FACTORS INFLUENCING UPTAKE OF IRON AND FOLIC ACID SUPPLEMENTS AMONG WOMEN OF CHILD BEARING AGE IN MOMBASA COUNTY

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Factors Influencing Uptake of Iron and Folic Acid Supplements among Women of Child Bearing Age in Mombasa County

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DECLARATION

This thesis is my original work and has not been presented for a degree in any other University.

Date……. Signature ……..

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This thesis has been submitted for examination with our approval as University supervisors.

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DEDICATION

This thesis is dedicated to my beloved children, Jawad and Khuzeimah for their love and inspiration towards the completion of this work. May God bless them abundantly.

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LIST OF ABBREVIATIONS AND ACRONYMS

ANC	–	Ante Natal Care
CAADP	–	Comprehensive Africa Agriculture Development Programme
CDC	–	Center for Disease Control
CHWs	–	Community Health Workers
CI	–	Confidence Level
DNA	–	Deoxyribonucleic Acid
EGCG	–	Epigallo Catechin Gallate (EGCG)
ERC	–	Ethics Review Committee
FP	–	Family Planning
GPs	–	General Practitioners
HINI	–	High Impact Nutrition Intervention
IDA	–	Iron Deficiency Anemia
IFA	–	Iron Folic Acid
JKUAT	–	Jomo Kenyatta University of Agriculture and Technology
KNBS	–	Kenya National Bureau of Statistics

MNCH	–	Maternal, Newborn and Child Health
MoPHS	–	Ministry Of Public Health and Sanitation
NFNSP	–	National Food and Nutrition Security Policy
OR	–	Odds Ratio
p	–	Significance Level
RNA	–	Ribonucleic Acid
SPSS	–	Statistical Package for Social Sciences
UNICEF	–	United Nations Children's Fund
WCBA	–	Women of Child Bearing Age
WHO	–	World Health Organization

DEFINITION OF TERMS

Anaemia – Hemoglobin concentration below established cut off levels depending on age, sex and physical status. Hb concentration of<110g/L among pregnant women.

Anencephaly – Fatal condition in which the upper neural tube fails to close hence poor development of brain.

Fortification – A process where micronutrients, among them folic acid, are added to flour with intention of promoting public health through increasing blood folate levels in the populace.

Iron deficiency – A state of inadequate iron to maintain normal physiological functions of tissues.

Spina Bifida – When lower end of neural tube fail to close this result to spinal Cord and backbones not develop properly.

Supplementation – Provision of specified dose of nutrient preparation, which may be in the form of a tablet, capsule oil solution or modified food for either treating an identified deficiency or preventing occurrence of such a deficiency.

ABSTRACT

As per the 2016 estimates, the global prevalence of anaemia among Women of Child Bearing Age (WCBA), 15-49 years was about 32.8%, with more than 30% of the cases being in Sub-Saharan Africa. Approximately 50% of the cases were considered to be due to iron deficiency. According to the World Health Organization, about 20% of perinatal mortality and 10% of maternal mortality in Sub-Saharan Africa is attributed to iron deficiency anaemia. In Kenya, only about 8% pregnant women take Iron and Folic Acid (IFA) supplements for more than 90 days, while over 30% do not take them at all. In Changamwe, only 8.3% of WCBA had received Iron folate supplements at the third trimester of their pregnancy, contrary to the Ministry of Health recommended dose of 60 mg/day of iron and 400µg/day of folic acid respectively for 180 days. This is a clear indication that there is low uptake of IFA supplementation among WCBA in Changamwe. The study assessed factors influencing Iron and Folic Acid (IFA) supplements uptake among WCBA in Mombasa County. This was an analytical cross-sectional survey done between January and March 2015. The target population was 270,982 WCBA from which a sample of 400 was selected using stratified random sampling method. Data was collected using semi-structured questionnaire from 399 WCBA and analyzed using frequencies, percentages, chi-square test and regression analysis. Inferences were drawn at 95% level of confidence and results were presented using tables and figures. Results indicated that 342 (85.7%) of the WCBA had used IFA supplements in the last five years preceding the study; WCBA aged 15-26 years were 78% less likely to uptake IFA supplements compared to those aged 26-36 years; WCBA who had no formal education were 92% less likely to uptake IFA supplements compared to those with secondary level of education; WCBA who did not receive IFA supplements during pregnancy were 93% less likely to uptake IFA supplements compared to those who received; WCBA who did not take IFA drugs as per prescription were 90% less likely to uptake IFA supplements compared to those who did; while WCBA whose source of information on IFA supplements was TV and radio were 87% and 90% respectively less likely to uptake IFA supplements compared to those whose source was hospital. The study concluded that majority of WCBA in Changamwe sub-county had taken IFA supplements in the last five years (between January 2010 and December 2014) preceding the study; socio-demographic and socio-economic conditions of the WCBA including age and education level had significant relationship with uptake of IFAs; practices such as uptake of IFAs during pregnancy and taking IFAs as per prescription had significant relationship with uptake of IFAs; and sources of information on IFAs had significant relationship with uptake of IFAs amongst WCBA in Changamwe sub-county. The study recommends that the ministry of health and county department of health should promote behavior change communications among young WCBA to increase both demand and compliance to IFA supplementation; sensitize the health care workers to provide information on health benefits of IFA supplementation prior to conception and throughout pregnancy; and develop effective strategies to disseminate information on IFA supplementation to complement public health facilities.

CHAPTER ONE

INTRODUCTION

1.1. Background Information

Maternal anaemia is a critical health challenge worldwide that affecting approximately 500 million women of childbearing age (WCBA), 15-49 years yearly (Young, 2018). The world prevalence of anemia among pregnant women in 2016 was estimated at 40.1%, while that of non-pregnant women was about 32.5%, and approximately 32.8% for all WCBA (World Health Organization (WHO), 2018; Development Initiatives, 2018). In high-income countries, the prevalence of anaemia among non-pregnant and pregnant women is low compared to low-and-middle-income countries (Stevens *et al*., 2013). In 2011 for instance, prevalence of anaemia among non-pregnant WCBA in high-income countries stood at 16% compared to African countries (North Africa 33%, central and West Africa 48%, East Africa 28% and Southern Africa 28%) (Stevens *et al*., 2013). According to the 2016 estimates, the prevalence of anaemia among WCBA in Kenya was 27.2%, with the prevalence among pregnant women standing at 38.2% and non-pregnant women at 26.2% (WHO, 2018).

Anaemia has major consequences on human health as well as social and economic development. Anaemia is the world's second leading cause of disability and is associated with maternal and child morbidity and mortality such as increased risk of miscarriage, stillbirth, prematurity, and low birth weight of the baby (WHO, 2014). It is responsible for about more than 115,000 maternal deaths and 591,000 perinatal deaths globally per year, of which three-quarters occur in Africa and South-east Asia (Stevens *et al*., 2013).

The WCBA are said to be anaemic when their serum hemoglobin levels are less than 110 g/L in the first and last trimesters of pregnancy, at sea level while in the second trimester of pregnancy, the level of hemoglobin typically declines by approximately 5

g/L (WHO, 2011). However, anaemia is considered iron deficiency anaemia (IDA) when it occurs together with some evidence iron deficiency (e.g. low ferritin levels). Iron deficiency and infections are the most prevalent etiological factors of anaemia among WCBA (Stevens *et al*., 2013). Other factors contributing to anemia include deficiencies of nutrients such as vitamin A, vitamin B12, folate and riboflavin as well as thalassemias and hemoglobinopathies (WHO, 2015; Balarajan *et al*., 2011).

Owing to the fact that anaemia is a multi-factorial disorder, a multi-pronged strategy is needed for its prevention and mitigation among WCBA. To alleviate maternal anaemia, the WHO advocates for a daily uptake of 30-60mg of iron, and 0.4 mg of folic acid throughout the gestation period (WHO, 2016). The daily use of iron folate supplements during pregnancy minimizes considerably, the prevalence of maternal anaemia, birth defects, low birth weight, spina bifida, and child mortality (Haider *et al.,* 2013).

The Ministry of Health has been on the front line of employing the WHO IFA supplementation recommendations among WCBA. Unfortunately, the uptake and adherence rate of iron and folic acid supplements among pregnant women in Kenya remains poor. According to the Kenya Demographic Health Survey of 2014, compliance to iron/folate supplements by pregnant women in Kenya was low. Nationally only 8% of the pregnant women took Iron supplements more than 90 days of the recommended 180 days. The statistics revealed that 5% of the respondents took supplements for 60-89 days, 53% took the supplements for fewer than 60 days and 30% reported that they did not take iron supplements at all during their last pregnancy.

In spite of considerable developments in the Kenyan health care system following devolution of health resources, only a marginal reduction in the prevalence of anemia among WCBA has been recorded, and it varies from one environment to another (Kilonzo, Kamaara & Magak, 2017). This can be generally attributed to lack of awareness among many WCBA regarding the effects that their own health status and health-related behaviors may have on the fetus during pregnancy. While antenatal care is established in the maternal, newborn, and child health (MNCH) continuum, it overlooks

the most fundamental phase of embryonic development, which often occurs before a woman even becomes aware of her Pregnancy (Dean *et al.,* 2013). The evidence is increasingly pointing towards earlier care prior to pregnancy to promote women health and healthier pregnancy outcomes for the mother and newborn. From several studies, uptake of folic acid supplements before conception and during the first trimester may reduce the risk of women bearing children with neural tube defects by 72 -100% (Dean *et al.,* 2013).

This study considered a multi-dimensional approach for the prevention of maternal anaemia among WCBA. Such a strategy is not limited only to daily dosage and intermittent iron supplementation as proposed by WHO, rather it also incorporates aspects of nutrition, fortification using micronutrient powders, staple foods and condiment fortification and efforts to enhance food security and dietary diversification.

Kenya is home to more than 40 million people, 80% of whom live in rural areas and rely almost entirely on agriculture (Transform Nutrition, 2011; CAADP, 2013). More than 10 million (almost a third of the population) are chronically food insecure (Republic of Kenya, 2011). The country's food and nutrition insecurity is often attributed to the poor performance of the agricultural sector. As reported in Kenya's National Food and Nutrition Security Policy (NFNSP) of 2011, per capita food availability in the country had declined by more than 10% in the past 30 years (Republic of Kenya 2011).

Kenya's situation of food security and nutrition is further complicated by an unstable economic environment, a recent rise in food and fuel prices, adverse weather conditions, insufficient budgetary allocations, and weak sector coordination putting over 3 million under starvation annually (Transform Nutrition, 2011). Malnutrition exists in various forms, including acute and chronic undernutrition, micronutrient deficiencies, as well as overweight and obesity. These conditions affect primarily the pregnant and lactating women and children under five years of age (u5s) contributing substantially to their morbidity and mortality (MoPHS, 2012).

In view the foregoing discussion, supplementation of pregnant women with iron and folic acid coupled with fortification of staple foods are among the nutrition interventions that influence maternal and child nutrition. Commonly known as "High Impact Nutrition Interventions" (HINIs), the interventions form part of the 12 of which were adopted by UNICEF and the Ministry of Public Health and Sanitation (MoPHS), then later ratified by Kenya's Nutrition Inter-ministerial Coordination Committee in 2010. Unfortunately, antenatal coverage in Kenya remains low at 47% for the 4th visit, the aforementioned interventions notwithstanding (WHO, 2013). Mombasa County has not been reported iron folate uptake as an intervention to maternal anaemia, Further, there was inadequate documentation at various levels of health services.

This study, therefore, evaluated the factors influencing the Iron and folic acid supplements uptake among WCBA in Changamwe sub County. As a baseline survey, the findings of this study and recommendations therein will aid stakeholders and policy makers in the Ministry of Health and County governments to establish pragmatic strategies that will improve maternal outcomes by enhancing the uptake of IFAs among WCBA.

1.2. Statement of the Problem

Iron deficiency anaemia remains a momentous public health challenge around the world, with Sub-Saharan Africa leading in prevalence. As at 2016, the prevalence of anaemia among WCBA was estimated 32.8% globally, with Sub-Saharan Africa accounting for more than 30% of those cases. Also, approximately half of the global cases of anaemia were attributed to iron deficiency (WHO, 2018). Many women in Sub Saharan Africa have not adhered to the WHO recommendation that women of reproductive age should take IFA supplements. Consequently, such women whose uptake of folic acid is inadequate are more likely to have children with birth defects and/or may experience high rates of maternal and child morbidity and mortality (Rahman *et al*., 2014). As indicated by the the WHO, about 20% of perinatal mortality and 10% of maternal mortality in Sub-Saharan Africa is ascribed to iron deficiency anaemia (WHO, 2011).

In Kenya, IFAs is routinely administered to all women attending antenatal clinics in public health facilities, at no cost. Despite free distribution, adherence to IFAS uptake has remained poor over the years with only about 8% of pregnant women taking IFAS for more than 90 days, while over 30% fail to take them altogether (KNBS, 2015). The failure to take the iron folate supplements has elevated the prevalence of anaemia among pregnant women which is estimated at 38.2% as of 2016 (WHO, 2018). According to the available clinical attendance records in Changamwe, only 8.3% of WCBA had received the Iron folate supplements at the third trimester of their pregnancy, converse to the recommended dose by the Ministry of Health iron in pregnancy of 60 mg/day and folic acid 400µg/day respectively for 180 days. This is a clear indication that there is poor uptake of iron folate supplementation among WCBA in Changamwe despite various interventions by the Ministry of Health.

The statistics from Mombasa County, specifically Changamwe reveal that some women have not complied with iron folate uptake. Moreover, there are no proper records on IFA supplements at the health facilities and proportion of reproductive age women actually using the supplements. Therefore, the present study set out to investigate the factors influencing IFA supplements uptake among WCBA in Mombasa County.

1.3. Justification of the Study

The findings on the proportion of IFAs uptake among WCBA in Mombasa County provide feedback to key stakeholders in the county and national governments on the effectiveness of interventions put in place and thus inform policy review and reforms.

The findings on the practices influencing IFAs uptake among WCBA provides insight on whether or not the WCBA are well informed on the best practices of IFA supplementation in relation to their daily life practices. Information obtained from the study will assist stakeholders in the health sector to develop behavior change communication strategies and materials aimed at influencing behavior change towards effective IFAs uptake among WCBA.

The findings on the socio-demographic and socio-economic characteristics influencing IFAs uptake among WCBA in Mombasa County will provide a detailed understanding of the distribution of IFAs uptake across the various socio-demographic and socio-economic clusters and thus inform targeted policy interventions.

The findings on the health-related factors influencing IFAs uptake among WCBA provides a guide to enhance community strategy towards strengthening continuous health education on IFA supplementation at facility and community level.

1.4. Objectives

1.4.1. General Objective

To determine factors influencing the uptake of Iron Folic Acid supplementation (IFA) among WCBA in Mombasa County, Kenya.

1.4.2. Specific objectives

The study was guided by the following specific objectives:-

i. To determine the proportion of IFAs uptake in the last five years among WCBA in Mombasa County.
ii. To assess the practices influencing IFAs uptake among WCBA in Mombasa County.
iii. To determine the socio-demographic and socio-economic factors influencing IFAs uptake among WCBA in Mombasa County.
iv. To determine health related factors influencing IFAs uptake among WCBA in Mombasa County.

1.5. Research Questions

The study was guided by the following research questions: -

i. What is the proportion of IFAs uptake in the last five years among WCBA in Mombasa County?
ii. What are the practices influencing IFAs uptake among WCBA in Mombasa County?
iii. What are the socio-demographic and socio-economic factors influencing IFAs uptake among WCBA in Mombasa County?
iv. What are the health related factors influencing IFAs uptake among WCBA in Mombasa County?

1.6. Conceptual framework

This study adopted a conceptual framework to guide in the factors influencing IFAs uptake among WCBA in Mombasa County. The conceptual framework took into account the independent and dependent variables. These variables are presented diagrammatically in figure 1.1 below.

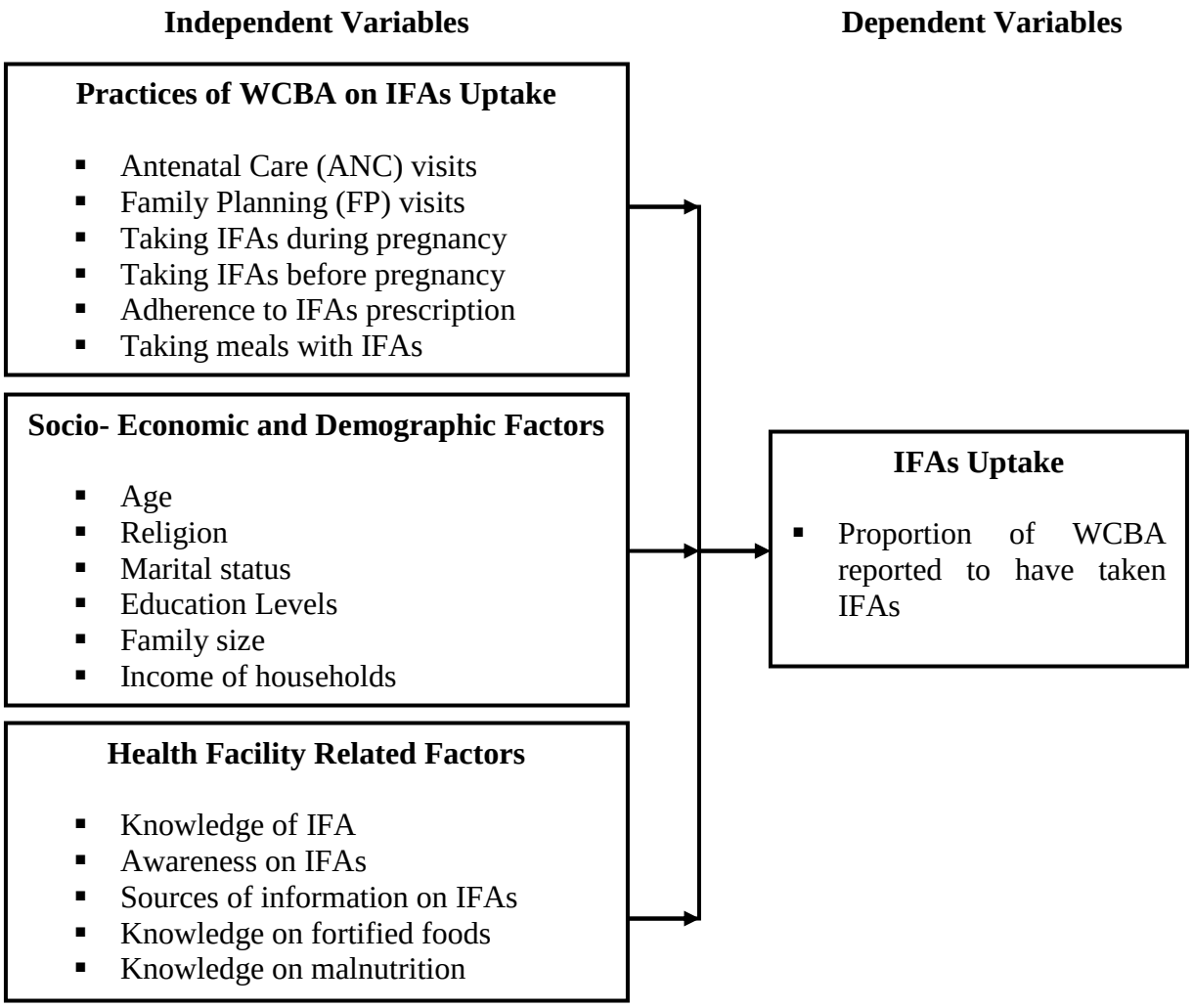

Figure 1.1: Conceptual Framework

CHAPTER TWO

LITERATURE REVIEW

2.1. Importance of Micronutrients in Pregnancy

Micronutrient is an organic compound (as a vitamin) essential in minute amounts to the growth and health of an animal. Iron and Folic Acid (IFA) are classified as micro minerals and are only needed in trace amounts in pregnant women. Micronutrients play crucial roles in human nutrition, including the prevention and treatment of various diseases and conditions, as well as the optimization of physical and mental functioning (Robb & Koshuta, 2015).

