or check during antenatal care?					
30. How often do you eat meat, fish, eggs, beans and green leafy vegetables in a week?					
31. How often do you take Iron-folic acid tablets at home in a week?					
32. How often do you sleep in insecticide treated bednets at night in a week?					
33. How often do you take malaria drugs for IPT since you got pregnant?					

34. How often do you forget or avoid taking antenatal drugs at home?					
35. Have you ever used traditional medicine. instead of antenatal drugs in this pregnancy?					
36. How often does your husband or someone else remind you to take your drugs in a week.					

SECTION E – KNOWLEDGE ON IRON-FOLIC ACID SUPPLEMENTION USE

(*Please tick from the following options what you know about Iron-folic acid tablets)*

37. Have you ever seen Iron-folic acid tablets before? [1] Yes [2] No [98] Don't know.

38. What was the colour of the Iron-folic acid tablet_____?

39. In your opinion why do you need to take this Iron-folic acid tablet daily during pregnancy?

(PROMPT FOR MORE RESPONSES AND CIRCLE ALL CORRECT ANSWERS)

---

[1] To prevent shortage of blood (Anaemia) [2] To maintain proper growth of the foetus

[3] To ensure good health for the woman [98] Don't know

40. Who are the most targeted group for Iron-folic acid supplementation (circle all positive answers) [1] Children 6-59 month [2] Adolescent girls [3] Pregnant and lactating mothers [98] Don' know

41. What are the major health benefits of taking Iron-folic acid tablets during pregnancy?

(PROMPT FOR MORE RESPONSES AND CIRCLE THE CORRECT ANSWERS)

[1] It helps prevent anaemia (IDA) during pregnancy [2] It helps prevent low-birth-weight in babies [3] It promotes proper development and growth of the baby. [4] It helps the woman to be healthy and prevent infection.

42. Where did you learn about the benefit of Iron-folic acid tablets?

[1] Radio and Television

[2] Other mothers and pregnant women

[3] Health talks during antenatal at Health center

[4] Poster/Leaflet [5] Others

(specify).....

SECTION F – ATTITUDE TO IRON-FOLIC ACID SUPPLEMENTION USE

(Please tell me to what extent you agree or disagree with these statements I will read to you now)

ATTITUDE TO ANAEMIA PREVENTION	**Strongly Agree**	**Agree**	**Strongly Disagree**	**Disagree**	**Unsure**
43. Taking Iron-folic acid tablets daily is beneficial to only sick pregnant women.					
44. Iron-folic acid supplements is for those women who can not afford good food daily.					
45. Pregnant women who eat regularly don't need iron-folid acid supplement at all.					
46. Taking Iron-folic acid supplement is not culturally acceptable because it is natural					
47. A woman who uses ITN bednet regularly don't need to take Iron-folic acid at all.					
48. Taking Iron-folic acid tablet daily usually cause severe harmful side effect to the pregnant woman.					
49. Pregnant women hate taking Iron-folic acid tablets daily because of its bitter taste.					

50.	Pregnant women who take iron-folic acid tablets daily usually give birth to overweight babies.					
51.	Daily use of iron-folic acid tablets can help pregnant women to be strong and healthy.					
52.	Pregnant women who take iron-folic acid tablet daily are less likely to get anaemia.					

SECTION G – PRACTICES ON IRON-FOLIC ACID SUPPLEMENT USE

PRACTICES OF ANAEMIA PREVENTION	**Never**	**Rarely (Once)**	**Sometime (2 or 3times)**	**Always (5 or more times)**	**Unsure**
53. How often do you take Iron-folic acid tablets in a week?					
54. How often did you deliberately not take iron-folic acid tablets daily as prescribed?					
55. How often do you use the iron-folic acid tablets exactly the way doctor prescribed?					
56. How often have you noticed a side effect after using iron-folic acid tablets?					
57. How often have you been					

discouraged by the taste, smell or size of iron-folic acid tablets					

What reasons can make you not to take Iron-folic acid tablets as prescribed? (Read to Respondent)

