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University of Witwatersrand School of Public Health

Effect of fear on the use of Insecticide Treated Nets amongst pregnant women aged 15 - 49 years in Tororo District, Uganda

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A research report submitted to the School of Public Health, University of the Witwatersrand in partial fulfillment of the requirements for the degree of Master of Public Health.

November 10, 2015

Declaration

I, Charles Kakaire declare that this research report is my original work. It is submitted in partial fulfilment of the requirements for the degree of Master of Public Health, in the field of Social and Behaviour Change Communication, at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination to this or any other university.



November 10, 2015

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Acronyms and Abbreviations

ANC	Antenatal Care
EIR	Entomological Inoculation Rate
EPPM	Extended Parallel Process Model
IPTp	Intermittent Preventive Treatment of malaria in Pregnancy
ITN	Insecticide Treated mosquito Net
UNICEF	United Nations Children Fund
WHO	World Health Organization
WITS	Witwatersrand

Operational definitions

Entomological Inoculation Rate	"Number of infectious (mosquito) bites per person per unit time" (1)
Fear	"An internal emotional reaction composed of psychological and physiological dimensions that may be aroused when a serious and relevant threat is perceived"(2)
Threat	"Danger or harm that exists in the environment whether known or unknown. Perceived threat is thoughts about that danger/harm and is composed of two dimensions; susceptibility and severity" (2)
Perceived susceptibility	Beliefs about one's risk of experiencing the threat (3) (e..g "I'm at risk of malaria")
Perceived severity	Beliefs about the magnitude of the threat(3) (e.g Malaria causes death)
Efficacy	"Effectiveness, feasibility and ease with which a recommended response averts the threat. Perceived efficacy is thoughts about dimensions of self efficacy and response efficacy" (3)
Self efficacy	Beliefs about one's ability to perform the recommended response to avert the threat (3) (e.g. I am able to use ITNs consistently to prevent malaria)
Response efficacy	Beliefs about the effectiveness of the recommended action in averting the threat(4) (e.g. Using ITNs consistently prevents my acquiring malaria)
Danger control responses	Belief, attitudes and intention and behavior changes in response to a recommended action(4)
Fear control responses	Copying responses that diminish fear such as defensive avoidance, denial and reactance(4)

Abstract

Introduction: Insecticide Treated mosquito Nets (ITNs) are recommended as one of the most effective interventions for the prevention of malaria in pregnancy. It is recommended that pregnant women sleep under an ITN everyday through their pregnancy to avoid exposure to the mosquitoes. Despite increased coverage due to free distribution programs, ITN use remains low among some pregnant women, attributed to various factors. This study investigated the effect of fear on the use of insecticide treated nets amongst pregnant women 15-49 years in Tororo district in eastern Uganda. Other factors affecting ITN use were also explored.

Methods: A cross sectional study was conducted with 230 pregnant women attending antenatal care services at Tororo district hospital in January 2015. Data were collected using an interviewer-administered questionnaire with items measuring ITN use, the four constructs of the Extended Parallel Process Model (perceived susceptibility, perceived severity, self efficacy, and response efficacy), and covariates including age, education, marital status and socio economic status. Bivariate and multivariate analysis was conducted to establish the relationship between perceived susceptibility, severity, self efficacy and response efficacy and ITN use among the study population.

Results: More than a three quarters of the participants (n=230) reported using ITNs the night before the study. The two constructs of the Extended Parallel Process Model which were associated with ITN use were perceived efficacy (aOR 4.96, 95% CI 2.42 – 10.18) and perceived severity, which was negatively associated with ITN use (aOR 0.35, 95% CI 0.14 – 0.85). Other factors which were marginally associated with ITN use were socio economic status (aOR 1.67, 95% CI 0.95 – 2.92) and educational attainment (aOR 3.59, 95% CI 0.85 – 15.11).

The main reasons given for not using ITNs were net being too hot (23.91%), worn-out or in poor condition (21.74%), not enough nets in the house (10.87%), net not hung (6.62%) and net being too cold or used by someone else (both at 2.17%). Majority of the non ITN users (32.61%) mentioned other reasons for non use such as visiting a friend where there was no net, and spending the night at a funeral.

Conclusion: Overall the findings of this study show that efficacy is significantly associated with ITN use among pregnant women more than any other known factors including fear. Results have important implications for social and behavior change communication (SBCC)

programs aimed at promoting ITN use for pregnant women as behavioral interventions should focus on increasing the self-efficacy to use the ITNs.

Acknowledgements

A big Thank you to Dr. Nicola Christofides, my supervisor, for the tireless support and guidance in refining the topic, methodology and focus of this research – as this wouldn't have been possible without her patience – yes, patience!

To all the reviewers and examiners, many thanks for the comments and guidance through the drafts as it has all led to this improved version. Great appreciation to the Malaria Consortium folks – Daudi Ochieng and Dr. Atim, for pushing through the partial financial support for this research as it came in very handy for the data collection expenses and Emmanuel Kayongo, for the pre data collection guidance, especially introducing me to the form hub App!

To my family, Diana, and the boys – you rock! Thank for your patience and support throughout the course! The 2013 MPH Comrades, thank you for all your support throughout the entire course and for helping with the initial shaping of the topic (Sila and Shelter!) for the constant check-ins (Aldrian and Leonard…and Rumbie!) and the entire class for the support through the group works – and the consistent Friday evening social group (Thembi and Teluleko) .

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Chapter One: Introduction

1.1. Background

The 2012 World Malaria Report highlights the enormity of malaria, with 207 million cases in 2012 alone and 627,000 deaths reported from this mosquito transmitted disease (5). Recent data from the 2014 report shows a slight reduction in malaria, with 198 million cases reported in 2013 and an estimated 584,000 deaths but with approximately 3.3 billion people still at risk (6).

Africa accounts for the largest burden of the disease, bearing 90% of the world's transmission with children under five years and pregnant women being the most vulnerable group (5). With over 25 million pregnancies in sub Saharan Africa each year, pregnant women are at a higher risk of contracting the disease, the consequences of malaria are enormous for both mother and unborn baby ranging from severe maternal anaemia, low birth weight and perinatal mortality (7).

In Uganda, malaria is the leading cause of mortality and morbidity, affecting mainly pregnant women and children under five years (8). The disease is responsible for 70% of outpatient cases, over 50% of inpatient admissions, and 9-14% of inpatient deaths across the country (9). Malaria is endemic across the entire country with only the exception being the south western part of the country.

There are five major malaria prevention strategies in Uganda including Indoor Residual Spraying (IRS), case management, health systems strengthening and integration, Intermittent Preventive Treatment of malaria in Pregnancy (IPTp) and use of Insecticide Treated mosquito Nets (ITNs) (10). However, the two main strategies during pregnancy are Intermittent Preventive Treatment of malaria in Pregnancy (IPTp) and use of Insecticide Treated mosquito Nets (5).

Mosquito nets are effective in the prevention of malaria as they provide a physical barrier, preventing access by the vector to an individual (11). There are different strategies for distribution of insecticide treated mosquito nets in Uganda but the main ones are free distribution to vulnerable groups (including children under five years of age and pregnant women) and free distribution through antenatal Care (ANC) clinics (12).

Insecticide Treated mosquito bed nets (ITNs) are recommended by the World Health Organization as a key component of malaria prevention programs because of their effectiveness (13). The evidence for efficacy of ITNs in reducing cases of malaria is widely documented in a Cochrane review and meta analysis of 32 national datasets examining net use among children and pregnant women (14, 15).

While the World Health Organization (WHO) notes that global ITN coverage and use has increased dramatically over the past years indicating a high correlation between ITN ownership and use (5), there are variations in this relationship at country level especially in the Africa region(16). Two independent studies from Nigeria and Uganda showed that despite an increase in ITN ownership, there was a decline in use (17, 18). A review of ITN ownership and use during pregnancy identified various factors for use/non use of ITNs including low awareness of need, discomfort, low mosquito activity, and no belief in the protection method (19). Other factors accounting for the low ITN use include low perceived vulnerability to malaria, low perception of severity of the disease and low awareness of how to use the ITNs (19, 20).