During pregnancy and lactation period, women need more nutrients since they are at high risk of iron deficiency and iron deficiency anemia because of increased iron needs during pregnancy (Dinga, 2013). Therefore, Iron and folic acid supplementation should start early during the reproductive years, since improving iron and folate nutrition of women of child-bearing age can improve pregnancy outcomes as well as enhance maternal and infant health. The uptake of iron and folic acid should be supplemented with a balanced diet, and micro nutrient supplements. These should include protein, iron, iodine, vitamin A, folate, and other nutrients. According to the WHO (2014) deficiencies of certain nutrients are associated with negative maternal outcomes such as fetal and newborn death, birth defects, and decreased physical and mental potential of the child.

To suffice here, iron or vitamin B12 deficiency among WCBA particularly in developing nations contributes to 20 percent of maternal mortality (WHO, 2015). The periods before and between pregnancies provide an opportunity for women of reproductive ages to prepare for pregnancy by consuming an adequate balanced diet, including supplements and fortified foods where available, and by achieving a desirable weigh, failure to which they are likely to suffer from anaemia. This is partly contributed to due to nutritional factors such as inadequate diet (primarily inadequate iron supply

inclusive of folate and vitamin B12 deficiencies), blood loss resulting from hemorrhage, impaired micronutrient absorption, and helminth infestation (WHO, 2015; Balarajan *et al*., 2011). The uptake of iron and folic acid can play a fundamental role in preventing severe anaemia among pregnant women, therefore the study focuses on factors influencing the uptake of IFAS among WCBA.

2.2. Iron and Folic Acid Supplements and Pregnancy

2.2.1. Iron Supplements and Pregnancy

Iron is one of the most abundant minerals on earth of which the human body requires only small quantities for proper functioning. Iron supplements contain either the ferrous or ferric form of iron. Ferrous iron is the best absorbed form of iron supplements which are three-fold; - ferrous sulfate, ferrous fumarate, and ferrous gluconate. However, each form contains a different amount used by the body called “elemental iron” which is necessary for physiological functions of tissues (Abbaspour *et al*., 2014). Pregnant women require more iron for proper functioning of the body. The need for iron increases about six to seven times from early pregnancy to late pregnancy. Moreover, the increased iron requirement is due to expansion of maternal red blood cell mass for increased oxygen transport, including transfer of iron, to both the growing foetus and the placental structures, and as a needed reserve for blood loss and lochiaat parturition (Abbaspour *et al*., 2014).

Adults will usually require a dose of 60-200 mg of elemental iron daily, depending on the severity of the anemia. Since the amount of iron absorbed decreases as doses of iron get larger, most people should take their daily iron supplement in two or three equally spaced doses. For adults who are not pregnant, the Centers for Disease Control and Prevention (CDC) typically recommends taking 50-60 mg of oral elemental iron daily (Brucker & King, 2017).

Iron deficiency anaemia (IDA) is caused by inadequate supply of iron to the cells following depletion of the body's reserves (Stevens *et al*., 2013). In addition, lack of dietary diversity and proper nutrition by eating foods rich in absorbable iron, and loss of iron due to parasitic infections, particularly hookworm, and other occult blood losses can lead to iron deficiency anaemia (WHO, 2015; Balarajan *et al*., 2011). Pasricha *et al*., (2013) asserts that women of child bearing age are at a greater risk due to pathologic blood losses during menstruation and delivery among pregnant women. In addition, pregnancy and childbirth result to a net iron loss of 580 to 680 mg because of fetal and placental requirements and bleeding during delivery. This is compounded by an increased demand for iron from 0.8 to 7.5 mg absorbed iron per day. However, the exact upper limits of this elevated demand of iron in the last trimester of pregnancy is debatable (Gathigi, 2011).

The consequences of IDA are serious, varied and can interfere with the productive capacity of WCBA. The impact of IDA is two-fold since it affects both the mother and the foetus. Iron deficiency anaemia characterized by lower haemoglobin levels (Hb) causes low birth weight and premature birth during the second trimester of gestation (WHO, 2014). During pregnancy, it can lead to perinatal complications on both the mother and the foetus. Studies have also shown that IDA whether moderate or severe adversely affects the cognitive performance and development and physical growth of infants (Mousa, Naqash & Lim, 2019). Generally, IDA increases maternal mortality, prenatal and perinatal infant loss. It is responsible for about more than 115,000 maternal deaths and 591,000 perinatal deaths globally per year, of which three-quarters occur in Africa and South-east Asia (Stevens *et al*., 2013). In developing countries, approximately 20% of perinatal mortality and 10% of maternal mortality is reported to be due to IDA (WHO, 2011).

Studies conducted on the strategies and mitigation measures on IDA suggested that women who took daily iron supplements had higher haemoglobin and were less likely to have anaemia (Rodriguez-Bernal *et al*., 2012). The increase was even higher when

supplementation was started after 20 weeks of gestation, but the difference was maintained with different doses of elemental iron. Indeed, universal prenatal supplementation involving weekly administration of iron or iron and folic acid was observed to effectively prevent anaemia and iron deficiency anaemia (Kaufer-Horwitz & Gómez, 2010). However, this study while advocating for uptake of iron folate supplements among WCBA, as a mitigation measure against IDA, it also presupposes for other alternative forms of supplementation such as dietary diversification and food fortification.

It is noteworthy that albeit short-term solutions, interventions for controlling IDA among WCBA in low- and middle-income countries suggested that iron supplementation, and micronutrients can swiftly boost iron stores (Dean *et al*., 2011). Medium-term approaches, including food fortification and bio-fortification, might take a long time to plan, pilot and carry out. Long-term approaches on the other hand entail genuine transformations in food security and dietary diversification which also reflects fundamentally on the socio-economic demographics of developing nations. Therefore, this study appreciates that comprehensive approach to anemia control which encompasses short, medium, and long-term interventions is of necessity to WCBA.

2.2.2. Folic Acid and Pregnancy

Largely found in fortified foods and supplements, folic acid represents the synthetic form of folate (vitamin B9), while folate occurs naturally in foods. Folate is part B group of vitamins comprising of eight vitamins. Folate plays a fundamental role in cell replication and growth. It is involved in the development of DNA and RNA, the body's genetic material and is especially essential during the rapid growth of cells and tissues for instance, during infancy, adolescence, and pregnancy (Crider *et al*., 2011).

Folic acid is also vital for appropriate cognitive function and plays a substantial role in psychological and emotional health of WCBA (Crider *et al.*, 2011). Furthermore, folic acid and vitamin B12 operate closely in the development of red blood cells and facilitate

proper functioning of iron in the body. Vitamin B9 on the other hand, works in association with vitamins B6 and B12 and other nutrients to regulate blood levels of the amino acid homocysteine (Clarke *et al*., 2010). Alternatively, it is based on the amount needed to maintain red blood cell folate, control blood homocysteine and normal blood folate concentrations (Gathigi, 2011). This is aimed at achieving the recommended dietary allowances for folic acid among non-pregnant and pregnant women which are 170µg and 400µg respectively. The primary sources of folate in terms of amount and availability are liver, fortified foods, legumes and green leafy vegetables (Gathigi, 2011).

Folate deficiency is caused by a number of factors which are not limited only to inflammatory bowel diseases and celiac diseases or certain form of medications such as chemotherapy which lowers levels of folic acid in the body (Temple *et al*., 2017). Moreover, folate deficiency can result from inadequate absorption often resulting from high alcohol intake, compromised use, increased requirements especially during pregnancy, and excessive excretion due to long standing diarrhea (Cylwik & Chrostek, 2011). During pregnancy, women require additional folic acid to diminish the risk of neural tube birth defects such as brain damage, cleft palate, and spina bifida. The chance of neural tube defects occurring is significantly reduced when supplemental folic acid is consumed in addition to a healthy diet before conception and during the first month after conception.

Folate deficiency during pregnancy may also elevate the risk of preterm delivery, infant low birth weight and fetal growth retardation, as well as increasing homo-cysteine level in the blood, which may lead to spontaneous abortion and pregnancy complications (Mousa *et al*., 2019). Strategies to combat folate deficiency and anaemia among WCBA proves that giving folate with iron is better at preventing anemia than providing iron alone. Supplementing pregnant women with folic acid lessens the risk of congenital heart defects, cleft lips defects and urinary tract anomalies (Mousa *et al*., 2019). It is from such grounds that WCBA are encouraged to eat fortified foods with folic acid to

shrink the risk of serious birth defects. In this line, non-pregnant and pregnant women are also advised by the WHO to have a daily intake of 400 and 600 micrograms respectively of synthetic folic acid from fortified foods and/or supplements in order to have sufficient folic acid intake (WHO, 2016).

In a Uganda based research on the uptake of folic acid, it was observed that during pregnancy women were encouraged to have an adequate intake through supplementation and food diets such as eating of dark green leafy vegetables, citrus fruits, nuts, legumes, whole grains, and fortified breads and cereals (Ministry of Health Uganda, 2010). The study also noted that since most pregnancies in Uganda were unplanned, intake of fortified foods rich in folic acid and/or folic acid supplements was necessary for all WCBA.

Another study conducted in Coast region of Kenya analyzed how malaria was linked to iron deficiency anaemia (IDA). It was established that mothers and children with low iron folates were likely to succumb to malaria compared to those with iron folate in their bodies (Nyakeriga *et al.*, 2004). The findings of Nyakeriga *et al.*, (2004) has not substantiated factors behind adherence to IFA supplements in the Coast region rather their work is grounded on malaria, maternal and children health. This is relevant to the present study as it associate iron deficiency anaemia with negative maternal outcomes.

2.3. IFAs Knowledge and Practices among WCBA (15-49 years)

2.3.1. Attendance of Ante natal Clinic (ANC)

Ante Natal Clinic (ANC) attendance and knowledge on IFA supplementation is significant among WCBA. The present study considers antenatal care as the entry point for pregnant women to receive a wide spectrum of prevention and health promotion services. Safe motherhood for positive maternal outcome largely depends on antenatal care and uptake of Iron folate supplementation. In light of this, WHO recommends a minimum of four (4) ANC visits, ideally on 16, 24-28, 32 and 36 weeks and

recommends healthy promotion including nutritional counseling as an important component. It has been shown that compared to their counterparts, women attending regular ANC are better informed and display better attitudes and antenatal practices (Perumal *et al.*, 2013). Thus, nutrition education and counseling is an integral part of ANC that influences maternal and child health outcomes (Ghosh *et al.*, 2015).

2.3.2. Dietary Behavior of Folic Acid and Multivitamins

It is essential consider nutritional education as a means to enhance the health of women of reproductive age in addition to pregnancy outcome. Dean *et al.* (2013) discussed that preconception nutrition specific interventions in particular increase of folic acid and multivitamins supplement among pregnant women resulted in positive maternal outcome. Even though single intervention is effective but multiple interventions programmes in addition to behavior modification components are even more successful in terms of modified behaviors and health outcomes. However, it is important to note that high level of iron deficiency can result from increased demand for iron such as in pregnancy, which the diet cannot accommodate due to nutritional deficiency. Thus, it's recommended that health professionals use multiple interventions strategies to counter iron deficiency among women of reproductive age (Dunneram & Jeewon, 2015).

Geissler *et al.* (1999), while investigating the perception of anaemia and soil – eating among pregnant women in the Kenyan Coast, noted the relevance of behaviour modification to IDA among WCBA. They observed that pregnant women at the coast eat soil during pregnancy to boost their fertility and maternal outcome. They further argued that the association of soil-eating with fertility had no physiological explanation but was more influenced by culture. This study was largely anthropological and the narratives of the women were not informed by any scientific thought. Despite such shortcomings, their findings shows that dietary behaviour is partly influenced by culture.

2.3.3. IFA Supplementation and Maternal Outcome

It is well known that pre-conception supplementation of folic acid diminishes the occurrence of spina bifida more than taking of iron alone (Cordero *et al*., 2010). Several countries but not limited to United States of America (USA), Canada, Costa Rica, Chile and South Africa have implemented a mandatory folic acid fortification program (Castillo-Lancellotti *et al*., 2012). The degree of folic acid fortification and baseline prevalence, however, varies between one region, country and another before and after fortification (Macaldowie, 2011). Despite the disparities among countries, uptake of IFA supplements have led to positive maternal outcome due to reduction on mortality rates (Lassi, 2015).

A study conducted by University of Tokyo correlated the of folic acid serum content in 254 pregnant women with their daily folate intake and dietary practices. The findings revealed that serum folate in women consuming green tea and oolong tea (Herbal) was substantially reduced compared to those consuming black tea. The consequent effects were observed even in women taking 100 to 130 ml of tea daily. Decreased folate bio availability in the aforementioned women has been associated with interaction of tea catechin (tannin) and dietary folate (Shiraishi *et al.,* 2010). The elucidation to this phenomenon is that Epigallo Catechin Gallate (EGCG), a tea catechin, is reported to suppress Dihydroxy Folate Reductase activity. This enzyme converts dietary folic acid into its active form Tetrahydroxy Folate. Therefore, when a pregnant woman takes adequate folate supplementation, taking tea simultaneously will diminish its bioavailability contributing to folate deficiency (Raveenthiran, 2012).

Another comparative study was carried out by Boston epidemiologists on mothers of 518 spina bifida cases with 6424 controls for tea consumption. Among women with a daily intake of more than 400 μg daily folic acid, ingesting three or more cups of tea per day notably amplified the risk of fetal spina bifida (Yadzy *et al.,* 2012). From this study's findings, it is evident that taking Iron folate supplements with poor dietary habits can lead to negative outcomes. However, it would still be interesting to this study to find

out other supplements being used by women of reproductive age who are non–compliant with uptake of iron folate supplementation provided by the Ministry of Health.

From the foregoing discussion, it is important to point out that there are other salient factors that may interfere with the influence of IFAs on women of reproductive age. A study conducted in Nigeria to investigate the high spina bifida prevalence malaria -prone regions proposed that anti-malarial drugs rather than *plasmodium* could be the reason behind the high prevalence. It was noted that all the 41 mothers to children with anomalies had taken anti-malarial drugs during first trimester. Further, Sulphadoxine Pyrimethamine (SP) and other antimalarial drugs were reported to act by obstructing folate metabolism of *plasmodium.* The drugs were also found to analogically block pregnant women's metabolism of folate. Thus, administering anti-malarial drugs to pregnant women reduces folate bio-utilization and increases the risk of malformations (Emejulu & Okwarach, 2012).

2.3.4. Compliance to IFAs

A study conducted in an urban area of south India to determine compliance with IFA therapy among pregnant women established that compliance towards IFAs was based on cost and economic status (Mithra *et al.,* 2013). Women from low socio-economic background who attended public health facilities received the tablets free and complied at 64.7% while those from high socio-economic background complies was low since they attended private clinics where IFA tablets were sold to them. In addition to cost, other factors contributing towards IFA compliance included age groups, employment status, predominant diet, and order of pregnancy among others such as forgetfulness (Mithra *et al.,* 2013).

A similar cross sectional study was conducted in Ethiopia on factors associated with adherence to IFAs among urban and rural women of reproductive age. The study selected 358 urban and 356 rural pregnant women attending ANC in North Western zone of Tigray from March to April 2014.The rate of adherence to both set of women

was 37.2% an indicator that there was no significant difference among the two with regard to adherence to IFA supplementation. The reasons behind inadequate compliance was late ANC visits, accessibility, elderly age, socio-economic factors and cultural beliefs (Gebre *et al*., 2015). The present study is an assessment of IFA supplementation uptake among WCBA and therefore their compliance rate is a central variable in the discussion that will follow later. But most importantly the factors influencing adherence to IFA supplements.

2.4. Factors Influencing Compliance to IFA Supplements among WCBA

The study reviewed literature on the factors influencing IFA supplements uptake in terms of awareness, education status, socio-economic status and accessibility and availability of IFA supplements.

2.4.1. Education and Awareness on IFAs among WCBA

A number of studies have been conducted to determine factors influencing adherence to IFAs supplementation among women of reproductive age worldwide. However, the results are varying from the developed nations to less developed depending with the methods and variables of the study. In India, Mithra *et al.* (2013) investigated the IFAs supplements uptake and reported that 58.7% of the study participants had taken all the IFA supplements and 64.7% adhered to the supplementation. They credited the high adherence rate to awareness and education level of the respondents under examination. On the other hand, lack of awareness on the benefits of IFAS is associated with decreased adherence (Mithra *et al.*, 2014). This study captured information on the education status of the study respondents including their spouses. This was aimed at drawing the association of the socio-demographic factors and IFAs supplementation uptake among WCBA. Dinga (2013), in a study on anaemia and adherence to IFAs supplementation, observed that knowledge on anemia was associated to IFAs uptake. However, the study indicated that education level was not significantly associated with uptake of IFAs.

On awareness of antenatal care and IFAs supplementation, Mazza and Chapman (2010) conducted a study on preconception and periconceptional IFA supplementation and correctly observed that most women were unaware of the need to attend for preconception care and were concerned at the extent of issues involved. Majority of them felt that general practitioners (GPs) should be more proactive in promoting preconception care availability. According to WHO (2016), IFA supplementation before pregnancy can improve birth outcomes, increasing the iron and folic acid status in women pre-pregnancy, while addressing the iron deficiency that affects some menstruating women and adolescents (WHO 2016). Other than awareness by general practitioners, Mazza and Chapman (2010) acknowledged that there exists barriers and enablers for women regarding the delivery and uptake of preconception care and periconceptional folate supplementation. They perspectively called for intervention to improve preconception care delivery (Mazza & Chapman, 2010). The study was not limited to knowledge and practices on IFA supplementation rather it focused also on accessibility and mitigation. However, the present study while acknowledging the significance of clinical information on IFAs supplements uptake among WCBA, it goes a step further to examine their practices.

Another study conducted in Bangladesh to understand community preparedness for IFAs uptake early in pregnancy established that most women who used IFAs during pregnancy reported better health and physical strength compared to those who failed to take the supplements (Alam *et al.*, 2015). They further observed that those women who took IFAs perceived them to boost blood volume leading to foetal nourishment and compensated for blood loss during delivery. However majority of the women who had not taken IFA were culturally informed that the supplements led to increase in foetus size which resulted to complications during delivery. Alam *et al.* (2015) also noted that women who took IFAs had inadequate knowledge on when to start using the supplements as most of them took them from the third trimester. This study was relevant as it acknowledged the significant role played by Community Health Workers (CHWs) in creating awareness on IFA supplements. However, the present study does not focus

on the community preparedness for IFAs uptake rather it seeks to find out the factors influencing IFA supplementation in Changamwe Sub-County in Kenya.

Studies conducted in Tanzania in 2009 and Ethiopia in 2013 indicated that only 16.1 % and 23.4 % respectively had taken IFA supplements in the last 90 days of their pregnancy (Ogundipe *et al.,* 2012; Gebremedhin *et al*., 2014). A similar study carried out in Kenya in 2013 at Thika Municipality reported that only 24.5% of the study participants were adherent to IFAS. In addition to these studies; a research conducted in Kiboga Disctrict in Uganda on the determinants of anaemia among pregnant women revealed that most women suffered from anaemia after failing to take iron and folic acids (Mbule *et al*., 2013). The writers cited lack of awareness as the reason behind poor uptake of IFA supplements in the district. They avers that women from households without a functional radio were twice more likely to be anaemic compared with women from households where there was a functional radio. They added that there was little awareness and functional knowledge about anaemia and IFA supplements among pregnant women. Although the study by Mbule *et al.* (2013) is relevant due to its emphasis on awareness, most of their respondents were from the rural arears contrary to this study in Changamwe which was conducted in an urban setting.

Another study conducted in Gulu Dstrict in Northern Uganda on prevention of Spina Bifida, and Folic acid intake during pregnancy among 394 WCBA attending antenatal clinic (ANC) established folic acid intake was limited in the area (Bannink *et al.,* 2015). This was correctly attributed to limited education level and understanding of women and health workers about the importance of early folic acid intake. In addition to inadequate education, Bannink *et al.* (2015) observed that late ANC attendance by women, poor supply chain and dilapidated health services caused by war and poverty also influenced IFAs uptake. While appreciating that education is relevant to knowledge consumption and practice, the present study considers other variables such as religion, spouse's education level and socioeconomic status as related to IFA uptake. The study presupposes that a woman of reproductive age may be limited in terms of awareness and

education but when the spouse is well educated and is aware of the benefits of iron folic supplement, the woman will comply.

