Factors Influencing Vitamin A Supplementation Among Mothers of Children Under Five Years Old Attending Mbagathi District Hospital, Nairobi, Kenya

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A Thesis submitted in partial fulfillment for the Degree of Master of Science in Public Health in the Jomo Kenyatta University of Agriculture and Technology

2010

DECLARATION

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

Signed ……. Date …….

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This Thesis has been submitted for examination with our approval as university supervisors.

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DEDICATION

To my husband, Isaac Kamau for his endless material, moral and technical support and my children Victor Mugoya and Esther Wacuka for bearing with my absence from them throughout the study period. Dear ones, you made this work possible, am forever indebted to you, I will always love you.

ACKNOWLEDGEMENT

First and foremost, I thank God Almighty for the gift of life, good health, the opportunity to pursue this course and successful completion of my studies. I extend my sincere gratitude to my supervisors; Dr. Anselimo Makokha and Mr. Joseph Mutai for their invaluable assistance, positive criticism, guidance, technical advice and constant encouragement throughout the course of this study. Thanks a lot for your tireless efforts and earnest dedication beyond the call of duty, in the supervision of this project.

I am forever indebted to my statistician, Dr. Isaac Mugoya for his valuable input and technical guidance during the development of the study protocol and analysis of the study results. I am grateful to the hospital management team at Mbagathi District Hospital for allowing me to use their facilities during the course of this study.

I express gratitude to all the staff at the Maternal and Child Health (MCH) clinic and Paediatric Outpatient Department (POPD), for their great support during the data collection period. I thank the Division of nutrition; Ministry of Public Health and Sanitation for their support in giving me data and relevant information on vitamin A supplementation in the country.

Many thanks to my classmates, the staff at the Institute of Tropical Medicine and Infectious Diseases (ITROMID), family members and friends for their support and encouragement and the Kenyan community among who this study was done.

TABLE OF CONTENTS

DECLARATION ..... **ii**

DEDICATION ..... **iii**

ACKNOWLEDGEMENT ..... **iv**

TABLE OF CONTENTS ..... **v**

LIST OF TABLES ..... **ix**

LIST OF FIGURES ..... **x**

LIST OF APPENDICES ..... **xi**

LIST OF ABBREVIATIONS AND ACRONYMS ..... **xii**

ABSTRACT ..... **xiii**

CHAPTER ONE

INTRODUCTION **1**

1.1 Background 1

1.2 Problem Statement 2

1.3 Justification 4

1.4 Research Questions 5

1.5 Objectives 5

1.5.1 General Objective 5

1.5.2 Specific Objectives 6

1.6 Assumptions of the Study 6

CHAPTER TWO

LITERATURE REVIEW 7

2.1 Physiology and Functions of Vitamin A 7

2.1.1 Forms of Vitamin A 7

2.1.2 Food Sources of Vitamin A 9

2.1.3 Absorption and Bioavailability of Vitamin A 10

2.1.4 Recommended Dietary Allowances for Vitamin A 10

2.1.5 Functions of Vitamin A 12

2.2 Vitamin A Deficiency 15

2.2.1 Causes of Vitamin A Deficiency 15

2.2.2 Consequences of Vitamin A Deficiency 15

2.2.3 High Risk Groups for Vitamin A Deficiency 18

2.2.4 Risk Factors leading to Vitamin A Deficiency 18

2.2.5 Strategies to Address Vitamin A Deficiency 19

2.3 Vitamin A Supplementation 20

2.3.1 Supplementation Goal 20

2.3.2 Postpartum Supplementation 20

2.3.3 Role of Supplementation 21

2.3.4 Vitamin A Supplementation Coverage among Kenyan Children 24

2.3.5 Combination of Vitamin A Supplementation with Immunization 25

2.3.6 Sustaining Vitamin A Supplementation Programme 26

2.4 Vitamin A Toxicity 27

CHAPTER THREE

MATERIALS AND METHODS 28

3.1 Study Design 28

3.2 Study Site 28

3.3 Study Population 29

3.4 Sampling and Sample Size 29

3.5 Data Collection 30

3.6 Research Variables 31

3.7 Data Management and Analysis 32

3.8 Ethical Considerations 33

3.9 Limitations of the Study 33

CHAPTER FOUR

RESULTS AND DISCUSSION 34

4.1 Socio-Demographic Data 34

4.2 Vitamin A Supplementation Awareness 36

4.2.1 Mothers' General Awareness 36

4.2.2 Awareness of Recommended Supplementation Schedule for Children ... 39

4.2.3 Awareness of Supplementation to Mothers 41

4.2.4 Awareness of Vitamin A Rich Food Sources 42

4.3 Attitudes and Beliefs towards Vitamin A Supplementation 44

4.4 Practices and Utilization of Vitamin A Supplementation Services 51

4.4.1 Practices and Utilization in Relation to Children 51

4.4.2 Practices and Utilization in Relation to Mothers 58

4.5 Association between Various Exposures and Outcomes 62

4.5.1 Bivariate Analysis: Association between Demographic Characteristics and Awareness / Utilization of VAS 62

4.5.2 Multivariate Analysis 67

4.6. Other factors affecting vitamin A supplementation 69

4.6.1 Problems / Constraints Experienced with Vitamin A Supplementation 69

4.6.2 How to Improve Vitamin A Supplementation 72

4.7 Hospital Records and Children's Cards 73

CHAPTER FIVE

CONCLUSIONS AND RECOMMENDATIONS 75

5.1 Conclusions 75

5.2 Recommendations 76

REFERENCES 78

APPENDICES 85

LIST OF TABLES

Table 1: Conversion of Provitamin A Carotenoids to Retinol 9

Table 2: RDA for vitamin A by age, gender and physiological state 11

Table 3: Recommended Dosage for Routine Vitamin A Supplementation 27

Table 4: Socio-Demographic Characteristics of Respondents 35

Table 5: Summary of Mothers' Vitamin A Supplementation Awareness 40

Table 6: Mothers' Attitudes and Beliefs about Vitamin A and VAS 45

Table 7: Practices and Utilization of VAS services 54

Table 8: Bivariate Analysis: Proportions of Utilization / Awareness among Various Demographic Variables 63

Table 9: Chi Squares and Two-tailed Statistics 66

Table 10: Multivariate Analysis 68

LIST OF FIGURES

Figure 1: Structures of common forms of vitamin A 8

Figure 2: Information Mothers had Heard about Vitamin A/VAS 37

Figure 3: Mothers' Awareness about Benefits of Vitamin A 38

Figure 4: Mothers' Awareness of Vitamin A Rich Food Sources 43

Figure 5: Mothers' Beliefs about Consequences of VAD 48

Figure 6: Mothers' Beliefs and Attitudes about Likely Hindrances to VAS 50

Figure 7: Proportion of Youngest Child that had Received VAS Up to Date ... 51

Figure 8: Reasons Why Child had Missed VAS 56

Figure 9: Period when mothers received VAS 58

Figure 10: Problems/Constraints Experienced with VAS 69

LIST OF APPENDICES

Appendix I: Questionnaire ……84

Appendix II: Health Workers In-Depth Interview Guide …….. 93

Appendix III: Mothers In-Depth Interview Guide …….. 94

Appendix IV: Focus Group Discussion Guide …… 96

Appendix V: Informed Consent Form …… 98

LIST OF ABBREVIATIONS AND ACRONYMS

ANC	Antenatal Clinic
FGDs	Focus Group Discussions
FNB	Food and Nutrition Board
HIV	Human Immunodeficiency Virus
IDIs	In-Depth Interviews
ITROMID	Institute of Tropical Medicine and Infectious Diseases
KEMRI	Kenya Medical Research Institute
MCH	Maternal and Child Health Clinic
MDG	Millennium Development Goal
MOPHS	Ministry of Public Health and Sanitation
NID	National Immunization Day
NIH	National Institute of Health
NMS	National Micro Nutrient Survey
POPD	Paediatric Outpatient Department
RDA	Recommended dietary allowances
SSA	Sub-Saharan Africa
TB	Tuberculosis
UNICEF	United Nations Children Emergency Fund
VAD	Vitamin A Deficiency
VAS	Vitamin A Supplementation
WHO	World Health Organization

ABSTRACT

Vitamin A deficiency is a significant public health problem in Kenya. Studies have shown that Vitamin A supplementation is one of the best proven and most cost-effective interventions to improve vitamin A status and save children's lives. However, despite VAS being administered free of charge to all postnatal mothers and children 6-59 months in Kenya, the coverage remains low. The main objective of this study was to assess factors affecting practices and utilization of Vitamin A supplementation among mothers with children below five years attending Mbagathi District Hospital. This was a descriptive cross sectional hospital based study that utilized both quantitative and qualitative methods. It was conducted among mothers attending the hospitals' Maternal and Child Health Clinic and Paediatric Outpatient Department. A total of 158 respondents were interviewed. Quantitative data was analyzed using *Epi Info* statistical software while *NVIVO* software was used for thematic analysis of qualitative data. Majority (94%) of the respondents reported having heard about vitamin A supplementation, their major source of information being the health worker (82%). About a half (52%) of the respondents had their children up to date with VAS but less than a half (43%) of the mothers had received vitamin A after delivery. While 58% of the respondents were aware that the recommended schedule for VAS for children is every 6 months, 49% were aware vitamin A was given to mothers. All the respondents (100%) who had heard about VAS reported it was useful to children. There were no negative beliefs or attitudes mentioned. Three quarters of the respondents' children had missed the vitamin A capsule because they were either not aware of the schedule (41%) or had stopped

coming to the clinic (34%). Most (91%) of the respondents had not encountered any problems/constraints with VAS services. In conclusion, mothers were very positive and supportive of VAS. However, the services were not adequately utilized due to lack of information and awareness among both the health workers and the mothers. The awareness and utilization of VAS services was noted to increase with the level of education and was also high among the employed compared to the unemployed. I recommend regular refresher courses for all health workers to increase awareness of the entire VAS programme by the Ministry of Health. In addition, they should enhance information, education and communication pertaining to VAS services to raise public awareness and advocacy. Further research to evaluate other aspects of VAS programme should be carried out.

CHAPTER ONE: INTRODUCTION

1.1 Background

Data from the World Health Organization shows that about 60% of all deaths, occurring among children aged under five years in developing countries, could be attributed to malnutrition. It has been estimated that nearly 50.6 million under-five children are malnourished, and almost 90% of these children are from developing countries (Faruque, et al., 2008).

Globally, an estimated 254 million pre-school children are vitamin A deficient. Vitamin A deficiency (VAD) is estimated to affect at least 250 million children in the developing world. It is a major contributor to child mortality in Sub-Saharan Africa, Kenya included, where an estimated 42% (43.2 million) of children under 5-years-old are vitamin A deficient. Effective and sustained VAD control could reduce under-five mortality in the region by 25% and avert over 645,000 child deaths annually (Aguayo and Baker, 2005). WHO listed Kenya among the 72 countries in the world believed to have low serum retinol levels following the 1999 National Micronutrient Survey Report in Kenya where 76% of children were vitamin A deficient (MOPHS, 2008). Approximately two-thirds of the 10.8 million child deaths that presently occur can be prevented by available interventions such as vitamin A supplementation (Masanja, et al., 2006). This is essential to meet the target of the 4th Millennium Development Goal (MDG) which is to reduce child mortality by two thirds among children below five years by the year 2015 (WHO, 2003).

Provision of vitamin A supplements every six months is a manageable, safe, quick and effective way to improve vitamin A status and save children's lives. According to the Beaton Report (1994) all-cause mortality among children aged 6–59 months was reduced by 23% through vitamin A supplementation in areas where vitamin A deficiency was a public health problem (Beaton, et al., 1994). Providing immunization-linked high-dose supplementation to new mothers soon after delivery impacts a further benefit to young infants through enrichment of breast milk. In Kenya, vitamin A is routinely given every six months to children below five years of age through the expanded programme on immunization. In addition, it is given to women within six weeks of delivery to help them build enough vitamin A reserves in breast milk that is in turn passed on to the newborn child (WHO, 2003).

Shortages of vitamin A capsules have not been reported nationally in Kenya because UNICEF together with other donors has constantly and consistently supplied them to the country.

1.2 Problem Statement

Vitamin A deficiency is a significant public health problem in Kenya. Currently, 84% of the Kenyan children below five years are vitamin A deficient, up from 76% in 1999 despite the presence of a government’s programme to supplement vitamin A countrywide. Vitamin A supplementation services are offered freely in all immunizing facilities in Kenya together with childhood immunizations to all children 6-59 months and post natal mothers but the coverage remains far below the target. Factors that affect the utilization of vitamin A supplementation (VAS) services by

the clients have not been fully and widely elucidated. It is not clear why the implementation of VAS services has been poorer than immunization services yet the two use the same delivery strategies and structures (MOPHS, 2008). This study assesses the factors affecting practices and utilization of VAS services among mothers of children under five years old attending Mbagathi District Hospital (MDH).

Vitamin A supplementation for children below five years in Kenya on routine basis, through the expanded programmes on immunization and has been low since 2000. Coverage further declined drastically from year 2007. Between January and June 2008, Nairobi Province had the lowest coverage in all the eight provinces nationally; 56.9% among children aged 6-11 months and 12.3% among children aged 6-59 months. Dagoretti Division, where MDH is located had the lowest coverage among the eight divisions in Nairobi Province during this period, of 40% among children 6-11 months old and 10.7% among children 6-59months old. The coverage is even lower for postnatal mothers nationally (MOPHS, 2008). These figures are far below the national target of 80%.

This low coverage is a major concern for the Ministry of Public Health and Sanitation (MOPHS). There seems to be a general lack of sufficient information and failure to recognize the need for VAS in the country leading to low coverage. Hence, the great need to explore this issue to assess the factors that affect the utilization of VAS services by the clients to help determine what measures need to be put in place to improve this coverage if the goal of eliminating vitamin A deficiency is to be achieved.

1.3 Justification

It is alarming to realize that, although the Kenyan government has continued to provide free vitamin A supplementation services to all children under five years of age and postnatal mothers, vitamin A deficiency among children under five years of age has increased from 76% in 1999 to 84% in 2008. There has not been reported any acute shortages of vitamin A capsules country-wide. There is also great need to understand why the coverage of VAS lags behind immunization services despite the two interventions being delivered using the same strategies and structures. Studies on the same are scarce and none is documented in MDH, Dagoretti Division, whose VAS coverage was the lowest nationally between January and June 2008.

Chronic Vitamin A Deficiency (VAD) leads to permanent loss of sight which is the major cause of blindness in children below five years of age. It has other profound negative health consequences including physical and mental growth retardation, impaired immunity, maternal mortality and poor pregnancy outcomes. Vitamin A supplementation is a short-term intervention to address VAD. Successful VAS entails improved delivery of supplements which is measured by the coverage. Low coverage means less delivery of supplements and vice versa. Successful supplementation programmes require appropriately designed information, education and communication (ICE) strategies. Designing such strategies requires pre-programme formative research to uncover barriers and facilitators for supplementation.

This study sought to identify the issues surrounding the low coverage of VAS services. This would guide the relevant divisions within the MOPHS to design

specific interventions that would raise vitamin A coverage in the country. This study forms a basis for future studies that may wish to answer other questions on VAS. It will also be used as a baseline for similar studies in future.

1.4 Research Questions

1.4.1 Do mothers with children under five years old attending MDH know and follow the government recommended schedule of VAS?

1.4.2 What are the attitudes, beliefs and practices of mothers of children under five years old attending MDH towards VAS?

1.4.3 What are the factors affecting VAS services at MDH?

1.4.4 Do the attitudes, beliefs and practices of the mothers affect the utilization of VAS services at MDH?

1.5 Objectives

1.5.1 General Objective

To assess factors affecting practices and utilization of vitamin A supplementation (VAS) services among mothers of children under five years old attending Mbagathi District Hospital (MDH).

1.5.2 Specific Objectives

1.5.2.1 To assess utilization of VAS services among mothers of children under five years old attending MDH.

1.5.2.2 To assess the attitudes, beliefs and practices of mothers of children under five years old attending MDH towards VAS.

1.5.2.3 To identify the factors affecting VAS services at MDH.

1.5.2.4 To determine the association between attitudes, beliefs, practices and utilization of VAS services by the mothers.

1.6 Assumptions of the Study

1.6.1 Health workers are knowledgeable about VAS and competent in service provision.

1.6.2 Vitamin A is available to all clients throughout the year.

CHAPTER TWO: LITERATURE REVIEW

Vitamin A deficiency is one of the leading micro-nutrient deficiencies of public health importance due to its irreversible consequences when they fully set in. WHO estimates that 1.4% of all deaths worldwide (0.8 million) are due to Vitamin A deficiency (VAD). Vitamin A deficiency is the leading cause of preventable blindness in children and raises the risk of disease and death from severe infections.

2.1 Physiology and Functions of Vitamin A

2.1.1 Forms of Vitamin A

Vitamin A is the collective name for a group of fat-soluble vitamins. It designates a group of retinoid compounds with the biologic activity of all-*trans*-retinol. It's normally stored in the liver. In general, there are two categories of vitamin A, depending on whether the food source is an animal or a plant.

- Preformed vitamin A: From animal foods. It is absorbed in the form of retinol (an alcohol), one of the most usable (active) forms of vitamin A. Retinol can be converted by the body into retinal (an aldehyde) and retinoic acid (a carboxylic acid), other active forms of vitamin A. Retinoids usually consist of four isoprenoid units with five conjugated carbon-carbon double bonds.

The structures of common forms of vitamin A are shown in Figure 1.