One of the approaches used in sensitizing people about potential health risks and shaping their behavior is use of fear appeals (21) and among the models that applies this concept is the Extended Parallel Process Model (4). The model posits that fear appeals are most effective when they increase people's perception of the threat of the disease and at the same time increase efficacy to use the preventive strategy(2).

The EPPM postulates that a combination of threat defined as an individual's perception of both severity and susceptibility to getting a disease, and efficacy - composed of an individual's perception of both response efficacy and self efficacy to adopt a protective behaviour affects behavior change(4). These are the four main constructs of the model. This study is intended to explore and understand the relationship between the four EPPM constructs and how they affect ITN use among pregnant women in Uganda.

While the Extended Parallel Process Model has been tested in several interventions including workplace safety(21), asthma intervention programs(22), and physicians' decision to test patients for kidney disease(23) among others, there is no known study that has tested the application of the model in a malaria setting, specifically ITN use among pregnant women.

1.2. Statement of the problem

Insecticide Treated Nets are recommended as one of the main interventions for the prevention of malaria in pregnancy because of their relatively lower cost compared to other prevention mechanisms(10, 24). Despite a relatively high ITN coverage among pregnant women in most parts of Uganda due to free distribution programmes through antenatal care clinics, malaria in pregnancy continues to be a serious health risk in many parts of Uganda (25).

Studies have shown prevalence figures as high as 62.1% for placental infection with Plasmodium falciparum malaria in pregnant women in some parts of Uganda(26), indicating a clear mismatch between ITN coverage and usage among pregnant women (10, 19). This warrants an investigation into some of the undocumented factors such as fear as a possible factor which could be used to influence pregnant women's use of ITNs.

The EPPM predicts that fear of a health risk (such as malaria) can cause either adaptive, self-protective actions leading to behavior change (such as ITN use in this case) or maladaptive, self-defeating actions (leading to non use) (4). This study will explore the effect of the concept of fear on use of Insecticide Treated Nets amongst pregnant women.

1.3. Justification for the study

Understanding the reasons for the relatively low ITN use among pregnant women is useful in implementing social and behaviour change communication as part of net distribution programs as a malaria prevention intervention for this category of the population (27). Most research however has been focused on ITN coverage and distribution programs (28, 29) , with little focus on reasons for non ITN use by pregnant women, although this area has recently received some attention following the concerns about the discrepancy between ownership and use (30). This study aims to explore how fear, among other factors, affects the women's decision to use or not use ITNs.

Fear is viewed as either an inhibitor or motivator for behaviour change (4, 31). While some scholars have argued that fear is needed to motivate people to reach a negative drive state in order to motivate action (31), others note that it (fear) causes individuals to exhibit maladaptive reactions such as denial, fatalism, or avoidance in some population segments, especially those considered to be most at risk (4).

The Extended Parallel Process Model/fear management predicts and explains the possible variations in the adoption of precautionary behaviour and the model has been used and

tested on various health risks and outcomes, but no known study has used or tested the model in a malaria setting. This study aims at exploring the relationship between the model variables and use of insecticide-treated nets among pregnant women. Results from this study will be used to inform and reinforce ITN promotion programmes using the threat and or efficacy components as they related to net use.

1.4. Aim and Objectives

The overall aim of this study is to investigate the effect of fear on the use of insecticide treated nets amongst pregnant women 15-49 years in Tororo district in eastern Uganda in January 2015.

The specific study objectives are;

- To measure ITN use among pregnant women attending antenatal care services in Tororo district
- To describe perceived susceptibly and perceived severity of malaria among pregnant women attending antenatal care services in Tororo district
- To describe the perceived response and self efficacy to use insecticide treated nets among pregnant women attending antenatal care services in Tororo district.
- To determine the relationship between perceived susceptibility, perceived severity to malaria, response efficacy and self efficacy to use ITNs and insecticide treated net use among pregnant women attending antenatal care services in Tororo district

1.5. The Theoretical Framework - The Extended Parallel Process Model

The Extended Parallel Process Model (4) which is also commonly referred to as fear/threat management explains how “rational considerations (efficacy beliefs) and emotional reactions (fear of a health threat) combine to determine behavioral decisions”. The model predicts that fear of a health risk, such as malaria, can cause either adaptive, self protective actions or maladaptive, self defeating actions.

With its two main constructs of threat (made up of perceived susceptibility and perceived severity of malaria) and efficacy (made up of self efficacy and response efficacy) (4) the model highlights the circumstances under which different responses are elicited. By asking questions about threat and efficacy, people in an intended audience can be classified as having either high or low levels of perceived efficacy and either high or low levels of perceived threat.

The model predicts three outcomes, depending on one's level of perceived threat and efficacy. The first is a "no response" (32) – which occurs when perceived threat is low- where a person is not motivated to pay attention to the recommended action and hence not respond to it (i.e not use an ITN). The second is a "fear control response" – which occurs when perceived threat is high and perceived efficacy is low. In this situation, rather than engaging in the recommended action, the person tries to suppress the fear, ignoring the message or denying the threat (also resulting in non ITN use). The third outcome is a "danger-control response" (the ideal), which occurs when both perceived threat and efficacy are high (32).

The model proposes that only when both threat and efficacy are high, does a person focus on a recommended action, leading to behaviour change (4) – i.e ITN use in this case. To achieve a danger control and motivate individuals to action (e.g. to sleep under ITNs) however, the EPPM posits that efficacy variables must be higher than perceptions of severity and susceptibility (31). The model is illustrated in the figure below.

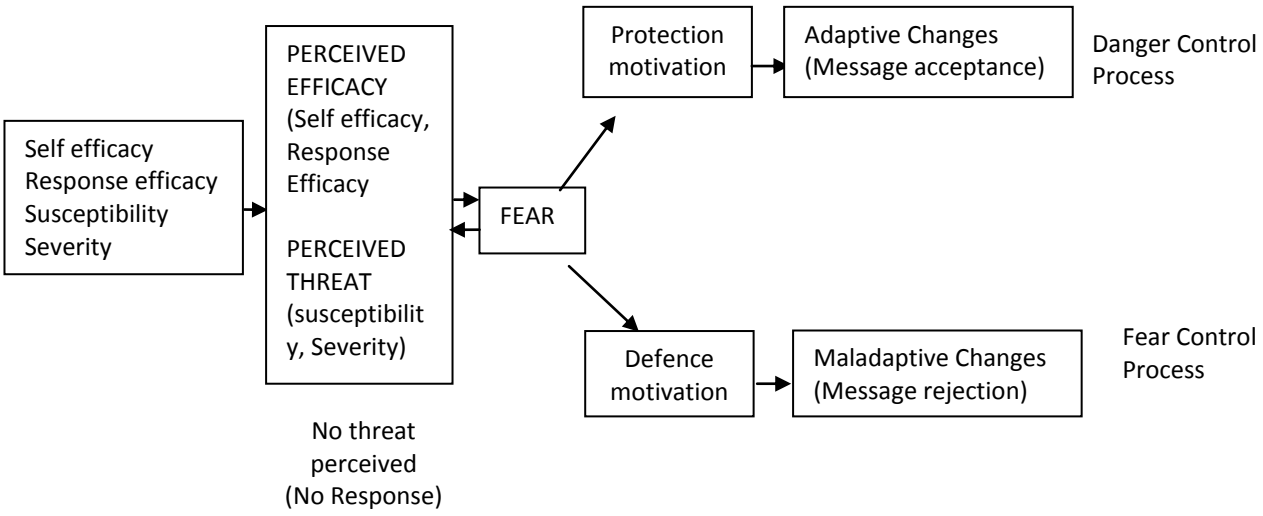


Fig 1.The Extended Parallel Process Model (4)

1.6. Literature Review

1.6.1. Insecticide Treated mosquito Nets as a malaria prevention mechanism

The use of Insecticide Treated nets (ITNs) is proven to be an effective public health intervention for malaria prevention(24, 33). In fact some studies have concluded that ITNs are currently the most effective intervention available for preventing morbidity and mortality due to malaria in tropical Africa (34).