2.4.2. Socio-Demographic and Socio-Economic Factors

The adherence to iron folate supplementation may be influenced by the social, demographic, and economic factors facing WCBA. This is well underscored by Mbule *et al.* (2013) in their study on determinants of prevalence of anaemia and poor uptake of IFA in Kiboga district in Uganda. They argued that poverty and limited access to nutrition and health education information contributed to low uptake and utilization of the public-health intervention package to combat anaemia in pregnancy. However, Dinga (2013) established that age, education level, marital status, and family size were not significantly associated with uptake of IFAs.

Okube *et al*. (2016) on his study on the prevalence and determinants of anaemia among pregnant women in the second and third trimesters of pregnancy attending antenatal clinic at Pumwani Maternity Hospital in Nairobi observed that social and economic welfare of the woman or the family determines their attitude towards issues of health. He argues that women who were economically empowered attended the antenatal clinics during pregnancy more than those who were economically disadvantaged (Okube *et al*., 2016). Women with less income spend their money on food and other pressing need while ignore their health status with some opting for traditional methods/non formal medication as compared to those with better earnings. The study further revealed that women who were socio-economically disadvantaged were twice anemic than those who had economic autonomy since they were not taking iron folate supplements as recommended.

2.4.3. Accessibility and Supplies of IFA Supplements

Access to health facilities and supplies of IFA supplements to WCBA (15-49 years) determines the uptake and prevalence rate of anaemia across Sub Saharan Africa. An

assessment of IFA supplement uptake through ANC established that non-adherence were due to inadequate access to care, late visits of ANC and inadequate ANC facilities among others such as inadequate counseling among others such as forgetfulness (Fiedler *et al.,* 2014). It is correct to argue that inadequate and sporadic supplies of iron folic products as well as the failure to distribute them among WCBA (15-49 years) is a barriers to adherence (Lacerete *et al*., 2011).

According to the WHO recommendations, all pregnant women should take iron folate supplements during the pregnancy. The WHO has recommended a 6-month regimen of a daily supplement containing 60 mg of elemental iron along with 400 μg of folic acid for all pregnant women (WHO, 2016). However, areas with a higher prevalence of anaemia, it is recommended that supplementation continue for three months postpartum (Dinga, 2013). Despite such recommendations, most developing countries have a low priority for health expenditures and with inadequate awareness infrastructure on the significance of iron supplements (Gillespie *et al*., 2016).

A study conducted in Kenya in Nyeri county reported that more than half (54.6%) of the women attending ANC failed to used iron supplements during the index pregnancy. According to Gathigi this coverage of the iron supplementation programme was low. He noted that women failed to take the iron supplements mainly due to inadequate supplies (Gathigi, 2011). The present study examined WCBA experiences on uptake of IFAs in Changamwe Sub-County and how various factors influenced women adherence to the supplements.

2.5. Summary and Research Gaps

From the literature reviewed, it has been established that age, awareness and educational level, employment status, socioeconomic status of women of reproductive age and their spouses is partly associated with uptake to IFA supplementation. In addition, the accessibility and availability of ANC services also play a vital role in the uptake of IFAS. However, most of the previous studies (Gathigi, 2011; Ogundipe *et al*., 2012;

Dinga *et al*., 2013; Okube *et al*., 2016; Kimiywe *et al*., 2017) were facility-based studies and only focused on prenatal/antenatal supplementation with IFA. The study by Okube *et al*. (2016) was particularly narrow as it focused on women attending ANC in the Second and Third Trimesters. Kimiywe *et al*. (2017) covered a wider population by targeting pregnant women and mothers of infants (0-6 months), but did not address pre-pregnancy supplementation with IFA. The current study was a community-based cross-sectional survey targeting all WCBA and thus was able to cover preconception, prenatal/antenatal and postpartum supplementation with IFA.

CHAPTER THREE

MATERIALS AND METHODS

3.1. Study Site

The study was carried out in Changamwe Sub County in Mombasa County in the Republic of Kenya. Mombasa County is located in the South Eastern region of Coastal of Kenya (Appendix 5). Out of the 47 counties in Kenya, Mombasa is the smallest, traversing an area of 229.7 km2 excluding 65 km2 of water mass. It borders Kilifi to the north, Kwale to the south west and the Indian Ocean to the east. The County lies between latitudes 3°56' and 4°10' South of the Equator and between longitudes 39°34'and 39°46'east of Greenwich Meridian. The County lies within the coastal lowland which rises gradually from the sea level in the East to about 132m above sea level in the mainland. The terrain is characterized by three distinct physiographic features, which includes the coastal plain, the hilly areas, and the Indian Ocean.

The county's ecosystem has both marine and terrestrial components. Both ecosystems are characterized by diverse species of flora and fauna, the most common being coconut trees and different species of fish, which have different cultural, social and financial values. The County lies within the coastal strip in the hot tropical region where the climate is influenced by monsoon winds. The rainfall pattern is characterized by two distinct long and short seasons corresponding to changes in the monsoon winds. The long rains occur in April –June with an average of 1,040 mm and correspond to the South Eastern Monsoon winds. The short rains start towards the end of October lasting until December and correspond to the comparatively dry North Eastern Monsoons, averaging 240mm. The annual average rainfall for the county is 640mm. The annual mean temperature in the county is 27.9°C with a minimum of 22.7°C and a maximum of 33.1°C. The hottest month is February with a maximum average of 33.1°C while the lowest temperature is in July with a minimum average of 22.7°C. Average humidity at noon is about 65 per cent.

Changamwe is one of the six sub counties of Mombasa County, others including Mvita, Nyali, Jomvu, Kisauni, and Likoni. The Sub-County lies 4° 1′ 34″ south of the Equator and 39° 37′ 50″ east of Greenwich Meridian. The sub county is peri-urban with an integrated rural and urban lifestyle. In Mombasa County, there are numerous slums situated in Changamwe, such as the Kipevu, Unuse, Kibarani and Dunga slums. There exists several health-care facilities delivering ANC services with a representation of two hospitals, four health centers, three dispensaries and private clinics within the sub county.

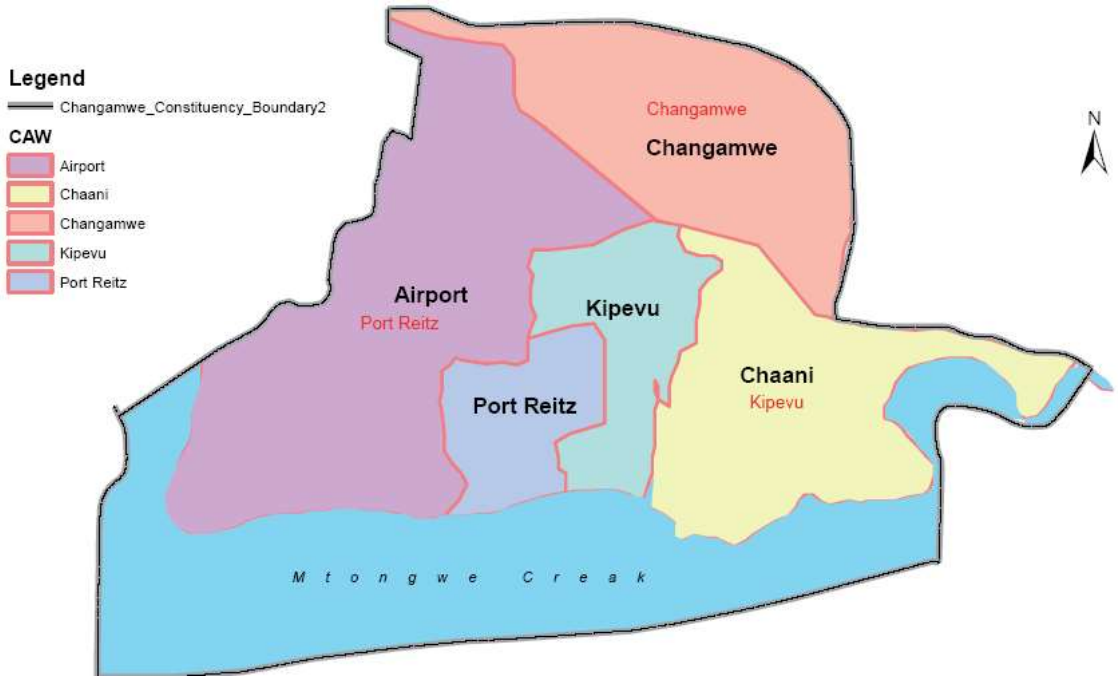

Figure 3.1: Map of Changamwe Sub-County

Source: Independent and Boundaries Commission (2010)

3.2. Study Design

This was an analytical cross-sectional study which was conducted between January 2016 and March 2016 to determine the factors influencing the uptake of iron and folic acid supplements among WCBA in Changamwe Sub County. The design involved one-time

interaction with the study population collecting data from the subjects without manipulating the environment (Kothari & Gaurav, 2014). The design allowed the assessment of possible relationships between uptake of IFAs and various socio-demographic and socio-economic characteristics of the WCBA, practices of WCBA and health facility related factors.

3.3. Study Population

The target population for this study was 270,892 WCBA in Mombasa County, while the study population was WCBA residing in 24,567 households in Changamwe Sub-County (KNBS, 2010). According to Kothari and Gaurav (2014), target population is the total collection of subjects to whom the researcher wishes to generalize the study findings, while study population is the population in research to which the researcher can actually apply their conclusions. It is from the study population that the researcher draws the sample (Kumar, 2011). Mombasa County was selected because of the poor compliance with IFA supplementation among WCBA in the county over time notwithstanding the free distribution by the Ministry of Health. Furthermore, there are no reports of iron folate uptake in the County as an intervention to maternal anaemia and documentation lacked at various levels of health services. Changamwe Sub-County was randomly selected from among the six sub-counties namely Mvita, Nyali, Changamwe, Jomvu, Kisauni, and Likoni.

3.4. Sampling Size Determination

Neutens and Rubinson (2014) describe sample size as the number of subjects to be included in the study. The study used a sample of 400 WCBA in Changamwe sub-county, Mombasa County. According to the 2009 Kenya Population and Housing Census, WCBA population in Mombasa County was enumerated at 270,982 persons (KNBS (2010). The study adopted Yamane (1967) formula in determining the desired sample size at 0.05 precision rate.

$$n = \frac{\mathrm{N}}{1 + N(e)^2}$$

Where n = Sample size

N = Population (270,982 WCBA)

e = Precision rate (0.05)

$$\frac{270{,}982}{1 + 270{,}982(0.05)^2} = 399.41 \cong 400$$

3.5. Sampling Technique, and Procedure

Stratified sampling technique was employed to divide the sample into five Strata (Wards) as shown in Table 3.1. Stratified sampling is a method of gathering representative data from a heterogeneous group in order to minimize the error of estimation (Neutens & Rubinson, 2014). Proportional allocation method - (Sample Size/Population Size) x Subgroup Size - was used to get the number of households in each ward according to their respective proportion in the population. Simple random sampling was then employed to select 400 households from where the WCBA were drawn, each household producing one. This techniques ensured that the study sample was randomly selected and thus minimized on selection bias.

Table 3.1: Sampling frame

Wards	No. of Households	No. of Participants
Portreitz	4570	74
Kipevu	1728	28
Airport	7271	118

Changamwe	3373	56
Chaani	7625	124
Total	**24567**	**400**

Source: Kenya National Bureau of Statistics (2010)

3.6. Inclusion and Exclusion Criteria

3.6.1. Inclusion Criteria

Women of child bearing age residing within Changamwe Sub County; WCBA above 18 years, who gave consent to participate in the study; and WCBA below 18 years, whose guardians/parents gave consent for their participation in the study.

3.6.2. Exclusion Criteria

Women aged below 15 years and those above 49 years in Changamwe Sub County; WCBA above 18 years, who did not consent to participate in the study; and WCBA below 18 years, whose guardians/parents did not give consent for their participation in the study.

3.7. Data Collection

3.7.1. Data Collection Instruments

The study used a pretested semi-structured questionnaire schedule to reach the study respondents. The questionnaire method was used because it is cost-effective, it saves time, it safeguards confidentiality, uses standardized questions, provides sufficient time to respond to questions and the questions are easy to respond to (Kothari & Gaurav, 2014). The questionnaire was prepared in English (Appendix 2A) and translated into Kiswahili (Appendix 2B) for the respondents who were not well versed with English

language. This ensured that the questionnaire was easy to use for the respondents and thus reduced instrument bias and ensured better responses from the respondents. The semi-structured questionnaire consisted of both open and closed ended questions. The open ended questions tested the subjective responses by the participant while closed ended questions focused on the objective responses based on the specific objectives and variables of the study. The questionnaire was structured in four sections including the socio-demographics and socio-economical characteristics of the respondents and their spouses; the proportion of WCBA taking IFAs; Practices of WCBA towards IFAs uptake; and health facility related factors.

3.7.2. Data Collection Procedure

The researcher submitted the research proposal for ethical review and permission was obtained from the Ethics and Review Committee (ERC) of Pwani University to proceed with the research (Appendix 3). The researcher also obtained permission from the Ministry of Health through the Department of Health Mombasa County to conduct the study in Changamwe Sub-County (Appendix 4). During field work, the researcher informed the study respondents on the nature and main objective of the study. Thereafter, the respondents had to voluntarily sign an informed consent form prior to the administration of the questionnaires (Appendices 1). For respondents who were between 15-17 years, consent was sought from their parents/guardians before administering the questionnaire.

In addition, the researcher assured the respondents on the confidentiality of the information they were going to give and that such information was going to be used for research purposes only. The participants were not only encouraged to respond to all the questions in the research instrument but were also informed of their free choice in disclosing private information. The participants were also informed that there were no risks involved in participating, and that the benefits of IFA uptake in protecting their pregnancies, and maternal outcome was of a necessity to the researcher and policy

makers in the Ministry of Health. The study also upheld the anonymity of the participants by ensuring that no personal identifiers were used in the questionnaires.

The questionnaires were administered to the WCBA by the researcher with the help of three research assistants between January and March 2016. The research assistants were final year undergraduate students and were recruited from JKUAT, Mombasa Campus. They were further trained on how to administer and fill in the questionnaires for the purpose of reducing study personnel bias during data collection. The researcher/research assistants took an average of 20 to 30 minutes to administer the questionnaire to each respondent. All the completed questionnaires in a particular day were checked by the researcher for completeness, and filed for safe custody awaiting analysis.

3.8. Piloting of Study Tools

The questionnaire was pre-tested two weeks prior to the actual field work with 40 WCBA (i.e. 10% of the sample size) residing in Kisauni Sub-County, Mombasa County which have similar characteristics or settings with Changamwe Sub-County. Pre-testing was conducted to assist in determining the dependability, consistency of the instruments. Based on the results of the pilot study, internal consistency of the questionnaire items was measured by Cronbach's alpha in order to judge the reliability of the questionnaire. Any reliability of 0.7 and above was taken to depict an agreeable level of reliability for the instrument (Taber, 2017). The reliability test performed on the study instrument yielded an alpha index of 0.827. Thus the items of the questionnaire were deemed to be consistent and the instrument was considered reliable. Emerging issues raised during the pretesting were corrected before the final distribution of the questionnaire.

3.9. Data Processing, Analysis, and Interpretation

The raw data collected was coded, cleaned, sorted, and entered into the IBM SPSS Statistics for Windows, Version 25.0 (IBM Corp, 2017) for data analysis. Univariate analysis was done using descriptive statistics (frequencies and percentages) in order to

summarize the data, and the results were presented using charts, graph and tables. Bivariable analysis was conducted using Chi-square (at a significance level of alpha = 0.2), to ascertain the significance of association between various socio-demographic and socio-economic characteristics of the WCBA, their practices and health facility related factors influencing IFA supplementation. Bivariable logistic regression (at a significance level of alpha = 0.2) was conducted in order to screen the independent variables to be included in the multivariable logistic regression. Finally, multivariable logistic regression (at a significance level of alpha = 0.05) was performed to determine the influence of the various factors on uptake of IFA supplements. Inferences were drawn based on the study findings at 95% level of significance.

3.10. Ethical Consideration

The study was approved by the Pwani University Ethics Review committee (Appendix 3) and permission for data collection was obtained from the Department of Health, Mombasa County (Appendix 4). The research procedures were undertaken in a way that ensured that ethical requirements were upheld. Participation in the study was voluntary and participants were informed of their right to withdraw from the study at any stage if they wished to do so. The researcher/research assistants provided sufficient information and assurances about taking part in the study in order to allow the participants to understand the implications of participation and to reach a fully informed, considered and freely given decision about whether or not to do so, without the exercise of any pressure or coercion. The participants were informed of their right to disclose/withhold personal information and the researcher ensured that the information obtained remained confidential by using codes, ensuring participants' names did not appear in the questionnaire, and keeping completed questionnaire in locked cabinet to prevent any leak. Anonymity of the participants was protected by ensuring that any personal identifiers were removed from the questionnaires in order to ensure that the participants' identity could not be linked with personal responses. There was no physical and psychological harm suffered by the participants in this study as the nature of questions

asked were not likely to hurt feelings and maintaining privacy, confidentiality and anonymity ensured participants were not exposed to potential embarrassment or distress. The researcher also ensured the acknowledgement of works of other authors used in any part of the thesis.

CHAPTER FOUR

RESULTS

4.1. Introduction

This chapter presents the results obtained from the study as set out in the objectives. The study findings are presented to underscore factors affecting the uptake of IFA supplements among WCBA in Mombasa County, Kenya. Data for the study was collected from WCBA residing in Changamwe Sub-County between January and March 2015.

4.2. Participants Response Rate

The study targeted 400 women of childbearing age (WCBA) in Changamwe sub-county as research respondents. However, 399 respondents were reached which was 99.8% response rate.

4.3. Proportion of Women Aged 15-49 years Taking IFA Supplements

This study sought to understand the proportion of WCBA (15-49 years) in Changamwe who had taken IFA supplements between 2010 and 2014. The results in figure 4.1 indicate that a high proportion 342 (85.7%) of the respondents reported to have used IFAs while only 57 (14.3%) had not used IFAs.

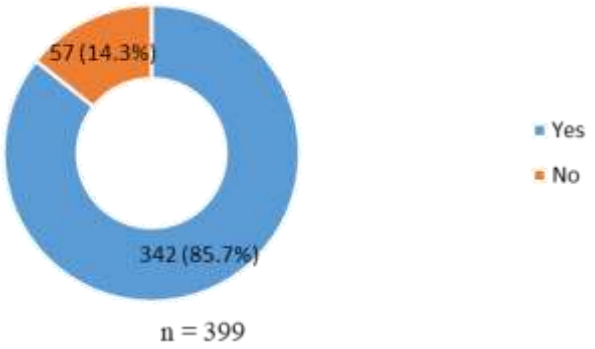

Figure 4.1: Women of Child Bearing Age who took IFAs between 2010 and 2014 in Changamwe Sub-County, Kenya, 2017

4.3.1. Period of Last IFAs Uptake among WCBA

Table 4.3 shows the period of last IFA supplementation among the WCBA in Changamwe Sub-County. Out of the 352 respondents who indicated the period when they last took IFAs, 237 (67.3%) reported to have received IFAs in the year 2015.

Table 4.1: Period of Last IFAs Uptake among Women of Child Bearing Age in Changamwe Sub-County, Kenya, 2017

Year	Frequency	Percentage (%)
Before 2010	10	2.8
2010	2	0.6
2011	3	0.9
2012	29	8.2
2013	71	20.2
2014	237	67.3
Total	**352**	**100.0**

4.3.2. Reasons for Using IFAs

Out of the 350 respondents who indicated reasons for using IFAs, 166 (47.4%) indicated that they use IFAs to protect themselves from anemia, 91 (26%) wanted to improve their general health, while 78 (22.3%) of the respondents wanted to give birth to a healthy baby. Table 4.2 presents the results.