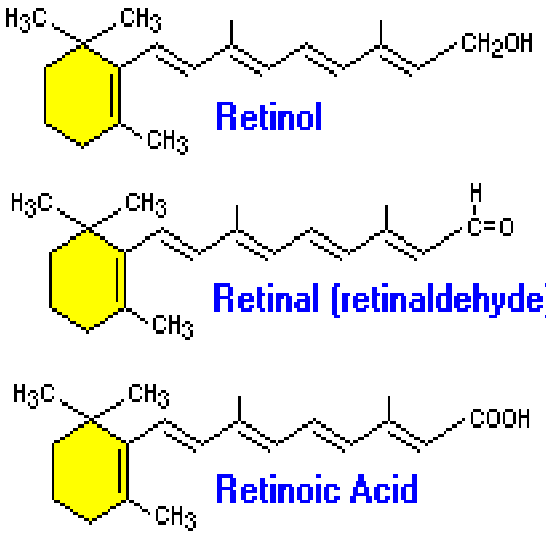

Figure 1: Structures of common forms of vitamin A

- Provitamin A carotenoid: From plant sources. They can be converted into retinol in the body. Common provitamin A carotenoids found in foods that come from plants are beta-carotene, alpha-carotene, and beta-cryptoxanthin. Among these, beta-carotene is most efficiently converted into retinol. Alpha-carotene and beta-cryptoxanthin are also converted to vitamin A, but only half as efficiently as beta-carotene. The various forms of Vitamin A and their conversion rates to retinol are shown in Table 1 (NIH, 2006; FNB, 2001).

Table 1: Conversion of Provitamin A Carotenoids to Retinol (FNB, 2001)

Substance and its chemical environment	**Micrograms of retinol equivalent per microgram of the substance**
Retinol	1
Beta- carotene, dissolved in oil	1/2
Beta- carotene, common dietary	1/12
Alpha-carotene, common dietary	1/24
Beta-cryptoxanthin	1/24

2.1.2 Food Sources of Vitamin A

Food sources of vitamin A can either be from animals in form of preformed Vitamin A or plants in form of Pro-vitamin A carotenoids. Animal sources include: egg yolk, liver, oily fish such as herring, pilchards, tuna, sardines, whole milk and milk products such as yoghurt, butter, cheese and margarine. Plant sources include yellow and dark green leafy vegetables such as spinach, broccoli, kales, lettuce, carrots, yellow or orange fruits such as ripe mango, papaya, guava, melon, passion fruit, red pepper herbs such as coriander and parsley, apricots, pumpkin, orange –fleshed sweet potatoes, tomatoes and avocado (FNB, 2001; NIH, 2006).

2.1.3 Absorption and Bioavailability of Vitamin A

Retinoids are fairly efficiently absorbed while pro-vitamin A carotenoids are less efficiently absorbed hence bio availability of vitamin A is higher from animal sources than from plant sources. Bio availability varies greatly depending on several factors: Retinoids are absorbed directly in blood hence rate of absorption is higher than pro-vitamin A carotenoids which are absorbed as chylomicrons. Pro-vitamin A carotenoids' absorption is reduced in diets low in fat because absorption of vitamin A requires dietary fat. It also depends on food mixture in which pro-vitamin A carotenoids are incorporated, effect of absorption and bio-conversion, nutrient status of the host, food preparation methods, interactions between various nutrients, genetic and host related factors as well as amount of pro-vitamin A carotenoids consumed in a meal since very high amounts are required to be converted to one unit of retinol as shown in Table 1 (MOPHS, 2008).

2.1.4 Recommended Dietary Allowances for Vitamin A

The average recommended dietary allowances (RDA) of retinol per day are 900mcg (3,000 IU) for men and 700mcg (2,310 IU) for women.

Table 2 shows the RDA for vitamin A by age, gender and physiological state.

Table 2: RDA for vitamin A by age, gender and physiological state (FNB, 2001).

Life Stage Group	Recommended Dietary Allowances (RDA) Adequate Intakes (AI*) µg/day	Upper Limit µg/day
Infants		
0–6 months	400*	600
7–12 months	500*	600
Children		
1–3 years	300	600
4–8 years	400	900
Males		
9–13 years	600	1700
14–18 years	900	2800
19 - >70 years	900	3000
Females		
9–13 years	600	1700
14–18 years	700	2800
19 - >70 years	700	3000
Pregnancy		
<19 years	750	2800
19 - >50 years	770	3000
Lactation		
<19 years	1200	2800
19 - >50 years	1300	3000

2.1.5 Functions of Vitamin A

Vitamin A (or retinol) is a fat-soluble vitamin that the body cannot produce and must be supplied in the diet. It is stored in the body, principally in the liver and is released as needed into the bloodstream, becoming available for use by cells throughout the body, including those of the eye. It plays an essential role in a large number of physiological functions that encompass vision, growth, reproduction, hematopoiesis and immunity thus is essential for the functioning of the immune system and the healthy growth and development of children. It strengthens the body's resistance to common diseases of childhood (including measles and diarrhea) and protects against blindness. It has been shown to regulate both the innate and adaptive immune responses (Garg, *et al.*, 2005; Haselow, *et al.*, 2004; Long, *et al.*, 2006; MOPHS, 2008). The functions include:

Vision: This is the major unique function of vitamin A in the body. It's essential for normal vision and ocular function. The role of vitamin A in the vision cycle is specifically related to the retinal form. Within the eye, retinal is bound to rhodopsin (rods) which is responsible for seeing black and white and enables people to see in dark/dim light and iodopsin (cones) which is responsible for visual process under bright light and helps translate objects into colour images (Combs, 2008).

Gene transcription: Vitamin A, in the retinoic acid form, plays an important role in controlling gene transcription. Once retinol has been taken up by a cell, it can be oxidized to retinal (by retinol dehydrogenases) and then retinal can be oxidized to retinoic acid (by retinal oxidase). The conversion of retinal to retinoic acid is an

irreversible step, meaning that the production of retinoic acid is tightly regulated, due to its activity as a ligand for nuclear receptors. Retinoic acid can bind to two different nuclear receptors to initiate (or inhibit) gene transcription: the retinoic acid receptors (RARs) or the retinoid "X" receptors (RXRs) (Combs, 2008).

Dermatology and skin health: Vitamin A appears to function in maintaining normal skin health. The mechanisms behind retinoid's therapeutic agents in the treatment of dermatological diseases are being researched. For the treatment of acne, the most effective drug is 13-cis retinoic acid (isotretinoin). Although its mechanism of action remains unknown, it is the only retinoid that dramatically reduces the size and secretion of the sebaceous glands. Isotretinoin reduces bacterial numbers in both the ducts and skin surface. This is thought to be as a result of the reduction in sebum, a nutrient source for the bacteria. Isotretinoin reduces inflammation via inhibition of chemotatic responses of monocytes and neutrophils. It has also been shown to initiate remodeling of the sebaceous glands; triggering changes in gene expression that selectively induces apoptosis (Nelson, *et al.*, 2008).

Immune function and resistance to infections: In almost every infectious disease studied, vitamin A deficiency has been shown to increase the frequency and severity of disease. Several large trials with malnourished children have demonstrated dramatic reductions in mortality from diseases such as measles by the simple and inexpensive procedure of providing vitamin A supplementation. This "anti-infective" effect is undoubtedly complex, but is due, in part, to the necessity for vitamin A in normal immune responses and sufficient antibody development. Additionally, many infections are associated with inflammatory reactions that lead to reduced synthesis

of retinol-binding protein and thus, reduced circulating levels of retinol. There is an extensive literature reporting that vitamin A deficiency induces important changes in the adaptive immune response such as reduced T lymphocyte proliferation and functionality and reduced response against specific antigens (Long, *et al.*, 2006).

Hematopoiesis: Studies have demonstrated that there exists a correlation between vitamin A status and hemoglobin level. Vitamin A is an important factor for normal hematopoiesis. Iron deficiency inhibits mobilization of vitamin A stores and decreases the absorption and utilization of vitamin A. Addition of retinyl palmitate to iron fortified maize-bread has been reported to enhance the absorption of iron. Comparatively more rise in hemoglobin with the supplementation of iron along with vitamin A also supports the interaction between iron and vitamin A metabolism (Garg, *et al.*, 2005).

Epithelial cell integrity: Many epithelial cells appear to require vitamin A for proper differentiation and maintenance such as skin, lungs and intestinal tract. Lack of vitamin A leads to dysfunction of many epithelia - the skin becomes keratinized and scaly and mucus secretion is suppressed. It seems likely that many of these effects are due to impaired transcriptional regulation due to deficits in retinoic acid signaling.

Tissue Differentiation: In the body there are many different cells with many different functions. Vitamin A is essential for differentiation of epithelial cells (those of the skin, the mucous membranes, the cornea and the blood vessel walls).

Bone metabolism and remodeling: Normal functioning of osteoblasts and osteoclasts is dependent upon vitamin A. It's essential for proper bone elongation (MOPHS, 2008).

Embryonic development and Reproduction: Normal levels of vitamin A are required for sperm production, reflecting a requirement for vitamin A by spermatogenic epithelial (Sertoli) cells. Similarly, normal reproductive cycles in females require adequate availability of vitamin A (MOPHS, 2008).

Antioxidant Activity: Extra unabsorbed carotenoids help trap and remove harmful radicals from the body (FNB, 2001).

2.2 Vitamin A Deficiency

2.2.1 Causes of Vitamin A Deficiency

Vitamin A deficiency occurs when insufficient vitamin A is consumed in the diet, too little is absorbed from the foods eaten, or too much is lost due to illness such as chronic diarrhoea. Vitamin A deficiency (VAD) is primarily caused by dietary inadequacy. It can also result from rapid utilization of vitamin A during illness (particularly measles, diarrhea, and fevers), pregnancy and lactation and during phases of rapid growth in young children (Haselow, *et al.,* 2004).

2.2.2 Consequences of Vitamin A Deficiency

Vitamin A deficiency is an important determinant of safe motherhood and child survival. Globally, it is estimated that 140–250 million children under five years of

age are affected by VAD which is one of the most common nutritional disorders. It's a contributing cause of an estimated 9% of child deaths (WHO, 2003). Every year, between 250,000 and 500,000 children around the world go blind from a lack of vitamin A in their diet; 70% of these children die within one year of becoming blind (NIH, 2008). In Sub-Saharan Africa region, wide extrapolations from national survey data estimate that 42% of children 6-59 months (43.2 million children) are at risk of VAD. It is a major contributor to child mortality in SSA region; Kenya included (Bendech, *et al*., 2007). Research also suggests that VAD is an important factor in increasing the risk of maternal morbidity and mortality. Globally, 20 million pregnant women and 18% of all women suffer from VAD. It contributes to an estimated 13.2% maternal deaths. Maternal VAD during lactation rapidly disposes the nursing child to severe VAD (West, 2002; Stoltzfus, 1994).

Vitamin A deficiency Xerophthalmia, an advanced form of ocular symptoms and signs, unfortunately occurring after other tissues have been impaired, is the most specific indicator of VAD. Xerophthalmia refers to partial or total blindness due to damage of the cornea as a result of severe dryness and opacity of the cornea from a severe VAD. It develops systematically starting with night blindness - impaired vision in dim light due to moderate deficiency followed by drying of the eye especially the conjunctiva. Conjuctival xerosis then follows which is an abnormal dryness accompanied by development of bitot's spots (foamy, soapy whitish patches on the white part of the eye). If this is not addressed, it proceeds to corneal xerosis (cloudy, dry corneal surface) and corneal ulceration. If not treated, softening of the cornea follows called keratomalacia which is reversible upon treatment. If not

treated, the softened cornea starts forming permanent hard scars which lead to permanent loss of sight. Globally, 4.4 million children and 6.2 million women suffer from xerophthalmia (West, 2002).

Vitamin A deficiency also causes skin lesions, inhibited growth and bone development and loss of weight in the young as well as increased susceptibility to infection and increased risk of mortality from infectious disease especially in malnourished children. It also affects iron metabolism, more so, when deficiencies of both nutrients coexist. Abnormal function of many epithelial cells, manifest by such diverse conditions as dry, scaly skin, inadequate secretion from mucosal surfaces, infertility, decreased synthesis of thyroid hormones and elevated cerebrospinal fluid pressure due to inadequate absorption in meninges (MOPHS, 2008; UNICEF, 2007; WHO, 2003; West, 2002; Sommer, 1992).

Vitamin A deficiency remains a major problem facing Kenya's poor and needy population hence the need for supplementation. Its impact in this population is worsened by the HIV/AIDS pandemic. Recent studies have found that HIV/AIDS is associated with vitamin A deficiency in developing countries thus supplementation among the HIV positive in addition to all the vulnerable groups of the population mostly infants, preschool children, school-age children, and women of child-bearing age. Positive response has also been reported on the complications associated with HIV when vitamin A supplementation is administered (Hongo, 2003). According to the 1999 National Micronutrient Survey Report in Kenya, 76% of children were vitamin A deficient while this figure increased to 84% in 2008. High risk regions were identified as the Coastal region (Mombasa, Kwale), the Lake Region (Kisumu,

Bungoma), Semi-arid lands (Baringo), and Eastern Province (Mbeere, Meru) (MOPHS, 2008).

2.2.3 High Risk Groups for Vitamin A Deficiency

Children aged 6-59 months comprise the highest risk group. Those with severe malnutrition, measles, diarrhea, TB, HIV, malaria and respiratory tract infections, low birth weight babies, non- breastfed infants, children with little vitamin A rich foods in diet, babies born to mothers with low body stores of vitamin A, all young children living in high risk areas or during emergency are particularly affected. Children under two years of age are at highest risk of death due to VAD – 70% of lives saved are among the 6-24 months old group. Lactating and pregnant women, people living with HIV/AIDS and other immune-suppressed conditions and any other person whose diet is low in vitamin A or with mal-absorption problems form a second category of high risk group. This is because of their increased vitamin A needs (MOPHS, 2008; Haselow, *et al.*, 2004).

2.2.4 Risk Factors leading to Vitamin A Deficiency

There are several factors that predispose to high risk of developing VAD. Consumption of diets low in vitamin A which leads to fewer amounts than the body requires, poor nutritional status of an individual and consumption of diets low in fats all predispose to VAD because fats are required to aid in absorption of vitamin A which is a fat- soluble vitamin. Other factors include: malabsorption problems,

infections such as measles, diarrhea, TB, HIV/AIDS, malaria and respiratory tract infections all of which decrease appetite, damage the gut hence reduce absorption of vitamin A into the body and increase vitamin A needs. Pregnancy is also a risk factor because it increases vitamin A needs in the body for the growing foetus (MOPHS, 2008).

2.2.5 Strategies to Address Vitamin A Deficiency

Vitamin A Supplementation has been proved to be an efficient and effective way to mitigate against VAD for all age groups. In this regard, the Kenyan government has adopted VAS for children between 6 months and 59 months with two doses per year 6 months apart and for postpartum mothers with one dose of 200,000 IU within 6 weeks of delivery. Further to this, dietary diversification and modification to include increased production, availability, access and intake of vitamin A rich foods has been adopted. In addition, consumption of vitamin A fortified foods such as oils and fats is another strategy the government has adopted. Public health measures such as control of helminthes infections, control of malaria, promotion, protection and support of exclusive breastfeeding for the first 6 months and continued breastfeeding up to 24 months and nutrition education has proved an effective strategy as well (MOPHS, 2008; UNICEF, 2007; WHO, 2003).

2.3 Vitamin A Supplementation

2.3.1 Supplementation Goal

As part of the global call to action, the UN Special Session on Children in 2002 set as one of its goals the elimination of VAD and its consequences by the year 2010. The strategy to achieve this goal is to ensure that young children living in areas where the intake of vitamin A is inadequate receive the vitamin through a combination of breast feeding, dietary improvement, food fortification and supplementation. Combining the administration of vitamin A supplements with immunization is an important part of this effort. This is essential to meet the target of the 4th MDG which is to reduce child mortality by two thirds among children below five years by the year 2015 (WHO, 2003).

2.3.2 Postpartum Supplementation

Vitamin A is transferred from mother to child via the placenta during gestation and in breast milk during lactation. The mammalian strategy for providing vitamin A to offspring is to ensure that the foetus acquires adequate but small amounts of the vitamin during gestation and to provide plentiful vitamin A postnatally through breast milk so that the infant rapidly builds protective stores of vitamin A. Maternal VAD can naturally compromise these otherwise normal processes (Stoltzfus, 1994). Providing immunization-linked high-dose supplementation to new mothers soon after delivery has provided a further benefit to young infants through enriched breast milk. Opportunities currently exist to administer supplements to women at delivery. Alternatively, mothers can receive their post-partum dose at the time of the

newborn's first immunization contact for BCG (Bacille Calmette-Guérin), an anti-tuberculosis vaccine. Post-partum VAS lags behind efforts for young children. In Kenya, its coverage was 10% in 2004 while for BCG was 87%. This BCG contact clearly represents a missed opportunity to replenish the vitamin A stores of deficient mothers (UNICEF, 2007).

2.3.3 Role of Supplementation

Delivery of high-dose supplements remains the principal strategy for controlling vitamin A deficiency. Moreover, vitamin A supplementation is recognized as one of the most cost-effective interventions for improving child survival. Thus, achieving and maintaining high coverage of vitamin A supplementation is crucial to attaining Millennium Development Goal 4: reduce by two thirds the mortality rate among children under five years by 2015. Periodic supplementation improves vitamin A status by increasing liver stores and tissue concentrations of retinol. Guaranteeing high supplementation coverage is therefore critical, not only to eliminating VAD as a public-health problem, but also as a central element of the child survival agenda (UNICEF, 2007).