Reason for non compliance	Yes	No	Don't know
58. Experiences side-effects like vomiting after use			
59. Often forget to take the tablets			
60. The pill makes me to eat too much and add weight			
61. Prefer eating good food than taking drugs daily			
62. Don't have any reason for not taking the tablets			

63. Where do you usually receive or buy (source) your Iron-folic acid tablets?

(1) Buy from Chemist
(2) At Health center during Antenatal
(3) Receive from nurse at home
(4) At Mission clinic in church
(5) Others

64. How often do you take Iron-folic acid since you got pregnant?

(1) 1-2 times Daily
(2) 2-3 times weekly
(3) 2-3 times monthly
(4) Less than 5times in 3months
(5) Never taken
(6) Don't know

65. Which of these reasons **strongly** motivates you to take Iron-folic acid tablets daily?

(1) Felt better when they ingested the tablets.

(2) Midwife instructed them to take the tablets and explained tablets would improve health.

(3) Always take whatever you are prescribed because of fear of illness.

(4) Knew that the tablets would 'increase their blood' and were afraid of 'losing blood'.

(5) Husband/mother made sure you took the tablets daily.

(6) Knew that you 'lacked blood' and that the tablets would increase your blood.

66. Which of these reasons **strongly** discourage you from taking Iron-folic acid tablet daily?

(1) Experienced gastrointestinal side-effects e.g. vomiting, diarrhoea and constipation.

(2) Took the tablets until the prescription ran out, but did not purchase more tablets.

(3) Forgot to take the tablets on most days because I grew tired of taking tablets.

(4) Could not afford to purchase the prescription.

(5) Was afraid that too many tables could harm y and/or her baby.

(6) Never came to follow-up antenatal visits and therefore could not get more iron tablets.

APPENDIX TWO

RESPONDENT'S QUESTIONNAIRE

DIDENA DE AITO EJE ATI LILO OOGUN FOLIC ACID LARIN AWON ALABOYIN TI O WA SI ILE IWOSAN ALABODE TI IBADAN NORTH LOCAL GOVERNMENT AREA.

IPIN A: Awon Abuda Ibakegbe/Ikaniyan Lawujo

2. Ojo ori: Omo odun melo ni yin ni ojo ibi to ko ja?……..... (Years)

2. Ise wo le nse: Iru ise wo gan le n se?

(1) Osise Ijooba (2)Ise Aladani/Ise onisowo

(3) Osise pelu Aladani (4) Alanise

(5) Afeyinti lenu ise (6) Awon miran.....

3. Eko: Ibi ti akopa kawe de.

(1) Ko kawe (2) Alakoo bere

(3) Ile-iwe giga (4) Ile-iwe giga julo (5) Orisi miiran……..

4. Eya Ede:Kini eya tabi ilu ti e tiwa?

(1) Yoruba (2) Hausa

(3) Ibo (4)Awon miran …….....

5. Esin: Kini esin yin?

(1)Igbagbo (2)Musulumi

(3) Elesin Ibile (4) Orisi miran…….....

6. Eto Igbeyawo : Kini eto igbeyawo yin?

(1) Omidan ti o ti loko tabi iya (2) Abileko

(3) Won ko arawo (4) Opo

(5) Won pinya (6)Alabagbepo

7. Kini afojuda oye ti a n ri losu? (1) Koto ₦10,000 (2) ₦10,000 si ₦20,00

(3) ₦20,000 si ₦30,000 (4) ₦30,000 si ₦40,000

(5) ₦40,000 si ₦50,000 (6) ₦50,000 soke

(7) Orisi miran…….....