Table 4.2: Reasons for Uptake of IFAs among Women of Child Bearing Age in Changamwe Sub-County, Kenya, 2017

Reasons why use IFAs	Frequency (n=350)	Percentage (%)
Spouse support	2	0.6
Health worker counseling	13	3.7
Prevention of anemia	166	47.4
Good general health	91	26.0
Maternal outcome (healthy baby)	78	22.3
Total	**350**	**100.0**

4.3.3. Factors Hindering IFAs Uptake

The table 4.3 below shows that 142 (35.6%) of the respondents reported that inaccessibility to health facilities was the main reason hindering IFAs uptake. Additionally, 84 (21.1%) of the respondents reported inadequate finances, while 60 (15.0%) indicated culture and myths as the reasons hindering IFAs uptake. Table 4.3 presents the results.

Table 4.3: Factors hindering Adherence to IFAs Uptake among Women of Child Bearing Age in Changamwe Sub-County, Kenya, 2017

Factors	Frequency (n = 399)	Percentage (%)
Culture	60	15.0
Inadequate finances	84	21.1
Religion	18	4.5
Inaccessibility of Health centers	142	35.6
Ignorance	35	8.8
Myths i.e. Giving birth to overweight babies	60	15.0
Total	**399**	**100.0**

4.4. Practices of WCBA Influencing Uptake of IFAs

This study sought to understand the practices of WCBA (15-49 years) regarding IFA supplementation by investigating if they visited ANC and FP clinics, whether IFAs were administered to them during and before pregnancy, their mode of supplement intake, types of medication taken with IFAs, whether they take meals with IFAs and nutritional aspects such as type of food consumed with IFAs.

4.4.1. Clinical Information on Adherence to IFA Supplementation

Figure 4.2 shows that majority, 377 (94.5%) of the respondents had visited ANC, 329 (82.5%) had attended FP clinics, while 353 (88.5%) had received IFAs during pregnancy. However, only 92 (23.1%) had taken IFAs before pregnancy.

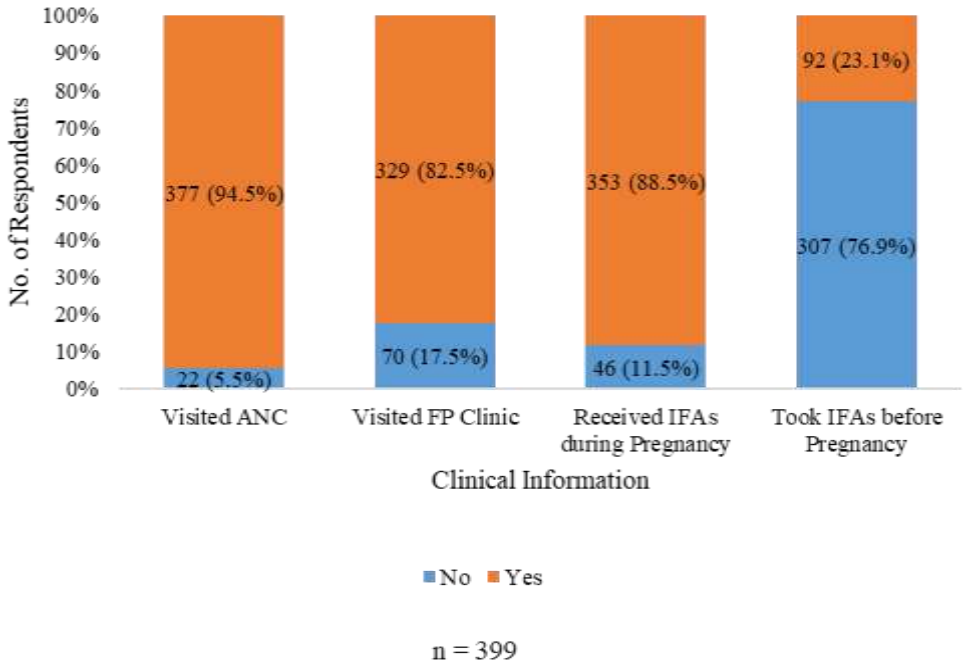

Figure 4.2: Clinical Information of Women of Child Bearing Age in Changamwe Sub-County, Kenya, 2017

4.4.2. Uptake of IFA Tablets by WCBA

Figure 4.3 shows that majority of the respondents, 329 (83.9%; n = 392) were taking drugs as prescribed by the health workers while 275 (70.2%; n = 391) were taking drugs daily. However, 156 (39.8%; n = 392) of the study respondents took IFAs with other medications, while 186 (47.4%; n = 389) took IFAs with meals. Additionally, 56 (14.3%; n = 391) of the respondents took IFAs with tea.

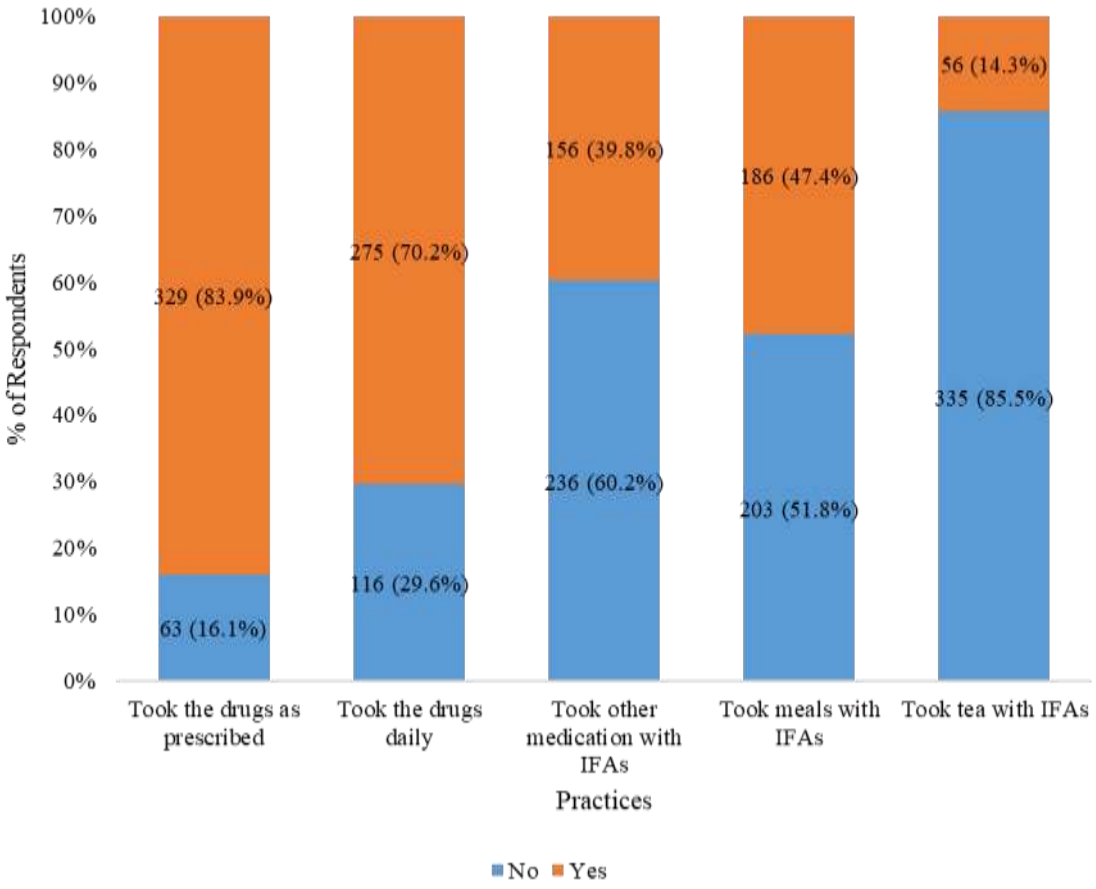

Figure 4.3: Uptake of IFA Tablets by Women of Child Bearing Age in Changamwe Sub-County, Kenya, 2017

Figure 4.4 shows the reasons given for failure to take the drugs daily. Out of the 110 respondents who gave reasons, 71 (64.5%) reported that the reason for their failure to take the IFAs daily was the taste, while 19 (17.3%) used alternatives, and 17 (15.5%) cited the side effects of the drugs as reason of their failure to adhere to the prescription.

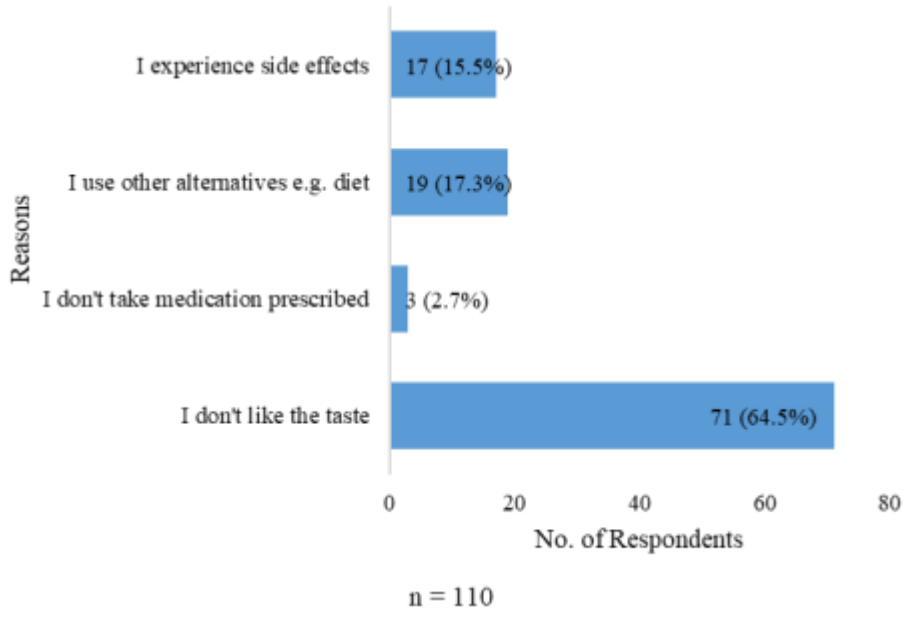

Figure 4.4: Reasons for not Taking IFAs daily by Women of Child Bearing Age in Changamwe Sub-County, Kenya, 2017

4.4.3. Medications taken with IFA Supplements

Out of the 156 respondents who indicated that they took IFAs with other, 129 (82.7%) reported that they were taking IFAs with SP, 9 (5.8%) with multivitamin, while 8 (5.1%) were taking IFAs with analgesics. Figure 4.5 presents the results.

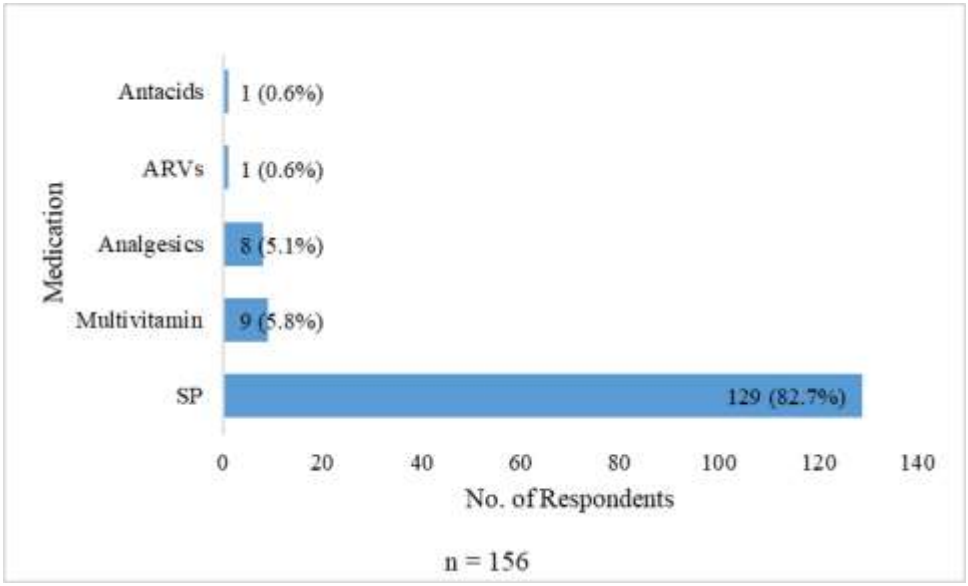

Figure 4.5: Types of Medication Taken together with IFAs by Women of Child Bearing Age in Changamwe Sub-County, Kenya, 2017

4.4.4. Nutritional Diversity and Food Consumption

To comprehend the diversity of food and nutrients consumed during pregnancy, the respondents were asked to show their intake of four main food categories comprising proteins, carbohydrates, vitamins and minerals. Majority, 294 (73.7%) reported taking

all forms of food during pregnancy which encompassed; proteins, carbohydrates, vitamins and minerals. Figure 4.6 presents the results.

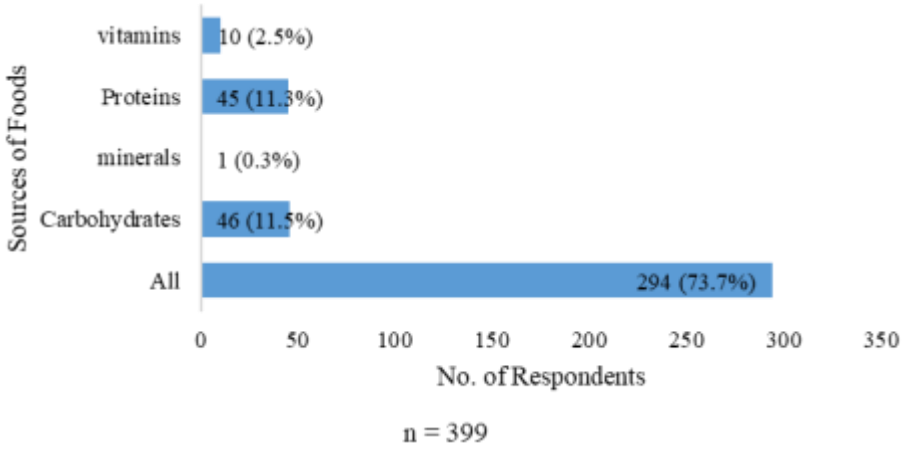

Figure 4.6: Types of Foods Taken during Pregnancy by Women of Child Bearing Age in Changamwe Sub-County, Kenya, 2017

4.4.5. Relationship between Practices of WCBA (15-49 years) and Uptake of IFAs

The researcher performed bivariate analysis using Chi-square test at a significance level of *alpha=0.2* in order to screen for factors to be included in the bivariable logistic regression model. The results in Table 4.4 indicate that practices including ANC visits [$X^2(1) = 64.945$, $p < 0.2$], FP clinic attendance [$X^2(1) = 5.094$, $p < 0.2$], taking IFAs during pregnancy [$X^2(1) = 162.179$, $p < 0.2$], and taking IFAs before pregnancy [$X^2(1) = 5.5886$, $p < 0.2$] had significant associations with uptake of IFAs. In addition, taking IFAs as per prescription [$X^2(1) = 146.578$, $p < 0.2$], taking IFAs daily [$X^2(1) = 72.499$, $p < 0.2$], taking IFAs daily [$X^2(1) = 2.295$, $p < 0.2$] and taking meals with IFAs [$X^2(1) = 8.703$, $p < 0.2$] had significant associations with uptake of IFAs.

Table 4.4: Association between WCBA Practices and Uptake of IFAs among Women of Child Bearing Age in Changamwe Sub-County, Kenya, 2017

		IFAs Uptake		Pearson's Chi-square		
Independent Variables	***Category***	***No***	***Yes***	X^2	***df***	***P***
Visited ANC (n = 399)	Yes	41 (11%)	336 (89%)	64.945	1	.000
	No	16 (73%)	6 (27%)			
Visited FP Clinic (n = 399)	Yes	41 (12%)	288 (88%)	5.094	1	.024
	No	16 (23%)	54 (77%)			
Received IFA during Pregnancy (n = 399)	Yes	22 (6%)	331 (94%)	162.179	1	.000
	No	35 (76%)	11 (24%)			
Took IFA before Pregnancy (n = 399)	Yes	6 (6%)	86 (94%)	5.886	1	.015
	No	51 (17%)	256 (83%)			
Takes IFA drugs as per prescription (n = 392)	Yes	13 (4%)	316 (96%)	146.578	1	.000
	No	37 (59%)	26 (41%)			
Takes IFA drugs daily (n = 391)	Yes	9 (3%)	266 (97%)	72.499	1	.000
	No	40 (35%)	76 (65%)			
Takes other medications with IFAs (n = 392)	Yes	15 (10%)	141 (90%)	2.295	1	.130
	No	35 (15%)	201 (85%)			
Takes meals with IFAs (n = 388)	Yes	13 (7%)	173 (93%)	8.703	1	.003
	No	34 (17%)	169 (83%)			
Takes tea with IFAs (n = 390)	Yes	7 (13%)	49 (87%)	.000	1	.994
	No	42 (13%)	293 (87%)			

The bivariable logistic regression analysis at a significance level of *alpha=0.2* was conducted in order to screen for factors to be included in the multivariable logistic regression model. The results in Table 4.5 indicate that WCBA who had not visited ANC [OR = 0.046; 95% CI = 0.017 to 0.123; $p < 0.2$] were 95% less likely to uptake IFAs compared to those who had visited ANC, while WCBA who had not visited FP clinic [OR = 0.480; 95% CI = 0.252 to 0.917; $p < 0.2$] were 52% less likely to uptake IFAs compared to those who visited FP clinic. Additionally, WCBA who did not receive

IFAs during pregnancy [OR = 0.021; 95% CI = 0.009 to 0.047; p < 0.2] were 98% less likely to uptake IFAs compared to those who received IFA during pregnancy.

The results further indicate that WCBA who took IFAs before pregnancy [OR = 2.855; 95% CI = 1.184 to 6.888; p < 0.2] were 2.9 times more likely to uptake IFAs compared to those who did not, while WCBA who did not take IFA drugs as per prescription [OR = 0.029; 95% CI = 0.014 to 0.061; p < 0.2] were 97% less likely to uptake IFAs compared to those who did. Additionally, WCBA who did not take IFA drugs daily [OR = 0.064; 95% CI = 0.030 to 0.138; p < 0.2] were 94% less likely to uptake IFAs compared to those who did. Moreover, WCBA who took other medications with IFA supplements [OR = 1.367; 95% CI = 0.861 to 3.111; p < 0.2] had a higher likelihood to consume IFAs by 1.4 times relative to those who did not, while WCBA who ingested IFA supplements concurrently with their meals [OR = 2.677; 95% CI = 1.365 to 5.250; p < 0.2] had a higher likelihood by 2.7 times to uptake IFAs compared to those who did not.

Table 4.5: Regression of Uptake of IFAs on Practices of Women of Child Bearing Age in Changamwe Sub-County, Kenya, 2017

		IFAs Uptake		Regression Results		
		No	**Yes**	**OR**	**95% CI**	**p-value**
Independent Variables						
Visited ANC	Yes (Reference)	41 (11%)	336 (89%)	1.000		
	No	16 (73%)	6 (27%)	0.046	0.017 to 0.123	.000
Visited FP	Yes (Reference)	41 (12%)	288 (88%)	1.000		
Clinic	No	16 (23%)	54 (77%)	0.480	0.252 to 0.917	.026
Received IFA	Yes (Reference)	22 (6%)	331 (94%)	1.000		
during	No	35 (76%)	11 (24%)	0.021	0.009 to 0.047	.000
Pregnancy						
Took IFA	No (Reference)	51 (17%)	256 (83%)	1.000		
before	Yes	6 (6%)	86 (94%)	2.855	1.184 to 6.888	.020
Pregnancy						
Took IFA drugs	Yes (Reference)	13 (4%)	316 (96%)	1.000		
as per	No	37 (59%)	26 (41%)	0.029	0.014 to 0.061	.000
prescription						
Took IFA drugs	Yes (Reference)	9 (3%)	266 (97%)	1.000		
daily	No	40 (35%)	76 (65%)	0.064	0.030 to 0.138	.000
Took other	No (Reference)	35 (15%)	201 (85%)	1.000		
medications	Yes	15 (10%)	141 (90%)	1.367	0.861 to 3.111	.133
with IFA						
Took meals	No (Reference)	34 (17%)	169 (83%)	1.000		
with IFAs	Yes	13 (7%)	173 (93%)	2.677	1.365 to 5.250	.004

4.5. Socio-Demographic and Socio-Economic Characteristics of Respondents

The study captured the socio-demographic and socio-economic characteristics of the respondents in terms of age, religious affiliation, marital status, education, occupation, number of children and household income.