In a systematic review of ITN use among pregnant women, the use of ITNs during pregnancy reduced placental malaria by up to 23%, foetal loss by up to 32% and improved birth weight by at least 33 grams (35). Another study in the Gambia found that prevalence of malaria decreased with ITN use irrespective of ethnic group (36), while provision of bed nets to pregnant women in both high and low endemic areas in Kenya was found to be protective to both the women and their children (37).

ITNs are generally recommended due to their relatively lower cost compared to other prevention measures (10), with some scholars comparing their cost effectiveness in preventing death to that of measles vaccinations(38). To achieve equity, the World Health Organisation recommends free distribution of ITNs or subsidized mechanisms including targeted campaigns focused on pregnant women and children under five years of age(39).

In at least 38 countries within the Africa region, ITNs are distributed free of charge to all age groups (40) and majority of the other countries have systems to ensure subsidized prices for ITN sells. Because of their community-wide effect, the higher the proportion of the population that is using or covered with the ITNs, the greater the repulsion to mosquitoes, providing an added benefit to those sleeping in and near the ITNs(41).

Despite significant increases in ITN coverage, with over 73% of the populations at risk in Africa having nets by 2010, challenges still lie with distribution and continuous supply (5, 39). The 2009 Uganda Malaria Indicator Survey (10) found that only 47% of households owned an ITN with variations in different regions in the country, although this figure has now increased to over 90% according to a recent survey (42).

1.6.2. Insecticide Treated Net use among pregnant women in Uganda

The 2009 Uganda Malaria Indicator survey showed that there was a general increase in coverage of mosquito nets following the distribution of about six million mosquito nets, with another consignment of over 20 million expected to be procured in the coming years with donor support(10).

National estimates of ITN coverage in Uganda in 2010 were at 60%, an increase from 35% in 2009 (10, 25), although this figure has now increased to over 90% according to the latest Malaria Indicator survey (42). While ITN coverage has greatly improved over the past few years, ITN use among currently pregnant women in many intervention areas remains low (24, 25, 39). The World Health Organisation notes that ITN possession has not gone hand in hand with use in many parts of the world (24) while the 2009 Uganda MIS showed that regardless of coverage, only 44% of pregnant women slept under an ITN the previous night

before the survey, although the percentage increased to 47% in 2011 (10, 25), and 75% in 2014 (42). Among household with at last one ITN, the percentage of women who slept in an ITN has increased to 84% in 2014 compared to 77% in 2009 (42).

Regardless of type of net used, ITN usage is higher in urban than rural areas, while there is a very high correlation between ITN use and level of education, with 47% of women with no education reporting using nets the previous night, compared to 61% of those with at least secondary education or higher(10).

1.6.3. Determinants of use of Insecticide Treated Nets

Several studies have documented the factors affecting use of ITNs in Uganda including discomfort, ITNs being too hot, not hung properly, absence of places to hang, and low perceived susceptibility to malaria among others (10, 19, 27, 33, 43). While national data in 2009 showed that use of insecticide treated nets is strongly associated with education, with those at secondary level or higher using ITNs more (19), findings from two separate studies in specific districts in Uganda and parts of Nigeria respectively revealed a different scenario, showing higher ITN use being associated with lower education especially among pregnant women (18, 20). As noted by Auta et al. (20), this might be related to high perceived vulnerability to malaria in poor households, a finding that is validated by the recent Malaria indicator survey which showed ITN use to be highest among households in the lowest wealth quintile (42).

Among other known factors for non ITN use, which have been little explored include limited perceived benefit of ITNs or no belief in the protection method(19), suggesting a need for further research around these two concepts of vulnerability and efficacy as determinants of ITN use.

1.6.4. The use of theory to inform Social and Behavior Change communication interventions

Theories are “sets of interrelated concepts and propositions that explain or predict situations by specifying the relations among variables” (44). The use of theory is a core element in the design and implementation of Social and behaviour change communication interventions. The available evidence indicates that public health and health promotion interventions which are grounded in social and behavioural science theories tend to be more effective than those without a theoretical base (45), and that “those strategies that combine multiple theories and concepts have a larger effect” (46). In fact the most successful public health interventions tend to be the ones that are based on an

understanding of health behaviours and the context in which they happen (44, 47). Theories and models explain behaviour and suggest how to develop effective ways to influence and change behaviour(44, 48), however, while theories vary in the extent to which they are developed and tested as concepts, the most important feature of a theory is its testability(49). A theory based malaria intervention in Tanzania grounded in the Health belief model was evaluated and found to be effective in increasing ITN use (50). This study therefore sets out to test the Extended Parallel Process Model on ITN use among pregnant women.

Chapter Two: Methodology

2.1. Study design

The study utilized an analytical cross sectional design. Data were collected from a sample of 230 pregnant women attending antenatal services on the four model variables of perceived susceptibility, perceived severity, self efficacy, and response efficacy and on the outcome variable of ITN use.

2.1.1 Study site

The study was conducted at the antenatal clinic within the Tororo district general hospital in eastern Uganda, approximately 230km from the capital, Kampala. This 200 bed health facility is the main public hospital in the district serving a population of approximately 491,874 (9).

Tororo district has an exceptionally high burden of malaria (51). While the district outpatient attendance rates related to malaria are similar to the national average, its entomological inoculation rate (EIR) is one of the highest in Uganda, estimated at 562 effective bites per person per year -an average exposure of 1.5 infectious mosquito bites per night (9).

The antenatal care (ANC) clinic at Tororo general hospital is one of the sites for continuous free distribution of Insecticide Treated mosquito Nets to pregnant women by the Malaria consortium, one of the main malaria partner organisations in Uganda. The clinic operates every day of the week and serves an average of 60 women daily.

2.1.2. Study Population and Sampling

The study population included all pregnant women, who were attending antenatal services at the ANC clinic within Tororo general Hospital in January 2015. A systematic sampling design was used where every third woman in the queue was approached and invited to participate. A total of 245 women were approached to take part in the study and out of these, ten declined to participate – indicating a 4% refusal rate. Two hundred and thirty participants were interviewed. Interviews were conducted over a period of three weeks, with an average of 15 questionnaires completed per day, although the first two days of the week (the original clinic days) always yielded more participants compared to the rest of the week. Five questionnaires which had incomplete responses were excluded from the analyses.

Using the STATA command – Sampsi, the sample size was calculated based on an assumption that 35 percent of women with low perceived severity and efficacy would be ITN users and 55% among those with high perceived severity and high efficacy would be ITN users. The 35% was a conservative estimate based on the nationwide figures for ITN use among pregnant women in 2009 which was estimated at 44% (52).This sample size was calculated assuming a power of 0.80 and an alpha of 0.05. A sample size of 212 women was recommended for the study. This was increased by approximately 15% to account for non-response or refusals yielding a target sample of 245.

2.1.3. Data collection

Data were collected using a questionnaire with closed ended questions and administered face to face by two trained female research assistants who were recruited from the study area. The questionnaire was developed in English and translated into Japadhola - the main local language spoken in Tororo district. The Japadhola translated version was then back translated into English to ensure accuracy and no distortion in content ad meaning.

A two-day training was conducted for the research assistants to familiarize them with the questionnaire and ensure a common understanding of the study purpose, study objectives and how the dimensions were measured in the questionnaire. Each research assistant was required to administer at least 120 questionnaires, and the average time taken to complete a questionnaire was 20 minutes, yielding a final total of 230 questionnaires over a three weeks period.