8. Iye omo melo le ti bi??

(2) Oyun akoko (2)Omo kan si meji (3) Omo meta si merin (4)Omo marun si mefan (5) Omo meje soke

IPIN B IMO LORI IDENA ARUN AITO EJE

9. Se ti gbo nipa arun aito eje? [1] Beni [2]Beko [98] Nkomo

10. To baje beni, nibo le ti ni imo re? (Yi odo si eyi ti o ba mo ni be).

[1]Nipa ero asoro ma gbesi tabi amohun ma wo ran. [2]Iwe ikede [3]Lati odo ebi tabi ore [4]Dokita oni wosan tabi osise ile-iwosan.

[5]Iwe iroyin [6]Ile-ijosin tabi mosalasi [7]Ile iwe [8] Ile itaja ogun

[9]Orisimiran _____

11. Nje o lero wipe eniyan le ku nipa arun aito eje? [1]Beni [2]Beko [98]Nkomo

12. Bawo ni eyan sele ni arun aito eje

[1]Nipa jije ounje ti ko le se ara lore [2]Nipa aisan iba

[3]Nipa arun kogbogun [4]Nipa arun inu [5] Nipa arunmolegun [6] Nipa opolopo eje lati egbo [7] Nipa lilo ogun fun ara riro dede [98] Nkomo [8] Orisi miran _____

13. Nje e le so pato amin tabi ifara han arun eje kekere ti e mo? _____

_____

(FALA YI GBOGBO IDAHUN TO YE KA)

[1] Fatigue tabi rire dede [2]Rire lati inu lore kore [3] O yi oju [4] Ori fifo [5] Ki ku owo tabi otutu owo ati ese [6] Ara gbigbona kekere [7] Ara sisi [8]E emi to poju tabi koma se sege sege [9]Sise eemi [10]Aya didun [98]Nkomo

14. Iwo awon ojo ori wo ni arun aito eje ma n saba sele si? [1] Omo ikoko [2]Omo odun marun si sale [3] Omode birin [4] Alaboyun [5] Awon iya ti o un fun omo lomu [6] Okunrin ati Obirin ti won gbe pelu arun ko gbogun [98] Nkomo

[1] Orisi miran_____

15. Iru ona wo lalegba dena arun aito eje (Ka fun awon ti o fe dahun ibeere)

IMO NIPA EJE KUKURU	Beeni	Beko	Nkomo
Sun labe ITN awon apefin lojojumo			
Ounje asara lore pelu efo lojojumo			
Lo ogun eje lojojumo			
Lo ogun aran lore kore			
Lo ogun iba lore kore lati tele awon nkan ti ma bere lowo yin bayi			

IPIN C – ONA LATI DENA AITO EJE

(E jowo e so fun mi o to ona wo ti efaramo tabi ti e ko faramo awon ibere ti mo fe ka fun yin yi)

ONA LATI DENE AITO EJE	Ofaramo gidigidi	Ofaramo	Kofaramo gidigidi	Kofaramo	Unsure
16. Arun aito eje ma n wa pelu gbogbo alaboyun ti koni si ipalara fun iya ati omo.					
17. Lilo ogun iba lore kore ati ogun eje lojojumo le pa omo lara.					
18. Vaccination ni gba ayewo ninu oyun o ti lati dena arun aito eje ninu oyun.					
19. Ti obirin ba jiya nipa arun aito eje ninu oyun, koni ni arun aito eje mo.					
20. ITN awon apefon ki se itewogba nipa asa wa, nitori na ko lagbara lati dena arun iba.					

21. Lilo ogun eje lojojumo se anfani fun ilera oloyun					
22. Lilo ogun ara lese akoba fun obirin ninu oyun.					
23. Obirin alaboyun ti o ba lo ogun lati dena arun aito eje ma ni ilera to peye.					
24. Obirin to ba lo fun ayewo ninu oyun ati ogun IPT, ITN ati ogun eje si le ni arun aito eje.					
25. Idena ti o peye fun arun aito eje ninu oyun ni, nipa awe ati adura.					