4.5.1. Distribution of Study Respondents by Age

Figure 4.7 below shows the distribution of respondents by age. They were categorized into three main groups as follows, 15-26 years old, 26-37 years and 37-49 years old. Out of the 397 respondents who indicated their age, majority, 214 (53.9%) of the respondents were aged between 26-36 years. Figure 4.7 presents the results.

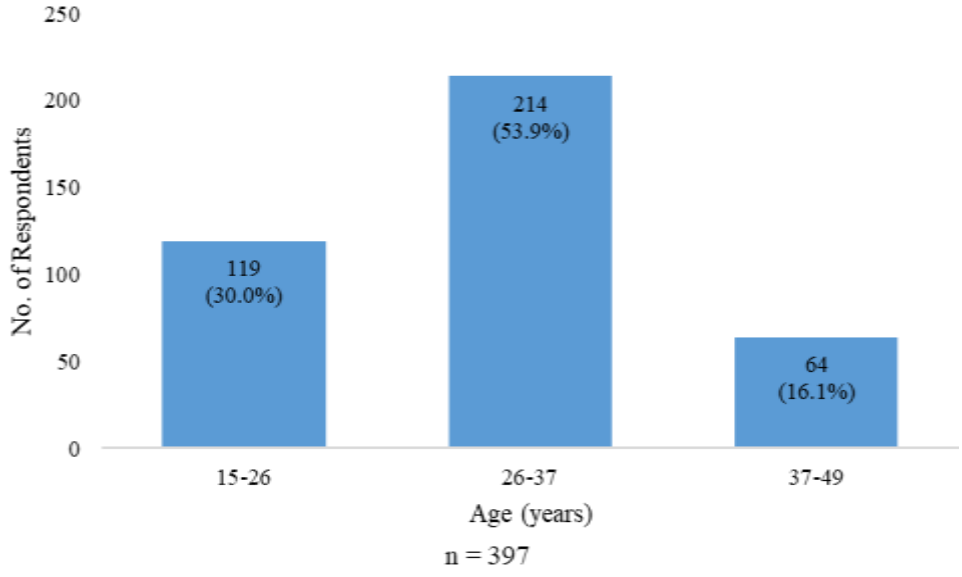

Figure 4.7: Age of Women of Child Bearing Age in Changamwe Sub-County, Kenya, 2017

4.5.2. Religious Affiliation of Study Respondents

The results show that majority, 329 (82.5%) of the respondents were Christians, while 69 (17.3 %) were Muslim faithful. Figure 4.8 presents the results.

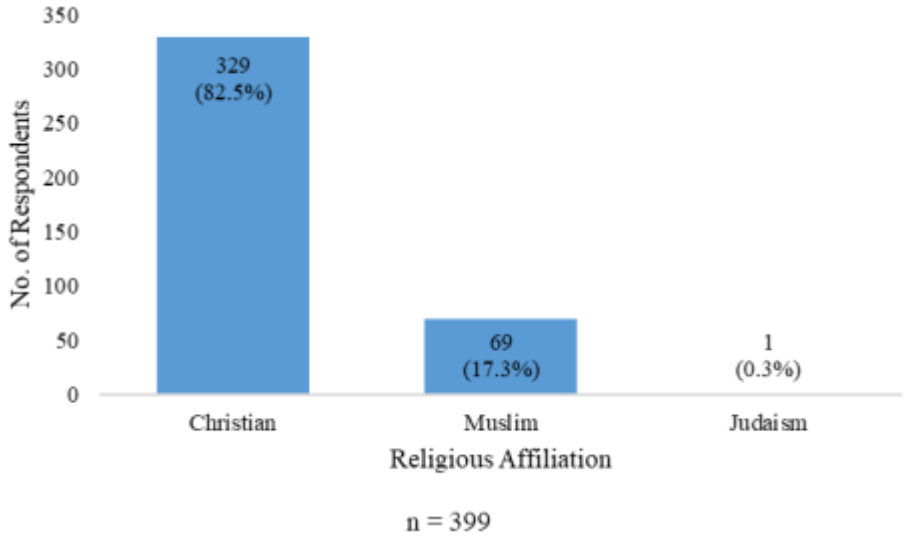

Figure 4.8: Religion of Women of Child Bearing Age in Changamwe Sub-County, Kenya, 2017

4.5.3. Marital status of the Study Respondents

The results in figure 4.4 shows that 308 (77.2%) of the respondents were married, while only 64 (16%) were single mothers. Figure 4.9 presents the results.

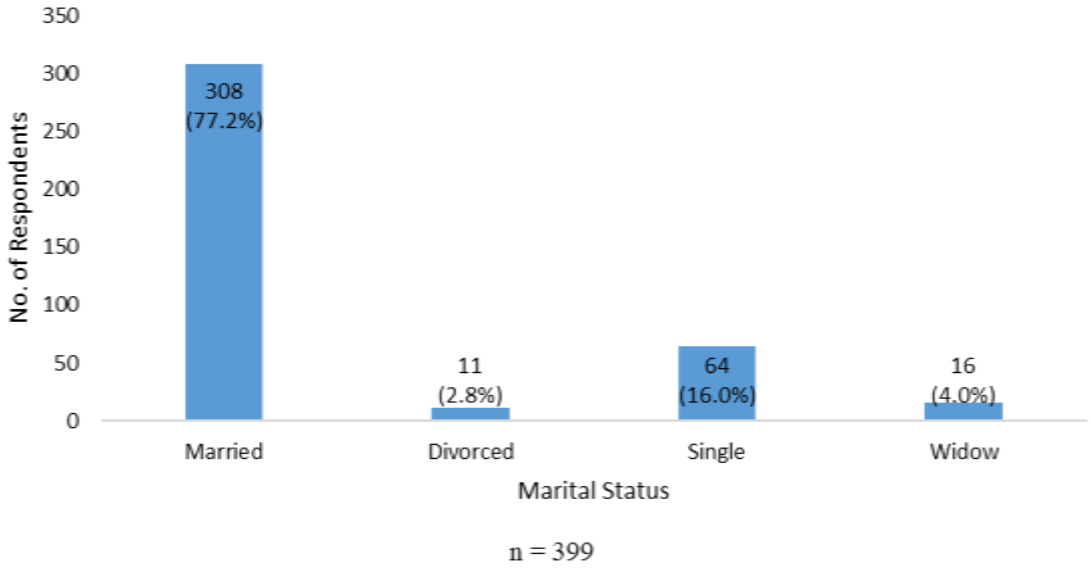

Figure 4.9: Marital Status of Women of Child Bearing Age in Changamwe Sub-County, Kenya, 2017

4.5.4. Education Level of Respondents

A high proportion, 168 (42.1%) of the respondents had attained secondary level of education, while 147 (36.1%) had attained primary level of education. Only 5 (1.3%) of the respondents had attained university level education. Figure 4.10 presents the results.

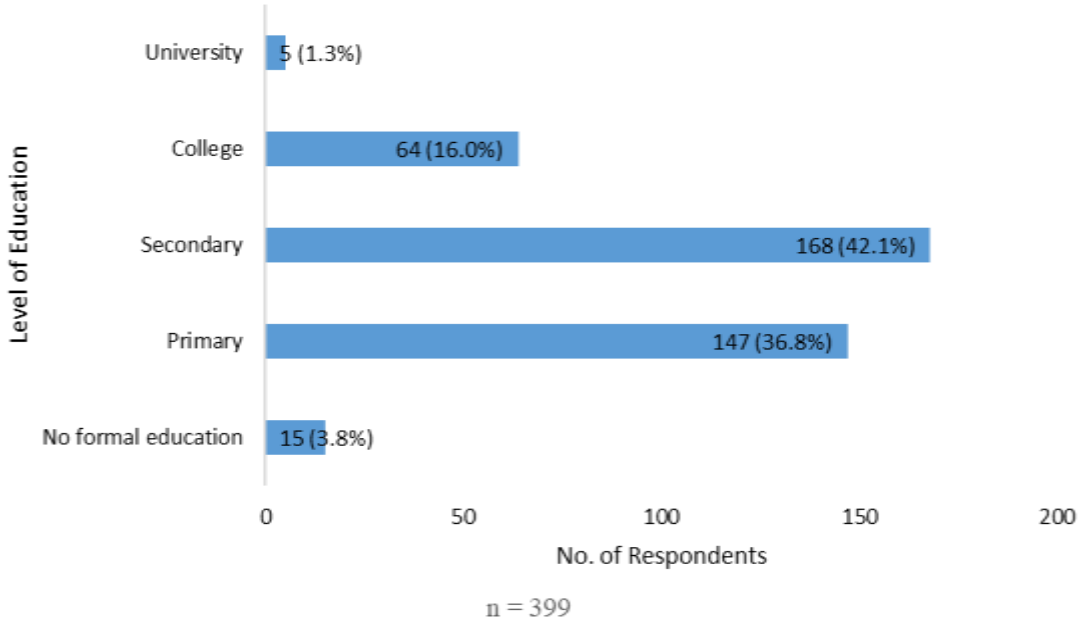

Figure 4.10: Education Level of Women of Child Bearing Age in Changamwe Sub-County, Kenya, 2017

4.5.5. Occupation of Study Respondents

A high proportion, 155 (38.8%) of the respondents were house-wives, 133 (33.3%) were self-employed, while 85 (21.3%) were salaried. Figure 4.11 presents the results.

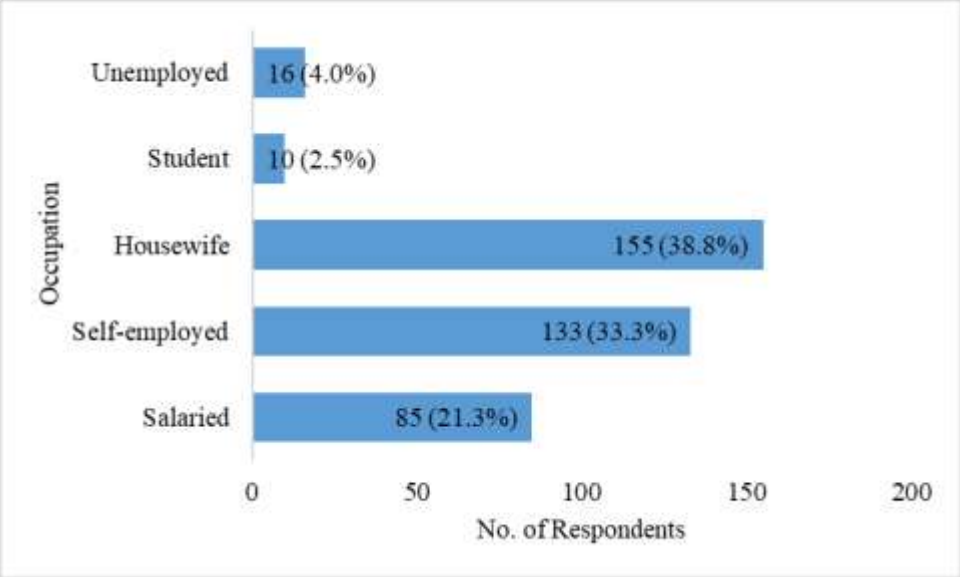

Figure 4.11: Occupation of Women of Child Bearing Age in Changamwe Sub-County, Kenya, 2017

4.5.6. Income of the Study Respondents

Out of the 382 respondents who indicated their income level, more than half, 226 (59.2%) of the respondents earned an income of less than Ksh. 5,000, while only 2 (0.5%) earned Ksh. 50,000 and above. Figure 4.12 presents the results.

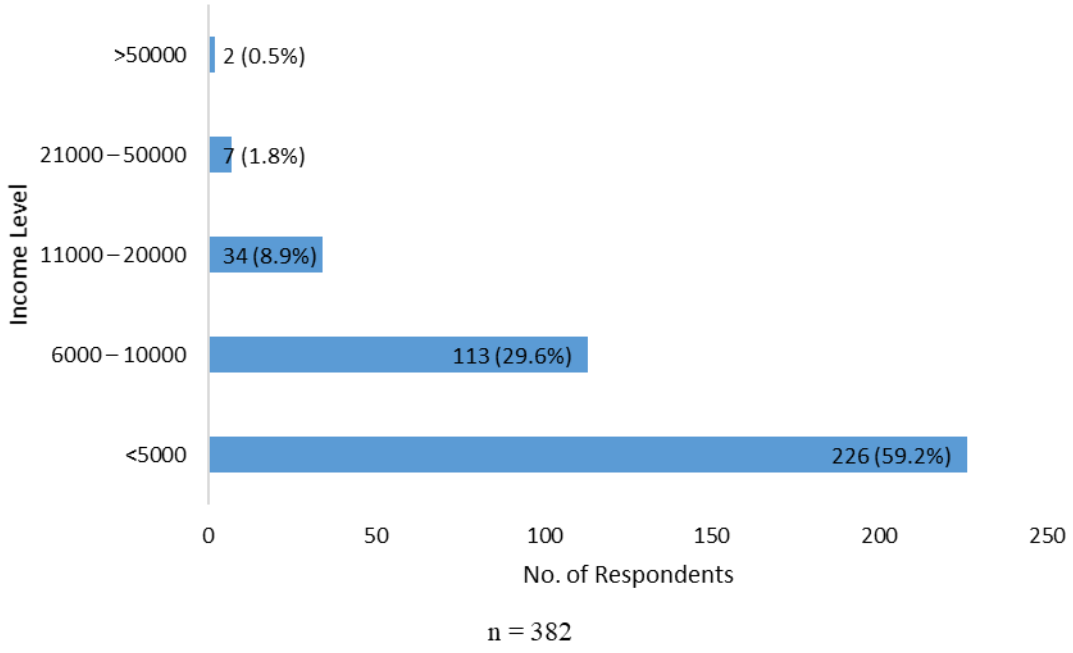

Figure 4.12: Income Level of Women of Child Bearing Age in Changamwe Sub-County, Kenya, 2017

4.5.7. Family Size of the Respondents

Out of the 398 respondents who indicated their family size, 310 (77.9%) of the respondents had between 1-3 children, while only 4 (1%) had six or more children. Figure 4.13 presents the results.

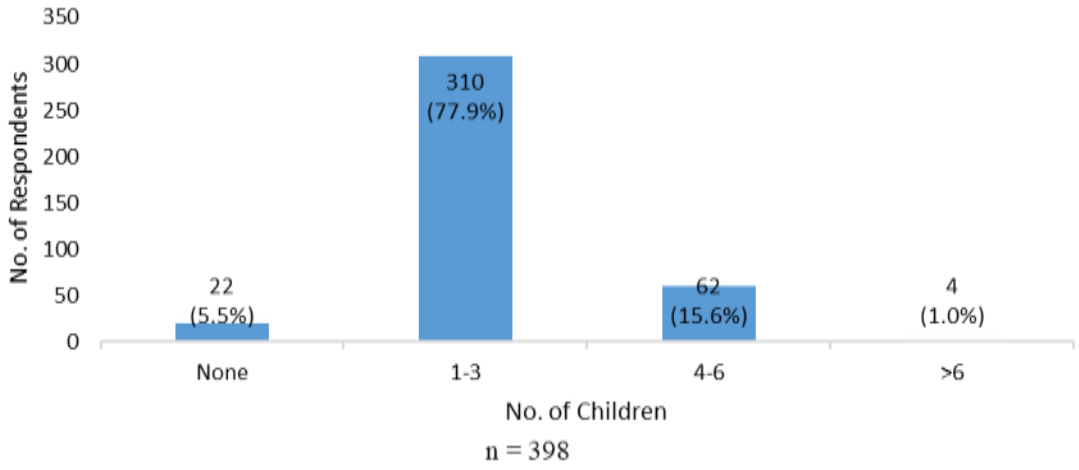

Figure 4.13: Family Size of Women of Child Bearing Age in Changamwe Sub-County, Kenya, 2017

4.5.8. Relationship between Respondents' Demographic Characteristics and IFAs Uptake

The researcher performed bivariate analysis using Chi-square test at a significance level of *alpha=0.2* in order to screen for factors to be included in the bivariable logistic regression model. The results in Table 4.6 indicate that five socio-demographic and socio-economic factors had significant associations with uptake of IFAs. The factors

included age [X^2(2, n=399) = 24.843, p < 0.2], marital status [X^2(3, n=399) = 20.100, p < 0.2], education level [X^2 (4, n=399) = 29.679, p < 0.2], occupation [X^2(4, n=399) = 19.478, p < 0.2], and family size [X^2(4, n=398) = 31.283, p < 0.2]. Regression analysis was conducted to determine the relationship between these factors and uptake of IFAs. Table 4.6 presents the results.

Table 4.1: Association between Demographic Characteristics and Uptake of IFAs among Women of Child Bearing Age in Changamwe Sub-County, Kenya, 2017

		IFAs Uptake		Pearson's Chi-square		
Independent Variables	***Category***	***No***	***Yes***	X^2	***Df***	***P***
Age in years (n = 399)	15-26	33 (28%)	87 (72%)	24.843	2	.000
	26-37	17 (8%)	198 (92%)			
	37-49	7 (11%)	57 (89%)			
Religious Affiliation (n = 397)	Christian	49 (15%0	279 (85%)	1.801	1	.298
	Muslim	7 (10%)	62 (90%)			
Marital Status (n = 399)	Married	34 (11%)	274 (89%)	20.100	3	.000
	Divorced	5 (45%)	6 (55%)			
	Single	17 (27%)	47 (73%)			
	Widow	1 (6%)	15 (94%)			
Education Level (n = 399)	None	7 (47%)	8 (53%)	29.679	4	.000
	Primary	29 (20%)	118 (80%)			
	Secondary	15 (9%)	153 (91%)			
	College	4 (6%)	60 (94%)			
	University	1 (20%)	4 (80%)			
Occupation (n = 399)	Salaried	4 (5%)	81 (95%)	19.478	4	.001
	Self-employed	13 (10%)	120 (90%)			
	Housewife	32 (21%)	123 (79%)			
	Student	3 (30%)	7 (70%)			
	Others	5 (31%)	11 (69%)			
Income Level (n = 382)	<5000	36 (16%)	190 (84%)	3.270	4	.514
	6000 – 10000	12 (11%)	101 (89%)			
	11000 – 20000	5 (15%)	29 (85%)			
	21000 – 50000	0 (0%)	7 (100%)			
	>50000	0 (0%)	2 (100%)			
Family Size (n = 398)	None	12 (55%)	10 (45%)	31.283	3	.000
	1-3	37 (12%)	273 (88%)			
	4-6	7 (11%)	55 (89%)			
	>6	1 (25%)	3 (75%)			

The bivariable logistic regression analysis at a significance level of *alpha=0.2* was conducted in order to screen for factors to be included in the multivariable logistic regression model. The results in Table 4.7 indicate that WCBA aged 15-25 years [OR = 0.226; 95% CI = 0.120 to 0.428; p < 0.2] were 77% less likely to uptake IFAs compared to those aged 26-36 years. The results also indicate that WCBA who were single [OR = 0.343; 95% CI = 0.177 to 0.663; p < 0.2] and those who were divorced [OR = 0.149; 95% CI = 0.060 to 0.780; p < 0.2] were 66% and 85% respectively less likely to uptake IFAs compared to those who were married. The results further indicate that WCBA who lacked formal education [OR = 0.086; 95% CI = 0.027 to 0.269; p < 0.2] and those who had received primary level education [OR = 0.399; 95% CI = 0.205 to 0.778; p < 0.2] were 91% and 60% respectively less likely to uptake IFAs compared to those with secondary level of education.

In addition, WCBA who were employed on a salary [OR = 5.268; 95% CI = 1.795 to 15.461; p < 0.2] and those who were self-employed [OR = 2.402; 95% CI = 1.202 to 4.797; p < 0.2] were 5.3 times and 2.4 times respectively more likely to uptake IFAs compared to those who were housewives. The results also indicate that WCBA who had no children [OR = 0.113; 95% CI = 0.046 to 0.280; p < 0.2] were 89% less likely to uptake IFAs compared to those who had 1-3 children.