Through the efforts of WHO and its partners, an estimated 1.25 million deaths since 1998 in 40 countries due to VAD have been averted (WHO, 2008). More than 94 million doses of vitamin A were administered in 41 countries in 1998, helping to avert nearly 169,000 deaths. During 1999, administration of more than 97 million doses in 50 countries helped avert an estimated 242,000 deaths (Ching, *et al.*, 2000). In developing countries, up to one-third of deaths in pre-school-age children could be

averted by improving VAS (Aguayo and Baker, 2005). Effective and sustained VAD control could reduce under-five mortality in SSA by 25% and avert over 645,000 child deaths annually (Haselow, *et al*., 2004).

A meta-analysis of several large vitamin A trials has shown that improving vitamin A status reduces mortality rates by between 23–34% among children six months to five years of age if VAS is given at least twice per year at coverage rates of at least 80% (Masanja, *et al.*, 2006; Beaton, *et al.*, 1994). VAS has consistently reduced overall infant mortality, diarrhea-associated infant mortality, and the severity of pathogen-induced diarrheal disease episodes (Long, *et al.*, 2006). A randomized double blind trial showed major reduction of malaria morbidity with combined vitamin A and zinc supplementation in young children in Burkina Faso: 34% decrease in the prevalence of malaria in the supplemented group compared to 3.5% in the placebo group with a 30.2% reduction of malaria cases in the supplemented group (Zeba, *et al.*, 2008).

Periodic VAS to children 6-59 months is a useful public health strategy to improve child survival and to decrease the risk of nutritional blindness and of morbidity of infectious origin from measles, severe diarrhea, HIV, malaria and intestinal helminthiases. The beneficial effects of vitamin A supplementation among children with severe measles could be mediated by a short-term increase in antibody production, possibly as a result of increased lymphocyte proliferation. The effect on severe diarrhea is likely due to the role of vitamin A in restoring and maintaining gut mucosal integrity. The apparent benefit for survival and growth among HIV-infected

children could also be related to the latter, through decreased nutrient losses and improved nutritional status (Villamor and Fawzi, 2005).

Improving vitamin A status of deficient children increases their chances of survival: Risk of death from measles, diarrhea and malaria can be reduced by 50%, 40% and 30% respectively while risk of all-cause mortality can be reduced by 23 % (Beaton, *et al.,* 1994; MOPHS, 2008). Improving vitamin A status in children also prevents night blindness, xerophthalmia, corneal destruction and blindness, may reduce birth defects, reduces severity of malaria episodes, reduces anaemia and may prevent epithelial and perhaps other types of cancer. Improving vitamin A status of postpartum women: Restores the mothers' vitamin A stores, increases the vitamin A content of breast milk, improves infant vitamin A status, and may help prevent VAD in high risk infants. It decreases infant morbidity/mortality and improves maternal health (Haselow, *et al.,* 2004).

It is possible that in areas with a high prevalence of both VAD and HIV infection, the reduction in mortality following vitamin A repletion is lower than in regions with a high prevalence of vitamin A deficiency and a low prevalence of HIV infection. In a trial in Tanzania, for instance, vitamin A supplementation of a cohort of children 6 to 59 months old, in which 9% of the children were HIV-infected, resulted in a 49% reduction of all-cause mortality. Among the HIV-infected children, all-cause mortality was reduced by 63% (Fawzi, *et al.*, 1999). In the light of these findings, it has recently been concluded that VAS of HIV-infected children appears to be beneficial in reducing the incidence, severity and mortality of diarrhea, one of the leading causes of child mortality in sub-Saharan Africa (Aguayo and Baker, 2005).

2.3.4 Vitamin A Supplementation Coverage among Kenyan Children

Vitamin A supplementation for children below five years in Kenya through EPI and on routine basis has been low since 2000. Overall, the VAS coverage from 2007 at all age groups and at all levels was far lower than the over 80% coverage that Kenya reached the previous two years. The 2000 Multiple Indicator Cluster Survey (MICS) by Ministry of Health (MOH) reported coverage of 42%. In 2003 the national Kenya Demographic Health Survey (KDHS) reported coverage of 32.5% (KDHS, 2003). Results from secondary data analysis that was collected during campaign coverage since 2000 were always higher than routine data. National Immunization Days (NIDS) coverage in 2000 reached 90% while in 2002, 91% coverage was attained through a VAS and Measles campaign. Between 2004 and 2006, through the use of immunization campaigns, Kenya increased VAS coverage reaching 80% with two doses in 2006.

In early 2007, the MOH decided to reduce the use of campaigns for both immunization and VAS. Instead, MOH decided to support increased delivery of routine services using fixed health facilities countrywide. This strategy was supported by a communication campaign called "Malezi Bora" which happens twice a year and encourages the use of all routine health services provided at fixed-site health facilities throughout the year. The change in strategy resulted in a major drop in national VAS coverage. Reports show that only 14.8 % of children 6-59 months were reached between January and June 2007, 19.8 % between July and December 2007 and 19.5% between January and June 2008. Coverage was always much higher in children 6-11 months because their VAS is usually given during their

immunization visits at health facilities: 61.9% between January and June 2007, 71.9% between July and December 2007 and 73.1% between January and June 2008. However, the coverage was always lowest for children aged 12-59 months: 8.4% between January and June 2007, 12.7% between July and December 2007 and 12.2% between January and June 2008 (MOPHS, 2008).

2.3.5 Combination of Vitamin A Supplementation with Immunization

Immunization services often provide the only reliable routine contacts with health services for mothers and their children thus offer unrivalled opportunities for delivering vitamin A supplements. Studies show that vitamin A does not have any negative effect on seroconversion of childhood vaccines (WHO, 2003). It does not interfere with the antibody response but instead enhances it in some of the vaccines given such as polio virus type 1 vaccine (Bahl, *et al*., 2002). The Expanded Programme on Immunization (EPI) works in coordination with nutrition programmes to promote administration of supplementation by linking delivery of the vitamin to immunization programmes in three ways: (1) routine immunization services (2) supplementary immunization events, such as national immunization days (NIDs) or vaccination campaigns against measles, tetanus and polio and (3) treatment of measles and xerophthalmia (WHO, 1999). Since 1987, WHO has advocated the routine administration of vitamin A with measles vaccine in countries where VAD is a problem. Great success and many millions of children have been reached by including vitamin A with NIDs to eradicate polio. Immunization campaigns have allowed a large number of children in countries with clinical and subclinical VAD to

receive supplements of vitamin A. An increasing number of countries are providing vitamin A supplements as a part of their immunization campaigns and other routine health activities (Ching, *et al.*, 2000).

2.3.6 Sustaining Vitamin A Supplementation Programme

Although supplementation and fortification programmes can be effective, sustainability has been an issue in terms of efficacy, effectiveness and cost effectiveness especially in developing countries (Low, *et al.*, 2007). With the role of VAS coverage as a proxy for programme effect and an internationally agreed-on indicator of progress towards child survival goals, strengthening monitoring at all levels is key. Globally, a key barrier to sustainable programming remains the lack of recognition of the need for VAS. Although opportunistic linkages with other interventions produced high coverage, minimum efforts have been made to effectively communicate the importance of vitamin A for child survival. Knowledge, attitude, and practice surveys have revealed this failing at all levels, from consumers to policymakers. Until this knowledge gap is addressed, a transition from a push-driven to a demand-driven intervention cannot be expected (Dalmiya, *et al*., 2006). Successful supplementation programmes require appropriately designed information, education and communication strategies. To ensure VAS is accepted and adhered to by caregivers, it is necessary to ensure that motives are clearly explained, specific questions answered and clear instructions are given (Hill, *et al.*, 2007).

2.4 Vitamin A Toxicity

High storage levels of vitamin A in the body that can lead to toxic symptoms are called hypervitaminosis A. Since vitamin A is fat-soluble, disposing of any excesses taken in through diet is much harder than with water-soluble vitamins. Vitamin A and most retinoids are highly toxic when taken in large amounts, and the most common cause of this disorder in both man and animals is excessive supplementation. In contrast, excessive intakes of Pro - vitamin A carotenoids are not reported to cause disease because they act as anti-oxidants (FNB, 2001).

There are four major adverse effects of hypervitaminosis A: Birth defects, liver abnormalities, reduced bone mineral density that may result in osteoporosis and central nervous system disorders. Signs of acute toxicity include nausea and vomiting, headache, dizziness, blurred vision, muscle and abdominal pain and muscular uncoordination (NIH, 2006). To avoid toxicity through supplementation, WHO has given the recommended schedule of supplementation to be used worldwide and is being used in Kenya (Table 3).

Table 3: Recommended Dosage for Routine Vitamin A Supplementation (WHO, 2003)

Target Group	**Dosage (IU)**	**Frequency**
Lactating mothers (not pregnant)	200,000	Single dose at delivery or within 6 weeks of delivery
Infants 6-11 months	100,000	Single dose
Children 12-59 months	200,000	Single dose every 6 months

CHAPTER THREE: MATERIALS AND METHODS

3.1 Study Design

This was a descriptive cross-sectional hospital based study conducted in two departments in Mbagathi District Hospital (MDH); Maternal and Child Health Clinic (MCH) and Paediatric Outpatient Department (POPD). It utilized both quantitative and qualitative methods in data collection, was done once during the month of June 2009 and respondents were interviewed once. Child welfare clinic (road to health) cards were reviewed for records of vitamin A supplements administration. The VAS hospital records were also reviewed on a daily basis for the whole month to verify utilization and recording of VAS services.

3.2 Study Site

The study was conducted in two departments; MCH and POPD at Mbagathi District Hospital which is the largest district hospital in Nairobi province, Kenya. It is located in Dagoretti Division, Nairobi West District, approximately 3 kilometers from Nairobi city centre. It started functioning as a general hospital in July 1995 with an aim of decongesting the national referral hospital, Kenyatta National Hospital. It serves as a referral hospital for all the health centres and dispensaries in Nairobi Province. The MCH provides preventive services only, to both mothers and children under five years old including child welfare, antenatal and family planning services. On the other hand, POPD provides curative services to all children under five years of age.

3.3 Study Population

The study focused only on the mothers with children below five years old attending MDH; MCH and POPD.

3.3.1 Inclusion Criteria

All mothers attending MDH; MCH and POPD with children under five years who consented for the study irrespective of their physiological state.

3.3.2 Exclusion Criteria

3.3.2.1 Mothers attending MDH; MCH and POPD with children beyond 5 years.

3.3.2.2 Refusal to give informed consent.

3.3.2.3 Mothers of children needing urgent attention like emergency cases.

3.4 Sampling and Sample Size

3.4.1 Sampling

A systematic random sampling of study participants was done. Every alternate client was recruited and questionnaires administered to the clients to make 158 respondents. Key informants were purposively chosen for in-depth interviews and focus group discussions as outlined in data collection.

3.4.2 Sample Size Determination

Sample size was calculated based on VAS coverage data among children 6-59 months old for Dagoretti Division where MDH is located between January and June 2008 which was 10.7%. Using Fisher's formula, the sample size of 147 participants, was calculated as follows (Fisher, 1960).

$$n = Z^2 P (1-P) / d^2 = \frac{1.96^2 \times 0.107 \times (1 - 0.107)}{0.05^2} = 147$$

Where:

n = Required sample size

Z = Confidence level at 95% (standard value of 1.96)

P = Prevalence of VAS coverage among children 6-59 months old in Dagoretti division (10.7%)

d = Level of Precision at 5%

3.5 Data Collection

Quantitative data was collected by administering semi-structured questionnaires to mothers with children under five years old attending MCH and POPD at Mbagathi District Hospital. The main topics in the questionnaire were; socio-demographic data, VAS awareness, attitudes and beliefs, utilization and practices as well as other factors affecting VAS services at MDH (appendix I). The questionnaires were translated into Kiswahili then pre-tested by administering to mothers at MCH prior to commencement of the study. Questions found not to be well understood were discussed with the staff then revised and rephrased as per attached appendix 1.

Qualitative data was collected through focus group discussions and in-depth interviews of both the mothers and the staff to get richer responses and allow more valuable insights. Two focus group discussions (FGDs) were conducted; one at MCH and the other one at POPD consisting of 8-10 mothers each. The aim of FGDs was to

ascertain uniformity of practices. A total of five in-depth interviews (IDI) were purposively conducted which consisted of; one mother at MCH, one mother at POPD, nursing officer in charge at MCH, nursing officer in charge at POPD and the nutritionist at MCH. The aim of the IDI was to establish individual practices. Guides for the FGD and IDI were developed and used (appendix II, III, IV). The FGDs and IDIs were tape-recorded but prior permission to use the gadgets was sought. Child welfare clinic (road to health) cards were reviewed for records on vitamin A supplements administration. The VAS hospital records were also reviewed on a daily basis for one month to verify utilization and recording of VAS services. Three field assistants, consisting of nurses that were off duty during the period of data collection, were recruited and trained for a day on administration of questionnaires and conducting FGDs and IDIs to assist in data collection.

3.6 Research Variables

3.6.1 Independent Variables:

The independent variables of interest were: Age, marital status, education level, occupation, number of living children, residence, attitudes, beliefs, practices and problems / constraints on VAS.

3.6.2 Dependent Variable:

Awareness and utilization of vitamin A supplementation services.

3.7 Data Management and Analysis

Quantitative data was coded after collection then entered, validated and analyzed using *Epi Info version 3.3.2* statistical software. To ensure confidentiality, the computer access was restricted by password protection. Each questionnaire had a unique identifier to allow validation. Data cleaning and validation were done prior to analysis. Descriptive statistics including frequency distribution and proportions were done for different groups: level of education, marital status, age groups, number of children and occupation. Univariate analysis was done to demonstrate distributions of various exposures. Proportions of independent variables in different groups were compared by calculating chi square(x^2). To measure strength of association between the exposures and the outcomes, bivariate analysis was done; prevalence ratio (PR) was calculated by constructing 2x2 contingency tables and dividing the products of cross-multiplication. Ninety five percent confidence intervals (95% CI) and two-tailed p-value were calculated to assess significance of results obtained. Two-tailed level of significance used was 5% (p-value 0.05). To control for confounders and effect modification, factors found to be statistically significant were used for multivariate analysis.

Thematic analysis was used for qualitative data. Tape-recorded data from the IDIs and FGDs was transcribed and translated into English. It was then typed in Microsoft Word and exported to *NVIVO version 7* software for analysis. Files were created into FGD and IDI after which themes were created followed by coding and placing of codes on the themes. The data was then described.

3.8 Ethical Considerations

Approval for scientific and ethical issues was sought from the KEMRI Scientific Steering Committee and Ethical Review Committee respectively. Emphasis on issues of confidentiality and privacy were made clear at the time of consenting to participate in the study. The purpose of study was made clear to participants who were required to give informed consent prior to their voluntary participation in the study (see appendix V). Information was kept confidential by restricted access and coding of questionnaires. Mbagathi District Hospital authorities were notified of the study and findings will be shared with the hospital authorities.

3.9 Limitations of the Study

3.9.1 Most information about VAS was by history, which could have led to recall bias.

3.9.2 The study was restricted to one site and may not be generalized to other areas with different demographic characteristics.

CHAPTER FOUR: RESULTS AND DISCUSSION

4.1 Socio-Demographic Data

A total of 158 respondents were interviewed. They had come for various services in the hospital; about half (49%) had taken their sick children for treatment followed by those who had taken their children to the children's welfare clinic (37%). Those that had gone for antenatal services comprised 7% and another 7% had attended family planning services. Nearly all (96%) of the respondents were Christians while 4% were Muslims. A greater part of the respondents were aged between 23 years and 27 years with their mean, median and mode being 26 years. The youngest mother was 18 years while the oldest was 41 years.

Most (83%) of the respondents were married, a few were single (13%), separated (3%) and widowed (1%). A good number of the mothers interviewed were either housewives (45%) or self-employed (26%). The rest were either in formal employment (19%) or unemployed (6%). The highest level of education that the largest proportion (41%) of the respondents had attained was up to upper primary. The others had gone up to; secondary (31%), college (22%), lower primary (5%), university (0.5%) and 0.5% had not gone to school at all. The highest proportion (46%) of the respondents had one child followed by those with 2 children (28%). Majority (67%) of the respondents were residents of Nairobi West District. A minority (4%) of them had come from outside Nairobi Province.

Table 4 summarizes the socio-demographic characteristics of the respondents.

Table 4: Socio-Demographic Characteristics of Respondents

Variable	Number	Percentage
1.Department		
MCH	81	51.3
POPD	77	48.7
2. Maternal age		
Below 20	3	1.9
20-25	72	45.6
26-30	57	36.1
30-35	20	12.7
Above 35	6	3.7
3. Residence		
Nairobi North	9	5.7
Nairobi East	37	23.4
Nairobi West	105	66.5
Others	7	4.4
4. Occupation		
Employed	71	46.7
Unemployed	81	53.3
5. Marital Status		
Married	129	82.7
Unmarried	27	17.3
6. Highest Education		
College	35	22.3
Secondary	49	31.2
Primary	73	46.5
7. Living children		
1	72	46.2
2	44	28.2
3 and Above	40	25.6
8. Religion		
Christian	151	95.6
Muslim	7	4.4

4.2 Vitamin A Supplementation Awareness

4.2.1 Mothers' General Awareness

Out of the 158 respondents, 94% reported having heard about vitamin A and/or VAS. The results show that health workers were the source of information for 82% of the respondents, followed by media (10%), community members (6%) which included neighbours, friends and community leaders. Only 2% of the respondents reported their source of information as magazines and/or books. This was confirmed by data from FGDs where the major source of information reported by the mothers was from health workers, a minority from academics (schools), media, magazines and posters.