The questionnaires were administered on each day of the week when the antenatal clinic was operational at the same time of the day to ensure standardization of the data collection and comparable procedures. All completed questionnaires were cross checked by the researcher to ensure quality and completeness of the responses.

On advice of the clinic administrator, and to avoid keeping the women longer after their appointment, the questionnaires were administered while the women were still in the queue before being attended to by the health care worker. Interviews were conducted in the shade adjacent to the waiting clinic and each woman was invited to the shade when their turn came. Interviews lasted for an average of about 10 minutes which is just about the same time a consultation with the midwife takes.

2.1.4. Survey instrument development & measurement

The questionnaire used to collect data for this study was adapted from the malaria Behavior Change Communication (BCC) Indicator reference guide developed by the working group of malaria BCC experts (53) (see appendix 1). The guide includes Indicator definitions, survey questions to measure the indicators and some guidance on analysis and interpretation of results. Items measuring specific variables of interest for the study including perception of risk, vulnerability, self-efficacy, and response efficacy among others were extracted and used in this study instrument.

The dependent variable measured in the study was ITN use among pregnant women alongside four independent variables from the theoretical framework including perceived susceptibility, perceived severity, self efficacy and response efficacy. Covariates measured in the study include socio demographic factors; age, marital status, education and socio economic status.

For the threat variables, perceived susceptibility was measured by asking participants the extent to which they felt at risk of acquiring malaria. Responses were recorded from six items on a 4-point likert scale with answers ranging from 1(*strongly agree*) to 4 (*strongly disagree*), *e.g. When someone I know gets malaria, I usually expect them to completely recover in a few days.* The internal consistency for this scale as measured by a Cronbach's Alpha was 0.54 indicating poor internal consistency.

Perceived severity was measured with 4 items on a 4-point scale ranging from 1 (*strongly agree*) to 4 (*strongly disagree*), *e.g. I don't worry about malaria because it can be easily treated.* The internal consistency for this scale as measured by a Cronbach's Alpha was 0.43, indicating poor internal consistency. For efficacy variables, participants were asked 6 questions to measure how confident they were that they could use nets regularly and also protect themselves from malaria.

Participant responses to self efficacy questions were recorded from five items on a 4-point scale ranging from 1 (*definitely could*) to 4 (*definitely could not*), e.g. *I am confident that I can sleep under a bed net for the entire night when there are few mosquitoes.* The internal consistency for this scale as measured by a Cronbach's Alpha was 0.72, indicating a fair internal consistency.

Response efficacy was measured by asking participants about their beliefs that ITNs can prevent getting malaria with responses recorded from six items using a 4-point scale ranging from 1(*strongly agree*) to 4(*strongly disagree*), e.g. *My chances of getting malaria are same*

whether or not I sleep under a bed net. Internal consistency of this scale as measured by a Cronbach's Alpha was 0.50, indicating poor internal consistency.

Covariates including socio demographic characteristics; age, education, marital status, and socio economic status were measured. Age was a single item asking about age at last birthday, educational attainment was measured using an item which measured the highest level of schooling completed (including an option of none), and marital status was measured through a single item. Socio-economic status was measured using an asset index. Information was collected on the household's ownership of selected assets that are believed to have a strong association with poverty levels (54), most of which can be used to measure household welfare when combined with other indicators to generate a wealth index.

Particular information was collected on ownership of electricity, radio, cassette player, television, mobile phone, refrigerator, table, chairs, sofa set, bed, cupboard and clock as a measure of level of incomes. A summary score from these items was transformed into categorical data presented as low, medium and high.

2.1.5. Data management and analysis

Data were collected using questionnaires and entered into a mobile phone based application using Form hub (www.formhub.com) and downloaded into an Ms Excel file and finally exported into Stata software. Data cleaning and analysis was conducted using STATA version 12 (STATA Corporation, College station, Texas USA). Frequency tables were used to present descriptive data on socio demographic characteristics, ITN use and the independent variables of threat and efficacy while inferential statistics were used to compare the proportion of ITN users and non-users' perceived susceptibility, perceived severity, self efficacy and response efficacy, and were scored and transformed into categorical variable, low, and high. Pearson's chi-squared or Fisher's exact tests were used to detect associations between socio-demographic characteristics of the study population and their reported use of Insecticide Treated Nets (ITNs). Multivariable, binary logistic regression models were then built to further test the relationships between the key theoretical constructs while controlling for possible confounders such as Socio Economic Status and educational attainment.

Table 1; Data transformation and analysis

Objective	Variable	Data transformation	Analysis
1. To measure ITN use among pregnant women attending antenatal services in Tororo district	ITN use- measured using a dichotomous variable; E.g. *Slept under ITN the previous night, with answers Yes/No*	None	Reported as frequency and proportions and presented in table format
2. To describe perceived susceptibly and perceived severity of malaria among pregnant women attending ANC services in Tororo district	Perceived susceptibility Perceived severity * Both measured with 6 and 4 items using a 5-point likert scale	A score was obtained by adding the items together after reverse coding relevant items. The distribution of the score was plotted and found to be skewed. As a result, variables were transformed into categorical variables with two levels: low, medium, high	Frequency and Proportions of the categories that were obtained.
3. To describe the response and self efficacy to use ITNs by pregnant women attending antenatal services in Tororo district	Response efficacy and Self efficacy *Both measured with 5 and 6 items respectively using a 5-point likert scale from strongly agree to strongly disagree	A score was obtained by adding the items together after reverse coding relevant items. Plotted data revealed skewed results hence variables were transformed into categorical variables with two levels: low and high	Frequency and Proportions
4. To determine the relationship between perceived susceptibility, perceived severity, response efficacy and self efficacy and ITN use among pregnant women attending ANC services in Tororo district	Scores for the constructs *Perceived susceptibility *Perceived severity *Response efficacy *Self efficacy – as measured above were all entered into a logistical regression model and measured against ITN use controlling for potential confounders; education and socio economic status.	The transformation of the EPPM constructs is described under objectives 2 & 3. Composite scores were developed for the threat (severe + susceptibility) and efficacy (response + self-efficacy) variables and these were categorised into high and low. Other covariates were transformed e.g. SES was scored and then categorised into a three-level variable: high, medium, low while age was categorised into three groups.	Pearson's Chi Squared and Fishers Exact Tests were used to compare the relationship between the four theoretical constructs and ITN use. A multivariable logistic regression model was built to test the hypotheses that high threat and efficacy predicted ITN use while controlling for potential confounders such as educational attainment and socio economic status.

2.2 Ethics

Ethical approval for the research was received from the Wits Faculty of Health Sciences Human Research Ethics Committee (Certificate No. M140860), the School of Health Sciences Research and Ethics committee at Makerere University in Uganda and the Uganda National Council for science and Technology (see appendix 5 and 6). Formal approval was also received from the Tororo District Health Office and the Tororo General Hospital (see appendix 3).

Informed consent, ensuring anonymity, was sought from all study participants prior to the start of the interviews and all consent forms were delinked from the data collection process and stored separately (see appendix 2). Data was collected from all women attending ANC services at the study site regardless of age as women less than 18 years who have been pregnant are considered emancipated minors and therefore can independently provide informed consent to participate in research (55).

Prior to administering the questionnaire, Research assistants explained the purpose and objectives of the study to all potential participants. Participants were informed that they had the right to decide not to participate in the study and that if they agreed to participate, they could refuse to answer any question, or to stop the interview at any time without prejudice.

A unique identification number was assigned to each participant and no identifying details were captured on the questionnaire. All data was stored on a password protected computer that is only accessed by the researcher. Paper questionnaires were stored in a locked cabin in a store and will be stored for a period of not less than five years after the completion of the study. The dataset was made only accessible by the researcher and supervisor and not shared with anyone else.

