EFFECTIVENESS OF THE DISCOUNT VOUCHER SCHEME ON THE UPTAKE OF INSECTICIDE TREATED NETS FOR PREGNANT WOMEN AND INFANTS IN MUHEZA DISTRICT

By

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A Dissertation Submitted in Partial Fulfilment of the Requirements for the Degree of Master of Public Health of the Muhimbili University of Health and Allied Sciences

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CERTIFICATION

The undersigned certifies that he has read and hereby recommends for acceptance by the Muhimbili University of Health and Allied Sciences a dissertation entitled ***'Effectiveness of the Discount Voucher Scheme on the uptake of insecticide treated nets for pregnant women and infants in Muheza district'*** in Partial fulfillment of the requirements for the degree of Master of Public Health of the Muhimbili University of Health and Allied Sciences.

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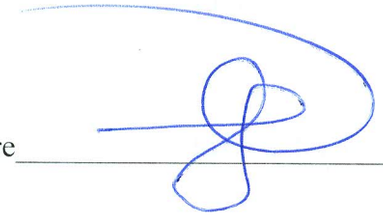
Date 26. 05. 2009

DECLARATION AND COPYRIGHT

I, **Mfaume Rashid Said**, declare that this dissertation is my original work and that it has never been submitted for diploma or degree in any other University

Signature 

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DEDICATION

This dissertation is dedicated to all my family members who have always been providing encouragement to me on acquiring new knowledge and skills.

ABSTRACT

Targeted subsidy for insecticide treated nets (ITNs) in the form of discount voucher scheme in pregnancy and infancy is a valuable tool for malaria control.. Despite that discount voucher schemes were introduced in Tanzania, some five years back, socio-cultural and economic barriers towards the use of the scheme exist..This study assessed the effectiveness of the Discount voucher scheme on the uptake of ITNs for pregnant women and infants and associated barriers. A cross-sectional survey at the reproductive and child health clinics among pregnant women and care takers of children aged 9 to 30 months and in-depth interview of health Staff and retail net sellers. Awareness of the Discount voucher scheme was more than 90% among both study populations and both perceived the voucher scheme to be beneficial to them. More than half (61.5%) of pregnant women and care takers received discount voucher. High uptake of discount vouchers and ITNs was among respondents living within close (less than 5 kms) to the net selling outlet ($P<0.01$) and among those with ability to pay the top up money ($P<0.01$).. The main barriers to uptake of discount voucher and ITNs were; lack of top up money, long distance to the net retail seller, low awareness of the scheme. It can be concluded that the discount voucher schemes in both study groups has increased discount voucher uptake and mosquito net use despite the prescence of some barriers. The observed barriers to uptake of the vouchers and mosquito nets should be addressed so as to achieve optimal effectiveness. The continued sustained supply of discount vouchers, mosquito nets and insecticide re-treatment kits need to be emphasized..

DISSEMINATION OF RESEARCH FINDINGS

The following bodies will be provided with a copy of this study; Muhimbili University of Health and Allied Sciences, Ministry of Health and social Welfare, District Executive Director's office, Muheza District Council and Tanzania German Programme to Support Health (TGPSH) office.

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LIST OF ABBREVIATION

ANC	-Antenatal Clinic
CDC	-Center for Disease Control and Prevention
DVS	-Discount Voucher Scheme
GFATM	-Global Fund for AIDS, Tuberculosis and Malaria
IHRDC	-Ifakara Health Research and Development Center
IRK	-Insecticide Re-treatment Kit
ITN	-Insecticide Treated Nets.
LLIN	-Long Lasting Insecticide Treated Net.
MMTSP	-National Malaria Medium Term Strategic Plan
MOHSW	-Ministry of Health and Social welfare
MUHAS	-Muhimbili University of Health and Allied Sciences
NMCP	-National Malaria Control Programme
PHC	-Primary Health Care
PI	-Principal Investigator
PSI	-Population Service International
RBM	-Roll Back Malaria
RCH	-Reproductive and Child Health
TNVS	-Tanzania National Voucher Scheme
USAID	-United States Agency for International Development
WHO	-World Health Organization

CHAPTER ONE

1.0. INTRODUCTION

1.1. Background

Malaria continues to be a major public health problem in the world although it is preventable and treatable. It is estimated that, 300–500 million clinical malaria cases and 1.5 - 2.7 million deaths that occur annually are directly attributable to malaria. The great majority occur in young children from remote rural areas of sub-Saharan Africa (WHO, 2003). Sub-Saharan Africa represents 90% of global Malaria deaths of which 80% occurs in children below five years and the pregnant women,(WHO, 2005).

Majority of infections are caused by Plasmodium falciparum, the most dangerous of the four human malaria parasites (Kakkilaya, 2006). It is also because the mosquito Anopheles gambiae is the most widespread in Africa and the most difficult to control (WHO, 2003).

In Tanzania, Malaria is number one cause of death in children below five years and accounting for 30% of the national disease burden, (MOHSW, 2006). Ninety three percent (93%) of the population is considered to be at risk of malaria and twenty-five percent (25%) being prone to malaria epidemics every four to five years. It kills one child in sub-Saharan Africa in every 30 seconds, (World Health Report, 2005)

Malaria is a major contributing cause of poverty and absenteeism from work and school in the endemic areas of Tanzania and a major barrier to the social and economic development. It is estimated that 3.5 percent (USD $121 million) of the Gross Domestic Product (GDP) is consumed as malaria costs. Private expenditure, primarily on drugs, coils, sprays and bed-nets, represents seventy one percent (71%) of total expenditures on health in Tanzania (USAID-CDC, 2005)

During the last decade insecticide-treated nets (ITNs) have become a key strategy for malaria control (WHO, 2005). Both, untreated and treated mosquito nets are effective in preventing mosquito bites. However, ITNs are significantly more effective as they repel or prevent mosquitoes from biting and shorten the mosquito's life span, reducing the chances of transmission. It has been shown that high coverage and properly used ITNs can cut malaria transmission by up to 90% and reduce child deaths from all causes by 20% by high use of ITNs in communities, (World Health Report, 2005). A discount voucher system (DVs) to promote the use of ITNs amongst pregnant women and infants was established where by all pregnant women and care takers of infants attending to the RCH clinics are eligible to receive such a voucher. The aim is to facilitate their access to ITNs and to provide a structured opportunity for the promotion of ITNs to this high-risk group. Protecting pregnant women is crucial for protecting infants, who usually sleep with their mothers (Marchant et al, 2002).

Social marketing is an appealing tool for getting such nets to poor rural communities who are most afflicted by malaria. This approach usually involves subsidized prices to make nets and insecticide more affordable and help establish a commercial market. Social marketing is by public private partnership involving the Ministry of Health and social welfare (MOHSW), NGOs, and private net sellers. Tanzania National voucher scheme for pregnant women has been being implemented since October 2004 to where a discount voucher that worth Tsh. 2,750 as part of the payment for ITNs. The voucher is provided to all women at their first antenatal visit to the RCH Clinic. The subsidized scheme to the pregnant mothers is funded by the Global Fund to fight against HIV and AIDS, Tuberculosis and Malaria. In 2007, the value of the voucher was increased up to Tsh.3,250 in keeping with the increase in the price of the Mosquito nets in the retail shops, (Marchant et al, 2007). Infant discount voucher system has been implemented in Tanzania since October 2006. This voucher scheme is funded by the United States Presidents' Malaria Iniative (PMI), (Marchant et al., 2007). This was a complementary to the existing pregnant women voucher scheme. It delivers subsidized infant vouchers at a price of Tsh. 3,250 to all infants attending reproductive and child health clinic for measles vaccination at nine month of age. Children more than one year who are sent to RCH Clinics for measles vaccine are also provided with infant discount vouchers. The proportion of children under fives and their pregnant women who sleep under ITNs was 16% and 16% for both groups (TDHS, 2004/2005).

With regard to use of mosquito nets under the voucher scheme, only 20% of community members with an existing net had been bought with a voucher, (Tami et al, 2006). This created a need to develop effective, feasible educational strategies that will inform and motivate community members, and thus maximize the uptake of ITN. This has to be emphasized in communities where mosquito net use is low and strengthened where there is good uptake of the vouchers and mosquito nets.

1.2. Problem Statement

Despite the fact that insecticide treated mosquito nets (ITNs) are the promising tool in malaria control especially to the vulnerable groups, the proportions of under fives and pregnant women sleeping under ITNs is quite low (23% and 21% respectively) (MOHSW, 2006). Targeted subsidy for ITN under Tanzania National Discount voucher scheme is one form of social marketing strategy for ITNs use. Although Social marketing is a valuable tool that aims at ensuring long term accessibility to nets, enhancing management of logistics and education efforts, little is known on how effective this strategy is (Mulligan, 2008). Regarding delivery of discount vouchers and IRKs, little is also known on how best to deliver discount vouchers and ITNs to achieve a high level of coverage and what financing mechanism might be used to achieve this and ensure long term sustainability of delivery and uptake of discount vouchers and ITNs, (Mushi et al, 2003).