Table 4.7: Regression of Uptake of IFAs on Demographic Characteristics of Women of Child Bearing Age in Changamwe Sub-County, Kenya, 2017

Independent Variables		IFAs Uptake		Regression Results		
		No	Yes	OR	95% CI	p-value
Age	26 – 37 (Reference)	17 (8%)	198 (92%)	1.000		
	15 – 26	33 (28%)	87 (72%)	0.226	0.120 to 0.428	.000
	37 – 49	7 (11%)	57 (89%)	0.699	0.276 to 1.769	.450
Marital status	Married (Reference)	34 (11%)	274 (89%)	1.000		
	Single	17 (27%)	47 (73%)	.343	0.177 to 0.663	.001
	Divorced	4 (36%)	7 (64%)	.149	0.043 to 0.514	.003
	Widowed	1 (6%)	15 (94%)	1.861	0.238 to 14.536	.554
Education	Secondary (Reference)	153 (91%)	15 (9%)	1.000		
Level	No formal education	8 (53%)	7 (47%)	.086	0.027 to 0.269	.000
	Primary	118 (80%)	29 (20%)	.399	0.205 to 0.778	.007
	College	60 (94%)	4 (6%)	1.471	0.469 to 4.610	.508
	University	4 (80%)	1 (20%)	.392	0.041 to 3.738	.416
Occupation	Housewife (Reference)	30 (19%)	125 (81%)	1.000		
	Salaried	4 (5%)	81 (95%)	5.268	1.795 to 15.461	.002
	Self-employed	13 (10%)	120 (90%)	2.402	1.202 to 4.797	.013
	Student	3 (30%)	7 (70%)	0.607	0.149 to 2.480	.487
	Others	5 (31%)	11 (69%)	0.572	0.186 to 1.765	.332
Family Size	1-3 (Reference)	37 (12%)	273 (88%)	1.000		
	No children	12 (55%)	10 (45%)	.113	0.046 to 0.280	.000
	4-6	6 (10%)	56 (90%)	1.065	0.451 to 2.512	.886
	>6	1 (25%)	3 (75%)	0.407	0.041 to 4.011	.441

4.6. Socio-Demographic and Socio-economic Characteristics of Respondents' Spouses

The study captured the socio-demographic and socio-economic characteristics of the respondents' spouses in terms of age, education, occupation, income and religious affiliation. A total of 320 respondents indicated that they were married.

4.6.1. Age of the Respondents Spouses

Out of the 320 respondents who were married, 174 (54.4%) of indicated that their spouses were aged between 30-40 years, while 82 (25.6%) of the respondents indicated their spouses to be aged between 15-30 years Figure 4.14 presents the results.

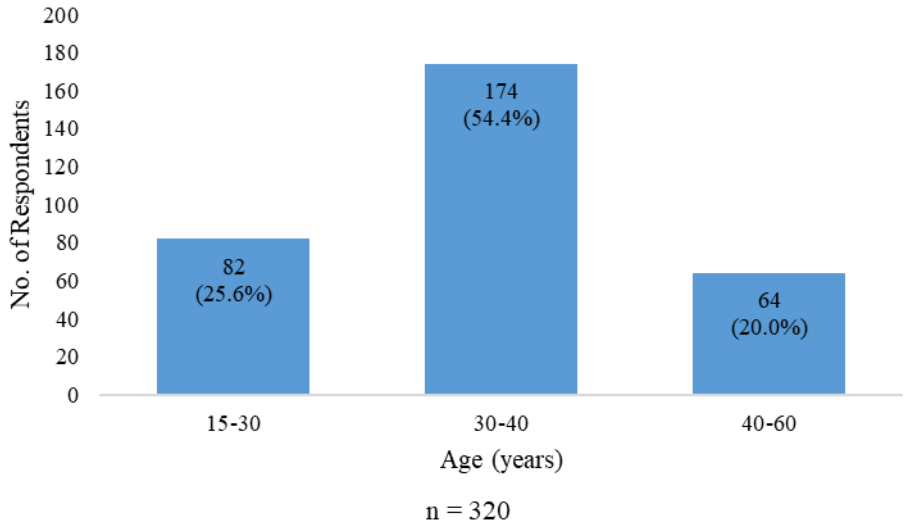

Figure 4.14: Age of Spouses of Women of Child Bearing Age in Changamwe Sub-County, Kenya, 2017

4.6.2. Education Level of the Respondents Spouses

Out of the 320 respondents who were married, 164 (51.3%) indicated that their spouses had attained secondary level of education, while only 20 (6.3%) of the respondents indicated that their spouses were university graduates. Figure 4.15 presents the results.

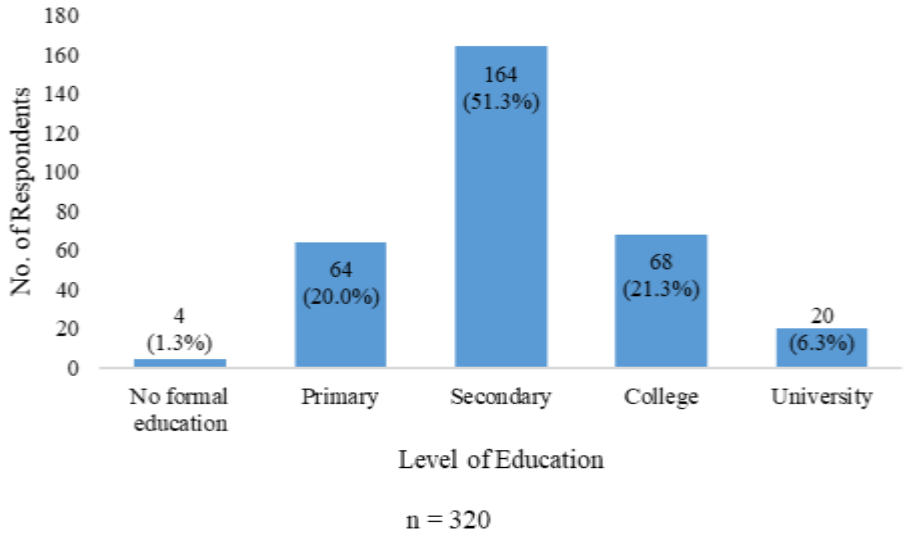

Figure 4.15: Education Level of the Spouses of Women of Child Bearing Age in Changamwe Sub-County, Kenya, 2017

4.6.3. Occupation of Respondents' Spouses

Out of the 320 respondents who were married, 197 (61.6%) indicated that their spouses were salaried with monthly income, while 107 (33.4%) indicated that their spouses were self-employed Figure 4.16 presents the results.

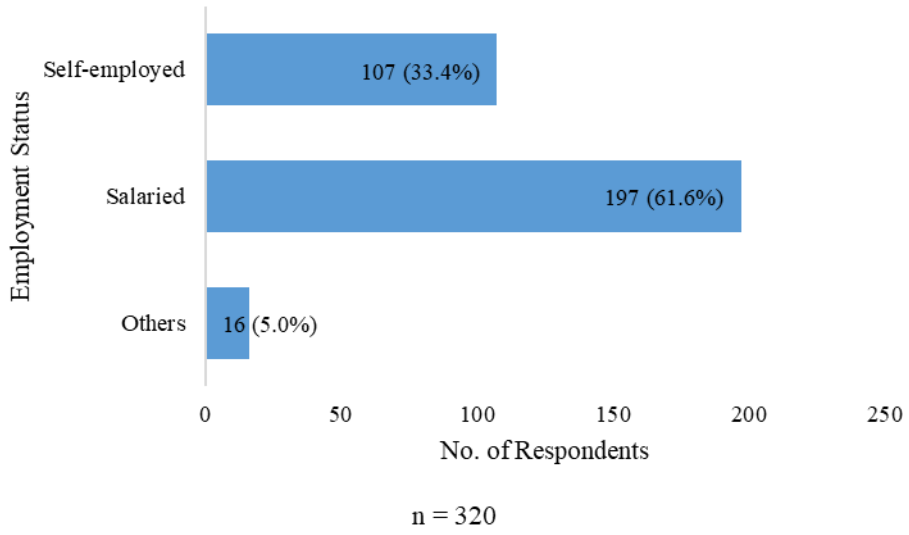

Figure 4.16: Occupation of the Spouses of Women of Child Bearing Age in Changamwe Sub-County, Kenya, 2017

4.6.4. Income of the Respondents Spouse

Out of the 320 respondents who were married, 279 (87.3%) indicated that their spouses earned a net monthly income of below Ksh. 20,000, while only 4 (1.3%) of the respondents indicated that their spouses earned Ksh. 50,000 and above. Figure 4.17 presents the results.

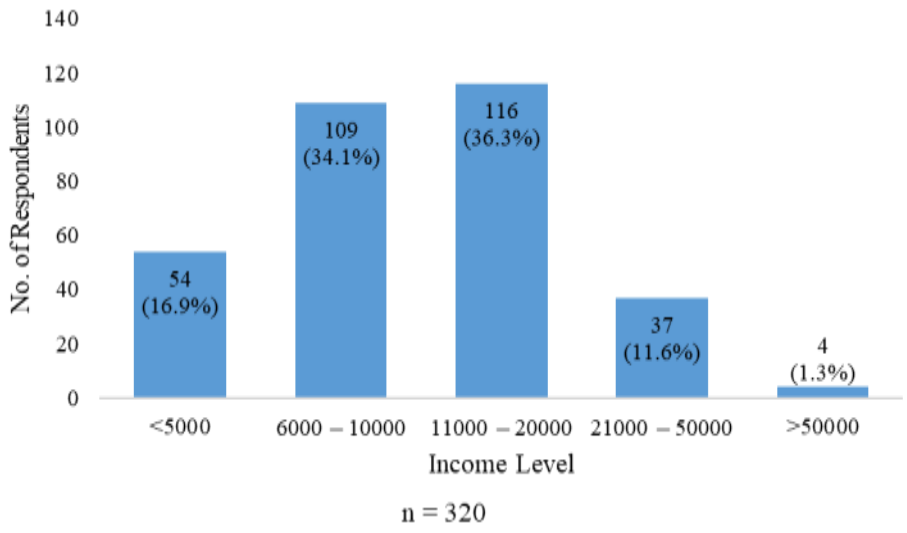

Figure 4.17: Income Level of the Spouses of Women of Child Bearing Age in Changamwe Sub-County, Kenya, 2017

4.6.5. Religious Affiliation of the Respondents Spouses

Out of the 320 respondents who were married, 258 (80.6%) indicated that their spouses were Christians, while 62 (19.4%) indicated that their spouses were Muslims. Figure 4.18 presents the results.

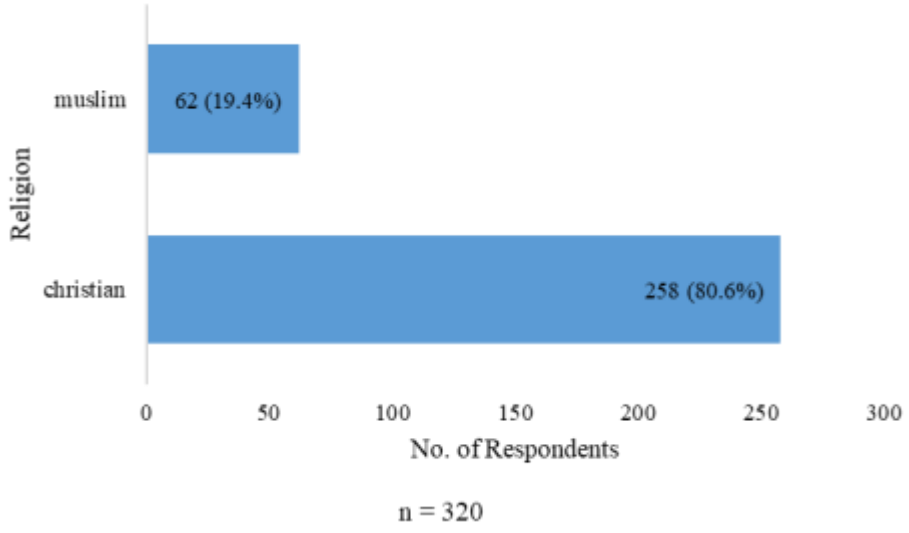

Figure 4.18: Religion of the Spouses of Women of Child Bearing Age in Changamwe Sub-County, Kenya, 2017

4.6.6. Relationship between Spouses' Demographic Characteristics and Uptake of IFAs

The researcher performed bivariate analysis using Chi-square test at a significance level of *alpha=0.2* in order to screen for factors to be included in the logistic regression analysis. The results in Table 4.8 indicate that none of the demographic characteristics had significant association (p>0.2) with uptake of IFAs.

Table 4.8: Association between Spouses' Demographic Characteristics and IFAs Uptake among Women of Child Bearing Age in Changamwe Sub-County, Kenya, 2017

		IFAs Uptake		Pearson's Chi-square		
Independent Variables	***Category***	***Yes***	***No***	X^2	***df***	***P***
Age in years (n = 320)	15-30	14 (17%)	68 (83%)	2.761	2	.251
	30-40	18 (10%)	156 90%)			
	40-60	5 (8%)	59 (92%)			
Education Level (n = 271)	None	3 (20%)	12 (80%)	1.535	4	.820
	Primary	0 (0%)	4 (100%)			
	Secondary	19 (12%)	145 (88%)			
	College	6 (9%)	62 (91%)			
	University	2 (10%)	18 (90%)			
Occupation (n = 319)	Salaried	22 (11%)	175 89%)	.026	2	.987
	Self-employed	12 (11%)	94 (88%)			
	Others	2 (13%)	14 (87%)			
Income Level (n = 320)	<5000	6 (15%)	48 (85%)	17.916	4	.267
	6000 – 10000	0 (11%)	4 (89%)			
	11000 – 20000	10 (15%)	106 (85%)			
	21000 – 50000	4 (0%)	33 (100%)			
	>50000	16 (0%)	92 (100%)			
Religious Affiliation (n	Christian	49 (15%)	279 (85%)	0.797	1	.372

= 319)	Muslim	7 (10%)	62 (90%)

4.7. Health Related Factors Influencing Uptake of IFA Supplements

4.7.1. Respondents Knowledge on IFA Supplements

In order to ascertain the respondents' knowledge and understanding of IFA supplements, they were expected to describe the components of the IFA drug, number of drugs per IFA kit and color of the drugs as captured in table 4.9, figure 4.19 and table 4.10 respectively. The respondents were expected to describe the components of the tablets correctly if they have used them. Most, 319 (79.9%) of the respondents correctly described IFAs as Iron and Folic Supplements as shown in Table 4.9.

Table 4.9: Description of IFA Supplements by Women of Child Bearing Age in Changamwe Sub-County, Kenya, 2017

Description	Frequency (n = 399)	Percentage (%)
Iron and Folic Supplement	319	79.9
Iron supplement	29	7.3
Folic Acid supplement	31	7.8
Sulphadoxine Pyrimethamine	14	3.5
Don't know	6	1.5
Total	**399**	**100.0**

Figure 4.19 shows that out of 350 respondents who had used IFAs, majority, 179 (51.1%) indicated that the IFA kit has two drugs in it, while 139 (39.7) indicated that the IFAs kit contained many drugs.

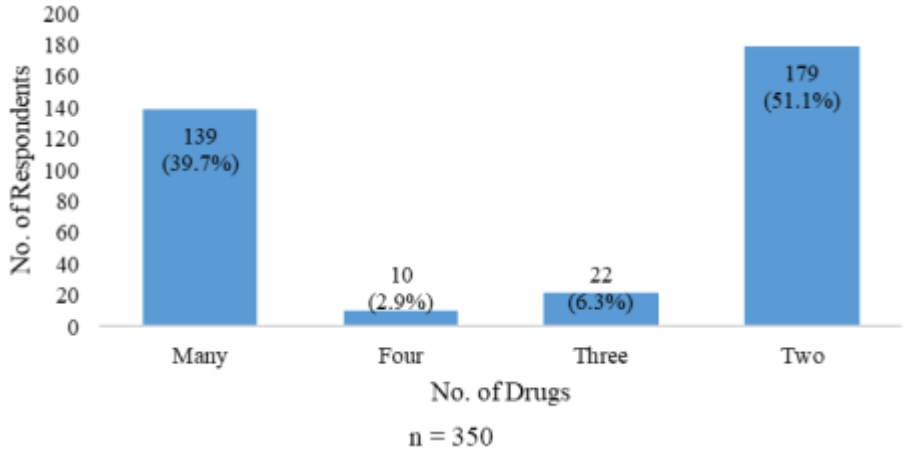

Figure 4.19: Number of Drugs in the IFA Kit as indicated by Women of Child Bearing Age in Changamwe Sub-County, Kenya, 2017

Table 4.10 shows that out of 181 respondents who indicated the colour of the IFA drugs, 179 (98.9%) reported that the drugs in the kit were red and yellow in color while 1 (0.6%) observed that it was blue and yellow.

Table 4.10: Color of the Drugs as indicated by Women of Child Bearing Age in Changamwe Sub-County, Kenya, 2017

Colors	Frequency (n = 181)	Percentage (%)
Red and yellow	179	98.9
Blue and yellow	1	0.6
I don't know	1	0.6

Total	**181**	**100.0**

4.7.2. Awareness on IFA Supplementation

The respondents' awareness on IFA supplements was determined by asking whether they have heard about IFAs. Majority, 347 (87%) of the respondents had heard of IFAs while 52 (13%) had not heard any information on the IFAs as presented in Figure 4.20.

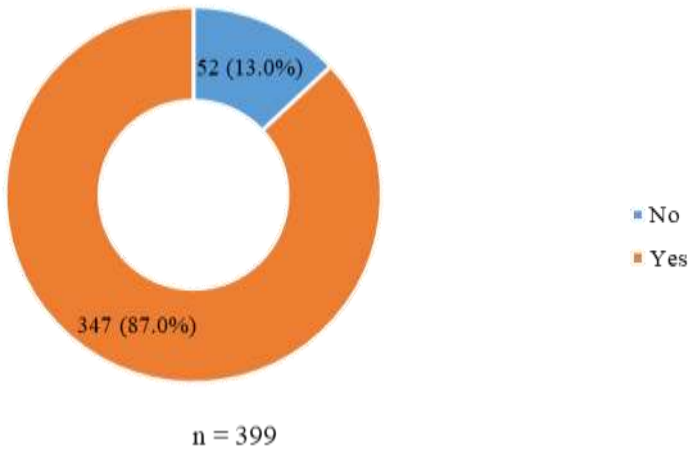

Figure 4.20: Awareness of IFAs among by Women of Child Bearing Age in Changamwe Sub-County, Kenya, 2017

4.7.3. Sources of Information on IFAs

Out of 350 respondents who indicated their source of information on IFAs, they 239 (68.9%) indicated that hospitals were their main source of information on IFAs. Figure 4.21 presents the results.

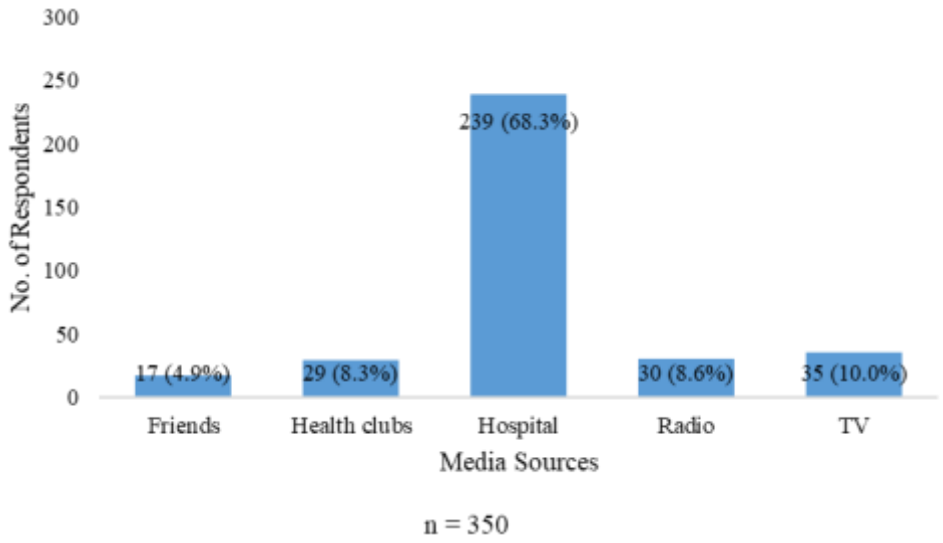

Figure 4.21: Source of Information on IFAs among by Women of Child Bearing Age in Changamwe Sub-County, Kenya, 2017

4.7.4. Knowledge on Fortified Foods

Majority, 303 (75.9%) of the respondents did not know what fortification was as shown in Table 4.1.