IPIN D – ISE SISE LORI IDENA AITO EJE

26. Kini nkan ti e ti se lati dena aito eje ninu oyun yi

IMO NIPA AITO EJE	Beeni	Beko	Nkomo
Sun labe ITN awon apefon lojojumo			
Ounje asara lore pelu efo lojojumo			
Lo ogun eje lojojumo			
Lo ogun aran lore kore			
Lo ogun iba lore kore lati en tele awon nkan ti ma bere lowo yin bayi			

E Jowo e so funmi iye igba ti en tele awon n kan ti ma bere lowo yin bayii.

ISE SISE LATI IDENA AITO EJE	LAILAI	NIGBAKANKAN (IGBAKAN)	NIGBAKANKAN (IGBA MEJI TABI	GBOGBO IGBA (IGBA MARUN TABI	MI O LE RO

			META)	JU BE LO)	
27. Igba melo le ma un lo fun aye wo ninu oyun?					
28. Igba melo le ti gba ogun to dena iba ati ogun eje ninu ayewo oyun?					
29. Igba melo le se ayewo eje tabi ki e yewo ninu oyun?					
30. Igba melo le ma un je eran, eja, eyin, ewa ati efo ninu ose?					
31. Igba melo ni e ma un lo ogun eje ni ile ni ose kan?					
32. Igba melo le ma un sun si nu awon apefon ni ale ninu ose kan?					
33. Igba melo le ma un lo ogun iba fun IPT lati igba ti eti loyun?					
34. Igba melo le ti gbagbe tabi sa fun lilo ogun oyun yin nile?					
35. N je e ti lo ogun ibile, dipo ogun itoju oyun?					
36. Igba melo ni oko yin tabi elomiran ran yin leti lati lo ogun yin ninu ose?					

IPIN E – IMO LORI OGUN EJE LILO

(*E jowo e fa ila si awon idahun yi ikan ti e ba mo nipa ogun eje)*

37. N je e tiri ogun eje ri? [1]Bee ni [2] Bee ko [98]Mi o mo.

38. Ki ni awo ogun eje naa ?_____

39. Ninu ero ti e, ki lo de ti e fi n ma un lo ogun eje yin lojojumo ninu oyun?

(GBIYANJU FUN IDAHUN YI KI O SI KALE MO AWON ESI TO PEYE)

[1] Lati dena ninu eje kekere ni ara . [2] Itoju omo ninu oyun .

[3] E gbodo ri wipe Alafia to pe ye wa fun obinrin . [98] Mi o mo .

40. Awo wo ni adojuko fun ogun eje (kale mo awon esi to peye) . [1] Omo bi osu mefa si okan di ladota osu . [2] Omo obinrin to ti to mo okunrin . [3] Oloyun ati obinrin to n toju omo lowo . [98] Mi o mo .

41. Ki ni an faani lilo ogun eje ninu oyun ?

(GBIYANJU FUN IDAHUN YI KI O SI KALE MO AWON ESI TO PEYE)

[1]Oun se ran wo lati dena eje kekere[IDA]ninu oyun . [2]Oun se ran wo lati dena bibi to kere . [3]O mu itesiwaju ati idagba soke ba omo . [4]Oun se ran wo fun ilera obinrin ati dena arun.

42. Ni bo lo ti ko nipa iwulo ogun eje?

[1] Ero asoro magbesi tabi amoun maworan

[2] Awon iya olomo miran tabi alaboyun

[3] Fi fu ni leko ninu ayewo oyun ni ile- iwosan.

[4] Iwe ikede

[5] Awon miran e so si be.....