Furthermore, despite social marketing that has been practiced, uptake of ITNs by the pregnant women and infant is still low. In rural Tanzania, uptake of ITNs through social marketing is 7.3% and 8.4% for under fives and pregnant women respectively (MOHSW, 2006). The barriers to uptake of vouchers and mosquito nets might include low income for top-up money, low awareness of the scheme, poor acceptability of the scheme, difficulties in accessibility, lack of prioritization at the household level, lack of sustained availability of the products in the RCH Clinics and vicinity of the community, perceived efficacy of insecticide, mosquito nuisance, perceived malaria risk, and other community variables such as age and gender (Brentlinger et al, 2007). To date, however, influence of local barriers on use, effectiveness and sustainability of ITN programmes remains limited. It was therefore necessary to explore these barriers.
Previous studies have not been possible to attribute the coverage of ITNs under targeted subsidy for infants through infant discount voucher schemes. It was there fore important to produce evidence on the proportion of ITNs use among infants is attributable to the discount voucher schemes (Grabowsky, 2005).

This study therefore aimed at assessing effectiveness of the discount voucher scheme on the uptake of insecticide treated nets for pregnant women and infants attending the reproductive and child health clinic in Muheza district and associated barriers to uptake of discount vouchers for mosquito nets.

1.3. Rationale

This study aimed at assessing the effectiveness of the discount voucher scheme on the uptake of insecticide treated nets by pregnant women and infants attending the reproductive and child health clinic in Muheza district and identifying the barriers associated with the uptake of discount vouchers and subsequently paying the top up money for the purchase of ITNs. The information generated from this study is expected to add to the existing knowledge on the effectiveness of discount voucher scheme for ITN uptake. It will also inform the policy makers and the potential stakeholders on the success of the social marketing of ITNs under the Tanzania National discount voucher scheme and when necessary to strengthen or change the current strategies and approaches. This will in-turn develop effective, feasible strategies that will both inform and motivate pregnant women, care takers and community members in general, and thus maximizing uptake of the discount vouchers and use of ITN in the communities. This information will also be useful to the Local District Authority managers on addressing the barriers to discount voucher and ITNs uptake by pregnant women and Infants under the discount voucher scheme.

1.4. Research Questions

This study addressed the following research questions;

1. To what extents are the pregnant women and care takers of infants aware and how do they perceive the importance of discount voucher scheme for subsidizing ITNs?

2. What proportions of pregnant women and infants attending to RCH Clinic received discount voucher for an ITN and have already acquired ITNs?

3. Is there a motivation for paying up the top up money for acquiring an ITN for pregnant women and care takers of infants?

4. What are the barriers for receiving a discount voucher from RCH Clinic and acquiring an ITN from a retail net selling shops/outlets.?

1.5. RESEARCH OBJECTIVES

1.5.1. Broad Objective

To assess the effectiveness of the discount voucher scheme on the uptake of insecticide treated nets (ITNs) for pregnant women and infants in Muheza district, Tanzania.

1.5.2. Specific Objectives

1) To assess awareness and perception on the discount voucher scheme for subsidizing ITNs for pregnant women and infants.
2) To determine the proportion of pregnant women attending to RCH Clinics who received a voucher for an ITN and have already acquired an ITN.
3) To determine the proportion of infants who received a discount voucher for an ITN during measles vaccination and have already acquired an ITN.
4) To determine the motivation for paying up the top up money for acquiring an ITN during pregnancy and infancy.
5) To examine the barriers for receiving a discount voucher from RCH Clinic and acquiring an ITN from the retail outlets.

CHAPTER TWO

2. 0. LITERATURE REVIEW

2.1. Global utilization of discount vouchers and ITNs

The Malaria control in Africa includes both preventive and curative strategies. On the preventive side insecticide treated bed nets (ITNs) are a promising tool for malaria control. Population coverage of ITNs in Africa falls below the Abuja target of 60%. During the last decade ITNs have become a key strategy for malaria control. The fact that malaria hits the most impoverished communities creates an imperative for the social marketing of ITNs using different approaches including targeted subsidy by voucher schemes to make ITNs affordable to the majority and improve the overall uptake (Abdulla et al, 2001).

The effectiveness of ITNs had been assessed by number of studies. In randomized control trials conducted in Burkina Faso, Ghana, Kilifi Kenya, Gambia, revealed an overall under five Mortality reduction of seventeen percent (17%) in the communities provided with ITN (Alaii et al, 2003). The impact was similar across a range of malaria endemecity. Impact derives not only from a reduction in malaria deaths, but also from reductions in child deaths due to other causes that are associated with, or exacerbated by malaria such as acute respiratory tract infection, low birth weight and malnutrition (WHO, 2003). A study in Southern Tanzania that assessed the impact of social marketing of ITNs on malaria and anaemia in pregnancy by Marchant et al, (2002),

showed that recently treated nets were most effective at preventing malaria and anaemia (prevalence of mild anaemia was 68% compared with 82% for those without nets and prevalence of malaria was 22% compared with 33% for those without nets).

2.2. Uptake of discount vouchers and use of subsidized mosquito nets among pregnant women

National surveys in Africa revealed the use of mosquito nets to be very low among pregnant women. Results of a recent surveys in Benin, Malawi Rwanda and Uganda, indicated less than 10 % use of any net and the use of ITN was only 3% (WHO, 2003). The same was observed in a community- based survey (Guyatt et al, 2004) in four Kenyan districts. Among the 1814 pregnant women randomly selected only 5% had slept under an ITN and only 11% of the women from rural areas used nets. For the urban, ITN usage was 27%. Forty one percent (41%) of the mosquito nets used by rural women had been obtained free from a research project or a nationwide UNICEF donation through antenatal clinics. Less than a quarter (13%) of the women using nets (treated and untreated) had bought their nets from shops or markets.

In the Gambia a national wide survey in rural setting showed a higher use of bed net among children under five and pregnant women than among the general population and reached up to 90% in these subgroups in the central region (D'Alessandro et al., 1994). This study findings are in contrast to another study conducted in southern Tanzania showing most women sleep under mosquito nets while pregnant, the use of voucher-

subsidized ITNs during pregnancy is still low despite widespread knowledge of the scheme. Parents apparently decide to buy the subsidized ITNs once the child is born and not during pregnancy. Importantly, in 20% of households the only existing nest had been bought with a discount voucher (Tami et al, 2006).

In Morogoro, Tanzania, voucher uptake was also observed to be relatively low, 12% of women said they had used a voucher by July 1999, 30% said they had actually used one and 40% of these women reported that their child was using treated mosquito nets, (Mushi et al, 2003)

2.3. Uptake of discount vouchers and use of subsidized mosquito nets in children below five years during Measles routine and national vaccination campaigns

Mass distribution of ITNs during Measles vaccination campaigns achieves rapid, high and equitable coverage at low cost. The integration of measles vaccination campaign and distribution of ITNs is being currently practiced by many African countries. During a national measles vaccination campaign in Zambia, children in four rural districts were given a free ITN when they received their measles vaccination. In one urban district, children were given a voucher, which could be redeemed for a net at a commercial distribution site. In the rural areas, ITN coverage among children below five years rose from 16.7% to 81.1% and in the urban area from 50.7% to 76.2% (Grabowsky et al, 2005).

These findings were similar to the findings of another study on ITNs distribution during measles vaccination campaign in Togo indicating increased possession of ITNs from 6% to 62% averaged over all households. An estimated 98% of households with a child less than 5 years of age had at least one ITN, of which approximately 95% were obtained from the distribution campaign. The campaign had the effect of equalizing ITN ownership rates between groups of different socioeconomic status.

2.4. Awareness, Perception, and the practices on the discount voucher for ITNs uptake

Awareness to the discount voucher scheme has been observed to be low (Marchant et al. 2002). Slightly more than a quarter (28%) of women in Morogoro Tanzania said they had heard of the scheme. Two percent (2%) of all women, 7% of those who had heard about the system said that they had been given a discount voucher. Of these 10, eight had already used the voucher at the time of interview. During a randomized controlled trial of insecticide-treated nets in western Kenya, the problems associated with the use of ITNs were that nets smell badly when newly treated or retreated, the chemical (insecticide) causes flu-like symptoms like running nose, and skin rashes, chemicals may make nets unfit for babies; when asked whether nets were harmful, all said nets were not a problem per se (Alaii et al., 2003).

Acceptability of discount voucher scheme and ITNs among community members in Zimbabwe was very high based on reported utilization of ITNs. More than 90% of

people said they bought the nets from the project in order to avoid mosquito bites and to prevent malaria (Tsuyuoka et al, 2002). Quite a number of respondents (69%) gave the answer that they bought mosquito nets from the project because they were cheaper (Z$130 to Z$390) than the market price (Z$1,000) and more than half (58.3%) claimed that they could not afford to buy mosquito nets at the market price. The price was accepted by the majority as cheap or very cheap in Gokwe, Hurungwe and Mount Darwin (92%, 82% and 98% respectively).