Chapter Three: Results

The overall objective of the research was to investigate the effect of fear on use of insecticide treated nets amongst pregnant women in Tororo district in eastern Uganda. In this chapter, results of the socio demographic characteristic, trends in ITN use, perceived susceptibility and severity, self efficacy and response efficacy are presented using frequency and percentages. Pearson's chi squared or Fishers Exact tests were used to detect the association between the outcome variable of ITN use and the four independent variables; self efficacy, response efficacy, perceived severity and perceived susceptibility.

The final multivariate logistic regression model is presented and shows the relationship between ITN use and threat and efficacy variables, while controlling for the other known factors associated with ITN use.

3.1. Socio demographic characteristics of pregnant women

Table 1 below describes the demographic characteristics of pregnant women who participated in the study. A total of two hundred thirty pregnant women (n=230) participated in the study. The mean age of the study participants was 25 years with a range of 15 to 49 years. Nearly all the study participants (94.81%) had some education with the majority of them (36.32%) having reached secondary school. A third (33.49%) had incomplete primary education and 10.38% had studied beyond secondary school. Nearly one in ten (8.96%) completed primary education, 5.66% secondary education and only 5.19% had no education at all.

While all the participants came from poorer households, there was some variation in deprivation. Majority of the pregnant women (56.52%) were found to be in the middle socio economic status category, followed by 23.04% in the lower and 20.43% in the higher category. Nearly all the study participants (95.65%) were married or living together with a partner with only 4.35% not reporting a live-in partner.

Overall, the majority of the study participants (60.87%) were from rural areas with only 39.13% residing in urban locations. More than half of the study participants (54.78%) had between zero (pregnant with first child) to two children, followed by 32.17% with three to five children, and 13.04% (30) with more than five children.

Table 2; Socio demographic characteristics

Characteristic	Frequency (n)	Percentage (%)
Age (n = 230)		
15-24	111	48.26
25-34	92	40
>34	27	11.74
Mean years (range)	*25 (15-49)*	
Educational attainment(n=212)		
No school	11	5.19
Primary incomplete	71	33.49
Completed Primary	19	8.96
Secondary incomplete	77	36.32
Completed secondary	12	5.66
More than Secondary	22	10.38
Socio Economic Status(n=230)		
Low	53	23.04
Medium	130	56.52
High	47	20.43
Currently married or living together as if married (n=230)		
Yes	*220*	*95.65*
No	*10*	*4.35*
Residence (n=230)		
Urban	90	39.13
Rural	140	60.87
Number of children in home(n=230)		
0-2	126	54.78
3-5	74	32.17
>5	30	13.04
Mean number of children (sd)	*2.92(1.94)*	

3.2. Insecticide Treated Net use among pregnant women.

Table 2 shows the patterns of ITN use among the study participants. Majority of the pregnant women (78.6%) reported sleeping under an ITN the night before the study while 21.4% did not. Nearly a half of the study participants (49.78%) reported using the nets every night compared to 23.58% most nights and 19.21% who reported using the ITNs during some nights. Only 7.42% reported never sleeping in an ITN.

Among the study participants who did not sleep under an ITN the night before the study, the common reasons given for non use included net being too hot (23.91%), worn-out or in poor condition (21.74%), not enough nets in the house (10.87%), net not hung (6.62%) and net being too cold or used by someone else (both at 2.17%). Majority of the non net users (32.61%) mentioned other reasons for non use such as visiting a friend where there was no net, and spending the night at a funeral.

Participants were asked about the likelihood that a family member would purchase a net in the following year. Only 21.1% of the women mentioned that their family members were very likely to buy an ITN in the next year. Majority of the participants (49.08%) reported that their family members were somewhat likely to purchase an ITN, while 29.89% were very unlikely to purchase an ITN in the next year.

Table 3; Insecticide Treated Net use among pregnant women

ITN use	Frequency(n)	Percentage (%)
Slept Under ITN last night *(n=229)*		
Yes	180	78.6
No	49	21.4
How often sleep in ITN *(n=229)*		
Every night	114	49.78
Most nights	54	23.58
Some nights	44	19.21
Never	17	7.42
Likelihood family member will purchase ITN (*n=218***)**		
Very likely	46	21.1
Somewhat likely	107	49.08
Very unlikely	65	29.82
Reasons for non ITN use *(n=46)*		
Too Hot	11	23.91

Too cold	1	2.17
Not enough ITNs	5	10.87
ITN not hung up	3	6.52
ITN used by someone else	1	2.17
ITN worn out/poor condition	10	21.74
Other (away from home, funerals etc)	15	32.61

3.3. Threat and Efficacy variables

As shown in the table 4, more than two-thirds of the pregnant women (72.61%) felt they were at high risk of getting infected with malaria with 27.39% reporting a lower perceived risk of acquiring the disease. Majority of the pregnant women (69.13%) had a high perceived severity of malaria while 30.87% of the study participants did not perceive malaria to be as serious (low perceived severity).

Majority of pregnant women (70.87%) had a low response efficacy (perception regarding the effectiveness of insecticide treated mosquito nets in preventing malaria) with only 29.13% of the study population recording a higher response efficacy.

The study found that most of the pregnant women (63.48%) had a high self efficacy to use ITNs to prevent malaria with approximately 36.52% of them showing a low self efficacy to use ITNs.

Table 4; Threat and Efficacy Variables

Characteristic	Frequency	Percentage (%)
Perceived Susceptibility (n=230)		
Low	63	27.39
High	167	72.61
Perceived Severity(n=230)		
Low	71	30.87
High	159	69.13
Self Efficacy (n=230)		
Low	84	36.52
High	146	63.48
Response Efficacy (n=230)		
Low	163	70.87
High	67	29.13

3.4. Exposure to mass media

Table four below describes the trends in exposure of the study population to two main mass media channel including television and radio. On average, pregnant women listened to radio 2.8 times a week. Most of the study participants (54%) reported listening to radio more than five times a week, followed by those who listened at least two to three times a week (19.1%). Thirteen percent of the study participants reported never listening to radio at all.

With regard to television viewership the study found that majority of the pregnant women (72.6%) never watched television at all. Only 44 (19.13%) of the study participants reported watching Television more than five times a week.

Table 5: Exposure to mass media

Characteristic	Frequency (n)	Percentage (%)
Radio listenership		
None	30	13
Once a week	18	7.8
2-3 times a week	44	19.1
4-5 time a week	14	6.1
More than 5 times a week	124	54
Mean	*2.8*	
Television viewership		
None	167	72.6
Once a week	1	0.4
2-3 times a week	9	3.9
4-5 time a week	9	3.9
More than 5 times a week	44	19.13

3.5. Association between Socio demographic characteristics and ITN use among pregnant women

Table 5 below shows the results from the analysis. Only socio economic status was significantly associated with use of ITNs (p=0.04). Pregnant women in a high socio economic status category were more likely (85.1%) to use ITNs than their counterparts in the medium (82.9%) and 62.26% in the lower category respectively. Ever had formal education was marginally associated with ITN use (p=0.06) with 79.6% of women with formal education using ITNs.

All the other socio demographic characteristics including age, place of residence, number of children, and marital status were not significantly associated with ITN use.

Table 6; Association between socio-demographic characteristics and ITN use

Characteristic	Used ITN n (%)	No ITN - n (%)	p value
Age (n = 229)			
15-24	90(81.08)	21(18.92)	0.67
25-34	70(76.09)	22(23.91)	
>34	20(76.92)	6(23.08)	
Attended formal education(n=229)			
No	6(54.55)	5(45.45)	0.06
Yes	174(79.82)	44(20.18)	
Educational level(n=212)			
Primary incomplete	56(78.87)	15(21.13)	0.99
Completed Primary	15(78.95)	4(21.05)	
Secondary incomplete	60(77.92)	17(22.08)	
Completed secondary	10(83.33)	2(16.67)	
More than Secondary	18(81.82)	4(18.18)	

Socio Economic Status(n=229)			
Low	33(62.26)	20(37.74)	0.004
Medium	107(82.95)	22(17.05)	
High	40(85.11)	7(14.89)	
Currently married or living together as if married (n=229)			
Yes	172(78.54)	47(21.46)	0.91
No	8(80.00)	2(20.00)	
Residence (n=229)			
Urban	71(78.89)	19(21.11)	0.93
Rural	109(78.42)	30(21.58)	
Number of children in home(n=229)			
0-2	100(79.37)	26(20.63)	0.92
3-5	58(78.38)	16(21.62)	
>5	22(75.86)	7(24.14)	

3.6. Associations between Threat and Efficacy variables and ITN use among pregnant women

Table 6 below describes the association between the four variables of the Extended Parallel Process Model and use of ITNs among the study population. Two variables, perceived severity and self efficacy were associated with ITN use.