This is consistent with the Philippines study where 85% of the respondents' source of information on VAS was the community health centers and only 26 % reported mass media as their source of information (Bloem, *et al.,* 2001). This may reveal lack of or poor communication between the health workers and their clients as well as the community in general. In a study done in Mali, more 'traditional' communication channels (town criers, friends and family members) appeared to be more effective in reaching the target groups than modern methods such as radio and television (Ayoya, *et al.,* 2007). It shows that if communication was improved between health workers and their clients, if they would be more proactive and take time to explain to the clients the importance of VAS, then it means more would take the initiative to take their children for VAS.

Figure 2 compares the proportions of the various responses on what respondents had heard about vitamin A. While the largest proportion (33%) had heard that vitamin A

protects children from illness, the next large proportion (25%) said they had heard nothing apart from just hearing the word vitamin A. A few had heard that vitamin A was good for child's health (19%) or that a child needed VAS every 6 months (6%). Only 5% respondents said they had heard that the target group for VAS was 6-59 months. This shows that there is a general lack of awareness about VAS among mothers. None of the mothers (0%) reported having heard anything negative about vitamin A/VAS.

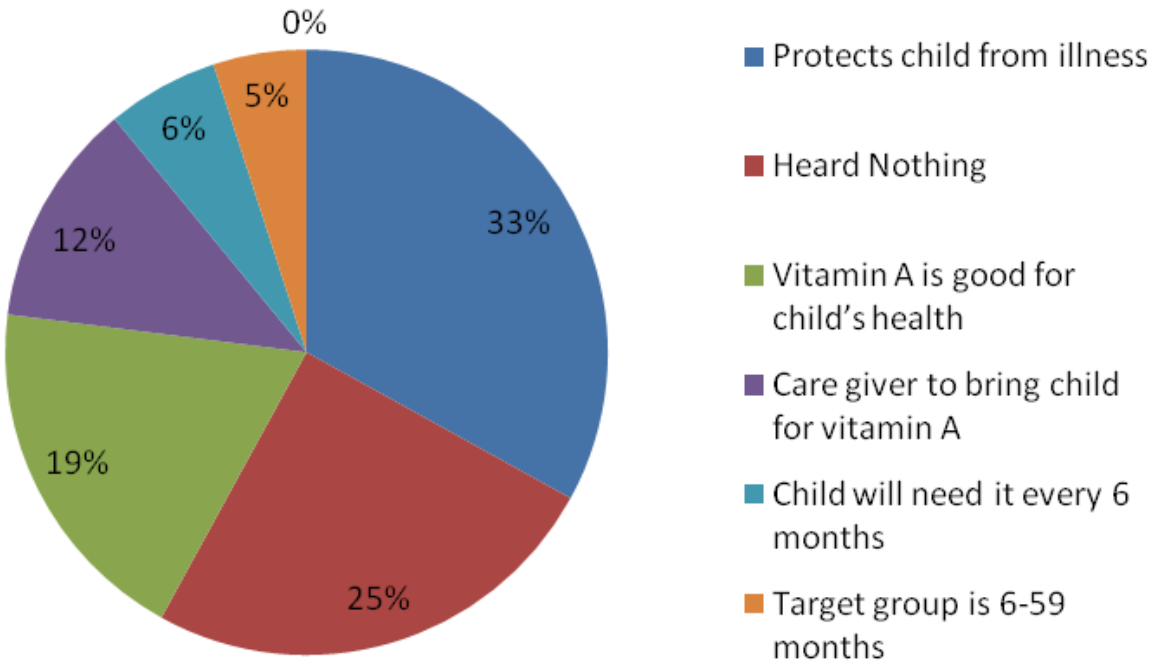

Figure 2: Information Mothers had Heard about Vitamin A/VAS

Figure 3 shows the various responses on the mother's awareness of benefits of vitamin A. Although slightly less than half (42%) of the respondents were aware that it protects children from illnesses while only a few (13%) associated it with being

good for the eyes, 17% reported not to be aware of the benefits associated with consumption of vitamin A.

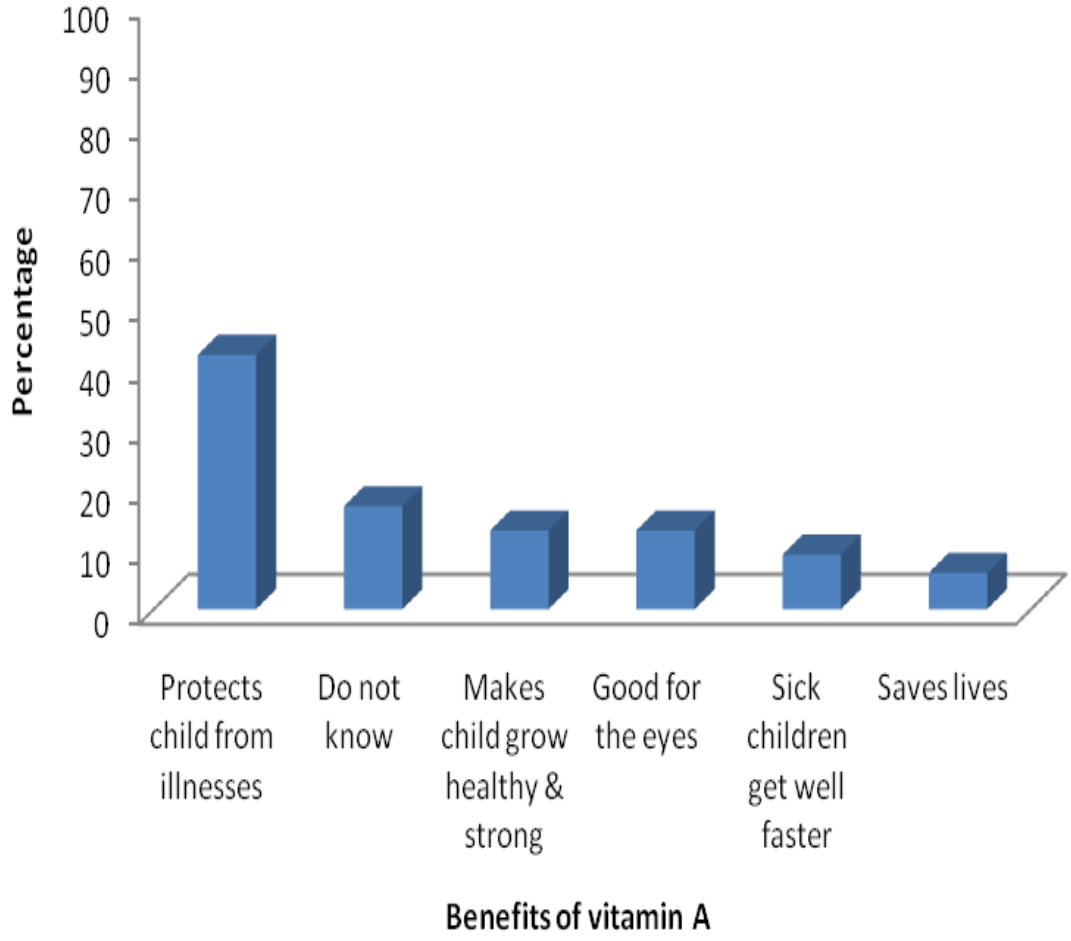

Figure 3: Mothers' Awareness about Benefits of Vitamin A

Since a good number of mothers (17%) did not know any benefit of vitamin A, it shows general lack of information on vitamin A with only 13% being aware that it's good for the eyes yet this is the main benefit and the major reason for VAS. This percentage is much lower compared to Bloem's study in Philippines where 50% of the mothers were aware that vitamin A was good for the eyes (Bloem, *et al.*, 2001).

Hence, there is need to enhance health education in general, especially on benefits of vitamin A and VAS.

When asked how vitamin A was administered, the mothers seemed to correctly differentiate vitamin A from other vaccines since the majority (95%) responded that it was administered orally although a few mothers would confuse it with oral polio vaccine. The fact that some (5%) did not know how it is administered at all (Table 5) indicates lack of information and awareness. It shows that so much value was attached to the vaccinations but not to VAS probably because the mothers do not have much information about VAS as they did about other vaccines.

4.2.2 Awareness of Recommended Supplementation Schedule for Children

The study revealed that 58% of the respondents were aware that the recommended schedule for VAS in children was every six months. However, 27% had no awareness while 13% thought it was once every month as they took their children for child welfare clinic every month and 2% s thought it was once a year as shown in Table 5.

Table 5: Summary of Mothers' Vitamin A Supplementation Awareness

Variable	Number	Percentage
1. Route of administration of vitamin A (n= 146)		
Orally	139	95
Don't know	7	5
2. Government recommended schedule of VAS in children (n= 142)		
Every 6 months	83	58
Don't know	38	27
Every month	18	13
Once a year	3	2
3. Aware mothers received VAS (n= 152)		
Yes	72	49
No	59	40
Do not know	21	11
4. When vitamin A is given to mothers (n= 64)		
Immediately after delivery	30	47
During pregnancy	25	39
Up to 6 weeks after delivery	9	14
5. How the child can get enough vitamin A (n= 136)		
From food	100	73
Vitamin A capsule	36	26
Fortified foods	1	1

Nearly three quarters (73%) of the respondents were aware that food was the highest source of adequate vitamin A to the child as compared to vitamin A capsule (26%) or fortified foods (1%) as shown in Table 5.

The fact that 13% of the respondents thought the recommended VAS schedule for children were every month, could be due to the practice of growth monitoring which

goes together with other immunizations and is done monthly, showing a lot of ignorance as far as VAS and its schedule are concerned. Most mothers did not know that vitamin A should continue up to five years of life. Though most mothers faithfully took their children to the clinic during the first year of life, they did not continue after the measles vaccine at nine months because they assumed that to be the end of all the routine vaccinations and hence also the end of MCH clinic visits for the child. This is consistent with a study done in Congo where mothers were found to stop attending the clinic after one year because the child had got all the routine vaccines (Tchibindat, *et al.*, 2004).

4.2.3 Awareness of Supplementation to Mothers

Information about VAS for mothers is even less widespread than for children. Table 5 above shows that about a half (49%) of the respondents were aware that vitamin A was given to mothers. However, a large proportion (40%) of the respondents indicated that vitamin A was never given to mothers and 11% were not aware whether mothers received vitamin A or not.

In contrast, this is higher compared to the Philippines' study where less than 15% were aware that postnatal women should receive VAS (Bloem, *et al.,* 2001). Knowing that mothers received VAS is also related to knowing when it's usually administered since among those who correctly reported that vitamin A was given to mothers, 61% knew it was given within six weeks post delivery. Misinformation was also evident as some (39%) respondents reported that vitamin A was given to mothers during pregnancy yet pregnancy is a contra-indication to VAS. If this

information was given to the mothers by the health workers who were the major source of information for most (82%) mothers, then it shows dissemination of wrong information among the health workers leading to misinforming of mothers. This implies there is need to update all health workers and follow them up through proper supervision to ensure that their clients get the right information.

4.2.4 Awareness of Vitamin A Rich Food Sources

Among the responses on vitamin A rich food sources, a relatively small proportion of respondents mentioned any one kind of food source, with the egg being the most widely mentioned food source (31%) as shown in Figure 4.

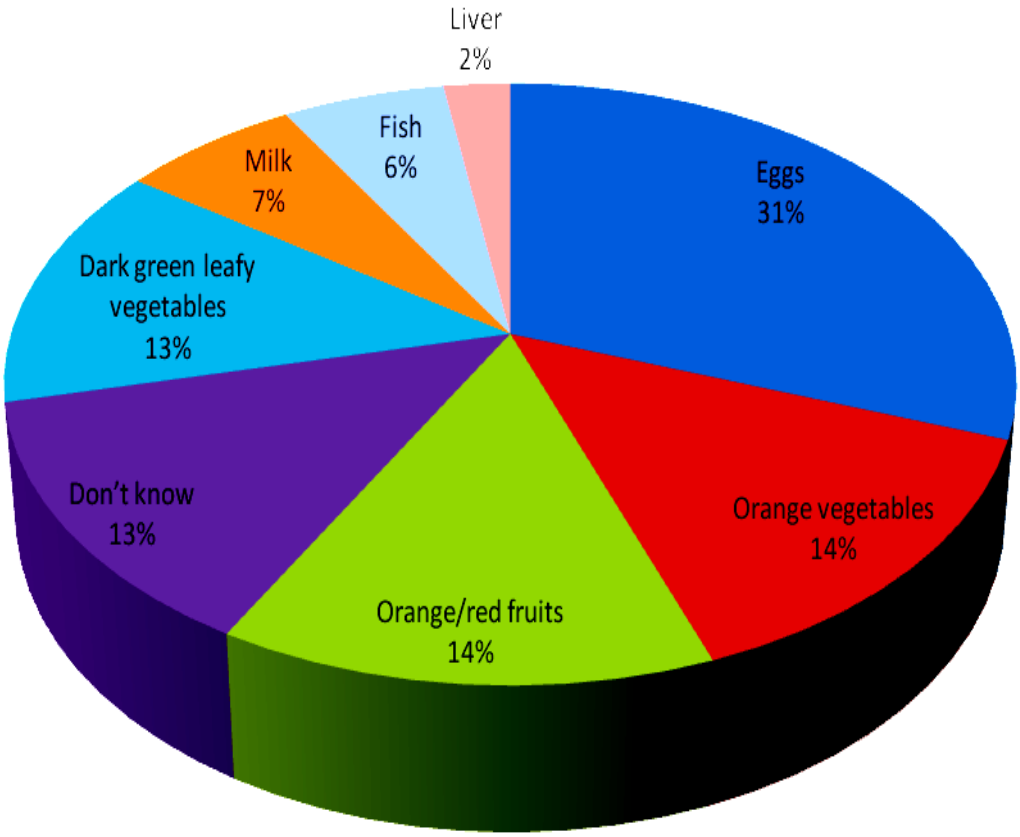

Figure 4: Mothers' Awareness of Vitamin A Rich Food Sources

The above results gained support from the FGDs which showed there was a general lack of awareness and understanding as far as vitamin A rich food sources are concerned. Hardly a quarter of the mothers thought of any fruits as containing all vitamins while others mentioned proteins such as beans as vitamin A rich food sources. More than three quarters of them had no ideas which are the vitamin A rich food sources but on informing them, they reported that they were affordable. One of the mothers reported:

> "Foods rich in Vitamin A are affordable. I used to struggle, going to *Gikomba* to look for cheaper options for fruits and vegetables since

my husband was not working. I used to walk and spare the fare to buy fruits for the child. So I believe as long as people are aware about it, they will work to make ends meet to ensure that their children get the best diet they can."

This shows a lack of information on nutritional value of certain foods and ends up being translated to dietary practices based on ignorance in respect to vitamin A. This, coupled with lack of VAS contributes to the relatively high prevalence levels of VAD in Kenya. A review of feeding practices in 6 African countries found that only 10-30% of children were receiving food sources rich in vitamin A at six months when these foods should be introduced (WHO, 1999). Hence, there is need to educate the public about VAS to avert the consequences of VAD.

4.3 Attitudes and Beliefs towards Vitamin A Supplementation

All the respondents who indicated awareness about vitamin A/VAS were also supportive of the government's VAS programme. All the respondents (100%) who had heard about VAS said they thought vitamin A was useful to children as shown in Table 6. They had no negative beliefs or attitudes against it. There were no superstitions or side effects reported to be associated with VAS as it was revealed by the FGDs and IDIs reports.

Table 6: Mothers' Attitudes and Beliefs about Vitamin A and VAS

Variable	Number	Percentage
1.Think vitamin A is useful to children (n= 148)		
Yes	148	100
2. Thoughts about VAS (n= 148)		
Good/helpful	140	95
Don't know	8	5
3. Would advise mothers to take their children for VAS (n= 146)		
Yes	145	99
No	1	1
4. Have discussed about Vitamin A with other mothers/people (n= 141)		
No	93	66
Yes	48	34
5. Initiative to go for vitamin A (n=141)		
Health Worker	131	93
Self	10	7
6. Willingness to go for go for next dose of vitamin A (n= 148)		
Yes	130	88
Do not know	12	8
No	6	4

FGDs and IDIs confirmed that both the clients and health workers were very positive about VAS. The mothers accepted it fully just like any other vaccine given in the

clinic only that most of them did not understand what this vitamin A was. They perceived it as a vaccine. The community believed it was for all children and not restricted to any particular groups of children. Thus they fully supported it. They believed it was good for the child's health and should continue as a mother in MCH reported:

> "I believe in drugs and vaccines; the child should get all those vaccines because it helps them not to get many diseases. My attitude is positive because it really helps in the child's healthy growth."

While majority (95%) of the respondents said they thought VAS was good and helpful, a few (5%) of the respondents said they did not know anything about VAS and they did not think it was important. The bulk of the mothers were not aware of a specific importance of vitamin A though they thought it was necessary, healthy and useful to the child as reported in FGDs;

> "We believe it strengthens the child's body and protects from diseases."

Table 6 above shows that almost all (99%) respondents said they would advice mothers to take their children for VAS. However, majority (66%) had never discussed about Vitamin A with other mothers/people. The content of discussion for the few (34%) who had, mostly was on the importance of vitamin A in relation to the national immunization days (campaigns). This indicates that VAS is not a commonly discussed topic among mothers and the general population. There is thus need to increase advocacy on VAS to make the public aware and invoke discussions among

the public which would lead to them seeking further information hence create more awareness and thus consequently increase the coverage. Scaling up peer-counselling methods has been shown to have a lot of positive impact in achieving public health programme goals and is needed to achieve the Millennium Development Goal (MDG 4) of improving child survival (Faruque, *et al.*, 2008).