2.5. Treatment of Mosquito nets under the Discount Voucher Scheme

The treatment and re treatment of nets requires following some procedures. To be effective nets have to be treated correctly. The nets can be treated through spraying or dipping. The most common way is through dipping. Treated nets have to remain effective and have to be re-treated at least once a year even if it has not been washed. When a net is washed it must be retreated after the third wash (WHO, 2002). The regular re-treatment of nets is major challenge to make ITN technology widely available.

There is also scientific evidence that the frequent wash of a treated net reduces its efficacy (Jawara et al., 1998) and people have different habits. In The Gambia (Jawara et al., 1998), a project revealed that 1% of treated nets had been washed, 13% after one month, 76% after 3 months. There is no doubt that in developing settings white nets which are mostly used are more exposed to wash, and more common with mothers having babies.

2.6. Barriers to the uptake of discount vouchers for ITNs and use of mosquito nets

Insecticide-treated mosquito nets provide real hope for the reduction of the malaria burden across Africa. Understanding barriers that determine access to ITN is crucial to debates surrounding the optimal delivery systems.

2.6.1 Cost/ affordability

A major barrier to net ownership in the African communities is poverty. The most common reason cited for not possessing a net is lack of money: the price of a net represents a large proportion of the income of a poor household (World Malaria Report, 2003). Cost of ITNs is an important barrier to their uptake. Given the poverty level within most African families, the ITN is perceived by many communities as an expensive investment good. That is why ITN was not considered as a priority, the priority in their life is subsistence (Alaii et al., 2003). Since the promotion of ITNs for malaria prevention, the cost has been a major obstacle to its spread. In Burkina faso and many other countries in Africa the main reason for not possessing net was its high cost (Okrah et al., 2002).

Studies conducted in Kenya, Nigeria and the United Republic of Tanzania indicate that household members are willing to pay for ITNs, but less than the current cost. One approach to reducing is by social marketing in which there is subsidy of the cost of ITNs on sale to some extent (WHO, 2003). House hold affordability to possess ITNs varies among the poor and least poor house holds and increase equity can be achieved through social marketing. Study in Ifakara, Tanzania (Nathan et al, 2004) revealed that about

20% of the poorest households and over 60% of the least poor households owned a mosquito net. Three years later, more than half of the poorest households owned a net, as did over 90% of the least poor: the ratio of net ownership among the poorest to least poor increased from 0.3 in 1997 to 0.6 in 2000. Social marketing in the presence of an active private sector for nets was associated with increased equity.

2.6.2. Availability of Mosquito nets

In the Enugu state of Nigeria ITNs are affordable, but the community is not willing to buy the products (Onwujekwe et al, 1999). In such a situation the Government and donors play a role in promoting the products to motivate community members to buy them, to ensure accessibility and availability to the product, and that to ensure widespread coverage. Similar efforts have been implemented in Tanzania where by Over 40% of households had access to retail outlets for nets and insecticide treatment kits within the community, urban areas had more outlets for both IRK and nets (57.3%, 53.1% respectively) than rural areas (34.4% and 36.5%) respectively,(MOHSW, 2006).

2.6.3. Distance to the RCH Clinic and Net sellers

Distance to the RCH Clinics and mosquito net sellers has been a barrier to ITNs Use.

In a study to assess coverage of ITNs in rural Nigeria: The study findings further indicated that community based distribution was found to increase access to the ITNs and nets were not too expensive. Alternatively selling ITNs centrally within the community also increased access (Obina et al, 2005). The study findings in Kenya indicated that travel time to nearest market centres (adjusted OR = 0.51, 95% CI = 0.37-

0.72) was significantly associated with use of retail sector nets by children aged less than 5 years (Noor et al, 2006). Similarly a study done in twenty one districts in Tanzania revealed that, over 40% of households had access to retail outlets for nets and insecticide treatment kits within the community, urban areas had more outlets for both IRK and nets (57.3%, 53.1% respectively) than rural areas (34.4% and 36.5%) respectively (MOHSW, 2006).

2.6.4. Social Cultural Barriers

The social cultural factors are important in the whole process of uptake of discount vouchers and utilization of ITNs. Adults were given priority to use nets because of their age and position as family earners (Aalii et al, 2003). This is similar to the findings of [Okrah et al, 2002] where 34% of nets were used by adult males, 19% by mothers with their young children, and 17% by elderly people.

Studies have shown that not all nets possessed by the community members are being used. Adherence to net is a very complex entity related to many factors. During a study where ITNs were given free of charge in Asembo-Kenya, about (30%) of the nets were unused, and an overall adherence of 72.3%.

The probability of adherence by individuals depend strongly on the age, children below five years were less likely to use the ITNs than older individuals. Contrary to some earlier mentioned studies, factors like mosquito density, heat, number of occupants in

the house, relative wealth, level of education of household head did not have any effect on the adherence. Instead the adherence reduced with time, during the second year of the project and when there was disruption of sleeping arrangement, when there was a visitor, during funerals, house construction or other events (Alaii et al., 2003).

CHAPTER THREE

3.0. METHODOLOGY

3.1. Study area

The study was conducted in Muheza District, Tanga. The District is located in the western Tanzania and covers an area of 4,992 square kilometres and easily accessible by land and sea. It has a total population of 279,473 of whom 26,624 are children below five years of age (National Census, 2002). It has six divisions 35 wards, 175 Villages and 44,124 Households. There are 59 health facilities in the District; One District Hospital, 4 Rural Health centres, 54 Dispensaries. The District has heterogeneous tribal composition. The natives are the Sambaa (In highlands) and (the Bondei in the low lands), (District PHC Report, 2007/2008).

Muheza Distict has been chosen as a study areas because: It has a rural population and the District has a discount voucher system, It is a Malaria holoendemic area, transmission being throughout the year (During rainy and dry seasons) and it has Malaria as a leading cause of Out patient department (OPD) attendances, as well as inpatients admission, and leading cause of deaths especially in children underfives. The District has been operating National Discount Voucher scheme as a targeted subsidy for ITNs since October, 2004 and October 2006 for pregnant women and Infants respectively. The children not sent to RCH Clinics for measles vaccination at nine

months and sent later than nine months were also provided with measles vaccination and infant discount vouchers.

3.2. Study design

A descriptive cross - sectional study was carried out in Muheza District between July 2008 to August 2008 to examine the effectiveness of the Discount Voucher Scheme on the uptake of insecticide treated nets for pregnant women and infants.

3.3. Study populations

The study populations consisted of (a) currently pregnant women attending the RCH Clinics (b) Care takers of children between nine to thirty months old attending the RCH Clinics. (c) The Selected RCH Clinic Staff. (d) Selected retail Mosquito Net sellers.

3.4. Inclusion Criteria

The study included; (i) Sampling interval was done to currently pregnant women attending RCH Clinics, (ii) Care takers of children between nine to thirty months old attending the RCH Clinic between October 2006 to July 2008 for measles vaccination or post measles vaccination visits, (October 2006, is the time the infant discount voucher scheme started being implemented and July, 2008 is when this study was conducted).
(iii) Pregnant women and care takers willing to give consent and participate in a study, (iv) Selected RCH Staff, and (v) the selected retail mosquito net sellers under National Discount voucher scheme.

3.5. Exclusion Criteria

(i) Non-pregnant women attending the RCH for services other than pregnancy and measles or post measles services

(ii) Pregnant women and care takers who were not attending RCH Clinic during the mentioned time interval

3:6. Study variables

(i) **Independent Variables:** Socio-demographic variables (age, sex, marital status, occupation, level of education), distance from the household to the retail net sellers, availability of discount vouchers at the RCH Clinics, ability to pay to-up costs for ITNs, safety of insecticide '*Ngao'* used to treat ITNs, awareness and perception of the discount voucher scheme for subsidizing ITN for pregnant mothers and care takers of children aged 9 – 30 months.

(ii) **Dependent Variables:** Uptake of discount vouchers and consequently purchases of ITNs for the pregnant women and infants.

3:7. Sample Size

(a) Pregnant women

The minimum sample size for the study was obtained from the formula (Bland, 1995) below:

$$n = \frac{z^2 P (100-P)}{\varepsilon^2}$$

Where P = Expected proportion of the pregnant women who attended RCH Clinic and provided with discount vouchers for ITNs; P = 38.9% [MOH, 2007]

ε = Margin of error ,set at 7% z = Standard Normal Deviate set at 1.96.

n = minimum sample size required.

Substituting the values into the formula gives the minimum sample size was as follows.

$n = \frac{1.96^2 \times 38.9(100-38.9)}{(7)2} = 186$ Pregnant women.

Therefore the minimum sample size was 186 pregnant women.

Adding 10% of non-respondents, maximum sample size required was 205.

(b) Care takers of children aged 9 – 30 months

The minimum sample size for the study was obtained from the formula (Bland, 1995) below:

$$n = \frac{z^2 P (100-P)}{\varepsilon^2}$$

Where P = Expected proportion of care takers of children aged 9- 30 months who attended RCH Clinic for Measles/ post measles vaccination and provided with discount vouchers for ITNs; P = 47% [MOH, 2007]

ε = Margin of error ,set at 7% z = Standard Normal Deviate set at 1.96.

n = minimum sample size required.