IPIN F – ISE SISE FUN OGUN EJE LILO

(E jowo e so fun mi o to ona wo ti efaramo tabi ti efaramo awon oro ti ma ka fun yin yin)

ATTITUDE TO ANAEMIA PREVENTION	MO FARAMO GIDI	MOFARAMO	MI O FARAMO GIDI	MI O FARAMO	MI O LERO
43. Lilo ogun eje lojojumo anfani loje fun alaboyun to un saisan.					
44. Ogun eje gidi wa fun awon obirin ti won o lagbara ounje gidi lojumo.					
45. Obirin alaboyun to un jeun dede, ko ni lo ogun eje gidi rara.					
46. Lilo ogun eje gidi, asa wa ko faye gba nitoripe omo.					

47.	Obirin to nlo ITN awon apefon dede, won o nilo ati lo ogun eje rara.					
48.	Lilo ogun eje lojojumo ma un fa ijamba gidi fun awon obirin oloyun.					
49.	Obirin oloyun korira lati ma logun eje lojojumo nitori kikorira re.					
50.	Obirin oloyun to n lo ogun eje lojojumo ma n bi omo to tobi gan.					
51.	Lilo ogun eje lojojumo le ran obirin alaboyun lowo lati lagbara ati lati ni ilera to peye.					
52.	Obirin oloyun to nlo ogun eje lojojumo, won o le tete ni aisan eje kekere.					

IPIN G – ISE SISE LORI OGUN EJE LILO

ISE SISE SI IDENA AITO EJE	LAILAI	NIGBA KAN (IGBA KAN)	NIGBA KANKAN (IGBA MEJI TABI META)	GBOGBO IGBA (IGBA MARUN TABI JU BE LO)	MI O LERO
53. Igba melo ni e un lo ogun eje lose?					
54. Igba melo ni e					

momo ma lo ogun eje yin lojumo bi won se ni ke ma lo?					
55. Igba melo ni e un lo ogun eje yin gege bi dokita se ni ke ma lo?					
56. Igba melo ni e ti se akiyesi isise sodi leyin igba ti e ba lo ogun eje yin?					
57. Igba melo ni e ti se pinu lati ma lo ogun yin nitori itowo, orun tabi iwon ogun eje naa.					

Kini idi ti ko ni je ke lo ogun eje yin gege bi won se ko? (Ka fun awon oni dahun)

Idi ti e fi lo	Beeni	Beko	Nkomo
58. Iriri isise sodi bi eebi lehin lilo re.			
59. Gigbagbe lekankan lati ma logun naa.			
60. Ogun naa ma mu mi jeun pupo, o tun je un tobi si			
61. Mo ni fe lati ma je ounje gidi ju lati ma logun lo			
62. Mi o ni di Kankan lati ma lo ogun mi			

63. Ni bo le ti ma n gba tabi ra awon ogun eje yin?

(1) Ra lati ile itaja ogun?

(2) Ni ile- iwosan lasiko ayewo alaboyun.

(3) Gba lowo nursi ni le.

(4) Ni ile-iwosan ile ijosin.

(5) Awon miran.

64. Igba melo le ma un logun eje lati gba ti e ti loyun?

(1) Igba kan si meji lojumo

(2) Igba meji si meta lose

(3) igba meji si meta losu

(4) Ko to gba marun ni osu meta

(5) Mi o ti lo ri

(6) Mi o mo.

65. Ewo ninu awon idi yi lo mu yin gidigidi lati ma lo ogun eje lojojumo?

(1) Won lokun dada ti won ba ti logun naa.

(2) Agbebi ma pa lase fun won ki won logun won, won tun salaye wipe o ma ran ilera won lowo.

(3) E malo ikankikan ti won ko fun yi ni gbogbo igba nitori iberu aisan.

(4) E mo wipe ogun na ma mu 'eje won posi' a si n beru lati padanu eje.

(5) Baba tabi iya e gbodo lo ogun na lojojumo.

(6) E mo wipe e n jiya eje ati wipe ogun na ma fun yin ni eje si.

66. Ewo ninu awon idi yi lo un se okan yin sege sege lati ma a logun yin lojojumo.

(1) Iriri fun inu tita iyipada si buburu bi apeere. Eebi, igbe ayaju ati inu kunkun.