Despite all the respondents being very positive about VAS, only 7% of the respondents had come for vitamin A out of their own initiative while 93% had come because the health worker had referred them for it. Rarely would one get a mother going to the clinic specifically to take her child to get VAS. This implies that information has not been fully disseminated from the health workers to the mothers. The health workers took the initiative to enquire from the mother whether the child had received VAS almost always since 93% had come because the health worker had referred them for it (Table 6).

Some mothers reported that it looks odd to take a grown up child to the clinic. No wonder those who take their children for VAS after the first year of life are so few. If they had all the details through proper health education, they would actually be able to take the initiative to take their children for VAS up to the recommended five years even after the other vaccines are over just like they took the initiative to ensure they take the child for all the other routine vaccines. This implies that the mothers have the will but no powers to enable them take the action. This means there is need to empower them by giving them the knowledge; sensitizing them about need for VAS and creating awareness through health education since knowledge is power.

From the IDIs responses, the health workers at MCH reported they had never seen their fellow staff going for vitamin A at the clinic. They reported that the mothers were very positive about VAS and none had ever refused the supplementation for herself or for her children. On the other hand, they said the mothers did not have adequate information so they rarely took the initiative to take their children particularly for VAS.

Figure 5 shows the respondents' beliefs about vitamin A deficiency (VAD). Only 18% of the respondents believed VAD was associated with eye problems/blindness. More than half (61%) believed that a child who does not have enough vitamin A gets sick often while 13% did not have any beliefs related to VAD. Another 8% associated it with malnutrition conditions such as rickets, marasmus or kwashiorkor.

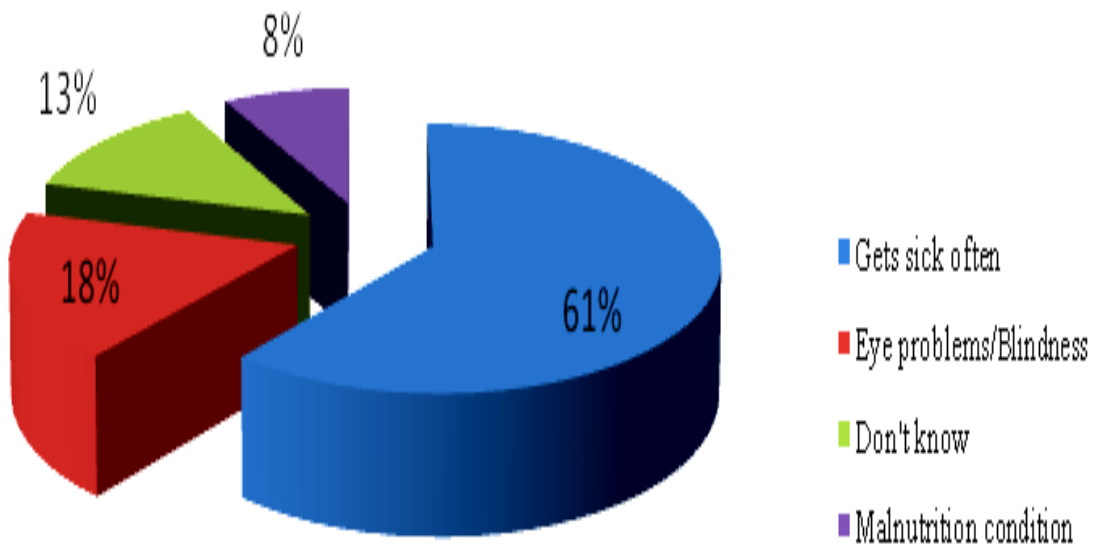

Figure 5: Mothers' Beliefs about Consequences of VAD

From FGDs and IDIs, most mothers did not know whether there was a specific consequence of VAD. None of the mothers mentioned anything to do with the eyes. They generally said;

"The child is weak and has no strength."

Since almost all mothers were positive about VAS as the health workers reported that no mother had ever refused it, it means that if they got proper information to know the specific consequences of VAD, they would not want their children to become victims of VAD, would take them for VAS and the coverage would be higher.

More than half (64%) of the respondents did not cite any possible hindrances to taking their children for VAS as shown in Figure 6. Among those who cited possible hindrances, 18% cited lack of time as the main likely hindrance. They believed that other possible hindrances included; far distance (7%); lack of awareness (5%); sick mother (4%) and a sick child (2%).

Health comes first in life because one cannot be productive at work unless one is in good health. The fact that majority (64%) of the respondents did not believe that anything would hinder them from taking their children for VAS (Figure 6) further qualifies the fact that the will is there but the power is missing. What matters most is the right attitude. Since lack of time was the next likely hindrance among 18% of the respondents, it shows that if they were able to value VAS like they valued their other commitments, then they would be able to create time for it just like they did for those other activities they were involved in. So long as the mother prioritizes VAS as among her important things, then she will create time to take her child for it. This is possible only if she realizes how critical and important VAS is and this is brought

about by increasing advocacy and sensitization among the entire community to increase the value attached to VAS.

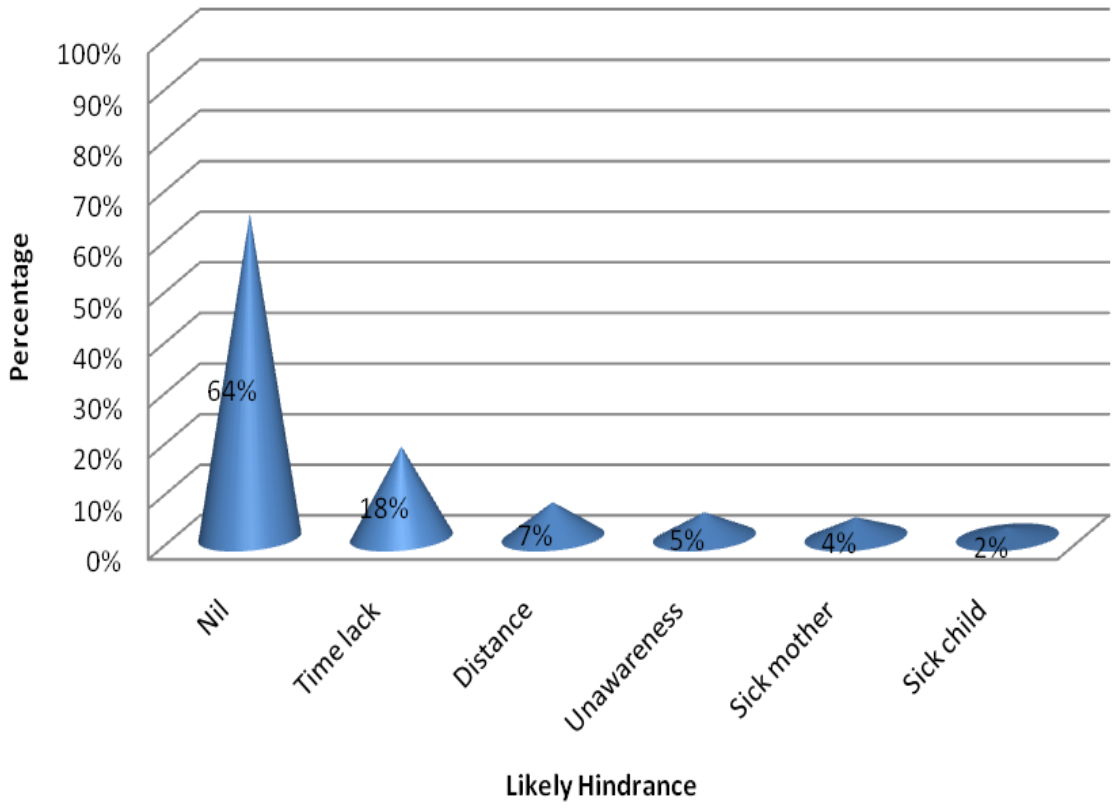

Figure 6: Mothers' Beliefs and Attitudes about Likely Hindrances to VAS

4.4 Practices and Utilization of Vitamin A Supplementation Services

4.4.1 Practices and Utilization in Relation to Children

Figure 7 shows that about a half (52%) of the respondents had their children up to date with the recommended schedule for VAS, 45% were not up to date and 3% did not know whether their last child had received all doses of vitamin A due. A few (10%) of the respondents did not know the colour of the capsule their children had received, 23% said it was blue and 67% said it was red. About three quarters (77%) of the children had received the capsule on a routine visit to the clinic although about half (53%) of the mothers recommended campaigns and outreaches as their preferred strategy for administration of VAS.

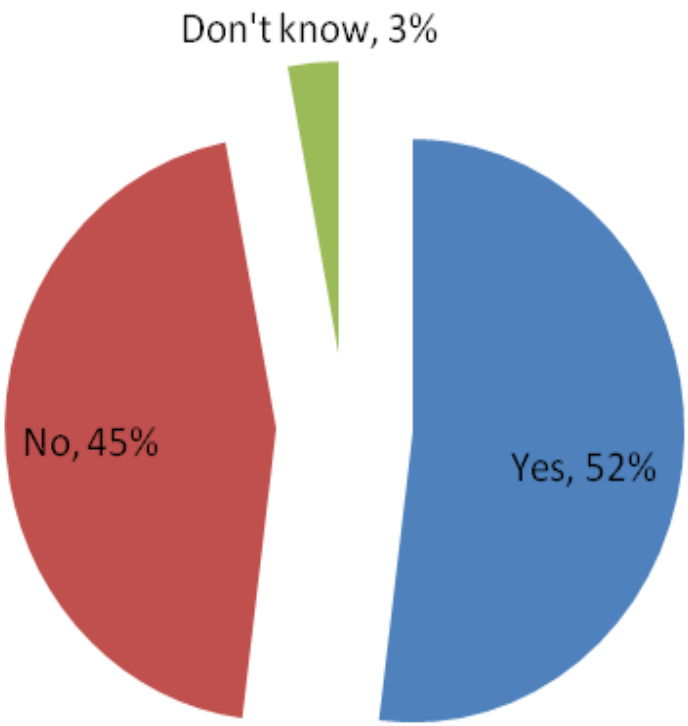

Figure 7: Proportion of Youngest Child that had Received VAS Up to Date

In IDIs, health workers reported that VAS was administered routinely to all children from 6 months to five years at MCH and to mothers immediately after delivery at maternity; labour ward. At the POPD, vitamin A was available in the pharmacy and it was given on prescription but not routinely. They reported that greater emphasis was placed on the child's health rather than maternal health. Thus more children received vitamin A compared to the mothers who received it after delivery.

Mothers and health workers interviewed all reported that in general, mothers took their children to the clinic consistently for the first year of life. Thereafter, majority stopped and only visited the hospital if the child got sick. At the clinic, children over one year were rare. This implies that most children over one year do not receive VAS.

This study shows that 52% of the mothers interviewed had their children up to date with the recommended schedule for VAS (Figure 7). This is higher than the coverage recorded in Dagoretti Division between January and June 2008 of 10.7% (MOPHS, 2008) and higher than a study done in India, slums of Orissa, where only 12.5% had received VAS (Swain and Mishra, 2006). This could have been due to the fact that the study was done one month after a national campaign which covered VAS and polio vaccine increasing the coverage more than by use of routine health institution activities. It has been noted that the coverage of VAS is always very high during the campaigns reaching even up to over 90% (MOPHS, 2008) and this is most likely why the coverage was much higher. It could have also been elevated by recall bias since most of the data collected was based mostly on history rather than records.

Table 7 shows that more than three quarters (88%) of the respondents reported they would take their children for the next dose of vitamin A. The reasons given for returning again were mostly because it was good for the child (76%) or to complete doses of vitamin A (13%) or because they were told by the health worker (11%). This shows that quite a good number of mothers understood why they should take their children for VAS. However, it indicates ignorance on the part of some mothers who thought of VAS just like a routine duty without actually understanding the focus, basis or rationale of VAS. This implies that they would only attend VAS services based on convenience hence it did not matter to them whether the schedule was adhered to or not.

Table 7: Practices and Utilization of VAS services

Variable	Number	Percentage
1. Circumstances under which child received VAS (n= 95)		
Routine Visit to clinic	73	77
Campaigns/outreaches	12	13
Visit to clinic for illness	10	10
2. Reasons for going for next dose (n= 135)		
Good for child	102	76
To complete doses of vit. A	18	13
Told by health worker	15	11
3. Reason for not going for next dose (n= 13)		
Lack of time	6	46
Do not know the benefit	4	31
Distance/ Transport	3	23
4. Mother's recommended strategy for VAS (n= 151)		
Campaigns/Outreaches	86	53
Fixed sites like Hospitals	65	47

A small proportion (8%) of the respondents did not know whether they would take their children for the next dose or not. Very few (4%) of them declined to take their children for the next dose due to lack of time (46%) or failure to know the benefit (31%) or far distance / lack of transport (23%).

Figure 8 shows that the main reasons given for children missing VAS were that either the mother was not aware of the VAS schedule (41%) or the child had completed routine immunization (34%) hence had stopped going to the clinic. This is consistent with a study done in Congo where mothers were found to stop attending the clinic after one year because the child had got all the routine vaccines (Tchibindat, *et al.*, 2004). A small proportion of 7% had missed VAS because of sick child while for others it was because of either lack of time (5%), negative staff attitude (5%) or stock-out (5%) in the other health institutions they were attending. A minority (3%) reported far distance from the health institution.

Information gathered from FGDs indicated that some of the mothers did not have any reason for missing VAS despite 45% of their children being not up to date with VAS (Figure 7). They said they were bored and lacked motivation which is consistent with a study in Ghana where mothers lacked motivation to adhere to VAS (Hill, *et al.*, 2007). This clearly indicates a gap in the awareness of VAS.

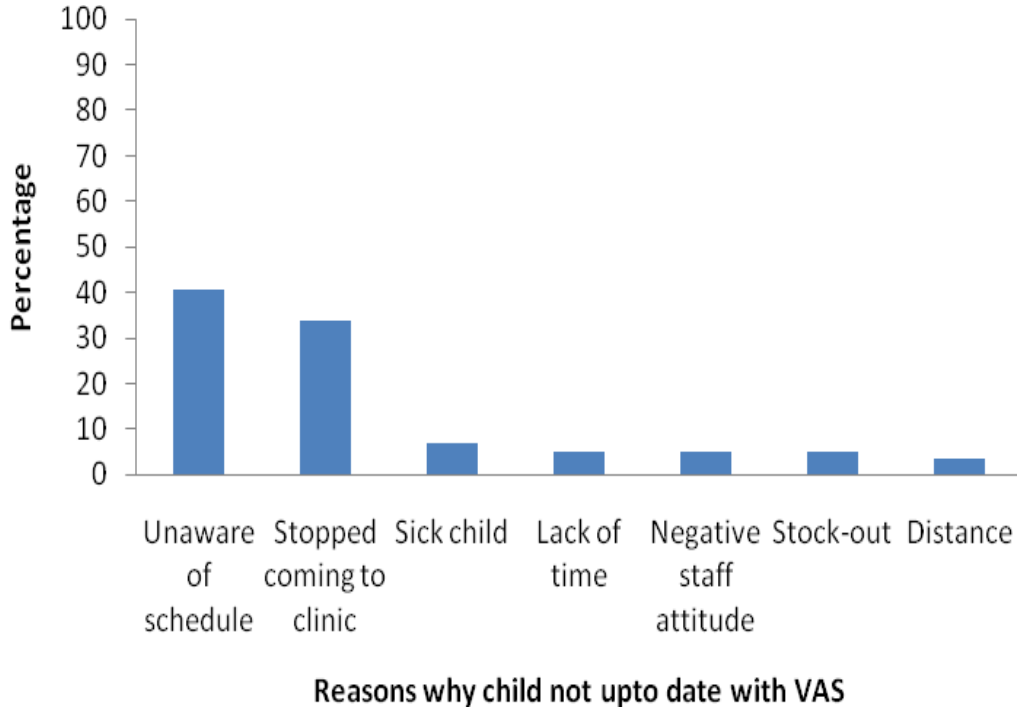

Figure 8: Reasons Why Child had Missed VAS

While routine immunization is scheduled to end before the first birthday, VAS is meant to end at the age of five years. The care takers are better informed about immunization than VAS schedule and are keen on having children get all vaccines due. This could mean that there has been less publicity, social mobilization and health worker sensitization about VAS compared to the routine immunizations.

The interval between clinic visits for routine vaccinations is usually one month hence easier to remember and follow compared to 6 months between VAS visits. This study found that the general practice among mothers was that; mothers took their children to the clinic consistently for the first year of life then the majority stopped

after that and only visited the hospital if the child got sick. Children over one year who were taken to the clinic were very few. Majority did not therefore get VAS after the first year of life. The mothers lay a lot of emphasis on the routine immunizations but not on VAS. This could be related to the information gap and lack of awareness on VAS and its recommended schedule among mothers. Only one dose of vitamin A (at six months) is given to a child before the first birthday. This may explain the higher coverage with the first dose compared to the subsequent doses as indicated by the administrative data at the Ministry of Public Health and Sanitation (MOPHS, 2008).

The practices at the hospital showed that VAS was administered routinely to all children from 6 months up to five years at MCH free of charge. This means if the mother or caretaker did not take her child to the clinic then she / he will not get the VAS. There are no measures in place to follow up the mothers or their children if they missed VAS. This leaves it upon the mother's initiative to take her child for VAS hence the need to empower them and explain fully the importance of VAS to them. In POPD, vitamin A was at the pharmacy where it was given on prescription but not routinely administered. The children were not screened for VAS at the POPD as is supposed to be. This brings about a missed opportunity for VAS since the POPD encounter is a very good opportunity to screen, explain and administer VAS for those who are not up to date. However, the nutritionist reported that this was not possible due to the shortage of staff. This brings about many missed opportunities which eventually lead to the low coverage.