Substituting the values into the formula gives the minimum sample size was as follows.

$n = \frac{1.96^2 \times 47 \times (100-47)}{(7)^2}$ = 195 Care takers.

Therefore the minimum sample size was 195 care takers of children aged 9 – 30 months. Adding 10% of non-respondents, maximum sample size required was 215.

3.8. Sampling procedures

For studies based on health facilities, the recommended (Kielman, 1995) sample for health facilities is 25-30 percent of all health facilities. Twenty five percent (Which is equal to 15 health facilities) of total health facilities providing RCH services in the district were selected by stratified sampling, followed by simple random sampling in every strata to cater for the required sample size.

3.9. Selection of health facilities

The health care facilities were stratified into public and private (whether private for profit or faith based). From strata, health facilities at all levels (hospital, health centre and dispensary) were considered. The district has only one District hospital, thus the hospital was conveniently studied. From the health center stratum (Constituting four health centers) two were selected by Simple random sampling. There are 54 Dispensaries; from this stratum (Dispensary), 13 Dispensaries were selected by simple random sampling.

On reaching the RCH Clinic a total daily expected attendance was obtained from the RCH registers. The first clients for both pregnant women and care takers were selected

at random from a list of numbers between one and thirteen (13) for pregnant women and between one and fourteen (14) for care takers. The rest were selected after every "K^{th} "Client. K = Sampling interval, N = the total population expected to attend on a particular day as obtained from the RCH Clinic register, n= the sample size per RCH Clinic which was 13 and 14 for pregnant women and care takers respectively. A sampling interval was calculated as follows:

k = N/n: There fore the exit interview at the RCH Clinic was conducted to every third respondent until the required sample was completed.

3.10. Key informants' In-depth Interviews

One RCH staff (RCH nurse incharge) from each health care facility was interviewed making a total of fifteen (15) health staff.

The interview involved collecting details on receipt, registration, storage and issuing of the discount vouchers to pregnant mothers and care takers. Barriers to uptake of discount voucher from the RCH Clinics were also probed. The RCH Clinic staff instruction to the respondents on when and where to get free insecticide, and respondents' ability to pay for the top-up money for ITNs

In-depth interview was also conducted with 3 net sellers (The only available net sellers in the District under the Discount Voucher Scheme) on the barriers to effective implementation of the scheme under public-private partnership, net price variation, and

instruction on how to treat and use a mosquito net correctly. Probing for clarification of questions which were not clear was done

3.11. Data collection tool and technique

Data was collected using both Quantitative and qualitative methods. Qualitative method aimed at providing opportunity to explore different aspects of the Discount Voucher scheme in depth

English questionnaires for pregnant women and care takers were developed. These were translated into Swahili. The Swahili versions of the questionnaires were used to interview the respondents as Swahili being their full language. In depth interview was conducted with the key fifteen (15) RCH Staff informants at the RCH Clinic and three (3) mosquito net retail shops/outlets as to assess effectiveness of the scheme and to identify barriers to accessing the discount vouchers, IRKs and subsequent purchase of mosquito nets from the retail net outlets. The interview guide was used for in-depth interview.

3.12. Pre-testing

Prior to commencing the study the questionnaires were pre-tested in Pangani District Council to check if they were well understood, the sequence of the questions was logical and if there was a need for any modification in terms of re-structuring or re-phrasing the questions. The exit interview at the RCH Clinics to pregnant women and care takers of

children between 9 – 30 months was conducted. The information from pre-tested questionnaires was not included as part of this Dissertation.

3.13. Data Collection

(i) Selection and training of research Assistants

Four research assistants with a medical background and a research experience were recruited. They were first given orientation on the purpose of the study, the interview schedule and skills that they had to apply during interview and data collection. Emphasis was put on obtaining consent and assurance of confidentiality to the respondents before beginning the interview.

(ii) Data collection procedure

Every study participant was explained the purpose of the study and asked for their oral consent before being interviewed. Exit interview of clients leaving the RCH Clinic after receiving antenatal care (Pregnant women) or post natal care (Care takers) was conducted for every third client exiting the RCH Clinic using the Swahili version of the questionnaire. The responses were then recorded on the questionnaire. The child and pregnant women RCH cards were counter-checked for discount voucher information/records. In depth interview was conducted to the key informants (RCH Clinic nurse incharge) at the RCH Clinic and retail mosquito net sellers.

3.14. Data Processing and analysis

Data was collected for a period of two weeks from late July 2008 to early August 2008. Data collected was checked on the same day to correct errors made in the field. Questionnaires were given serial numbers in both study populations. The quantitative data was entered and cleaned to check for correctness and completeness. The EPI 6 version of Epi Info soft ware for data processing and analysis was used and data presented using frequency tables and figures. Cross-tabulation was done to determine relationship between variables. Statistical significance tests performed between the independent and dependent variables. The 'chi' square test [x^2 - test] when valid was performed, significance level was set at <0.05

3.15. Ethical issues

Ethical clearance and approval to conduct a study was sought from the Research and Publication Committee of Muhimbili University of Health and Allied Sciences (MUHAS). The permission to conduct the study in the study area was obtained from Tanga Regional Administrative secretary and Muheza District Administrative secretary. The respondents were informed of the study objectives, its jurisdiction and benefits expected. Oral consent was obtained from the participants before being interviewed. All the study respondents were assured of confidentiality and anonymity and contact details provided in case of any queries. Through informed oral consent, participants were briefed about the right to agree or disagree to participate in the study. Those not wishing to participate in the study were allowed to withdraw. They were informed that the

information they provide will strictly be treated confidential and that will be used for study purpose only.

3.16. Limitation of the study

The exit interview to pregnant women and care takers at the RCH Clinics might have biased the responses. Accordingly, research assistants were therefore cautioned not to ask leading questions and avoiding getting into trap by suggesting answers to the posed questions.

The study being a health facility based, we could not validate ITNs possessions through Discount Voucher Scheme at thehousehold level; however the findings will serve as an indication on the actual and potential barriers to the operationalization of the Discount Voucher Scheme

3.17. Definitions of terms

(i) Discount Vouchers for ITNs

Is an official receipt issued to pregnant women and infants during measles vaccination as a subsidy of mosquito nets and treatment kits.

(ii) Net treatment status

It is defined as whether a net had been treated with insecticide at least within 12 months from a day of interview of this study.

(iii) Insecticide Treated nets

Is a mosquito net that has been impregnated with an insecticide, commonly treated with 1gm of 25% Deltamethrin locally known as '*Ngao*' depending on the size of the net

(iv) Targeted Subsidy: - Subsidy for ITNs targeted to the vulnerable groups, (Pregnant women and infants). In this study all children from October, 2006 when the Infant discount voucher Implementation started i.e. from 9months to 30 months old were involved.

(v) Effectiveness

This is the programme performance under real life conditions of Programme delivery, aiming at achieving stated goals or objectives and judged in terms of both output and impact. In this study effectiveness focused on availability and accessibility of discount

vouchers under the discount voucher scheme to antenatal mothers and infants, ability to pay the toping up money

(vi) Perception

The individual's feelings/notions concerning the subject matter which an individual is knowledgeable about and he/she has experienced. It usually inflences the individual's decision and actions

CHAPTER FOUR

4.0. RESULTS

4.1. Socio – demographic characteristics of the study sample

The study sample consisted of 205 pregnant women and 215 care takers of children between 9 months to 30 months old attending the RCH Clinic for measles vaccination and post measles vaccination visits, (See Table 1)

Table 1: Socio-demographic characteristics of respondents (Pregnant women) (n=205)

Characteristics	Category	Frequency	Percentage
Age (Years)	Below 20	18	8.8
	20 -24	60	29.3
	25 – 29	57	27.8
	30 – 34	38	18.5
	35+	32	15.6
Marital status	Married	162	79.0
	Single	17	8.3
	Cohabiting	18	8.9
	Widowed	2	0.9
	Separated	1	0.5
	Others	5	2.4
Occupation (multiple response analysis)	Employed	2	0.9
	Peasant	153	74.6
	Business woman	39	19.0
	Un-employed	10	4.9
	House wife	52	25.4
Education	Primary Education	184	89.8
	Secondary Education	14	6.8
	No formal Education	7	3.4

The respondents' age ranged from 15 to 45 years with a mean age of 30 years. Slightly more than a quarter 57 (27.8%) of the respondents were aged between 25 - 29 years and Less than a quarter 18 (8.8%) were below 20 years of age. Regarding occupation almost three quarters 153 (74.6%) were peasants and only small percentage 2 (0.9%) was employed. More than three quarter 162 (79%) of respondents were married and the large majority 184 (89.8%) having a literacy level of primary education.