(2) E logun naa titi ti o ma fi tan, sugbon e ma se ran ogun miran si.

(3) Gbagbe lati lo ogun naa nigba miran nitoripe o sun mi lati ma loguns.

(4) Ko lagbara lati ra ogun naa.

(5) Won beeru wipe pupoju ogun le se won ni jamba tabi omo won.

(6) E ti wa fun ayewo ri nini oyun, ni idi eyi e gba ogun eje.

APPENDIX THREE

INFORMED CONSENT

Dear Respondent,

I am a Master of Public Health (MPH) student of Department of Human Nutrition, Faculty of Public Health, University of Ibadan.

I am conducting a research into the above topic in partial fulfillment of the requirement for an MPH degree in Population and Reproductive Health Nutrition. The research is aimed at finding out what pregnant women know about anaemia during pregnancy and how they use iron-folic acid supplements given to them during antenatal care as well as find out what pregnant women are doing to prevent malaria.

You will be requested to voluntarily answer some questions honestly to help us in our findings which my also be useful for improving maternal and child health. You will not be penalized for not participating or discontinuing at any point, but your response is essentially appreciated and will be kept strictly confidential.

Thank you.

Consent: Are you willing to take part in the study:

YES.....NO.....

Signature or thumb prints of respondent.....

Date.....

Signature/Name of Researcher.....

Date.....

APPENDIX FOUR

EDA YORUBA

Eyin akopa wa,

Eku bi oju ojo ti ri. Oruko mi ni ……., akekoo-agba ti eka imo , Human Nutrition, Faculty of Public Health Yunifasiti ti Ibadan. Mo n se Iwadii lowolowo lorii didena de aito eje ati lilo oogun folic acid larin awon alaboyin ti o wa si ile iwosan alabode ti ibadan north local government area. Mo n fe bi o ba seese fun yin. Idahun yin ko mi han si elomiiran, a ko si ni ko oruko tabi adiresi yin, eyi ti o ja si pe ko si eni ti yoo mo eni ti o dahun Ibeere Kankan. Bi e ko bam o idahun si ibeere ki ibeere, ko si laburu. E kan

Ijohen: Nje o setan lati kopa ninu eko yii? Bee ni…….. Bee ko……..

Fifi owo si iwe tabi tite ika akopa……. Ojo/osu/odun……...

Oruko ati ifowo si iwe oluwadi……Ojo/osu/odun……..

APPENDIX FIVE
ETHICAL CLEARANCE

TELEGRAMS.....

TELEPHONE.....

MINISTRY OF HEALTH

DEPARTMENT OF PLANNING, RESEARCH & STATISTICS DIVISION

PRIVATE MAIL BAG NO. 5027, OYO STATE OF NIGERIA

Your Ref. No. .....

All communications should be addressed to the Honourable Commissioner quoting

Our Ref. No. AD 13/479/87

Date: 2nd December, 2009

The Principal Investigator
Department of Human Nutrition
College of Medicine
University of Ibadan

Attention: Nwankpa Romanus Okechukwu

Re: Oyo State Research Ethical Review Committee -OYSRERC)

In response to your letter requesting for ethical approval for the implementation of your Research Proposal titled *Anemia prevention practices and Iron folic acid supplementation use among pregnant women attending primary health care centers in Ibadan North local government area*

The Committee has noted your compliance with all ethical concerns raised in the first review. In the light of this, I am pleased to convey to you, the approval of the committee for the implementation of the Research Proposal in Oyo State, Nigeria.

Please, note that the committee will monitor, closely, and follow up the implementation of the research study. However, the Ministry of Health would like to have a copy of the results and conclusions of the findings as this will help in policy making in the health sector.

Wishing you all the best

Mrs V.A. Adepoju
Director, Planning, Research & Statistics
Secretary, Oyo State, Research Ethical Review