4.4.2 Practices and Utilization in Relation to Mothers

The study results show that less than a half (43%) of the mothers had received vitamin A after delivery. Out of these, 77% received VAS within the recommended period of up to six weeks after delivery, 7% after the recommended 6 weeks post delivery and 5% during pregnancy while 11% could not remember when they received VAS as Figure 9 shows.

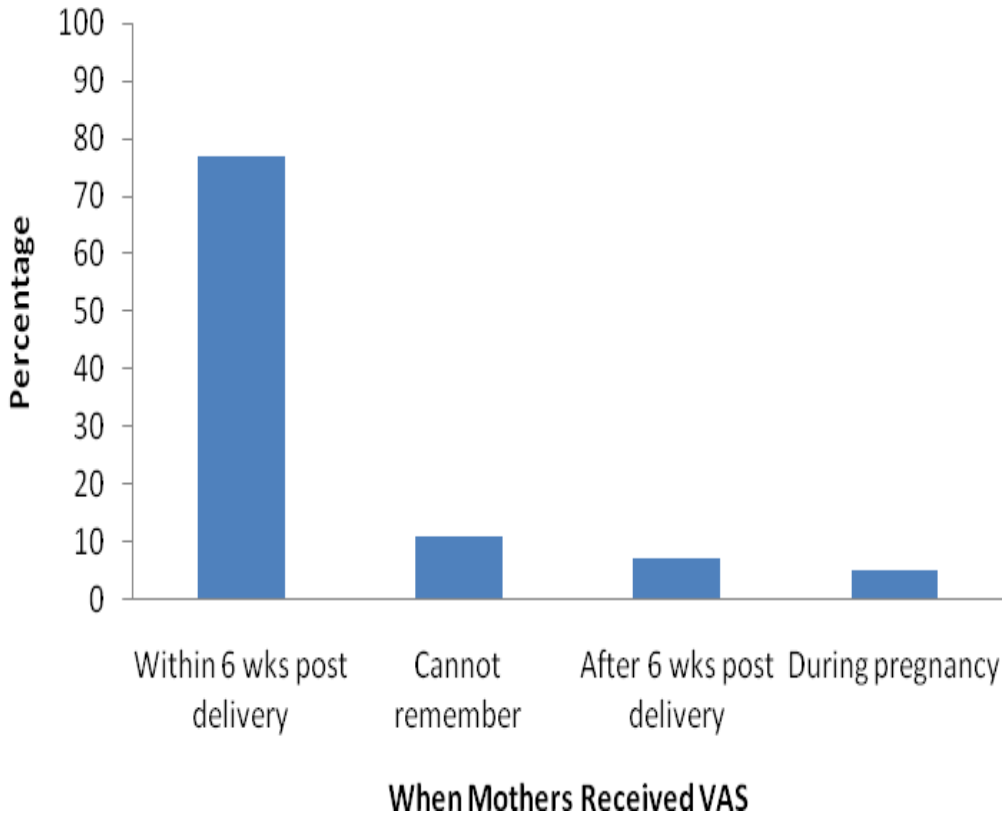

Figure 9: Period when mothers received VAS

This study shows that the practice at the hospital was to give all mothers VAS immediately after delivery at maternity (labour ward). However, rarely did the health

workers at MCH enquire whether the mother had received VAS after delivery. They reported that there was generally greater emphasis on child health than maternal health at the children's welfare clinic room. Hence more children received vitamin A compared to the mothers who received it after delivery. This shows a failure on the part of the health workers at MCH; it means that those mothers who deliver at home or who miss the supplementation after delivery for other reasons may not actually receive VAS at the MCH clinic.

This is supported by the fact that while they have a column to record all children supplemented with vitamin A at MCH, they have no column to record the mothers supplemented with vitamin A in their VAS records exercise book. So it means postnatal VAS is not one of their routine practices otherwise they would automatically have a record for it just like they had for children, or else, those mothers who got post-natal VAS at MCH were never reported. If the mothers were aware of the post-natal VAS as their right and its specific significance, they would probably take the initiative to request for it at MCH and the health workers would have to adjust their records accordingly. This shows the need to create more awareness and sensitization among both health workers and mothers.

Level of education and parity were among the major determinants of post-natal VAS as respondents with college education had the highest proportion (52.9%) of those who received vitamin A after their last delivery while mothers with three children and above had the lowest (34.4%). This could probably mean the more children a mother had, the less keen she was about VAS for herself.

Less than a half (43%) of the respondents had received vitamin A after their last delivery. This is more than the postnatal coverage data recorded in the MOPHS and in Niger where only an estimated 16% of mothers are provided with a high-potency vitamin A supplement within the 40 days following delivery (Aguayo, *et al.,* 2005) but similar to a Philippines study where it was 41% (Bloem, *et al.,* 2001). This low coverage may be due to the following reasons:

(1) The low hospital delivery rate of 42% nationally as reported by MOPHS, reproductive division (KDHS, 2003): The 42.8% that reported receiving vitamin A after delivery may have received it because they delivered at a health facility.

(2) Lack of information: This was evidenced by the high number of mothers who said that vitamin A was never given to mothers (40%), while 11% said they did not know. Only about half (49%) of the respondents were aware that vitamin A was given to mothers after delivery (Table 5). The information was not also widespread among the health workers as witnessed by the health worker's IDIs at POPD unawareness that mothers received VAS post-natally. This shows that majority of the health workers and mothers are not updated with information about VAS. It could also be possible that some mothers may have got VAS at the labour ward as part of the delivery package but may not have known it or may not have been informed by the health worker as shown by the high coverage data at labour ward of 91%.

3) Emphasis on child health compared to maternal health at MCH clinic whereby the child takes precedence and the mother is either forgotten or not fully catered for as the nutritionists reported.

4) Failure to record: This is supported by the fact that at MCH, they did not include a column to record postnatal VAS may be in the assumption that postnatal VAS is done at labour ward and not at MCH. WHO has clearly stipulated the need to explain and administer VAS to all postnatal mothers at first contact with the health worker irrespective of mode of infant feeding to increase the vitamin A content of breast milk (WHO, 2003).

Malpractice could not be ruled out among the health workers in relation to VAS as evidenced by 5% respondents who actually reported to have received vitamin A during pregnancy (Figure 9). These findings indicate a serious lack of information about vitamin A among health workers and mothers as well. It also indicates that mothers may actually not know what interventions they get whenever they visit antenatal clinics. VAS is contra-indicated during pregnancy. Pregnant mothers should not be given high doses of vitamin A because Vitamin A and related compounds in large doses are known to be teratogenic, especially in early pregnancy (Haselow, *et al.*, 2004; WHO, 2003). If it is true that some mothers were actually given vitamin A during pregnancy, then it shows a serious lack of awareness and misinformation among the health workers leading to the wrong practices. There is great need to update all health workers and create awareness on the entire VAS programme. There is need to correctly inform mothers what they get, when, why and what it is meant to do for her and her child. This would increase VAS coverage among the mothers as well as their children.

4.5 Association between Various Exposures and Outcomes

4.5.1 Bivariate Analysis: Association between Demographic Characteristics and Awareness / Utilization of VAS

The awareness as well as utilization of VAS services was consistently noted to increase with the level of education and consistently higher among the employed compared to the unemployed as Table 8 shows. No linear or direct relation was noted between other exposures and awareness or utilization of vitamin A.

On statistical analysis of education level against employment, mothers with post primary education were found to be 4 times likely to be employed than those with only primary education (PR 3.96, Chi-square 16.4, p-value <0.0001). So being employed among those more educated was not by chance; it was highly significant.

Table 8: Bivariate Analysis: Proportions of Utilization / Awareness among Various Demographic Variables

	Heard about VAS	Aware vitamin A is Good for eyes	Aware of Recommended schedule in children	Aware Vitamin A is given to mothers	Last child received all doses of vitamin A due	Received vitamin A after last delivery
Age						
Up to 25	71(94.7%)	7(9.3%)	37(54.4%)	33(46.5%)	34(55.7%)	31(44.3%)
26-30	55(96.5%)	11(19.3%)	30(56.6%)	27(49.1%)	27(51.9%)	20(37%)
Above 30	22(84.6%)	4(15.4%)	16(76.2%)	12(57.1%)	10(50%)	11(50%)
Marital Status						
Married	120(93%)	19(14.7%)	62(53.4%)	56(47.1%)	57(53.8%)	47(39.8%)
Unmarried	26(96%)	3(11.1%)	19(79.2%)	15(57.7%)	13(52%)	13(50%)
Highest Education						
College	35(100%)	9(25.7%)	25(75.8%)	20(57.1%)	18(56.3%)	18(52.9%)
Secondary	47(95.9%)	8(16.3%)	30(66.7%)	24(52.2%	22(53.7%)	19(40.4%)
Primary	65(89%)	5(6.8%)	27(42.9%)	29(44.6%)	31(52.5%)	25(39.1%)
Occupation						
Employed	68(95.8%)	12(16.9%)	44(68.8%)	37(55.2%)	35(55.6%)	30(44.8%)
Unemployed	74(91.4%)	8(9.9%)	38(52.8%)	31(41.9%)	34(53.1%)	30(40.5%)
Number of children						
1 child	70(97.2%)	11(15.3%)	41(61.2%)	35(50%)	32(56.1%)	29(42%)
2 children	43(97.7%)	7(15.9%)	22(52.4%)	21(50%)	27(64.3%)	21(48.8%)
3 and Above	33(82.5%)	4(10%)	19(61.3%)	15(45.5%)	12(37.5%)	11(34.4%)

Majority of the mothers reported having heard about vitamin A irrespective of age, marital status, level of education and occupation. All those who had college education reported having heard about vitamin A. In contrast, a proportion of less than 30% (6.8%-25.7%) of the respondents were aware that vitamin A was good for eyes among all the groups, highest percentage being among respondents with college education (25.7%). Respondents with primary education had the lowest proportion (42.9%) of those who knew the recommended schedule for VAS. This proportion increased with respondents' level of education and the mother's age. It seems as the mothers grew older, this awareness increased probably because the number of visits to the child welfare clinic increased as one's children grew older or as they got more children. The mothers also visited the clinic for other services like family planning thus increasing the contact with health workers and probably leading to increased awareness of the schedule for VAS for children.

Unemployed respondents had the lowest proportion (41.9%) of those who were aware that vitamin A was given to mothers after delivery. This awareness increased with mother's level of education and age (Table 8). The unmarried mothers were more aware of the recommended VAS schedule for children (79.2%) compared to their married colleagues (53.4%). This implies that most of the unmarried mothers were more educated than the married ones.

Likewise, the employed mothers were more aware of the schedule (68.8%) than the unemployed (52.8%) because the more educated mothers are more likely to be employed than less educated mothers. Similarly, unemployed respondents had the lowest proportion (41.9%) of those who were aware that vitamin A was given to

mothers after delivery. This awareness increased with mother's level of education and age. This is similar to the awareness on the recommended VAS schedule for children which increased with mother's level of education and age. This shows there is need to correctly inform mothers what they get, when, why and what it is meant to do for her and her child. This may increase awareness and consequently the coverage of VAS for both the children and their mothers.

Among the various exposures shown on the table above, all had 50% and above of the respondents whose last child were up to date with VAS except mothers with three children and above (37.5%). Respondents with college education had the highest proportion of those who received vitamin A after their last delivery (52.9%) while mothers with three children and above had the lowest (34.4%) as shown in Table 8.

The utilization of VAS services was consistently noted to increase with the level of education and consistently higher among the employed compared to the unemployed just like it was for VAS awareness. This is consisted with a study done in Thika, Kenya on child care practices whereby time taken to perform various activities was also found to vary with the mother's education level and her occupation (Kamau, *et al.*, 2002). Inequalities in service utilization by educational attainment have also been evident in other studies (Pant, *et al.*, 1996; Roy, *et al.*, 2005; Gujral and Gopaldas, 1995; Friedman, *et al.*, 2006).

Table 9: Chi Squares and Two-tailed Statistics

VARIABLE	NUMBER	PERCENTAGE	PREVALENCE RATIO	CHI SQUARE	CONFIDENCE INTERVAL	P-VALUE
1. Aware of Recommended Schedule in children						
a) Age: Up to 25 yrs	37	49.3	0.78	0.59	0.42-1.47	0.44
Above 25 yrs	46	55.4				
b)Education: Post-Primary	55	65.5	3.23	12.7	1.68-6.22	< 0.001**
Primary	27	37				
c)Occupation: Employed	44	62.0	1.84	3.45	0.96-3.53	0.06
Unemployed	38	46.9				
d)Marital status: Married	62	48.1	0.39	4.45	0.16 – 0.95	0.035**
Unmarried	19	70.4				
e)No. of children: One	41	56.9	1.39	1.03	0.74-2.61	0.31
Two & above	41	48.8				
2. Aware vitamin A is given to mothers						
a) Age: Up to 25 yrs	33	54.1	0.94	0.03	0.47-1.87	0.85
Above 25 yrs	39	55.7				
b)Education: Post-Primary	44	60.3	1.57	1.61	0.78-3.16	0.20
Primary	28	49.1				
c)Occupation: Employed	37	61.7	1.81	2.73	0.89-3.69	0.10
Unemployed	31	47.0				
d)Marital status: Married	56	53.8	0.78	0.31	0.32-1.89	0.58
Unmarried	15	60.0				
e)No. of children: One	35	58.3	1.28	0.49	0.64-2.58	0.48
Two & above	36	52.2				
3. Aware when vitamin A is given to mothers						
b) Age: Up to 25 yrs	19	25.3	1.07	0.03	0.52-2.20	0.86
Above 25 yrs	20	24.1				
b)Education: Post-Primary	28	33.3	2.81	6.98	1.28-6.18	0.008**
Primary	11	15.1				
c)Occupation: Employed	25	35.2	2.60	6.37	1.22-5.53	0.01**
Unemployed	14	17.3				
d)Marital status: Married	28	21.7	0.40	4.3	0.17-0.97	0.038**
Unmarried	11	40.7				
e)No. of children: One	19	26.4	1.15	0.14	0.56-2.37	0.71
Two & above	20	23.8				
4. Last child received all doses due						
c) Age: Up to 25 yrs	34	55.7	1.19	0.25	0.60-2.36	0.62
Above 25 yrs	37	51.4				
b)Education: Post-Primary	40	54.8	1.09	0.07	0.55-2.18	0.8
Primary	31	52.5				
c)Occupation: Employed	35	55.6	1.10	0.08	0.55-2.22	0.78
Unemployed	34	53.1				
d)Marital status: Married	57	53.8	1.07	0.03	0.45-2.57	0.87
Unmarried	13	52.0				
e)No. of children: One	32	56.1	1.15	0.15	0.57-2.30	0.70
Two & above	39	52.7				
5. Received vitamin A after last delivery						
A) Age: Up to 25 yrs	31	44.3	1.15	0.18	0.60-2.23	0.67
Above 25 yrs	31	40.8				
b)Education: Post-Primary	37	45.7	1.31	0.64	0.67-2.55	0.42
Primary	25	39.1				
c)Occupation: Employed	30	44.8	1.19	0.25	0.61-2.32	0.61
Unemployed	30	40.5				
d)Marital status: Married	47	39.8	0.66	0.91	0.28-1.55	0.34
Unmarried	13	50				
e)No. of children: One	29	42.0	0.97	0.006	0.50-1.89	0.94
Two & above	32	42.7				

** Significant p-value (p-value $\leq$ 0.05)

Two-tailed level of significance used was 5% (p-value 0.05).

On bivariate analysis, shown in Table 9 above, respondents with post-primary education were more likely to be aware of the correct VAS schedule (PR 3.23, Chi-square 12.7, p-value <0.001) compared to respondents with primary education. Respondents who were married were less likely (PR 0.39, Chi-square 4.45, p-value 0.035) to know the correct VAS schedule compared to their unmarried colleagues. Post-primary education (PR 2.81, Chi-square 6.98, p-value 0.008), being unmarried (PR 0.4, Chi-square 4.3, p-value 0.038) and being employed (PR 2.6, Chi-square 6.37, p-value 0.01) were associated with higher likelihood of being aware of the correct timing of VAS for mothers.

4.5.2 Multivariate Analysis

On controlling for confounding by performing multivariate analysis, the level of education remained as the only factor that was statistically associated (p-value < 0.001) with awareness about VAS schedule for both children and mothers as shown in Table 10.

Table 10: Multivariate Analysis

Variable	Coefficient	Std Error	P-Value
Recommended schedule for vitamin A supplementation			
Post Primary education		0.078	0.000581**
Unmarried	-0.184	0.102	0.073449
When mothers got vitamin A supplementation			
Post Primary education	0.153	0.074	0.039136**
Unmarried	-0.158	0.093	0.090366
Employed	0.127	0.074	0.087889

** Significant p-value (p-value $\leq$ 0.05); Post primary education.

The mothers who were educated were more likely to be employed than those who were not. This observation agrees with other studies that have found that the mother's health education and literacy status plays a major role in improving the health of the child. Nutrition education provides economies of scale and the promise of long-term sustainability to any public health programme (Pant, *et al.*, 1996; Roy, *et al.*, 2005; Gujral and Golpaldas, 1995; Friedman, *et al.*, 2006; Kamau, *et al.*, 2002). This indicates a need for health education to raise awareness about VAS among caretakers.