Table 2: Socio-demographic characteristics of respondents (Care takers) (n=215)

Characteristics	Category	Frequency	Percentage
Age (Years)	Below 20	19	8.8
	20 -24	72	33.5
	25 – 29	64	29.8
	30 – 34	41	19.1
	35+	19	8.8
Sex	Male	14	6.5
	Female	201	93.5
Marital status	Married	163	75.8
	Single	23	10.7
	Cohabiting	12	5.6
	Widowed	2	0.9
	Separated	3	1.4
	Others	12	5.6
Occupation (Multiple response analysis)	Employed	6	2.8
	Peasant	128	59.8
	Business woman	63	29.6
	Un-employed	11	5.2
	House wife	56	26.3
Education	Primary Education	185	86.0
	Secondary Education (I-IV)	14	6.5
	Secondary Education (V-VI)	1	0.5
	Informal Education	4	1.9
	None	11	5.1

The findings indicate that more than a quarter 64 (29.8%) of the care takers were aged between 25 - 29 years old and it was only a small percentage 19 (8.8%) who were aged below 20 years. The mean age of care takers was 26.6years with minimum age of 14 years and maximum being 60 years. The majority 201 (93.5%) of care takers were female. About three quarters 163 (75.8%) of the care takers were married and more than half 128 (59.8%) were peasants and majority 185 (86.0%) having a literacy level of primary school education (See Table 2)

4.2. Awareness and perception on the Discount voucher scheme for subsidizing ITNs for pregnant women and care takers

The respondents were asked as to whether they had ever heard about Tanzania National Discount vouchers scheme, majority 192 (93.6%) of pregnant women had heard of the scheme and the lager majority 198 (91.6%) of care takers we re also aware of the scheme. Of the pregnant women and care takers who were aware, the majority 160 (82.1%) and 189 (95.5%) respectively accessed the information on the scheme from the RCH Clinics and only small percentage 9 (4.6%) and 3 (1.5%) of pregnant women and care takers respectively obtained the information from news papers and magazine.

More than half 105 (59.0%) of pregnant women who received discount vouchers in their subsequent antenatal visits to the RCH Clinic were aware of the discount voucher scheme prior to uptake of the voucher. For care takers of infants attending to RCH Clinics during measles vaccination visit at nine month of age, more than half 123

(60.9%) were aware of the discount voucher scheme and almost three quarters 125 (73.5%) of care takers in the child post measles' visit to RCH Clinic were also aware of the discount voucher scheme.

The uptake of the pregnant women and infant discount vouchers was not significantly related to an increased level of awareness (P>0.05). (See Table 3)

Table 3. Relationship between awareness and Uptake of discount vouchers by the pregnant women and Care takers

	Number of pregnant women and Care takers uptaking discount vouchers		
AWARENESS	**n (%)**	**Total**	**p-value**
Pregnant women in their Subsequent ANC Visits			
Aware	105 (59.0)	178 (98.3)	1.00
Not aware	2 (66.7)	3 (1.7)	
Total	107 (59.1)	181 (100)	
Care Takers in post measles visits to RCH			
Aware	125 (73.5)	170 (98.8)	0.465
Not aware	1 (50.0)	2 (1.2)	
Total	**126(73.3)**	**172(100)**	

Many study respondents mentioned correctly that; those eligible in the scheme include pregnant women and Infants. Information on discount voucher schme was obtained from RCH Clinics for most of the respondents, 160 (82%) and 189 (95.5%) of pregnant women and care takers respectively. When asked about their perception with regard to the importance of the discount voucher scheme, large majority 191 (97.9%) of pregnant

women and 185 (93.4%) of care takers reported the scheme to be of great value to them. The commonly mentioned advantages of the discount voucher scheme included Low monetary value for buying a net in subsidized prices 180 (94.2%), easy access to IRK 23 (12.0%) and assisting those with low income 70 (36.6%) and the advantages mentioned by the care takers were low monetary value for buying a net in subsidized prices 153 (80.5%), easy access to IRK 21 (11.1%) and assisting those with low income 103 (54.2%).

4.3. The proportion of pregnant women and care takers attending to RCH Clinics and provided with discount vouchers and have already purchased ITNs and IRKs

It was observed that only 5 (2.7%) of the pregnant women who were aware of discount voucher scheme were in their first antenatal visits and majority 179 (97.3%) were in their second or more antenatal visits. More than half 8 (61.5%) of pregnant women who in their first and subsequent visits to RCH Clinic received discount vouchers. The uptake of the discount vouchers has been observed to be significantly higher 18 (94.7%) among the widowed women ($P<0.05$) (See Table 4)

Table 4. Relationship between marital status and uptake of discount vouchers by the pregnant women in their subsequent antenatal visits to RCH Clinics

	Number of pregnant women uptaking discount vouchers		
Characteristics	**n (%)**	**Total**	**p-value**
Marital status			
Married	80 (55.2)	145 (80.1)	0.003
Cohabiting	9 (52.9)	17 (9.4)	
Widowed	18 (94.7)	19 (10.5)	
Total	**107 (59.1)**	**181 (100.0)**	
$\chi^2 = 11.18$,	df = 2,		p = 0.003

With regard to care takers, more than half 14 (58.3%) of care takers during the infant measles' vaccination visit and almost three quarter 127 (73.3%) of the care takers in their subsequent post measles visit to RCH Clinic received discount vouchers .

There is significant relationship between sex of care taker and the uptake of discount vouchers as Slightly more than three quarter 123 (75.5%) of female care takers in their post measles vaccination visit to RCH Clinic received discount vouchers ($P<0.05$) (Table 5).

When care takers on their post measles visit to the RCH Clinics were asked as to what else was provided to the baby at nine month apart from measles vaccine, more than half 26 (61.6%) of care takers reported their babies to be given infant discount voucher.

Table 5. Relationship between sex of care taker and uptake of discount vouchers during measles and post measles visits to RCH Clinics

	Number of Care takers uptaking discount vouchers		
Characteristics	**n (%)**	**Total**	**p-value**
Measles vaccination Visits to RCH Clinic			
Male	1 (100.0)	1 (4.2)	*1.00
Female	13 (56.5)	23 (95.8)	
Total	**14 (58.3)**	**24 (100.0)**	
Post Measles Visits to RCH Clinic			
Male	4 (40.0)	10 (5.8)	*0.023
Female	123 (75.5)	163 (94.2)	
Total	**127 (73.4)**	**173 (100)**	

*F-test =(The percentage of cells with expected count less than five(5) is more than 20%

4.4. Uptake of Insecticide Re-treatment kits (IRK) (Ngao) by pregnant women and care takers

When respondents were asked as to whether they have ever heard of the insecticide re-treatment kits '*Nga'o*, a large percentage 11 (91.7%) of women in their first antenatal visit and majority 23 (95.8%)of care takers during child measles vaccination had ever heard of the insecticide re-treatment kits locally known as '*Ngao'*.

Among the reported sources of information on 'IRK' for pregnant women in their first antenatal visit and care takers during child measles vaccination visit, two third 10 (66.7%) of pregnant women and majority 21 (87.5%) of care takers mentioned RCH Staff as a source of information while a small percentage 1 (7.1%) of pregnant women and 2 (8.3%) of care takers mentioned public meetings and local village leaders as their sources of information. With regard to whether pregnant women were told as they deserve free IRK at the RCH Clinic, majority 6 (85.3%) in their first antenatal visit were not told as they are eligible for free insecticide '*Ngao'*.

When asked as to when to get another free IRK after obtaining the first free IRK, the majority 6 (87.5%) of pregnant women in their first antenatal visits said they could obtain it from RCH Clinic when sending a baby for DPT-HB3 and measles vaccination. More than one third 5 (45.5%) of care taker during measles vaccination visits at nineth month of age, said they could obtain next free IRK from RCH Clinic when sending a baby for regular child post measles' visits.

When asked as to whether they were informed by the RCH Staff that they are entitled for IRKs, almost two third 111 (64.6%) of pregnant women in the subsequent antenatal visits and a large percentage 123 (72.8%) of care takers in the post measles vaccination visits to RCH Clinics were not told that they are entitled. Large majority 28 (87.5%) of pregnant women in their subsequent antenatal visit and more than half 25 (59.5%) of care takers who were informed as they are entitled, were told to obtain next free IRK 'Ngao' at the RCH clinic when sending a baby for regular post natal visits to the RCH Clinics.