Pregnant women's (n=229) perceived severity was negatively associated with ITN use. Pregnant women with low perceived severity were more likely to use ITNs (87.32%) compared to their counterparts with high perceived severity (74.68%). In contrast, only 12.68% of pregnant women with low perceived severity did not sleep under an ITN compared to 25.32% with high perceived severity.

Self efficacy was significantly associated with ITN use. Pregnant women with a high self efficacy were significantly more likely to use ITNs than those with low efficacy. Women with high self efficacy to use ITNs (89.04%) were more likely to use them compared to only

10.96% who did not use ITNs the previous night. The proportion of women in the low self efficacy category who used ITNs was 60.24% compared to 39.76% who did not.

Efficacy (a combined score of self efficacy and response efficacy) was significantly associated with ITN use. Majority of the pregnant women (87.10%) with high efficacy used ITNs compared to only 12.90% who did not sleep under them. All the other variables including perceived susceptibility, response efficacy and threat (a combined score of severity and susceptibility) were not significantly associated with ITN use among the study population.

Table 7; Association between Threat and Efficacy variables and ITN use

Characteristic	Used ITN n(%)	No ITN - n(%)	p value
Perceived Susceptibility(n=229)			
Low	48(76.19)	15(23.81)	0.58
High	132(79.52)	34(20.48)	
Perceived Severity(n=229)			
Low	62(87.32)	9(12.68)	0.03
High	118(74.68)	40(25.32)	
Self Efficacy (n=229)			
Low	50(60.24)	33(39.76)	<0.001
High	130(89.04)	16 (10.96)	
Response Efficacy (n=229)			
Low	123(75.93)	39 (24.07)	0.13
High	57(85.07)	10(14.93)	
Threat (perceived susceptibility +severity) - n=229			
Low	61(72.62)	23(27.38)	0.09
High	119(82.07)	26(17.93)	
Efficacy (self efficacy + response efficacy) - n=229			
Low	99(72.79)	37(27.21)	0.01
High	81(87.10)	12(12.90)	

3.7 Multivariate logistic regression

Multivariate logistic regression analysis was conducted to test the relationship between ITN use and threat and efficacy, adjusting for socio economic status and education. The results of the model (n=229) are presented in Table 7 below.

After adjusting for other covariates, self efficacy and severity were significantly associated with ITN use. Pregnant women with a high self efficacy were nearly five times more likely to use ITN than those with low self efficacy (AOR 4.96 95%CI 2.42-10.18).

Perceived severity was negatively associated with ITN use. Pregnant women with high perceived severity were 65% less likely (AOR 0.35, 95% CI 0.14 - 0.85) to use ITNs than their counterparts with low perceived severity. There was no relationship between response efficacy or perceived risk and ITN use (AOR 1.32, 95% CI 0.57 – 3.05). All analyses controlled for formal education and socio economic status as potential confounders.

Table 8; Multivariate Logistic Regression Results for Insecticide Treated Net use, adjusting for Education and Socio Economic Status

Variable	AOR[1]	95% CI[2]	p value
Self efficacy	4.96	2.42 - 10.18	0.000
response efficacy	1.32	0.57 - 3.05	0.51
Severity	0.35	0.14 - 0.85	0.020
Susceptibility	0.86	0.39 - 1.87	0.69
Socio economic status	1.67	0.95 - 2.92	0.07
Attended formal education	3.59	0.85 - 15.11	0.08

[1] Adjusted Odds Ratio
[2] Confidence Interval

Chapter Four: Discussion

The aim of the research study was to investigate the effect of fear on the use of insecticide treated mosquito nets among pregnant women in Tororo district in eastern Uganda. This section discusses the findings relating to ITN use as presented in chapter three. The results are considered in light of the literature review and the conceptual framework of the Extended Parallel Process Model. Limitations of the study are discussed as part of the conclusions of the chapter.

Consistent with national statistics, this study found that majority of the pregnant women (48.4%) were between 15 and 24 years old, with only 11.7% being more than 34 years old (25). According to the 2011 Uganda Demographic and Health Survey, 24% of women aged 15-19 are already mothers or pregnant with their first child, more than one-third (39%) of women age 20-49 gave birth by age 18, and more than half (63%) by age 20. (25)

4.1 Insecticide Treated Net use among pregnant women

Insecticide Treated Net use among the study population was high (78.6%) compared to the 2010 average of 44% (10) and the 2014 Uganda Malaria Indicator Survey which showed that the percentage of pregnant women 15-49 years of age who slept under an ITN the previous night was 75% while those who slept under any mosquito net over the period of six months were 77%. This study therefore confirms a marked increase in ITN use among pregnant women over the last five years (42).

Similar to several other studies some of the reported reasons for non-ITN use by the pregnant women included net being too hot, worn out, or being used by someone else (56-59). Other reasons mentioned for non net use by majority of the study participants included being away from the home during visits to relatives particularly for funerals, a reason that was reported in another study conducted in Uganda (60). It appears that further research needs to be done on either the factory design of the ITNs or on the distribution mechanism to address these factors as they have consistently been identified as the major barriers to net use in various contexts.

4.2 Sustained use of ITNs

Currently at the study site, ITNs are provided free of charge to all pregnant women through the Malaria Consortium's Culture of Net Use project. Considering the high endemicity of the district coupled with a high perceived threat of malaria by majority of the participants, it is rather surprising that only one in five participants in this study were very likely to purchase

an ITN in the next year with the rest being somewhat likely or very unlikely to purchase an ITN. This finding indicates a low willingness to pay for an ITN among the study population. Although research from some areas indicates significant intentions of individuals to purchase ITNs following the end of free distribution programs (61) this finding may be a reflection of many other donor funded programs where the beneficiaries get used to free goods making it difficult for ownership to be sustained beyond the life of the project. An example is given from Kenya in 2006 where there was a prolonged halt to the free ANC based distribution programme after the commitment from the main donor ended, only resuming after another donor was identified (29). It may be worthwhile for the implementers to think through some creative mechanisms for ensuring sustainability of the ITN coverage such as adding cost sharing components.

4.3 The Extended Parallel Process model and ITN use

The Extended Parallel Process Model(4) was used to explore the effects of threat and efficacy on ITN use. Also commonly referred to as fear/threat Management, the EPPM efficacy beliefs and emotional reactions (fear of a health threat) combine to determine behavioral decisions (4). The EPPM postulates that "fear of health risk such as malaria can cause either adaptive self protective actions or maladaptive self defeating reactions" (2). When perceptions of a threat are strong and perceived levels of efficacy are high, the model predicts self-protective behavior (such as ITN use in this case) and when perceptions of a threat are strong, but perceived levels of efficacy are low, the model predicts maladaptive denial or rejection of protective behaviors (such as non ITN use)(4). The figure below illustrates the EPPM and is followed by the subsequent discussion of the results.