4.6. Other factors affecting vitamin A supplementation

4.6.1 Problems / Constraints Experienced with Vitamin A Supplementation

This study shows that the factors affecting VAS seem more often than not information-related as evidenced by the lack of awareness among both health workers and mothers. Although there had been no shortage or lack of vitamin A at the hospital, health workers reported that they had experienced excesses and wastage due to procurement of short expiry vitamin A supplements from the government. This however, did not seem to pose a major constraint as 91% of the respondents reported that they had not encountered any problems when seeking VAS services at the hospital as shown in Figure 10. This implies there are no major issues with the technicalities of programme operations. The FGDs and IDIs responses revealed consistent supply and stock of vitamin A at the hospital.

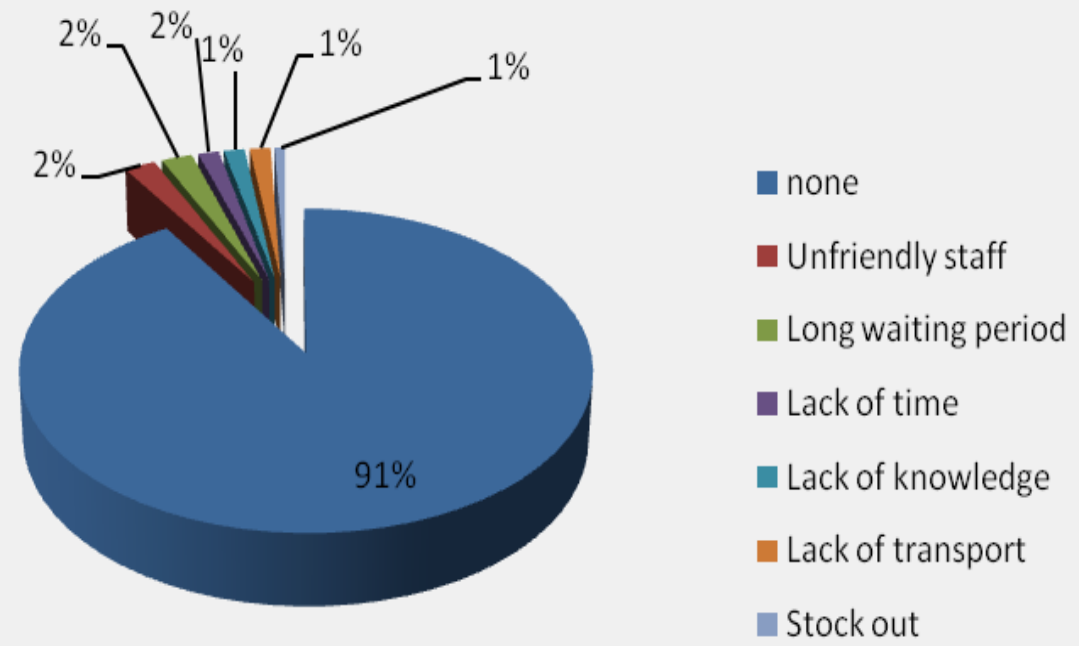

Figure 10: Problems / Constraints Experienced with VAS

Responses gathered from FGDs and IDIs indicated that the main reason reported for the low coverage of VAS was lack of information/awareness among both health workers and mothers. The community was generally not aware of the recommended schedule for VAS. Most of the mothers were not aware that they ought to receive vitamin A after delivery. Most of them did not generally know about the significance of VAS hence were not concerned or keen to follow the schedule. Most mothers did not know that vitamin A should continue up to five years of life. Though most mothers faithfully took their children to the clinic during the first year of life, they did not continue after the measles vaccine at nine months because, due to their lack of awareness, they assumed that was the end of all the vaccinations hence ends MCH clinic visits.

The health workers reported;

> "You realize that most mothers do not take their children to the clinic after the measles vaccine given at nine months. They only visit the hospital again if the child is sick. So those children do not get the vitamin A unless they get sick because that is when they come to hospital again. No wonder the coverage is that low. You know mothers have big influence on each other; they say this child has already finished all the immunizations so there's no need. They have other roles in the house."

Missed opportunities were another cause of the low coverage as the nutritionist at MCH reported;

> "There are also children who miss at 6 months and may be the mother does not know and you also skip it may be by mistake or you forget. There are also complaints from mothers who were told to come for Vitamin A but they do not have the card. So sometimes you find they are told to go and bring the card and they don't come back again."

Lack of time or busy work schedules was noted as a factor affecting VAS since among the few who declined to take their children for the next dose of VAS, almost half (46%) of the respondents said it was due to lack of time (Table 5). This shows they were busy at work and did not prioritize taking their children for VAS. This could be due to the fact that they did not think it was of great importance thus did not attach much value to it. If they were aware of its importance and attached much value to it, then they would definitely prioritize it and create time for it.

Vitamin A was easily acquired from the national nutrition offices on order. It is distributed through the structures of the expanded programme on immunization. A few mothers reported lack of vitamin A capsules in some other health institutions and far distance from the health facility. However, as earlier noted, there was no stock out reported at MDH and the MOPHS had not experienced any stock out either. In fact, the nutritionists reported oversupply and wastage due to being given short expiry vitamin A. So this reported stock-out in other health institutions could have been either failure of the management in those particular health institutions or lack of information on the part of health workers.

Cases of long waiting hours at the clinic were reported by some of the mothers in the FGDs. They attributed this to lack of sufficient health personnel at the hospital. This is evidenced by the fact that even the health workers reported they were too overworked making them unable to counsel or educate every mother they attend to on VAS. This could highly contribute to the low coverage since health workers cannot give quality services when they are overworked. This study noted that VAS programme is implemented under the Division of Nutrition and there was a shortage of nutritionists. Nurses could not perform those additional tasks as they were already overworked. However, nurses interviewed reported that the biggest problem was commitment by the nutritionists. They felt the nutritionists did not do their work well. There seems to be lack of clear guidelines from the MOPHS or proper policy on administration of vitamin A. The MOPHS should make clear guidelines/ policies and update all the health workers on the same to avoid neglect of duty.

4.6.2 How to Improve Vitamin A Supplementation

More attention needs to be given to improving VAS which is the single most cost-effective child survival intervention (WHO, 1999). Health education is key to improving VAS. Numerous suggestions were given on how to improve VAS, most being on educating mothers as well as all health workers; the how, to who, why and when of the entire programme, both in private and government hospitals. In the IDIs, the health workers reported that the information on vitamin A was not adequate like other immunizations and if the health workers were committed to the success of the programme, especially the nutritionists in whose docket it falls, then the coverage

would be higher. Advocacy and sensitization among all would go a long way in improving the programme.

Both mothers and health workers reported that creating awareness among all mothers would go a long way in improving the programme since once the mothers were aware, once they bought the idea, then they would be able to take the initiative to take their children for VAS for the entire period of five years as recommended. The mothers said;

> "It should be improved by health educating the mothers and guardians to bring their children to the clinic. When mothers are educated about it even if they do not have small children, they usually go family planning services and they can get both services together. So if they are told about it and well explained, they can take the initiative because the children are theirs"

Campaigns (door to door) were highly recommended including outreaches, health messages (advocacy) and school programmes to scale up the coverage. The campaigns are however expensive and neither sustainable nor cost-effective for routine delivery of VAS. Increasing personnel in government health facilities would also help to curb the problem of long waiting hours at the health facility.

4.7 Hospital Records and Children's Cards

The health workers reported in IDIs that once a child went to the MCH clinic, there was a system of recording in a book; sex, age and number of those who had been supplemented. The date was then recorded on the child's clinic card. At the end of

the month, a summary report was submitted from MCH showing the number of children who had attended the clinic and the number who had been supplemented to the district nutritionist who submitted to the provincial nutritionist then to the national level. A copy was left at the hospital. The health workers reported to be comfortable with the recording system although gaps in the recording system were identified.

Children's welfare clinic cards reviewed at MCH were indicated for VAS by writing the date the child received the vitamin A capsule on the card. However, dates for the next vitamin A capsule were not indicated on the card by the health worker. Most of the children at POPD did not have their cards. There was an exercise book at MCH for the hospital recording where all children who received VAS were tallied according to their age and sex on a daily basis but no record for postnatal mothers there. In this record, a total of 30 children under one year and 4 above one year had been supplemented in the month of June. Records for post-natal VAS received by mothers were captured at labour ward in the delivery book which showed that 148 mothers out of 163 who had delivered there in June had received VAS (91%).

CHAPTER FIVE: CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

Vitamin A supplementation services are averagely well utilized at Mbagathi District Hospital though still below the target by the Ministry of Public Health and Sanitation of 80% coverage.

The awareness as well as utilization of VAS services was consistently noted to increase with the level of education and consistently higher among the employed compared to the unemployed. Only the level of education remained statistically significant (p-value < 0.001) as a determinant of VAS awareness and utilization. Thus, the major factor affecting utilization of VAS services was lack of information and awareness among both health workers and the mothers. Most mothers were not aware that VAS for their children should be administered every six months and should continue up to five years. Likewise, only a few of them were aware that they should receive VAS after delivery.

Both the mothers and health workers were very positive about VAS. There were no negative attitudes and beliefs among them mentioned in relation to VAS. However, only a very small proportion of the mothers made the initiative to specifically take their children for VAS due to insufficient information and awareness. Their attitudes and beliefs clearly affect their utilization of VAS.

The common practice among mothers is to take their children to the clinic consistently for the first year of life then stop immediately the routine vaccines are

over by nine months confirming lack of recognition of the need for VAS up to the fifth year of life.

Mbagathi District Hospital had never reported a stock out of vitamin A capsules. However, record keeping and use of proper documents for VAS records was wanting at MCH. Many children and mothers missed VAS due to missed opportunities since screening was not consistently done at the various encounters with the health worker to check out those who were due for VAS yet had not received it. In addition, the mothers were asked to go home for the child's clinic card first in case they went for VAS without it then they disappeared and never turned up again. This led to many children not getting VAS yet they were due for it leading to missed opportunities.

5.2 Recommendations

Utilization of VAS services should be enhanced through innovative approaches to avoid missed opportunities as much as possible. These include: Screening for vitamin A status of all children at every contact with health facility followed by administration of VAS to those due, indicating the next VAS date on the child's card, screening of postnatal mothers at MCH for VAS status and administration of VAS to those who did not get it after delivery by the health workers. In addition, integration of VAS into the school health programme is encouraged with emphasis on pre-entry screening of learners for VAS status by all schools. Proper documentation should also be strengthened at the MCH clinics.

The Ministry of Public Health and Sanitation together with Mbagathi hospital should organize for more regular in-service training and refresher courses for all health workers to create awareness of the entire VAS programme among all health workers.

The Ministry of Public Health and Sanitation together with other stakeholders should increase information, education and communication pertaining to VAS services to raise awareness and advocacy through nutrition education, sensitization and mobilization. This should be done through all available means including media, reading materials and social groups. This may be achieved by educating key community personalities as change agents such as opinion leaders, leaders of social groups and any other person that members of the society hold in high esteem. It may also be done by use of prominent personalities such as champions to promote VAS programme. Through them, the message will always reach the intended target, will raise the value attached to VAS and thus create widespread impact in the Kenyan society.

There should be further research on the knowledge, attitudes, beliefs and general practice of health workers towards VAS and evaluation of other aspects of VAS programme to identify other weaknesses and act accordingly.

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APPENDICES

Appendix 1: Questionnaire / *Fomu*

Questionnaire Number _____Date _____

Department: 1. MCH _____ 2. ANC _____ 3. FP _____ 4. POPD _____

Socio-Demographic Data

1. Mother's Age __ _____
2. Residence

a) Nairobi West (i)Kibera_____ (ii) Dagoretti ____ (iii) Westlands_____

b) Nairobi North (i)Kasarani ____ (ii)Central ____ (iii) Pumwani _____

c) Nairobi East (i) Embakasi _____(ii) Makadara _____

3. Occupation a)Housewife _____

   b) Self-employed _____

   c) Formal employment_____

   d) Un-employed _____

   e) Others (Specify) _____

4. Level of highest education attained a) Lower Primary _____

   b) Upper Primary _____

   c) Secondary _____

   d) College_____

   e) University _____

5. Marital status

   a) Married _____

b) Single _____

c) Widow _____

d) Separated _____

e) Divorced _____

f) Others (Specify) _____

6. Religion a) Christian _____

b) Muslim _____

c) Traditional_____

d) Others (Specify) _____

7. Number of living children _____

Vitamin A Supplementation

8. Have you heard about Vitamin A supplementation? /*Je, umesikia kuhusu (vidonge) nyongeza za vitamin A?*

a) Yes / *ndio*_____

b) No / *la* _____

9. If yes, how did you get this information? (do not prompt, check all mentioned)

Kama ndio, ulipata hii habari wapi?

a) Health worker / *mhudumu wa afya*_____

b) Television / *televisheni*_____

c) Radio / *redio*_____

d) From friend or neighbour / *rafiki au jirani*_____

e) Community leaders / *viongozi wa jiji*_____

f) Newspaper / *gazeti*_____

g) Magazine or Books / *jarida au vitabu*_____

h) Others (specify) / *zingine*_____

10. What did you hear about vitamin A? (do not prompt, check all mentioned)

Ulisikia nini kuhusu vitamin A?

a) Don't know / *sijui*_____

b) Said they heard nothing / *hakuna* _____

c) Caregiver to bring child for vitamin A / *wazazi walete watoto kupokea vitamin A* ____

d) Target age group is 6 – 59 months / h*upewa watoto wa miezi 6-59* _____

e) Vitamin A is good for my child's health */ ni mzuri kwa afya ya mtoto wangu* _____

f) Protects child from illness / *huzuia mtoto kupata magonjwa* _____

g) My child will need vitamin A every 6 months / *mtoto wangu atahitaji vitamin A kila baada ya miezi sita* _____

h) Any negative */ yoyote kinyume* _____

i) Others (specify) / *zingine*_____

11. Who referred you for vitamin A / *Nani alikutuma kupata vitamin A?*

a) Self / *mimi mwenyewe* _____

b) Health worker / *mhudumu wa afya* _____

c) Others (specify) / *wengine* _____

12. How is vitamin A given to children? / *vitamin A hupewa aje watoto?*

a) Orally / *kwa mdomo*_____

b) Injection / *sindano*_____

c) Others (specify) / *zingine*_____

13. What are the benefits of vitamin A? (Do not prompt, check all mentioned)

Nini umuhimu wa vitamin A?

a) Don't know / *sijui*_____

b) Saves lives / *huokoa maisha*_____

c) Protects child / *hukinga mtoto*_____

d) Sick children get well faster / *watoto wagonjwa hupata nafuu haraka*_____

e) Good for eyes / *nzuri kwa macho*_____

f) Makes child grow healthy and strong / *hupea mtoto nguvu na afya*_____

g) Others (specify) / *zingine*_____

14. Which is the recommended schedule for vitamin A supplementation for children? (Do not prompt, check all mentioned) / *Ni ratiba gani inayofaa kutumiwa kupea watoto vitamin A?*

a) Every month / *kila mwezi*_____

b) Every six months / *kila miezi sita* _____

c) Once a year / *mara moja kwa mwaka* _____

d) Do not know /*sijui*_____

e) Others (specify) / *zingine*_____

15. Is vitamin A ever given to mothers? / *Je, vitamin A hupewa kina mama?*

a) Yes / *ndio* ____

b) No / *la*_____

16. If yes, when? / K*ama ndio, lini?*

a) During pregnancy / *akiwa mja mzito* _____

b) Immediately after delivery / *punde tu baada ya kujifungua* _____

c) Up to 6 weeks after delivery / *hadi wiki sita baada ya kujifungua*_____

d) Others (specify) / *zingine* _____

17. Can you tell me some food sources that are rich in vitamin A?

Niambie vyakula vyenye vitamin A kwa wingi

a) Don't know / *sijui*_____

b) Eggs / *mayai*_____

c) Liver / *ini*_____

d) Fish / *samaki*_____

e) Milk / *maziwa*_____

f) Orange /red fruits (ripe mango, papaya) / *matunda ya rangi nyekundu au manjano*_____

g) Orange vegetables (carrots, pumpkin) / *mboga za rangi ya manjano* _____

h) Dark-green leafy vegetable / *mboga zenye majani ya rangi ya kijani kibichi* _____

i) Others (specify) / *zingine* _____

18. How can your child get enough vitamin A? / *Mtoto wako anawezaje kupata vitamin A ya kutosha?*

a) From vitamin A capsule / *kutoka vidonge vya vitamin A* _____

b) Fortified foods e.g oils / *chakula cha madukani chenye vitamin A kama mafuta* ____

c) From food */ kutoka kwa chakula* _____

d) Others (Specify) / *zingine* _____

19. How often do you give your children the following foods / *Nielezee jinsi unavyowapea watoto wako vyakula vifuatavyo, ni baada ya muda gani?*

a) Eggs / *mayai*_____

b) Liver / *ini*_____

c) Fish / *samaki*_____

d) Milk / *maziwa*_____

e) Orange / red fruits (ripe mango, papaya) / *matunda ya rangi nyekundu au manjano*__

f) Orange vegetables (carrots, pumpkin) / *mboga za rangi ya manjano*_____

g) Dark-green leafy vegetables / *mboga zenye majani ya rangi ya kijani kibichi*_____

Attitudes and Beliefs

20. Do you think vitamin A is useful to the children*? / Je, unafikiria vitamin A ni muhimu kwa watoto?*

a) Yes / *ndio*___

b) No / *la* _____

21. What do you think about vitamin A supplementation? / *Je, Unafikiria nini kuhusu kupewa vidonge vya vitamin A ?*

_____

22. What happens to a child who does not have enough vitamin *A? / Ni nini humtendekea mtoto asiye na vitamin A ya kutosha?*