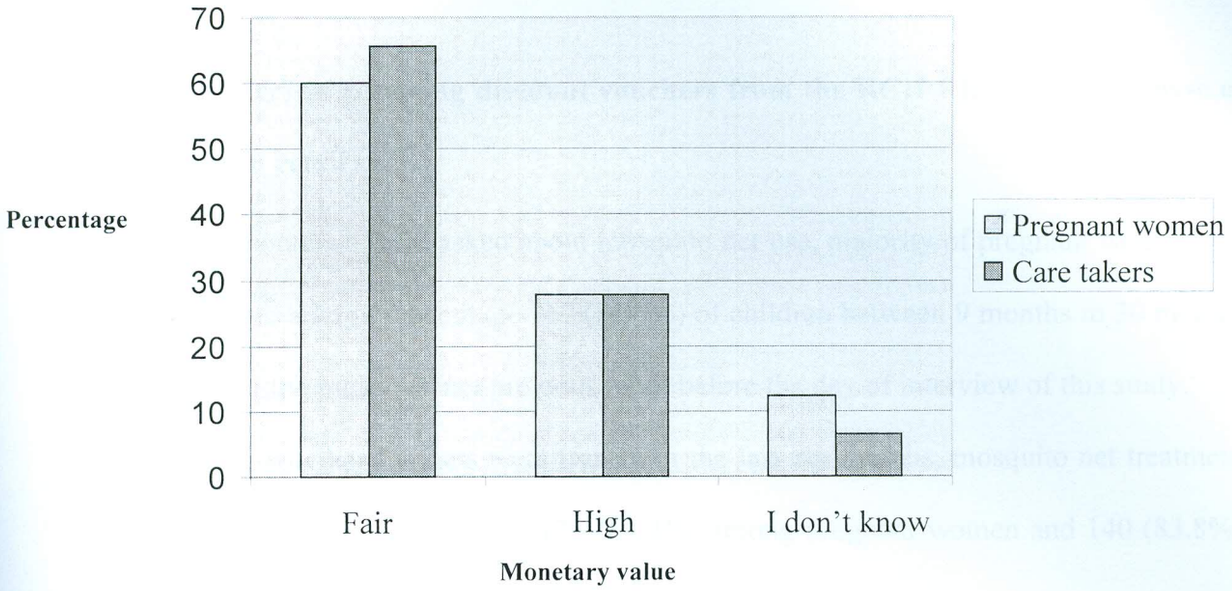
4.5. Motivation for paying up the top-up money for acquiring ITNs among pregnant women and care takers

Regarding the awareness to monetary value of the discount vouchers, more than half 108 (56.3%) of pregnant women and almost three quarter 139 (72.3%) of care takers were aware of the actual monetary value of the discount vouchers. When asked about their view to the magnitude of the actual monetary value of the discount vouchers, on multiple response analysis, almost two third 92 (65.7%) of care takers and more than half 78 (60%) of the pregnant women reported the 'toping- up' money to be fair and slightly more than a quarter 36 (27.7%) and 39 (27.9%) for pregnant women and care takers respectively said the top – up cost was too much high. The perception on the magnitude of actual amount of monetary value of the discount voucher is shown in figure 1.

More than ninety percent 184 (90%) of pregnant women and care takers were willing to pay the top-up money to acquire ITNs. They were motivated to pay the top-up money because they believed that the price is reasonable 166 (89%), voucher can be used to access ITNs 77 (41.4%),access of IRK 25 (13.4%) and that the voucher system is good 36 (19.4%).

The same motivating factors were mentioned by the care taker as follows; the price is reasonable 172 (91.5%), It can be used to access ITNs 74 (39.4%), access of IRK 13 (6.9%) and that the voucher system is good 28 (14.9%). With regard to the ability to pay the toping-up money and acquiring ITN, the question was relevant to the care takers in the post measles visits to RCH and pregnant women in the subsequent antenatal visit and those who received discount vouchers during measles vaccination visit and first antenatal visits respectively.

Figure 1: The perception on the magnitude of actual amount of monetary value of the discount voucher by the pregnant women and care takers



Majority 95 (87.3%) of pregnant women in their subsequent RCH Clinic visits and more than three quarter 102 (82.4%) of care takers in the post measles visits to RCH Clinics managed to pay the top – up money.

Ability to pay was significantly related to an increased uptake of discount vouchers ($P < 0.01$) as a large percentage 100 (98.0%) of the care takers in the post measles visit to RCH Clinic and majority of pregnant women in the subsequent pregnancies who mentioned that they were able to pay the top-up money received discount voucher.

Regarding willingness to pay for the top-up money the findings revealed no statistically significant difference between willingness to pay and uptake of discount vouchers ($p>0.05$) (Table 6).

4.6. Barriers in receiving discount vouchers from the RCH Clinic and purchase of ITNs from retail shops

When respondents were asked about mosquito net use, majority of pregnant women 154 (81.0%) and a large percentage 167 (85.6%) of children between 9 months to 30 months slept under the mosquito net previous night before the day of interview of this study. Regarding whether the nets were treated in the last six months, mosquito net treatment rate in the past six months was 135 (84.4%) among pregnant women and 140 (83.8%) among children between 9 – 30 months of age.

Table 6. Relationship between ability, willingness to pay and uptake of discount vouchers

	Number of Pregnant women and Care takers uptaking discount vouchers		
Characteristics	**n (%)**	**Total**	**p-value**
PREGNANT WOMEN			
Ability to pay			
Able to pay	93 (97.9)	95 (87.2)	*0.001
Not able to pay	8 (57.1)	14 (12.8)	
Total	**101 (92.7)**	**109 (100)**	
Willingness to pay			
Willing to pay	103 (50.0)	171 (96.6)	*0.685
Not willing to pay	3 (50.0)	6 (3.4)	
Total	**106 (59.9)**	**177 (100)**	
CARE TAKERS			
Ability to pay			
Able to pay	100 (98.0)	102 (82.3)	*0.039
Not able to pay	19 (86.4)	22 (17.7)	
Total	**119(96.0)**	**124 (100)**	
Willingness to pay			
Willing to pay	114 (75.0)	152 (92.1)	*0.741
Not willing to pay	9 (69.2)	13 (7.9)	
Total	**123 (74.5)**	**165 (100)**	

*F-Test =The percentage of cells with expected count less than fie (5) is more than 20%)

With regard to factors hindering the uptake of discount vouchers, less than a quarter 13 (6.8%) of pregnant women and 11(5.6%) of care takers reported insecticide *Ngao* to be not safe to the mosquito net user. Majority 163 (84.9%) of pregnant women and 177 (89.4%) of care takers mentioned that insecticide was safe. The side effects commonly mentioned by pregnant women included; more than half 8 (61.5%) mentioned difficult in breathing and pneumonia, causes cancer 6 (46.2%). With egard to care takers, more

than half 6 (54.5%) of care takers mentioned skin itching, difficult in breathing and pneumonia 5 (45.5%) as common side effects.

When respondents were asked on the barriers to receiving discount vouchers from the RCH Clinics and purchase of ITNs, more than half 115 (59.6%) of pregnant women and almost three quarter 143 (73.7%) of care takers mentioned lack of top up money to be the main barrier, more than two third 132 (68.4%) of pregnant women and almost half (47.2%) of care takers mentioned little awareness of the scheme among the pregnant women , husbands and care takers, not believing that a voucher can buy a mosquito net in a subsidized prices was another factor mentioned by 72 (37.3%) of pregnant women and 25 (13%) of care takers. The small percentages 4 (2.1%) of care takers mentioned un-acceptability of the discount voucher scheme by the community members and 8 (4.2%) of pregnant women mentioned un-acceptability of the size and colour of the mosquito net.

4.7. Distance to the mosquito net retail shops/ Outlet

Respondents were asked to provide their views on how distant is the mosquito net selling shop/outlet from the individual household, almost three quarter 146 (73.7%) of care takers and more than half 108 (55.4%) of pregnant women reported that the shops were close (less than 5km) to their house holds, where as less than a quarter 37 (18.7%) of care takers and slightly more than a quarter 55 (28.2%) of pregnant women said, the shops were far (More than 5km) from their household. Respondents living near to the

net selling shops were more likely to be motivated to take discount vouchers from the RCH Clinics and pay for the top-up money for ITNs ($P<0.01$) for both pregnant women and care takers (See Table7).

4.8. Reproductive and child health staff in the implementation of pregnant and infant discount voucher scheme

A total of fifteen (15) nurses in charges of the reproductive and child health clinics, one from each health facility were interviewed. Ten out of fifteen (10/15) of RCH staff interviewed mentioned the main objective of the pregnant women and Infant Discount voucher scheme is to reduce malaria and malaria related morbidity and mortality among these vulnerable groups. Two of fifteen (2/15) health staff said the main aim of this programme was to assist those with low income through toping up method. The findings suggest only one out of fifteen (1/15) RCH Staff could not mention completely the objective of the programme. All (15) informants reported to keep the vouchers safely. Regarding continuity in the supply of the discount vouchers to the respective RCH Clinics, four of fifteen (4/15) informants reported shortage of the voucher at different times as it was reported by one of the nurses in charge that

> *"There is a problem with consignment of discount voucher books, Currently the population has increased but the number of voucher books that the dispensary receives remains the same. For example since the programme was introduced in Pregnant women in 2004 and in infant in 2006" it is almost four year, the number of books being brought have been the same while the population has*

increased . Currently there are no voucher Books since May 2008", said one nurse in charge.