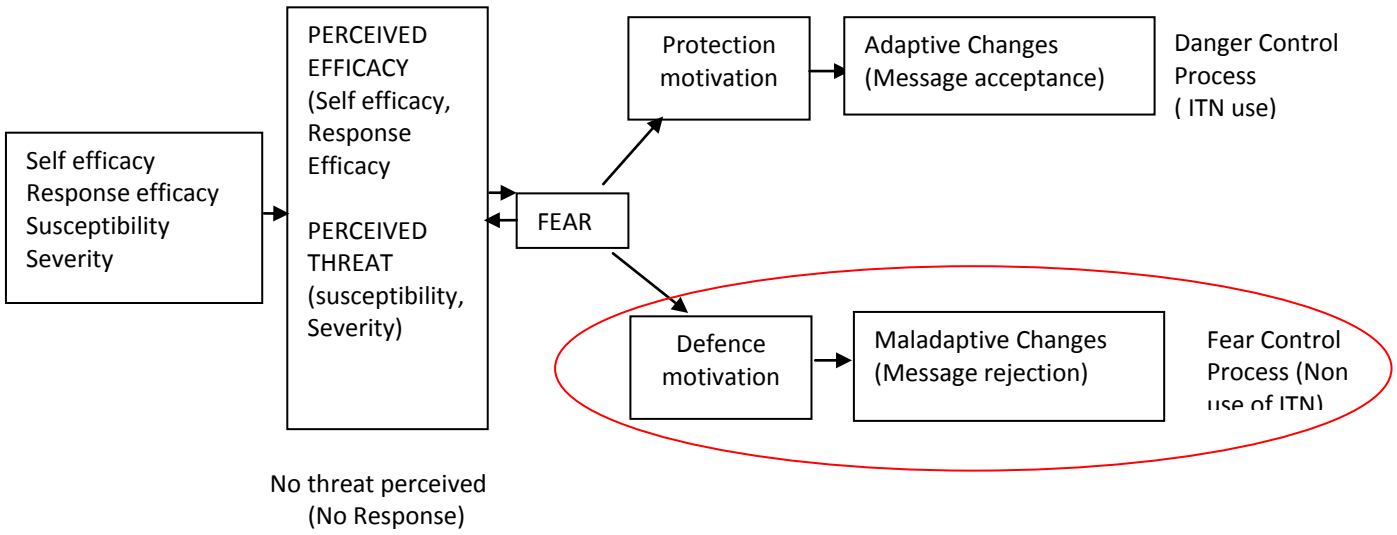


Figure 2: The Extended Parallel Process Model

4.3.1 Perceived susceptibility and ITN use

In this study, most of the respondents reported feeling vulnerable to malaria. While majority of the study population were found to have a high perceived susceptibility to acquiring the disease, about a third of the pregnant women reported to have had lower levels of believing that they were at risk of malaria. The finding that perceived susceptibility to malaria was not significantly associated with ITN use in this study could be a result of the endemic nature of the disease at the study site(62). In Burkina Faso, Toé and colleagues noted that the endemic nature of malaria in some places makes it an ordinary sickness, adding that familiarity with malaria might lead the population to consider it as a merely common disease and therefore not have heightened perceptions of risk (63).

It should be noted however that while susceptibility was not associated with ITN use in this study, there is evidence (27, 63) that shows it is a major factor in influencing change in behavior. For example a study of urban youth's perceived vulnerability to HIV in Ethiopia noted that in order to begin to undertake behaviour change, individuals should first perceive themselves to be at risk to a particular risk at hand (31). This point is supported by another study (64) which confirmed a causal relationship between susceptibility and fear, citing that fear was the primary driver for change in behavioural intent. The authors contend that behavioural intent is influenced indirectly by susceptibility through the fear mediating variable, a finding that is also supported by Lewis and colleagues, (65) who concluded that the key to behavioural change lies in creating susceptibility threats to motivate change.

4.3.2 Perceived severity and ITN use

A majority of the participants were found to have perceptions that malaria is a serious disease with potentially devastating outcomes. Perceived severity was negatively associated with ITN use, a finding that is consistent with other studies (66, 67) where severity was either not associated with, or negatively associated with behaviour change. This finding indicates a possible fear control response where study participants might be too scared of the consequences of malaria that instead of undertaking actions to prevent it (such as sleeping under an ITN), they are mostly concentrating on managing the fear.

It should also be noted that Tororo district, where this study was conducted is a malaria endemic area, and therefore most of the inhabitants are likely to have become used to the fact that malaria is very serious that they may be resigned to not being able to do anything about it. Indeed as seen from the study results as well as other available literature, high perceptions of severity without corresponding efficacy perceptions could lead to inaction.

In a South Africa study (68) severity perceptions were not significantly associated with HIV prevention behaviour and had no effect as an antecedent to fear, leading the authors to conclude that although participants in their study perceived HIV as being a severe disease, this aspect neither influenced levels of fear experienced nor their ultimate behaviour (68).

Other studies have also explained that increasing perceptions of severity may not be as important to the effectiveness of interventions as increasing perceptions of susceptibility. It is also possible in this study that as pregnant women get used to the consequences of malaria (severity), they may become fatalistic or deny the threat, hence the need for further research into possible reasons for not taking adequate preventive measures by most people who may think of a particular disease as common cause of ill health. (69).

While results from this study and the others mentioned above have indicated that the significance of perceived severity may not be linked to behaviour, evidence from some studies (70, 71) presents different kind of results.

In a Vanuatu study (71), high perceptions of malaria severity were linked to sustained use of ITNs on Aneityum island. Rimal & Kevin (70), in their study on the use of the risk perception framework to understand health behaviour posited that the high severity/risk group could experience a high level of anxiety and that they attempt to reduce it by resolving to seek additional information leading them to enact healthier behaviours (such as ITN use in this case). This finding is supported by another study which posited that in order to influence policy makers to allocate resources to a particular disease, focus should highlight the severity and not the susceptibility to the disease because highlighting the former may be dismissed due to low perceptions of personal vulnerabilities (72).

It should be noted however that while evidence from a meta-analysis of research on protection motivation (73) suggested that severity and susceptibility are both positively associated with message acceptance and behavioural intention, threat (a combination of severity and susceptibility) was not associated with ITN use in this study. In their study about fear appeals (74), the authors argued that ensuring that a threat is regarded as personally relevant by members of the target audience should be the main moderating factor in behaviour intention.

4.3.3. Self-efficacy and ITN use

Majority of the participants had a high efficacy to use ITNs, and consistent with theoretical predictions, self efficacy was positively associated with ITN use (4, 31). Pregnant women

with high self efficacy were more likely to use ITNs than those with low self efficacy. It should be noted that once people are confident in their ability to undertake a recommended action, such as sleeping under a mosquito net, there is a high likelihood that they will actually undertake the behaviour.

A study on threat and efficacy effect (75) found that self efficacy was a predictor in the adoption of preventive practices in response to various health communications. This is supported by other studies (76, 77) which concluded that self efficacy was significantly associated with behavioural actions, findings which are also consistent with the results of this study.

It is worth noting that perceived self efficacy is recognised as an important construct in the adoption and sustained practice of behaviours (78) and as noted in one study (3), the belief in personal efficacy plays a central role in the personal change, adding that "self efficacy is the foundation of human action and motivation". In a net use study in Tanzania (50) households with low efficacy were found to have used the ITNs less as their perceived threat of malaria increased, while among those with high efficacy, their ITN use increased as perceptions of threat increased, though only to a certain point.

4.3.4. Response efficacy and Insecticide Treated Net use

In this study, the perceptions of response efficacy were low among majority of the pregnant women, and this construct on its own was not associated with ITN use. Response efficacy refers to the belief in the effectiveness of the recommended intervention (4) and represents an individual's belief in the extent to which a prescribed behaviour or response works. This finding could be a result of most of malaria prevention programs in the district concentrating more on messaging around the threat of the malaria disease with little attention given to the effectiveness of ITNs as a malaria prevention mechanism. As a result of this, it is possible that the high perceived susceptibility and severity of malaria among the study participants could have outweighed their perceptions about how effective the Insecticide Treated Nets are in protecting them against the disease.