_____

23. What do you think are the effects of vitamin A supplementatio*n? / Je, unafikiria matokeo ya kupata vidonge vya vitamin A ni nini?*

_____

24. Would you advise other mothers to take their children for vitamin A supplementation? */ Je, ungewashauri wamama wengine wapeleke watoto wao kupata Vitamin A?*

    a) Yes / *ndio*_____

    b) No / *la*____

25. If not, why? / *Kama la, kwa nini*?

_____

26. Have you ever discussed about vitamin A with other mothers / people*? / Je, mmeshawai kujadiliana na kina mama au watu wengine kuhusu vitamin A?*

    a) Yes / *ndio*___

    b) No / *la* ___

27. If yes, what did you discuss? / *Kama ndio mlijadiliana nini*?

_____

28. What would make you not bring your child for vitamin A supplementation*? / Nini inaweza kukuzuia kupeleka mtoto wako kupata vitamin A?*

_____

Practices and Other Factors

29. Has your last child received all doses of vitamin A due? (children above 6 months only) / *Je, mtoto wako amepata vidonge vyote vya vitamin A anavyohitajika kuwa amepata?*

    a) Yes / *ndio* ____

    b) No / *la* ____

    c) Don't know / *sijui* _____

30. If no, what are the reasons? / *Kama la, ni kwa sababu gani?*

    _____

31. If yes, what was the color of the capsule? / *Kama ndio, ilikuwa ya rangi gani?*

    a) Blue / *samawati*_____

    b) Red / *nyekundu*_____

    c) Don't know / *sijui*_____

32. Under which circumstances did this child receive the capsule? / *Je, ni katika hali gani huyu mtoto alipata Vitamin A?*

    a) On a routine visit to the health clinic / *kliniki ya kawaida* _____

    b) On a visit to the clinic for illness / *kwenda hospitalini juu ya ugonjwa*_____

    c) Others (specify) / *zingine*_____

33. How long ago did the child receive the capsule? / *Ni kitambo gani alipata kidonge?*

    a) Less than 4 weeks ago / *chini ya wiki nne zilizopita*_____

    b) 4–7 weeks ago / *kati ya wiki 4-7*_____

    c) 2 months ago / *miezi miwili iliyopita* _____

d) More than 3 months ago / *zaidi ya miezi tatu iliyopita* _____

34. Will you come for the next dose of vitamin A? / *Je, utaendea kidonge kinachofuata cha vitamin A?*

a) Yes / *ndio* _____

b) No / *la* _____

c) Don't know / *sijui*_____

35. If yes, why will you bring your child again? / *Kama ndio, kwa nini utamlete mtoto tena*?

a) Good for child / *nzuri kwa mtoto*_____

b) Told to come again by health worker / *ushauri wa mhudumu wa afya kurudi tena* ___

c) To complete doses of vitamin A / *kumalizia vidonge vinavyohitajika* _____

d) Others (specify*) / zingine*_____

36. If no, why not? / *Kama la, kwa nini?*

a) Did not help child / *haikumsaidia mtoto*_____

b) Too difficult to get to health clinic / *ugumu wa kufika kliniki?*_____

c) Too long to wait at health clinic / *kungojea sana kwenye kliniki*_____

d) Not handled nicely at health clinic / *Kutoshughulikiwa vyema kwenye kliniki*_____

e) Child had adverse reaction (specify) / *mtoto alipata madhara*_____

f) Other reasons (specify) / *sababu zinginezo*_____

37. Which strategy would you recommend for best delivery of vitamin A supplementation?

Ni njia gani ungependekeza iliyobora ya kupeana vitamin A?

a) National immunization days (NIDs) / *siku kuu za chanjo nchini* _____

b) Child health days / *siku za afya ya watoto kama malezi bora* _____

c) Fixed site like hospital / *mahali pamoja kama hospitalini* _____

d) Micronutrient day / *Siku kuu ya vitamin na madini* _____

e) Others (specify) */ zingine*_____

38. What problems and constraints have you experienced with vitamin A supplementation services? / *Je ni shida gani umepata kuhusu huduma za vitamin A?*

_____

39. Did you receive vitamin A after your last delivery? / Je, *ulipata vitamin A ulipojifungua mara ya mwisho?*

a) Yes / *ndio*_____

b) No / *la* ____

40. If yes, how long after delivery? / *Kama ndio, mda gani baada ya kujifungua?*_____ (Please indicate how this information was verified i.e. RC for ReCall Or CA for CArd)__

Appendix II: Health Workers In-Depth Interview Guide:

Date _____ Venue _____

Time interview begins _____

Time interview ends _____

Key informant _____

1. What do you know about Vitamin A Supplementation (VAS)?
2. What are your beliefs and attitudes towards VAS?
3. Why do you think the coverage of VAS is so low? What makes the number of mothers receiving vitamin A after delivery lower compared to the number of children receiving birth polio or BCG vaccine yet they should be given at the same time?
4. What are your experiences with mothers in relation to VAS?
5. What are your experiences with supply / logistics in the hospital?
6. What do you think about the recording system for VAS services?
7. What's your general view about the entire VAS programme?
8. Please explain about the administration / delivery process of VAS services
9. What problems / constraints have you encountered as far as VAS services are concerned?
10. What do you think can be done to achieve higher coverage?

APPENDIX III: MOTHER'S IN-DEPTH INTERVIEW GUIDE:

Date _____ Venue _____

Time interview begins _____

Time interview ends _____

Key informant _____

1. What do you know about Vitamin A Supplementation (VAS)?

   Je, unajua nini kuhusu nyongeza za vitamin A?

2. What are your beliefs and attitudes towards VAS?

   Je, unaamini nini na una hisia zipi kuhusu nyongeza za vitamin A?

3. Do you know the recommended schedule for VAS? Name it.

   Je, unajua ratiba inayofaa kutumiwa kupata nyongeza za vitamin A ? Nielezee.

4. Do your children get the supplementation after first year of life? Why?

   Je, watoto wako hupata vitamin A baada ya umri wa mwaka mmoja? Kwa nini?

5. Do you think it is possible to follow the recommended schedule up to five years? Why?

   Je, unafikiri inawezekana kufuata ratiba inayopendekezwa mpaka umri wa miaka mitano? Kwa nini?

6. Are you aware whether mothers should receive VAS after delivery?

   Je, unajua kama kina mama wanastahili kupata vitamin A baada ya kujifungua?

7. What do you think makes the number of mothers receiving vitamin A after delivery lower compared to the number of children receiving birth polio or BCG vaccine yet they should be given at the same time?

Je, unafikiria ni nini hufanya akina mama wanaopata vitamin A kuwa wachache kuliko watoto wanaopata chanjo ya polio au BCG wanapozaliwa na zote zinastahili kupatianwa pamoja?

8. What are your experiences at the hospital in relation to VAS (with staff / supply)?

   Nielezee mambo yaliyokupata humu hospitalini kuhusiana na huduma za vitamin A.

9. What problems / constraints have you encountered as far as VAS services are concerned?

   Je ni shida gani umepata kuhusu huduma za vitamin A?

10. What do you think can be done to achieve higher coverage and ensure all children get VAS up to five years of life?

    Unafikiri ni nini inahitajika kufanywa ili kuongeza idadi ya watoto wanaopata vitamin A na kuhakikisha watoto wote wamepata vitamin A hadi umri wa miaka mitano?

APPENDIX IV: FOCUS GROUP DISCUSSION GUIDE:

1. What do you understand by Vitamin A Supplementation (VAS)?

   Unaelewa nini kuhusiana na nyongeza za vitamin A?

2. From where / whom do you receive such information?

   Unapata hii habari kutoka wapi

3. Do you think VAS is important? Why?

   Je, unafikiri nyongeza za vitamin A ni muhimu? Kwa nini?

4. What are the consequences of vitamin A deficiency?

   Nini madhara ya ukosefu wa vitamin A mwilini?

5. Do you think the community knows the recommended schedule for VAS? Why? Which one?

   Je, unafikiri jamii inafahamu ratiba inayofaa kutumiwa kupeana vitamin A? Kwa nini? Ni gani?

6. In this community, do you think children receive VAS as recommended?

   Katika jamii hii, unafikiri watoto hupata vitamin A inavyokusudiwa?

7. What are some of the available food sources of Vitamin A? Are they affordable?

   Ni vyakula gani vyenye vitamin A kwa wingi ambavyo hupatikana mahali hapa? Vinanunulika?

8. How does the community perceive VAS and what are their attitudes towards VAS?

   Jamii hii inazichukulia vipi na kuzifikiria vipi nyongeza za vitamin A

9. What are the views and beliefs of this community about VAS?

   Ni yapi maoni ya jamii hii kuhusu nyongeza za vitamin A? Wanaamini nini kuhusu vitamin A?

10. Are there groups of children who receive VAS? (Probe on any groupings such as for those educated, high status, slum dwellers etc)

    Je, kuna makundi ya watoto fulani ambao hupata vitamin A?

11. What problems does the community encounter as far as VAS services are concerned?

    Ni shida gani hukumba jamii hii kuhusiana na huduma za vitamin A?

12. How do you think VAS can be improved?

    Unafikiria huduma za vitamin A zinaweza kuboreshwa vipi?

APPENDIX V: INFORMED CONSENT / *IDHINI YA KUSHIRIKI*

STUDY TITLE:

Vitamin A supplementation (VAS) among mothers of children under five years old at Mbagathi District Hospital (MDH), Nairobi, Kenya.

Utafiti kuhusu nyongeza za Vitamin A miongoni mwa kinamama wenye watoto wa umri wa chini ya miaka mitano katika hospitali ya wilaya ya Mbagathi, Nairobi, Kenya.

PART A

Introduction

You are asked to participate in the study because VAS is one of the free nutritional intervention programmes yet the coverage is so low nationally, Nairobi included. I desire to find out what mothers know, believe and practice about Vitamin A, VAS and the constraints involved.

SEHEMU YA KWANZA

Utangulizi

Umealikwa kushiriki katika utafiti huu kwa sababu vitamin A hupeanwa bure nchi nzima lakini wanaoikujia ni wachache mno hata huku Nairobi. Natarajia kutafuta kinamama wanajua nini, wanaamini nini, wanafanya aje na ni shida gani zinawakumba kuhusiana na huduma za nyogeza za vitamin A.

Freedom of choice

This consent form gives you information about the study, the risks and benefits and the process that will be explained to you. Once you understand the study and agree to take part, you will be asked to sign or make your mark on this form. Before you learn

about the study, it's important to note that; your participation in the study is totally voluntary, you are free to make enquiries to fully understand the study before you agree to participate and you may decide to terminate the study at any time without facing any consequences.

Utafiti wa hiari

Kushiriki katika utafiti huu ni kwa hiari. Hii fomu inakuelezea zaidi kuhusu utafiti huu, lengo lake madhara na manufaa yake na yanayohitajika kwako kama utashiriki. Uko na ruhusa ya kuuliza maswali yoyote uliyonayo. Unaweza kuacha kushiriki wakati wowote bila madhara yoyote kwako.

Purpose of the study

The purpose of the study is to assess VAS among mothers of children under five years attending MDH.

Kusudi la utafiti

Kuelewa kuhusu nyongeza za vitamin A miongoni mwa kinamama wenye watoto wa umri wa chini ya miaka mitano katika hospitali ya wilaya ya Mbagathi.

Expectations during participation

I will ask you simple questions about VAS and if you wish, will participate in a deeper interview or a focus group discussion.

Matarajio

Nitakuuliza maswali kuhusu nyongeza za vitamin A na ukitaka unaweza kushiriki kwa majadiliano au kujibu maswali zaidi kuhusu vitamin A kwa kujieleza kwa undani.

Choice to withdraw or leave the study

You have the choice to or not to participate in this research study. If you choose not to participate or leave the study during the interview process, you may do so freely without any consequences against you.

Kuacha utafiti

Kushiriki katika utafiti huu ni kwa hiari. Unaweza kuacha kushiriki wakati wowote bila madhara yoyote kwako.

Harm and/or risks and/or discomforts

We do not anticipate any risks or discomforts to you during this study. You will be requested to avail yourself for an interview. We will protect your privacy and confidentiality during your participation in the study. The interview will take place in private. It is unlikely that any harm could happen to you as a result of being in this study.

Madhara ya kushiriki kwa utafiti

Utafiti huu hauna madhara yanayofahamika. Majibu yako hayatajulishwa watu wengine ila tu wanaohusika kwa utafiti huu.

Benefits

There is no cost for participating in the study. Your participation is voluntary and you have the right to withdraw at any time. You are free to ask for further clarifications as need be. You will have a chance to get vitamin A for all your children incase they are not up to date with the supplementation schedule. You will also get a leaflet on Vitamin A to remind you of its benefits.

By participating in this study and answering our questions, you will help increase our understanding of the knowledge, attitudes, practices and constraints faced with VAS. The results will be used to assist the MOPHS to understand attitudes, knowledge, practices and constraints regarding VAS services. This will enable them take the necessary steps to enhance uptake of VAS and formulate policies to improve VAS services countrywide.

Manufaa

Hauhitajiki kulipa chochote kushiriki. Kushiriki katika utafiti huu ni kwa hiari. Kwa kushiriki katika utafiti huu, utasaidia kufahamu mahitaji ya huduma za nyongeza za vitamin A yatakayotumiwa na wizara ya afya kusaidia kueneza na kuongezea idadi ya watoto wanaopata vitamin A kote nchini. Watoto wako watapewa Vitamin A kama hawajaipata kama inavyohitajika na utapewa kijikaratasi cha kusoma na kujikumbusha kuhusu vitamin A.

Privacy of records

All information provided will be kept confidential by all means. You will only be identified by a code and personal information from the interview will not be released without your written permission. You will not be personally identified in any publication of this study. However absolute confidentiality cannot guaranteed because your records may be reviewed by the Ethics committee at KEMRI.

Kubaniwa kwa utafiti

Majibu yote ya utafiti yatawekwa siri. Vitabu na maandishi yatakayotokana na utafiti huu hayatamjulishwa mhojiwa yeyote. Hauhitajiki kuandika jina lako. Hata hivyo,

nambari yako ya usajili katika utafiti huu inaweza kuajiliwa na maafisa kutoka taasisi ya Kenya ya uchunguzi wa matibabu.

In case of any questions, please contact / *kwa maswali yoyote uliza:*

Mary Wanjira Njue. Cell phone no: 0727736810. Email: njuemary@yahoo.com

If you have any questions about this research study and would like to talk to someone other than the researcher, you are encouraged to contact the following:

Ikiwa uko na maswali yoyote kuhusu utafiti huu na ungependa kuuliza swali kwa mtu mwingine isipokuwa mtafiti, unahimizwa ujulishe:

The Director, Institute of Tropical Medicine and Infectious Diseases (ITROMID)

Jomo Kenyatta University of Agriculture and Technology (JKUAT)

P.O Box 62000 00200 Nairobi

Tel: 067-52711

Email: itromid@nairobi.mimcom.net

OR / *AU*

The Chairman, KEMRI National Ethical Review Committee

P.O Box 54840 00200 Nairobi, Kenya

Tel: +254 20 2722541,2713349,0722205901,0733400003

Email: info@kemri.org

PART B

Please read the information in PART A or have it read to you carefully before completing this consent form. If you have any questions, please ask the investigator prior to signing the consent form.

SEHEMU YA PILI

Tafadhali soma fomu ama hakikisha umesomewa na kuelewa kabla ya kutia sahihi kwa hii fomu ya kutoa ruhusa kushiriki. Kama uko na maswali yoyote, uliza kwa mtafiti kabla ya kutia sahihi.

Declaration of volunteer

I Mr/Miss/Mrs.……. do hereby give consent to Ms Mary Wanjira Njue to include me in the proposed study entitled: Vitamin A supplementation among mothers of children under five years old at Mbagathi district hospital, Nairobi, Kenya. I have read the information sheet. I understand the aim of the study and what will be required of me if I take part in the study. The risks and benefits if any have been explained to me. Any questions I have concerning the study have been adequately answered. I understand that I can withdraw from the study at any time if I so wish without any consequences. I realize I will be interviewed once. I consent voluntarily to participate in this study.

Arifa ya mhojiwa wa hiari

Mimi Bw/Bi …… natoa ruhusa kwa Bi Mary Wanjira Njue anihusishe kwa utafiti wake kuhusu nyongeza za vitamin A miongoni mwa kinamama wenye watoto wa umri wa chini ya miaka mitano katika hospitali ya wilaya ya Mbagathi.

Nimesoma habari zote kuhusu utafiti huu. Nimeelewa lengo la utafiti huu na yanayohitajika kwangu kama nitashiriki. Madhara na manufaa yake yameelezwa kinagaubaga kwangu. Maswali yote niliyokuwa nayo yamejibiwa. Nimeelewa kwamba naweza kuacha kushiriki wakati wowote bila madhara yoyote kwangu. Najua nitahojiwa mara moja. Ninatoa ruhusa kwa hiari nishiriki katika utafiti huu.

Respondent's Name / *Jina la Mhojiwa* …….

Signature or left thumb print / *Sahihi au alama ya kidole gumba (kushoto)*

…… Date / *Tarehe*……

Name of person taking consent / *Jina la anayepewa ruhusa*

……..

Signature / *Sahihi* ……. Date / *Tarehe* ……..

Name of Investigator /*Jina la mtafiti*……

Signature / *Sahihi* …….. Date / *Tarehe* ……..