Table 7: Relationship between distance to mosquito net selling outlet and motivation towards Discount vouchers uptake by care takers in post measles visit and pregnant mother in the subsequent visits to RCH Clinics

	Number of Care takers and pregnant women uptaking discount vouchers		
Characteristics	**n (%)**	**Total**	**p-value**
Pregnant women			
Near (<5km)	68 (69.4)	98 (54.1)	* p=0.002
Far (>5km)	29 (54.7)	53 (29.3)	
I don't know	10 (33.3)	30 (16.6)	
Total	**107(59.1)**	**181 (100)**	
Care taker			
Near (<5km)	101 (79.5)	127 (73.8)	**p=0.005
Far (>5km)	19 (59.4)	32 (18.6)	
I don't know	6 (46.2)	13 (7.6)	
Total	**126(73.3)**	**172 (100)**	

* χ^2 =12.954, df =2, P=0.002 ** χ^2 =10.572, df =2, P=0.005

When the informants were interviewed on whether the introduction of discount voucher scheme has increased extra work load, fourteen of fifteen (14/15) RCH staff reported to have an increased work load from the scheme,

"By Introducing Discount voucher scheme, there has been an increase in the work load, because it raises a need to make follow-up with the village leaders/ hamlet chairpersons to confirm for the names of the ten cell leaders and client that should be included in the discount voucher. We also sometimes make follow

ups to the villages during out reach visits to trace the mothers and infants who are eligible for the discount vouchers. We have a *system of tracking the pregnant women and care takers of children between 9 – 30 months who have received or not received a voucher and are entitled for the discount vouchers and this is done during outreach visits in collaboration of the village health workers. Some times you need to walk up to 5 miles to verify the names of the ten cell leader"* reported one health staff

With regard to ability to pay the top up costs, it was reported by thirteen of fifteen (13/15) informants that most of pregnant women and care taker can not afford to pay the top up money.

"*When pregnant women and care takers of infants take the discount vouchers from the RCH Clinic, majority cannot afford to pay for the top-up money for ITNs. It happens sometimes that a woman takes a voucher during the first antenatal visit/measles vaccination visit at nine months of age, she keeps the vouchers in the mother or child RCH Cards and when they come to the clinic for the next RCH Visits you will see a discount voucher in the cards. It is there fore important to think of exemption mechanism for those eligible under the scheme and especially to those who can not pay the top-up money",* explained one of the RCH nurse

With regard to IRK, it was observed that there is no single health facility in the district that provides free IRK during DPT – HB3 and measles vaccination visits. All fifteen (15) informants reported not providing free IRK

> *"At the beginning free insecticide 'Ngao' was being provided free of charge to pregnant women at DPT3 and measles vaccination, it has never been provided free of charge among care takers of infants in the district. Since 2007, the insecticide 'Ngao' has not been distributed to the RCH clinics possibly because the current IRK is improved and long lasting for a period up to 2 years. Therefore no need for free IRK. We have not received any official information from the DMOs' office as to why there is no free Insecticides currently available at the RCH Clinics"*. One RCH Clinic Staff commented

4.9. Retail mosquito net sellers in the implementation of pregnant and infant discount voucher scheme

A total of three (3) net sellers were interviewed, these were the only available net sellers in the district under the discount voucher scheme. All the sellers obtained their mosquito nets from Tanga city. The Net seller pays an average amount of Tsh.2,000 per consignment as a bus fare. Each consignment lasts for about a month.

All three (3) net sellers reported variation in the retail mosquito net prices because the price at the whole sellers also varies. The toping up money varies according to the size of the mosquito net however it ranges from Tsh.750 to Tsh.3, 250. The price of the mosquito net at the whole sellers varies according to the size of the net. For example

Largest size: 6x6x9 = Tsh. 6,000/=, Medium Size: = Tsh. 5,000/= and Small size: = Tsh.4, 500/= . With regard to net sellers perception on clients' ability to pay for top-up money under the scheme, two of three (2/3) of the net seller said there are many pregnant women and care takers who can not afford to pay the top-up money as it was mentioned by one net seller that,

> *"Some women come here with only a leaf of discount voucher without toping up money. I take the leaf of a voucher and keep it in the shop, once a woman or care taker gets the money she/he comes here and I give him/her a Mosquito nets. Some do not keep safely the vouchers at their home, Look at this burnt discount voucher"*,

lamenting the net seller showing a piece of discount voucher, number 'HP 10415 119' that worth Tsh 3,250/= which was issued from the near buy RCH Clinic on 12.6.2007, but a woman failed to pay for top up money and the voucher got burnt when a house caught fire together with a Pregnant woman RCH Card.

When the informant (Net sellers) were interviewed as to whether they provide instruction on how to treat and use mosquito nets and what type of net and insecticide they sell, one net seller had this to say;

> *"The nets that are currently available are the 'Mbu net' and 'Safi net' which are the Swahili abbreviations for 'Mosquito net' and good net' respectively. These are packed with long lasting insecticide Ngao (1 gm Tablet containing 25% Deltamethrine). There are different colours and sizes of nets. These include Pink,*

Blue, and Green, white. Majority of women do not like the white colour as it gets dirty easily with smoke from cooking".

The other one said that

"There was a time when the discount vouchers were stolen from Muheza designated Hospital, the police held responsible some RCH Staff and myself also, claiming that i collaborated with them in stealing the discount voucher books, this was not fair and discouraged me and my fellow retail net sellers from continuing selling the mosquito nets under the discount voucher scheme" said the shop keeper.

With regard to providing instruction to the clients on how to treat and use mosquito nets one net seller had this to say:

"I usually provide instruction to the clients on how to use mosquito nets. I tell them they should use gloves during net treatment. On treating the net with insecticide they should mix insecticide with water depending on the size of the net. For example a net with a size of 6ft x 6ft x 9ft should use 1000ml of water"

CHAPTER FIVE

5.0. DISCUSSION

Targeted subsidy for insecticide treated nets is a form of social marketing strategy which is a valuable tool for malaria control under the pregnant women and infant discount voucher scheme. If appropriately implemented will ensure long term accessibility and optimal uptake of discount vouchers and mosquito nets, enhancement of management of logistics and health education with an outcome of maximum uptake for the pregnant women and their infants. This study aimed at assessing the effectiveness of targeted subsidy by discount voucher scheme for insecticide treated nets uptake by pregnant mothers and infants.

5.1. Awareness and perception of the Discount voucher scheme for subsidizing ITNs for pregnant women and care takers

The finding of this study revealed that over 90% of the pregnant women and care takers had high awareness of the discount voucher scheme. The high awareness is probably due to extensive social marketing being conducted in the district by a number of stake holders, sensitization through public meetings, RCH Clinics, public cinema shows, road shows and Bill bards. In 2002 as documented by Marchant et al, less than 30% of pregnant women were aware of the discount voucher scheme. This was a pilot study with a substantially low awareness creation by few available stake holders.

The high awareness as shown in this study perhaps translates into high uptake of discount vouchers. Previously when the subsidy was only Tsh.2,750 (Magesa et al, 2005), the awareness and uptake were low. Another study by (Marchant T et al, 2006) also revealed similar findings. Thus at the current level of provision of health education the targeted subsidy is becoming effective.

The information channel through the radio and RCH appears to be the most effective way of delivering health education. A study in the rural areas by (Mponda et al, 2006) also documented similar findings. Thus the social marketing strategy should strike to strengthen radio messages and also health messages delivered to the RCH Clinics

5.2. Uptake of discount vouchers by pregnant women and care takers attending to the RCH Clinics

Regarding the uptake of discount vouchers, the findings of this study indicate a high uptake of discount vouchers by the pregnant women and care takers. Possible reasons for high uptake among respondents might included; decrease in the toping–up money, the on going sensitization in the district by the number of stakeholders including; PSI, World vision international, the National Institute for Medical Research resulted into an increase in the uptake of the vouchers.

Uptake was even higher among widowed women being probably due the fact that they were the main decision makers in the household thus deciding on how income should be

utilized including payment of top-up money. High uptake among wodowed women can also be explained by the fact that in Tanzania settings male involvement in RCH services including TNVS is still low such that even if women are willing to pay for top-up cost, sometimes men/husbands act as barriers.

The findings of this study also indicate that there were some barriers to the uptake of discount vouchers that included lack of top up money, low awareness and un-acceptability of the programme by some individuals. (These were also the main reasons for low uptake of discount vouchers from the RCH Clinics). In contrast to the findings of this study, the uptake of discount vouchers remained low, only (12%) among pregnant women in the pilot discount voucher project in Morogoro (Mushi et al, 2003) possibly because in between the Morogoro pilot project and the current full TNVS there were number of strategies including social marketing, and increase in the monetary value of the discount voucher from Tsh.2750 to Tsh.3, 250.

Increased availability of the discount vouchers at the RCH clinics, issuing of discount voucher during outreach visits and acceptability of the discount voucher scheme by the community was associated with an increased uptake of the vouchers (Marchant T et al, 2006). Public campaigns should therefore be strengthened to enable majority of women and children to use ITN by an increased uptake of discount vouchers.

5.3. Uptake of Insecticide re-treatment kits "IRK" by pregnant women and care takers

The study findings indicate that free insecticide for re-treatment after first mosquito net treatment is no longer been provided at the RCH Clinic as the IRKs were out of stock. All respondents were not provided with IRKs in subsequent antenatal visits/post measles visits neither were they told that they are entitled for the next free IRK. This is probably due to the introduction of long lasting insecticide nets that lasts for 2 years which is bundled with IRK but this probably might as well be due to lack of political and administrative commitment on ensuring sustained supply of IRKs. Some newly employed health staff were not aware of the objective of the discount voucher scheme and thus could not deliver correct information on who are entitled for discount vouchers and free IRK. The respondents who bought IRK from private commercial market at Tsh.400/= had an increased financial burden on top of top-up costs.