Table 4.11: Knowledge of Fortification among Women of Child Bearing Age in Changamwe Sub-County, Kenya, 2017

Response	Frequency	Percentage (%)
Yes	96	24.1
No	303	75.9
Total	**399**	**100.0**

4.7.5. Knowledge on Malnutrition and Consequences

Majority, 258 (65.2%) seemed to know what malnutrition was as shown in Figure 4.22.

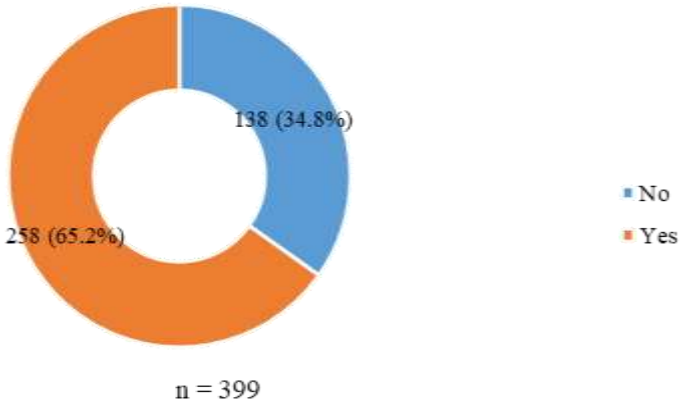

Figure 4.22: Knowledge on Malnutrition among Women of Child Bearing Age in Changamwe Sub-County, Kenya, 2017

The respondents cited various consequences of malnutrition as indicated in Table 4.12.

Table 4.12: Consequences of Malnutrition as indicated by Women of Child Bearing Age in Changamwe Sub-County, Kenya, 2017

Consequences	Frequency (n = 399)	Percentage (%)
Birth defects	93	23.3
Anemia	99	24.8
Infection	83	20.8
Don't know	124	31.1
Total	**399**	**100.0**

4.7.6. Accessibility and Supply of IFAs

Figure 4.23 shows that out of the 371 respondents who indicated their source of IFAs, 231 (62.3%) reported to have obtained their IFAs from the Health centers, with only 16 (4.3%) getting them at the private pharmacies.

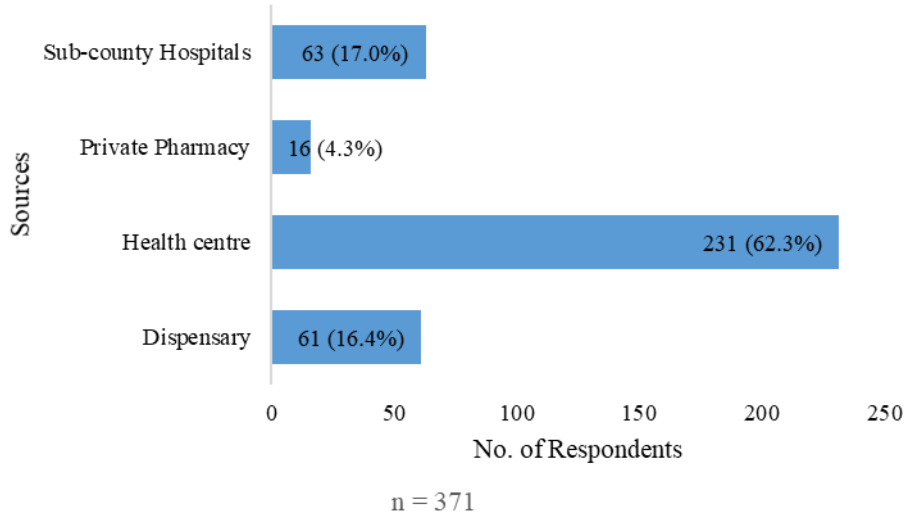

Figure 4.23: Sources of IFAs among Women of Child Bearing Age in Changamwe Sub-County, Kenya, 2017

4.7.7. Relationship between Health Facility Related Factors and Uptake of IFAs

The researcher performed bivariate analysis using Chi-square test at a significance level of *alpha=0.2* in order to screen for factors to be included in the bivariable logistic regression model. The results in Table 4.13 indicate that three factors including awareness on IFAs [$X^2(1) = 38.343$, $p < 0.2$], source of information about IFAs [$X^2(4) = 48.312$, $p < 0.2$], and source of IFA supplements [$X^2(3) = 11.024$, $p < 0.2$] had significant associations with uptake of IFAs.

Table 4.13: Association between Health Facility Related Factors and Uptake of IFAs among Women of Child Bearing Age in Changamwe Sub-County, Kenya, 2017

		IFAs Uptake		Pearson's Chi-square		
Independent Variables	***Category***	***No***	***Yes***	X^2	***df***	***P***
Knowledge of IFA (n = 399)	Yes	42 (13%)	277 (87%)	1.629	1	.202
	No	15 (17%)	65 (83%)			
Awareness on IFA supplementation (n = 399)	Yes	35 (10%)	312 (90%)	38.343	1	.000
	No	22 (42%)	30 (58%)			
Source of information about IFAs (n = 350)	TV	11 (31%)	24 (69%)	48.312	4	.000
	Radio	8 (27%)	22 (73%)			
	Health Clubs	1 (3%)	28 (97%)			
	Hospital	10 (4%)	229 (96%)			
	Friends	6 (35%)	11 (65%)			
Knowledge on fortified foods (n = 399)	Yes	47 (16%)	256 (84%)	1.545	1	.214
	No	10 (10%)	86 (90%)			
Knowledge on malnutrition (n = 396)	Yes	30 (12%)	228 (88%)	3.164	1	.075
	No	25 (18%)	113 (82%)			
Source of IFA Supplements (n = 371)	Sub-county Hospital	1 (2%)	62 (98%)	11.978	3	.007
	Dispensary	8 (13%)	53 (87%)			
	Health Center	17 (7%)	214 (93%)			
	Private Pharmacy	4 (25%)	12 (75%)			

The bivariable logistic regression analysis at a significance level of *alpha=0.2* was conducted in order to screen for factors to be included in the multivariable logistic regression model. The results in Table 4.14 indicate that WCBA who were not aware of IFAs [OR = 0.161; 95% CI = 0.083 to 0.310; $p < 0.2$] were 84% less likely to uptake IFAs compared to those who were aware. The results also indicate that WCBA whose source of information on IFAs was TV [OR = 0.095; 95% CI = 0.037 to 0.247; $p < 0.2$], radio [OR = 0.120; 95% CI = 0.043 to 0.336; $p < 0.2$], and friends [OR = 0.080; 95% CI = 0.025 to 0.260; $p < 0.2$], were 90%, 88% and 92% respectively less likely to uptake

IFAs compared to those whose source of information on IFAs was hospital. Additionally, WCBA who had knowledge on malnutrition [OR = 0.595; 95% CI = 0.334 to 1.059; p < 0.2] were 40% less likely to uptake IFAs compared to those who did not. The results further indicate that WCBA whose source of IFAs was private pharmacy [OR = 0.238; 95% CI = 0.069 to 1.818; p < 0.2] were 76% less likely to uptake IFAs compared to those whose source was health center.

Table 4.14: Regression of Uptake of IFAs on Health Facility Related Factors in Changamwe Sub-County, Kenya, 2017

		IFAs Uptake		Regression Results		
		Yes	No	OR	95% CI	Sig.
Independent Variables						
Awareness on IFAs	Yes (Reference)	35 (10%)	312 (90%)	1.000		
	No	22 (42%)	30 (58%)	.153	0.080 to 0.294	.000
Source of information about IFAs	Hospital (Reference)	10 (4%)	229 (96%)	1.000		
	Health Clubs	1 (3%)	28 (97%)	1.223	0.151 to 9.913	.425
	TV	11 (31%)	24 (69%)	.095	0.037 to 0.247	.000
	Radio	8 (27%)	22 (73%)	.120	0.043 to 0.336	.000
	Friends	6 (35%)	11 (65%)	.080	0.025 to 0.260	.000
Knowledge on malnutrition	Yes (Reference)	30 (12%)	228 (88%)	1.000		
	No	25 (18%)	113 (82%)	.595	0.334 to 1.059	.077
Source of IFAs	Health Center (Reference)	17 (7%)	214 (93%)	1.000		
	Dispensary	8 (13%)	53 (87%)	0.526	0.216 to 1.285	.159
	Sub-county Hospital	1 (2%)	62 (98%)	4.925	0.643 to 37.746	.125
	Private Pharmacy	4 (25%)	12 (75%)	0.238	0.069 to 1.819	.023

4.8. Multivariable Analysis

The researcher performed multivariable logistic regression analysis at a significance level of *alpha=0.05* in order to determine the relationship between the various factors and uptake of IFAs in Changamwe Sub-County. The results indicate that WCBA aged 15-25 years [OR = 0.225; 95% CI = 0.093 to 0.547; p < 0.05] were 78% less likely to

uptake IFAs compared to those aged 26-36 years. The results also indicate that WCBA who had no formal education [OR = 0.077; 95% CI = 0.009 to 0.670; $p < 0.05$] were 92% less likely to uptake IFAs compared to those with secondary level of education. Additionally, WCBA who did not receive IFAs during pregnancy [OR = 0.067; 95% CI = 0.021 to 0.218; $p < 0.05$] were 93% less likely to uptake IFAs compared to those who received IFA during pregnancy, while WCBA who did not take IFA drugs as per prescription [OR = 0.097; 95% CI = 0.033 to 0.287; $p < 0.05$] were 90% less likely to uptake IFAs compared to those who did. The results further indicate that WCBA whose source of information on IFAs was TV [OR = 0.134; 95% CI = 0.038 to 0.475; $p < 0.05$], and radio [OR = 0.095; 95% CI = 0.028 to 0.323; $p < 0.05$], were 87% and 90% respectively less likely to uptake IFAs compared to those whose source of information on IFAs was hospital.

Table 4.15: Regression of Uptake of IFAs on Demographic Characteristics of Women of Child Bearing Age in Changamwe Sub-County, Kenya, 2017

Independent Variables		IFAs Uptake		Regression Results		
		No	Yes	OR	95% CI	p-value
Age	26 – 37 (Reference)	17 (8%)	198 (92%)	1.000		
	15 – 26	33 (28%)	87 (72%)	0.225	0.093 to 0.547	.001
Marital status	Married (Reference)	34 (11%)	274 (89%)	1.000		
	Single	17 (27%)	47 (73%)	.534	0.199 to 1.432	.212
	Divorced	4 (36%)	7 (64%)	.247	0.018 to 3.358	.294
Education	Secondary (Reference)	153 (91%)	15 (9%)	1.000		
Level	No formal education	8 (53%)	7 (47%)	.077	0.009 to 0.670	.020
	Primary	118 (80%)	29 (20%)	.431	0.178 to 1.042	.062
Occupation	Housewife (Reference)	30 (19%)	125 (81%)	1.000		
	Salaried	4 (5%)	81 (95%)	1.662	0.447 to 5.794	.425
	Self-employed	13 (10%)	120 (90%)	1.701	0.663 to 4.365	.270
Family Size	1-3 (Reference)	37 (12%)	273 (88%)	1.000		
	No children	12 (55%)	10 (45%)	.303	0.077 to 1.190	.087
Visited ANC	Yes (Reference)	41 (11%)	336 (89%)	1.000		
	No	16 (73%)	6 (27%)	0.861	0.130 to 5.675	.876
Visited FP	Yes (Reference)	41 (12%)	288 (88%)	1.000		
Clinic	No	16 (23%)	54 (77%)	1.026	0.317 to 3.321	.966
Received IFA	Yes (Reference)	22 (6%)	331 (94%)	1.000		
during Pregnancy	No	35 (76%)	11 (24%)	0.067	0.021 to 0.218	.000
Took IFA	No (Reference)	51 (17%)	256 (83%)	1.000		
before Pregnancy	Yes	6 (6%)	86 (94%)	1.034	0.338 to 3.166	.954
Took IFA	Yes (Reference)	13 (4%)	316 (96%)	1.000		
drugs as per prescription	No	37 (59%)	26 (41%)	0.097	0.033 to 0.287	.000
Took IFA	Yes (Reference)	9 (3%)	266 (97%)	1.000		
drugs daily	No	40 (35%)	76 (65%)	0.343	0.111 to 1.063	.064
Took other	No (Reference)	35 (15%)	201 (85%)	1.000		
medications with IFA	Yes	15 (10%)	141 (90%)	0.997	0.376 to 2.646	.995
Took meals	No (Reference)	34 (17%)	169 (83%)	1.000		
with IFAs	Yes	13 (7%)	173 (93%)	1.562	0.589 to 4.143	.370
Awareness on	Yes (Reference)	35 (10%)	312 (90%)	1.000		
IFAs	No	22 (42%)	30 (58%)	49886 874.96	0.000	1.000
Source of	Hospital (Reference)	10 (4%)	229 (96%)	1.000		
information	TV	11 (31%)	24 (69%)	.134	0.038 to 0.475	.002
about IFAs	Radio	8 (27%)	22 (73%)	.095	0.028 to 0.323	.000
	Friends	6 (35%)	11 (65%)	.558	0.051 to 6.095	.632
Knowledge on	Yes (Reference)	30 (12%)	228 (88%)	1.000		
malnutrition	No	25 (18%)	113 (82%)	.633	0.227 to 1.763	.381
Source of IFAs	Health Center (Ref)	17 (7%)	214 (93%)	1.000		
	Dispensary	8 (13%)	53 (87%)	1.054	0.291 to 3.817	.937
	Sub-county Hospital	1 (2%)	62 (98%)	2.370	0.285 to 19.694	.424
	Private Pharmacy	4 (25%)	12 (75%)	0.242	0.053 to 1.101	.066

CHAPTER FIVE

DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

5.1. Discussion

5.1.1. Proportion of WCBA Taking IFA Supplements

The first objective of the study was to determine the proportion of WCBA in Changamwe Sub-county who had taken up IFA supplementation in the last five years preceding the study. The results revealed that a high proportion (85.7%) of the respondents reported to have used IFAs between January 2010 and December 2014. This is way above the current uptake and adherence rate of iron and folic acid supplements among pregnant women in Kenya whose national uptake rate is 24.6%. The rate of IFAs uptake was also higher compared to other countries. An Indian study according to Mithra *et al.* (2014) reported that 58.7% of the study participants had taken all the IFA supplements and compliance rate was at 64.7%. Other studies in Tanzania (Ogundipe *et al.* 2012), and Ethiopia (Gebremedhin *et al.* 2014) demonstrated that that in the, last 90 days of their pregnancy, only 16.1% and 23.4% of the study participants respectively had taken IFA supplements.

5.1.2. Practices Influencing Uptake of IFAs among WCBA

The second objective of the study was to determine the practices influencing IFAs uptake among WCBA in Changamwe Sub-county, Kenya. The practices considered in the analysis included visits to ANC, visits to FP clinic, receiving IFAs during pregnancy, taking IFAs before pregnancy, taking IFAs as per prescription, taking IFA drugs daily, taking IFAs with other medication, taking meals with IFAs and taking tea with IFAs.

The results suggested that receiving of IFAs during pregnancy had a significant relationship with uptake of IFAs. The results indicated that WCBA who did not receive

IFAs during pregnancy were 93% less likely to uptake IFAs compared to those who received IFA during pregnancy. The benefits of taking IFAs during pregnancy could be attributed for the increased likelihood to take IFAs. A study conducted in Bangladesh to understand community preparedness for IFAs uptake early in pregnancy established that most women who used IFAs during pregnancy reported better health and physical strength compared to those who failed to take the supplements (Alam *et al.,* 2015). They further observed that those women who took IFAs perceived them to boost blood volume leading to foetal nourishment and compensated for blood loss during delivery. However majority of the women who had not taken IFA were culturally informed that the supplements led to increase in foetus size which resulted to complications during delivery.

The results further indicated that taking IFAs as per prescription had significant relationship with uptake of IFAs. The results indicated that WCBA who did not take IFA drugs as per prescription were 90% less likely to uptake IFAs compared to those who did. This would significantly reduce the possibilities of contracting maternal anemia. The daily uptake of IFAS is in line to WHO recommendation of daily supplements for pregnant women (WHO, 2011). The WHO (2011) suggested that women who took daily iron supplements had higher haemoglobin and were less likely to have anaemia. This is also supported by Kaufer-Horwitz and Gómez (2010) who posits that collective provision of prenatal supplementation with iron or iron and folic acid per day of weekly was sucessful in anaemia and iron deficiency anaemia prevention. Nevertheless, the implementation of WHO recommendation on daily uptake of IFA supplements as demonstrated by many WCBA (68.9%) in Changamwe sub-county relies totally upon early inception of women into the programme and further guaranteeing consistent supply of the supplements all through the pregnancy period. Otherwise, the recommendations and the programme will have minimal impact on women in the reproductive age, raising their likelihood to succumb to maternal anemia.

5.1.3. Socio-demographic and Socio-economic Characteristics Influencing Uptake of IFAs among WCBA

The third objective of this study was to determine the socio-demographic and socio-economic characteristic influencing IFAs uptake among WCBA in Kenya's Changamwe Sub-county. The socio-demographic and socio-economic factors involved in the analysis included age, religious affiliation, marital status, education level, occupation, income level and family size.

The study established that the age of the WCBA in Changamwe had a significant relationship with uptake of IFAs. The findings indicated that WCBA aged 15-26 years were 78% less likely to uptake IFAs compared to those aged 26-37 years. However, there was no significant difference in uptake of IFAs between WCBA aged 26-37 years and those aged 37-49 years. The findings are inconsistent with the findings of Dinga (2013) who established that age of WCBA is not significantly associated with uptake of IFAs.

The findings also indicated that education level of the WCBA had a significant relationship with uptake of IFAs. The results indicated that the WCBA who had no formal education were 92% less likely to uptake IFAs compared to those with secondary level of education. However, there were no significant difference in uptake of IFAs between WCBA with secondary education and those with primary, college and university level of education. The findings are supported by Mithra *et al.* (2014) who indicated that the high uptake of IFAs in India was partly attributed to the education level of the study respondents. Another study conducted in Uganda on prevention of Spina Bifida, and Folic acid intake during pregnancy among WCBA attending ANC established that folic acid intake was limited in the area due to limited education level of the women (Bannink *et al*., 2015). However, Dinga (2013) established that education level of WCBA is not significantly associated with uptake of IFAs.

5.1.4. Health Related Factors Influencing Uptake of IFAS among WCBA

The fourth objective of the study was to determine health related factors influencing IFAs uptake among WCBA in Changamwe Sub-county, Kenya. The health related factors considered in the study included knowledge on IFAs, awareness on IFAs, sources of information about IFAs, knowledge on fortified foods, knowledge on malnutrition, and source of IFAs.

The results indicated that source of information about IFAs among WCBA in Changamwe had a significant relationship with uptake of IFAs. The results revealed that WCBA whose source of information on IFAs was TV and radio were 87% and 90% respectively less likely to uptake IFAs compared to those whose source of information on IFAs was hospital. However, there was no significant difference in IFAs uptake between WCBA whose source of information about IFAs was hospital and those whose source of information was health clubs and friends. The findings are consistent with the findings of Kimiywe *et al*. (2017) who indicated that the decision to take IFA supplements among WCBA in Kisumu and Migori was influenced more by the information they received from healthcare providers than by that from spouses or family members.

5.2. Limitations of the Study

The study acknowledges the following limitations:

1. The adoption of cross-sectional research design possess challenges in making causal inferences because cross-sectional studies only offer a snapshot. The risk factors and outcome are measured simultaneously, and therefore it may be difficult to determine whether the exposure proceeded or followed the outcome. In addition, the situation may deliver differing results if another timeframe had been chosen.
2. The study experienced item nonresponse which might have introduced nonresponse bias. Also, since the observed sample size was smaller than the sample size initially

planned, nonresponse may have had the effect of leading to estimators with larger variance than that which would have been obtained if complete response had been achieved.

5.3. Conclusion of the Study

The study concludes that:

1. Majority of WCBA in Changamwe sub-county had taken IFA supplements in the last five years preceding the study (between 2010 and 2014).
2. Practices such as uptake of IFAs during pregnancy and taking IFA supplements as per prescription had significant relationship with uptake of IFAs amongst WCBA in Changamwe Sub-county. The likelihood of IFAs uptake was high among WCBA who took IFAs during pregnancy and those who took IFAs as per prescription.
3. Socio-demographic and socio-economic conditions of the WCBA including age and education level were significantly associated with IFAs uptake in Changamwe sub-county. Increase in age and education level improved the likelihood of IFAs uptake increased with
4. Source of information on IFAs had significant relationship with uptake of IFAs amongst WCBA in Changamwe sub-county. The public health facilities, especially hospitals, were more effective in disseminating information on IFAs compared to other channels like TV and radio.

5.4. Recommendations of the Study

The study suggests the following recommendations:

1. The ministry of health alongside the county health department should promote behavior change communications among young WCBA through key messages and counseling to increase both demand and adherence to supplementation and uptake of IFA.

2. The Ministry of Health needs to invest in sensitization of the health care workers concerning the health benefits of IFAs preceding conception and during the pregnancy. Such sensitization forums should debunk some of the popularly held stereotypes connected with IFA supplementation such as giving birth to overweight babies which had made some women attending ANC and FP not to comply with IFA uptake. In addition, such awareness should also focus on other alternatives to IFAs such as fortified foods and dietary behaviours.
3. The ministry of health and the county department of health should develop most effective strategies to disseminate information on IFA supplementation through community-based channels to complement public health facilities.
4. The study should be replicated in other counties in Kenya with the aim of making comparison with the view of enhancing national policies and strategic interventions on IFA supplementation.

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APPENDICES

Appendix I: Consent Form

[A] ENGLISH VERSION

I am Mwanasha Ahmed Athman, a Master's student at Jomo Kenyatta University of Agriculture and Technology (JKUAT) in the Department of Public and Community Health, School of Public Health, College of Health Sciences. I am conducting a research on the ***'Factors influencing the uptake of Iron Folic Acid supplements among women of child bearing age (WCBA), 15-49 years in Mombasa County'*** in partial fulfillment of the requirements for the award of the degree of Master of Science in Public Health. It is my humble request that you voluntarily participate in this study by filling the questionnaire. The information you give will be used for the purpose of this research.

Questionnaire Number:_____

Date:_____

Respondent's Name (**optional**):_____

Address:_____

Iron and Folic Acid supplementation is offered to all pregnant women in Kenya and the study is soliciting for your views on the same. You are free to participate or not, if you decide to, you will respond to the questions attached. All this information will be treated as confidential. As we conduct this research we don't anticipate any risks for your participations. The information collected may benefit you directly and what we can learn from this study can provide general benefits to all women of reproductive age and the policy makers in the Ministry of health.

By signing this form you indicate that the consent form has been explained to you.

Participant number: _____

Participant name:

Sign : _____ Date: _____

[B] SWAHILI VERSION

UTAFITI: Sababu ambazo humuezesha mwanamke ambaye yuko kwenye umri wa kupata uja uzito kumeza madini ya IFA[Iron Folic Acid] katika wilaya ya Changamwe.

Nambari ya maswali ; _____

Tarehe : _____

Jina la Mtafiti : _____

Anwani: _____

Madini ya IFA yanapatikana katika zahanati zote za serikali ya Kenya na hupewa wanawake waja wazito. Huu utafiti ambao unafanywa hapa Changamwe ni kufafanua mbinu ambazo wanawake wa umri wa miaka kati 15-49 wanaelewa faida, na umuhimu wa kutumia madini ya IFA.

Ningependelea ushiriki katika utafiti huu kwa kujibu maswali yafuatayo (Kiambatisho 3). Hutalazimishwa kushiriki na hakuna athari yeyote utakayo pata kwa kushiriki ama kutoshiriki.Matokeo ya utafiti yatanufaisha wanawake wote na wizara ya afya katika mipangilio ya uwekezaji wa huduma hii. Majibu yako tutahifadhi kulingana na desturi zinazomiliki.

Ukiweka sahihi yako hapa inamaanisha umeelewa na kufahamu yote.

Nambari ya Mshiriki:_____

Jina la mshiriki:

Sahihi:_____ Tarehe:_____

Appendix II: Research Questionnaire

[A] ENGLISH VERSION

This study aims at investigating factors influencing the uptake of Iron and Folic Acid (IFA) supplements among Women of Child Bearing Age (WCBA), 15-49 years. The researcher is seeking your assistance in filling of this questionnaire. Kindly fill in the spaces provided or tick where necessary. Take note that the information given will only be used for the purpose of this research.

Questionnaire number: _____

Date filled/Received: _____

Researcher Assistant: _____

Section I: Social Demographic and Socio- Economic Characteristics

A) Characteristics of Women of Childbearing Age (WCBA), 15-49 years.

1. Age : 15-25 ( ) Age:26-36 ( ) Age:37-49 ( )
2. Residence : Subcounty _____ Location _____
3. Religion : Christian ( ) Muslim ( ) Akorino ( ) Others ( )
4. Marital status : Married ( ) Divorce ( ) Single ( ) Widow ( )
5. Education level: Primary ( ) Secondary ( ) College ( ) University ( ) None ( )

6. Occupation: Salaried ( ) Self employed ( ) Housewife ( ) Student ( ) Others ( )
7. Income (Kshs): <5,000 ( ) 6,000-10,000 ( ) 11,000-20,000 ( ) 21,000-50,000 ( ) >51,000 ( ) None ( )
8. No of children: 1-3 ( ) 4-6 ( )6 and More ( ) None ( )

(B) Characteristics of spouses among the married women (Don't fill this section if NOT married)

9. Age: ( ) 31-40 ( ) 41-60 ( ) >60 ( )
10. Education level: Primary ( )Secondary ( ) College ( ) University ( ) None ( )
11. Occupation: Salaried ( ) Self-employed ( ) Student ( ) Others ( )
12. Income (Kshs): <5,000 ( ) 6,000-10,000 ( ) 11,000-20,000 ( ) 21,000-50,000 ( ) >51,000 ( ) None ( )
13. Religion: Christian ( ) Muslim ( ) Akorino ( ) Others ( )

Section II: Proportion of Women of Childbearing Age (WCBA) taking IFAS

14. Have you ever taken IFAs [Iron Folic Acid supplements] in the last five years?

YES ( ) NO ( )

15. When was the last time you took IFA supplements?
Before 2010 ( ) 2010 ( ) 2011 ( ) 2012 ( ) 2013 ( ) 2014 ( )

16. If Yes in Q14, why did you take IFAs?

My spouse encourage me to take ( ) Advice by health worker ( )
To protect myself from anemia ( ) to improve general health ( )

To give birth to healthy baby ( )

17. If No in Q14, what is the reason for not using IFA's?

I eat well balanced diet ( ) Not attended antenatal clinic ( )

I don't like the taste ( ) my cultural belief does not allow ( )

Side effects ( ) my partner advised me not to take ( )
Other reasons……

Section III: Practices of WCBA towards IFAS Uptake

18. Have you visited ANC [Ante-natal] clinic?

YES ( ) NO ( )

19. Have you visited FP [Family Planning] clinic?

YES ( ) NO ( )

20. a. Have you ever received IFAs during pregnancy?

YES ( ) NO ( )

b. Have you taken IFAs before pregnancy?

YES ( ) NO ( )

21. If you have taken IFAs, did you take as prescribed by the health worker?

YES ( ) NO ( )

22. a. Have you been taking it daily?

YES ( ) NO ( )

b. If no what is the reason?

I don't like the taste ( ) Side effect ( )

I don't take medication prescribed ( ) I use other alternatives e.g. diet ( )

(Specify any side effects)……

23. Did you take other medications with IFAs?

YES ( ) NO ( )

Mention any……..

24. Did you take meals with IFAs?

YES ( ) NO ( )

25. Did you take tea together with IFAs?

YES ( ) NO ( )

26. Which foods do you take when pregnant? Mention

Protein ( )

sources……

Carbohydrates ( )

sources……

Vitamins ( )

sources……...

Minerals ( )

sources……..

Section IV: Health Related Factors Influencing IFAs uptake among WCBA

27. Do you know what IFAs is?

YES ( ) NO ( )

28. If yes, can you describe what IFA's is?

Iron and Folic Acid Supplement ( ) Iron supplement ( )

Folic Acid supplement ( ) Sulphadoxine Pyrethamine ( )

Don't know ( )

29. If yes in Q27, how many drugs are in IFA kit?

Two ( ) Three ( ) Four ( ) Many ( )

30. If Q29 the answer is Two, differentiate the color of the drugs

Red and yellow ( ) Blue and yellow ( )

Black and yellow ( ) Brown and yellow ( )

31. Have you heard about IFAs?

YES ( ) NO ( )

32. Identify the source of information:

TV ( ) Radio ( ) health clubs ( ) Hospitals ( ) Friends ( )

33. a. Do you know what fortification is?

YES ( ) NO ( )

b. Describe in your own words……

c. Give examples of foods that are fortified

Cereals _____

Flour_____

Other_____

34. a. Do you know what malnutrition is?

YES ( ) NO ( )

b. If Yes, describe in your own words…….

35. Do you know the consequences of malnutrition?

Birth defects ( ) Anemia ( )

Infection ( ) I don't know ( )

36. What was the source of IFA supplements you received?

Dispensary ( ) Health Centre ( )

Private Pharmacy ( ) Sub-county Hospitals ( )

Thank you for your response

[B] KISWAHILI VERSION

SEHEMU YA KWANZA

A) Hali za kijamii na kiuchumi za wanawake wa umri wa kuzaa watoto (miaka 15 hadi 49).

1. Umri
   15-25 ( ) 26-36 ( ) 37-49 ( )
2. Mahali unapoishi
   Wilaya……. Kata…….
3. Dini /ushirika
   Mkristo ( ) Muislamu ( ) Akorino ( ) Nyengine ( )
4. Pingu za maisha
   Umefunga ndoa ( ) Umeachika ( ) Upweke ( ) Mjane ( )
5. Elimu
   Shule ya msingi ( ) Sekondari ( ) Chuo ( ) Chuo kikuu ( )
6. Kazi
   Umeajiriwa ( ) Umejiajiri ( ) mke nyumbani ( ) mwanafunzi ( )
7. Mapato (Sarafu za Kenya)
   Chini 5000 ( ) 6000-10000 ( ) 11000-20000 ( ) 21000-50000 ( )
8. Watoto
   1-3 ( ) 4-6 ( ) 6-ziada ( ) Hakuna mtoto ( )

B) Uchambuzi kwa mabwana wa wanawake washiriki wa utafiti huu ambao wamefunga ndoa.(Kama huna bwana usijibu maswali haya).

9. Umri
   31-40 ( ) 41-60 ( ) zaidi ya 60 ( )
10. Elimu
    Shule ya msingi ( ) Sekondari ( ) Chuo ( ) Chuo kikuu ( )
11. Kazi
    Umeajiriwa ( ) Umejiajiri ( ) mwanafunzi ( ) kazi zengine( )
12. Mapato (Sarafu za Kenya)

Chini 5000 ( ) 6000-10000 ( ) 11000-20000 ( ) 21000-50000 ( )
zaidi ya 51K ( ) Hakuna ( )

13. Dini /ushirika
Mkristo ( ) Muislamu ( ) Akorino ( ) Nyengine ( )

SEHEMU YA PILI

Kiwango cha wanawake ambao wako katika umri wa uja uzito waliomeza tembe za IFA.

14. Je umewahi kumeza tembe za IFA kwa muda wa miaka mitano iliyopita?
Ndio ( ) La ( )

15. Eleza mara ya mwisho ulimeza tembe za IFA?
Kabla ya mwaka 2010 ( ) 2010 ( ) 2011 ( )
2012 ( ) 2013 ( ) 2014 ( )

16. Kama jawabu ni ndio (swali 14).Kwanini unameza tembe za IFA.?
Nilishawishiwa na bwanangu ( )
Najikinga na matatizo ya ukosefu wa damu ( )
Natarajia kujifungua mtoto mwenye afya nzuri ( )
Nimeshawishiwa na muuguzi ( )
Knawirisha afya yangu ( )

17. Kama jawabu ya ni La(swali 14)kwanini hujameza IFAs?

Nakula lishe bora ( )
Sipendelei ladha yake ( )
Matatatizo ya dawa baada ya kunywa ( )
Kukosa kufika kliniki ya waja wazito ( )
Mila yangu hairuhusu ( )
Sikupewa ruhusa na bwanangu ( )

SEHEMU YA TATU

Desturi za wanawake washiriki wa umri wa uja uzito kutokana na utumizi wa IFAs.

18. Je umewahi tembelea kliniki ya waja wazito?
    Ndio ( ) La ( )
19. Je umewahi tembelea kliniki ya kupanga uzazi?
    Ndio ( ) La ( )
20. a) Umepata tembe za IFAS wakati wa uja uzito?
    Ndio ( ) La ( )
21. b)Je umewahi meza tembe za IFAS kabla uja uzito?
    Ndio ( ) La ( )
22. Je kama ulimeza IFAS ulifuata maagizo ya mhudumu wa afya?
    Ndio ( ) La ( )

23. a) Je ulikua unameza dawa kila siku?
    Ndio ( ) La ( )

    b) Kama jawabu ya (swali 20) ni La, toa sababu ya kutomeza tembe za IFAS?

    Sipendelei ladha yake ( )

    Simezi tembe zozote ( )

    Athari za tembe baada ya kumeza ( )

    Natumia njia mbadala ya chakula ( )

    Toa mfano wa athari baada ya kumeza tembe za IFAS …….

24. Je unameza dawa nyengine ukichanganya na IFAS?
    Ndio ( ) La ( )

    Toa mfano wa dawa ……

25. Je unamiza dawa pamoja na chakula?
    Ndio ( ) La ( )

26. Je unakunywa chai ukimeza tembe za IFAS?
    Ndio ( ) La ( )

27. Toa mfano wa chakula unaachokula ukiwa mja mzito?
    Chakula cha kuongezea damu ……

    Chakula cha kujenga mwili ……..

    Vitamin ……..

    Madini mengine ……

SEHEMU YA NNE

28. Je unajua maana ya IFAS?
    Ndio ( ) La ( )

29. Jieleze inamaanisha nini? ……..
    Madini ya chuma na folic ( )

    Folic ( )

    Sijui ( )

    Chuma ( )

    Sulfa ( )

30. Je IFA ina mchanaganyiko wa madini mangapi?
    Mbili ( )

    Tatu ( )

    Nne ( )

    Nyingi ( )

31. Je unajua rangi ya dawa za IFAs
    Nyekundu na majano ( )

    Nyeusi na manjano ( )

    Samawati na majano ( )

    Chokolati na maanjano ( )

32. Je umesikia habari yeyote kuhusu IFAS kutoka kwa njia ya mawasiliano?
    Ndio ( ) La ( )

33. Taja njia ambayo ulisikia kuhusu matumizi ya IFAs

Televisheni ( )

Radio ( )

Vilabu ( )

Marafiki ( )

34. a)Je unajua kuhusu madini ongezeko kwa vyakula?
Ndio ( ) La ( )

b) fafanua kwa ufahamu wako ……

c) Toa mfano unaojua kwa vyakula hivi

Mbegu ……..

Unga ……

Vyakula vyengine ……

35. a) Je unajua ukosefu wa lishe bora?
Ndio ( ) La ( )

36. b)Fafanua …….

37. Unajua athari za ukosefu wa lishe bora?
Matatizo ya maumbile ya mtoto ( )

Ukosefu wa damu ( )

Magonjwa ya tatanishi ( )

Sijui ( )

38. Je ulipata tembe za IFAs wapi?
Zahanati ndogo ( )

Zaahanati kubwa ( )

Famasia ( )

Hospitali za wilaya ( )

Appendix III: Ethical Review Committee Approval

NACOSTI ACCREDITED

Pwani UNIVERSITY

ERC/MSc/041/2014

ETHICS REVIEW COMMITTEE

ACCREDITTED BY THE NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY AND INNOVATION (NACOSTI, KENYA)

CERTIFICATE OF ETHICAL APPROVAL

THIS IS TO CERTIFY THAT THE PROPOSAL SUBMITTED BY:

MWANASHA AHMED ATHMAN

REFERENCE NO:
ERC/MSc/041/2014

ENTITLED:
Factors influencing the uptake of antenatal supplements Iron folic acid among women of child bearing age in Changamwe Sub County

TO BE UNDERTAKEN AT:
MOMBASA COUNTY, KENYA

FOR THE PROPOSED PERIOD OF RESEARCH

HAS BEEN **APPROVED** BY THE ETHICS REVIEW COMMITTEE

AT ITS SITTING HELD AT PWANI UNIVERSITY, KENYA

ON THE **9th DAY OF MARCH 2015**

CHAIRMAN SECRETARY LAY MEMBER

PTO

Pwani UNIVERSITY
Ethics Review Committee
Pwani University, www.pu.ac.ke, email: r.thomas@pwaniuniversity.ac.ke, tell: 0719 182218
The ERC, Giving Integrity to Research for Sustainable Development

Appendix IV: Research Authorization from Mombasa County Government

COUNTY GOVERNMENT OF MOMBASA

DEPARTMENT OF HEALTH

OFFICE OF THE COUNTY DIRECTOR OF HEALTH

Uhuru Na Kazi Building, 5th Floor
Address: P.O Box 91040 – 80103, MOMBASA
Email: mspchd2013@gmail.com

Ref: MSA/CH/ADM.37 VOL.1/64 **Date: 10th August 2015**

The Medical Superintendent
Port Reitz District Hospital

RE: RESEARCH AUTHORIZATION
DR. MWANAISHA AHMED ATHMAN

The above named Doctor is stationed at Changamwe Sub County, a postgraduate student pursuing a Master of Science in Public Health at Kenyatta University of Agriculture and Technology (JKUAT).

She wishes to carry out research on factors influencing the uptake of Antenatal Supplements Iron and Folic Acid among women of child bearing age in Changamwe Sub County.

Kindly accord her the necessary support.

Thank you.

DR. SHEM PATTA
AG. COUNTY DIRECTOR OF HEALTH
MOMBASA COUNTY

Appendix V: Publication

INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH AND KNOWLEDGE
Website: www.ijirk.com ISSN- 2213-1356
E-mail: info@ijirk.com, editor@ijirk.com
Dhaka-1209, Bangladesh

Acceptance Letter

April 02, 2018

Dear Dr. Cromwell Mwiti Kibiti,

With much pleasure this is to inform that, the paper entitled ***"FACTORS INFLUENCING THE UPTAKE OF ANTENATAL IRON AND FOLIC ACID SUPPLEMENTS AMONG WOMEN OF CHILD BEARING AGE, 15-49 YEARS IN CHANGAMWE SUB COUNTY, KENYA"*** by **Mwanasha Ahmed Athman, Dr. Cromwell Mwiti Kibiti, Prof. Gideon Mutie Kikuvi & Ms. Mary Chepkorir Kerich;** Manuscript ID: **IJIRK- RR-M-300311** has been accepted by the Editorial Board based on the reviewers' reports and editorial considerations. The International Journal of Innovative Research and Knowledge (IJIRK) has decided to publish the paper with content unaltered in the running issue ***(Volume-3 Issue-3, March-2018).***

Your valuable work is very much appreciated by the International Journal of Innovative Research and Knowledge (IJIRK). The success and reputation of IJIRK owes much to all our submitting authors, who have toiled in the production of their work, and have chosen IJIRK as the journal they would like to publish in.

I believe that our collaboration will help to accelerate the global knowledge creation and sharing one step further. Again, thank you for working with IJIRK and I look forward to working together in the future.

With warmest regards,

Dr. Paul William
Editor-in-Chief
International Journal of Innovative Research and Knowledge (IJIRK)

Appendix VI: Location of Changamwe Sub-County