The uncertainity in the availability and irregular supply of IRKs at the RCH Clinics was also documented by (NMCP, 2007). The proportion of pregnant women issued with IRK at the RCH Clinic decreased from (18.2%) in 2006 to (10%) in 2007. It is there fore important that MOH/SW ensure sustained availability of IRKS in a form of free Long Lasting insecticide treated nets at all RCH Clinics in Tanzania in rural and urban areas as majority can not afford to buy IRKs at the private mosquito net sellers

5.4. Mosquito net use and motivation for paying up the top-up money for ITNs among the pregnant women and Care takers

The findings of this study show that mosquito nets use from the discount voucher scheme is high, over 80% of pregnant women and care takers of infants. This may be related to an increase in the proportions of respondents who were able to pay the top-up money. The other reasons related to an increased in net use included awareness creation at the RCH Clinics, increased subsidy from Tsh.2,750 to Tsh.3,250, acceptability of the voucher scheme by the community members and the on going social marketing conducted by PSI . High utilization of mosquito nets was also attributable to most respondents living close to net selling shops/outlets.This is different from what was observed in the past (Tami et al, 2005) that most women slept under a net while pregnant however the use of voucher-subsidized ITNs during pregnancy was low. The reason for low use was that, parents had apparently decided to buy the subsidized ITNs once the child was born and not during pregnancy.

Therefore strategies should be designed to ensure that nets are available to those who resides far from the health facilities. This might include making use of RCH clinics as net selling outlets. Public campaigns on use of ITNs and re-treatments should be emphasized especially to pregnant women and children under fives.

Although usage of ITNs was relatively high, there were some respondents who perceived nets to be unsafe. Efforts should therefore be made in health education to create awareness.

5.5. Barriers for receiving discount vouchers from the RCH Clinic and purchase of ITNs from retail shops

This study revealed a number of barriers to uptake of discount vouchers and utilization of ITNs as follows; lack of top up money, low awareness of the scheme among the pregnant women, husbands and care takers, unacceptable size and colour of the mosquito nets from the scheme, low social economic status, distance from the household to the net sellers. The findings were similar to what had been documented in the monitoring and evaluation study conducted in twenty one districts of Tanzania (MOH-SW, 2006) to be the barriers to discount voucher uptake.

The white colour in this study was reported to be un- acceptable as it gets dirty easily with smoke during cooking. This is similar to what has been documented previously (Marchant T et al, 2007) that low social economic status, distance from the household to the health facility and to the net sellers were limiting pregnant women and care takers from acquring the vouchers and ITNs. This was intervened by distributing discount vouchers at out reach visits where by only small percentage 2.1% was provided with discount vouchers at outreach visits. To maximize uptake of vouchers the provision of the vouchers during outreach visits has to be encouraged. The use of village health workers to track eligible individuals and providing discount vouchers on outreach visits should be encouraged

5.6. RCH staff and Mosquito net sellers in the implementation of pregnant and infant discount voucher scheme

It was revealed from this study that the awareness of the discount voucher scheme to some health staff is low as they could not mention the objective of the programme. However this was as relatively a small percentage of un-trained RCH staff as compared to what was documented previously (MOH/SW, 2006) that health staff awareness to be almost fifty percent. This is probably because the MOH/SW and Local district authority have not been priotizing allocating enough financial resources in their yearly plans to train health staff on TNVS. It is therefore necessary to build capacity to health staff on the voucher scheme that will in turn be expected to deliver correct information and service to the community.

Generally there is good system of discount voucher storage, issuing and recording which emphasizes on voucher safety, however there has been a voucher shortage at different times. Voucher supply to the RCH Clinic is still based on the programme baseline population size of 2004 for pregnant women and 2006 for infants as it was reported by one nurse that sometimes there is shortage of vouchers at the RCH Clinics because the population has increased compared to number of voucher books being provided. The shortage was even higher three years ago (MOH/SW, 2006) when more than two third of the RCH Clinics had been running shortage of discount vouchers. This difference can be explained by the fact that these were the early years of programme implementation, the reasons that can not be justified in the current situation of the scheme. The supply of the

vouchers to the health facilities should therefore be based on the current population size and should be on regular sustained basis to avoid shortage. Since the start of the voucher scheme, population has increased, thus the programme should respond accordingly to avoid shortage.

The study findings in Kenya indicated that travel time to nearest market centres was significantly associated with use of retail sector nets by children aged less than 5 years (Noor et al, 2006) as the service could be obtained near to their areas of residence.

The efforts to reach those with difficult in accessing to the RCH Clinics have been undertaken in the district where this study was conducted. Similar efforts had been undertaken in other areas as the previously documented findings in Nigeria (Obina et al, 2005) that community based distribution was found to increase access to the ITNs and nets were not too expensive. This is different from this study findings where by there was no significant improved access to the discount vouchers through community based distribution as outreach visits were not regular and sustainable.

Attempt to improve physical access to discount vouchers in the study area has been by issuing of discount voucher at outreach visits and tracking those eligible and providing them with discount vouchers. However this has increased work load to the few available health staff as it was reported by more than three quarters of the RCH staff. The staff sometimes need to travel up to five miles during outreach visits to track eligible individuals without transport support .The difficult in distributing discount vouchers

during outreach visits was also observed (Tanya et al, 2007) that very few of the vouchers were distributed during out reach visit probably due to shortage of health staff and lack of accessibility to some areas as a result of geographical difficulties.

The District local authority should support staff with transport and allowances to facilitate out reach visits and make use of village health workers in the provision of discount vouchers to the eligible groups. There were no major barriers reported by the net sellers on the implementation of the discount voucher scheme with regard to procurement from the whole sellers and issuing of the nets to the eligible populations.

There was a variation in the prices at the whole sellers and at the retailers. The retail net price was observed to be even higher as as compared to whole sale prices due to additional net transportation cost by the retailers. The study findings revealed presence of only few net selling shops/outlets (Only three shops/Outlets) in the whole district .The previous information (MOHSW, 2006) also indicated low coverage of net selling outlets/shops that was less than fifty percent (42.8%). TNVS has been encouraging the availability of more retail outlets selling ITN products in the rural setting. The programme should therefore continue encouraging Public Private Partnership by engaging more mosquito net sellers to increase number of net selling outlets/shops should be increased. The central government should make close regular monitoring of the mosquito net prices to control the variation in the prices of mosquito net under the discount voucher scheme.

CHAPTER SIX

CONCLUSION AND RECOMMENDATIONDS

6.1. Conclusion

Overall awareness of the Discount Voucher Scheme on the uptake of insecticide treated nets by pregnant women and infants is high among both groups of study respondents however awareness alone is not associated with increased uptake of the discount vouchers among pregnant women and care takers. Overall, pregnant women and care takers who acquired discount vouchers comprise almost two third of the total respondents.

Uptake of discount vouchers is significantly high among the widowed pregnant women and care takers. The findings also suggest that, lack of top up money to purchase ITNs, shortage of discount vouchers and insecticide *Ngao,* are the barrier for uptake of discount voucher and acquiring ITNs which in turn affects effectiveness of the voucher scheme. Uptake of discount voucher was high among those who were able to pay the top up money.

The mosquito net use in the previous night before a day of interview of this study was very high. Some study respondents perceived that the insecticide *Ngao* is unsafe to the mosquito net user. This could affect mosquito net treatment due to fear of side effects in this portion of individuals.

Long distance (>5km) to the net seller is a barrier to motivation of uptake of voucher from the RCH Clinic and to exchanging for ITNs. The findings indicate that living closer (<5km) to net sellers was associated with an increased utilization of ITNs.

There is variation in the prices of the mosquito nets at the whole sellers and retailers.

It was evident that some retailers sell the nets almost equal to the private commercial market price.

Tracking of eligible mothers and children during outreach visits is not implemented adequately under the discount voucher scheme. It was shown that only small portion of eligible individuals could be tracked. There is neither transport nor financial support provided to the health staff during outreach visits. A small proportion of health staff is not aware of the objective of Discount Voucher Scheme

6.2. Recommendations

(1)Training of RCH Staff on Discount Voucher Scheme should be emphasized as some health staff could not mention the objectives of the discount voucher scheme.

(2) Public campaigns should target the pregnant women and care takers who were found to have a relatively low awareness of the voucher scheme. This might include strengthening IEC on Discount voucher scheme.

(3) To initiate equity voucher in the district to assist pregnant women and care takers who can not afford to pay for the top up money.

(4) Strategies should be designed to control mosquito net price variation at the whole sellers and retailers.

(5) Tracking of the eligible pregnant women and children who have not received discount vouchers at the RCH Clinics should be emphasized by making use of outreach visits in the communities.

(6) Eligibility to the scheme should also include all children below five years of age and not just infants

(7) Mechanism should be designed to enable RCH Clinics to be used as one of Mosquito net/IRK selling outlets as some respondents complained of the long distance (5km) to the net selling Outlets.

(3) Sustained and adequate supply of discount voucher books, IRKs and mosquito nets of different sizes and colours is essential

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