This result may also be genuine considering that it resonates with the findings in a number of studies (79, 80) which have shown increasing resistance of anopheles mosquitoes to the pyrethrum insecticides suggesting that there could be a declining trend in the effectiveness of ITN in this particular area, as it is in other parts of Africa. Further evidence to support this is from a longitudinal study in this same area which observed a high incidence of malaria

among children in a cohort under three years with near universal coverage of mosquito nets. (62)

A number of studies on net use in different countries (63, 81, 82), have indicated that a lack of value attached to ITNs (or low response efficacy) plays a large role in their use, citing that without proper information populations are not able to connect malaria prevention and Insecticide Treated Nets. The authors of these studies contend that it is necessary for malaria prevention programs to not only clarify that ITNs solely prevent malaria, but also illustrate the other direct benefits derived from the use of ITNs in terms of the financial costs averted through less hospital visits.

Indeed, response efficacy is presented as a principle construct in another theoretical model - the AIDS risk reduction model (83). This model holds the assumption that people are less likely to engage in a certain behaviour or recommended action if they do not believe in its effectiveness in solving the problem or achieving a desired outcome. This evidence is correlated in a meta analysis of 65 studies examining the role of response efficacy which found that this construct was linked to behavioural outcomes and intentions in several fields such as smoking cessation, alcohol reduction and cancer prevention (73).

It should be noted however, that although response efficacy on its own was not associated with ITN use, efficacy was significantly associated with the use of ITNS among pregnant women. A combined score of self efficacy and response efficacy, efficacy, according to the extended parallel process model works in an additive manner (4). This particular result supports the assertion that when the perceived efficacy is greater, there is a high likelihood of positive attitudes, intentions and behaviours towards a recommended action (84).

4.3.5. Relationship between Perceived Threat and Efficacy and ITN use

While threat was high among majority of the participants in this study, this variable was not significantly associated with ITN use. Efficacy on the other hand was associated with the use of ITN among the pregnant women.

In the logistic regression model, when threat (a combination of perceived susceptibility and perceived severity) and efficacy (a combination of self efficacy and response efficacy) were combined, controlling for socio economic status and education, neither variable predicted ITN use, although individual constructs of severity and self efficacy were negatively and positively association with ITN use respectively. This result could be due to the opposite

direction that threat and efficacy act on ITN use, thus the composite measures of threat and efficacy did not explain the outcome, although individual components of the model were more useful in predicting ITN use.

Although perceptions of self efficacy were found to be high among majority of the participants, efficacy levels were generally lower than the perceptions of severity and susceptibility. Cho & Witte (31) posited in their Ethiopia study that for behaviour change to occur among individuals, both levels of threat and efficacy ought to be high, but noted that efficacy variables should be higher than the threat variables, which was not the case with the results of this study.

In the Extended Parallel Process Model (4), Witte asserted that the extent to which an individual feels threatened by a health risk determines his or her motivation to act, but, one's confidence to effectively reduce or prevent the threat determines the action itself. In this case, with threat levels being already high, there is need to increase the efficacy perceptions among participants in order to achieve increased ITN use.

4.3.6. Exposure to Mass media

Similar to findings from other national reports, majority of the study participants listened to radio, with more than half of them tuning in more than one a week, confirming radio as the most popular media channel in Uganda (85). The dismal television viewership by the study participants is also similar to findings across the country, attributed mainly to the absence of grid electricity which impacts on access (85). Although this study did not specifically measure the association between media exposure and ITN use among the participants, several studies have showed a strong association between net use and exposure to behavior change communication messages. A Cameroon study found that exposure to mass media using radio was associated with an increase in use of ITNs the previous night (86). In Uganda, radio has been widely used to promote ITN use with available evidence confirming the effectiveness of this channel (87). Future theory-based programming that aims to increase awareness about and intention to ITN use among pregnant women should consider using radio as one of the main communication channels because of the high listenership, in complement to other channels.

4.4. Limitations of the study

There are a number of limitations for this study. The study primarily focused on individual level- constructs and in doing so did not measure environmental level factors that may influence the women's decision to use or not use an ITN such as the patterns of household decision-making, the role of husbands or partners in making decisions regarding the use of ITNs. This is one of the main limitations of the Extended Parallel Process model as it considers factors at the individual level, yet behavior is influenced by other factors beyond the individual such as social structures and the environment among others.

This study was primarily quantitative and did not capture specific perceptions which could have given meaning to some of the results. A qualitative component would have helped to identify some of the moderating factors that are associated with the pregnant women's perceptions about the threat and efficacy variables.

The study used a self-report questionnaire to gather data from the respondents which presents a limitation as some respondents may not have been honest in their responses to specific questions.

Another limitation of this study is the potential to generalize the results. While the study sample and characteristics of respondents was representative of pregnant women in comparison to the recent Demographic and Health Survey and the Malaria Indicator Survey, this study, like many other studies that focus on pregnant women, was carried out at a health facility, and in one district. This may reduce the generalisability of the results as this sample did not include women who do not go to health care facilities for antenatal care. It may also be difficult to conclude that the results are applicable to pregnant women in other parts of Uganda.

Due to the free and continuous distribution of Insecticide Treated Nets at the study site, respondents could have assumed that the data collectors had been part of the distribution teams and provided answers that seemed favorable to the teams, thereby resulting into social desirability or courtesy bias.

A further limitation for this study was the reliability of some of the items used to measure the variables as there was poor internal consistency in three out of the four scales used to

measure the EPPM constructs. Further work needs to be done on the nature and framing of the questions as they may have affected the results of the study.

Chapter Five: Conclusion and Recommendations

5.1 Conclusion

The results of this study provide important information on the relationship between ITN use and perceived threat and efficacy variables. Self-efficacy was the most important predictor of ITN use among pregnant women in this particular study than any of the other commonly known factors including fear of malaria. As noted in Lewis et al (65) "while fear arousal appears important for attracting attention, its contribution to behaviour change seems less critical than other factors, such as perceptions of vulnerability and effective coping strategies".

Social and behaviour change communication strategies aimed at maintaining high threat levels and increasing efficacy are necessary to achieve improved use of ITNs among pregnant women. These approaches are capable of increasing use of ITNs among pregnant women during all stages of pregnancy leading to a culture of net use among this population group.

While the Extended Parallel Process Model provides a useful framework for analysing and understanding the audiences' threat and efficacy perceptions and their association with behavioural outcomes, in this study, the model may not be applicable in explaining ITN use among pregnant women as Net use was found to be high, despite the threat being higher than the efficacy variables, pointing to the influence of other factors beyond the two model variables. The study however confirms the significance of efficacy as an antecedent for danger control.

5.2 Recommendations

The results of this study present some clear implications for social and behaviour change communication practitioners and implementers of malaria prevention programs. The extended parallel process model provides a range of opportunities for malaria implementers in addressing ITN use among pregnant women beyond the known determinants.

5.2.1 Social and Behavior Change Communication

The Extended Parallel Process Model provides an important framework for malaria SBCC programming as an audience segmenting tool, and it can be used to identify four audience segments with the various combinations of threat and efficacy. SBCC practitioners should therefore utilise different message strategies to address ITN use considering those that

increase threat perceptions or increase efficacy beliefs - with emphasis on efficacy in this case.

Given the significance of efficacy as seen in the association with ITN use, it is important for implementers of malaria SBCC programs to focus on strengthening the efficacy messages. Since self-efficacy is strongly associated with ITN use, net promotion campaigns may find it more effective to concentrate on specific messaging related to how to use the nets instead of general information about ITNs. It should build women and men's confidence to use ITNs.

Effective SBCC interventions should aim at increasing the pregnant women's confidence and skills about how to use the ITNs, through such activities as demonstration workshops, edutainment programs showing audiences how to erect nets as well as other observational learning techniques. Since the level of radio listenership is so high among pregnant women, it may be considered as a channel for promoting ITN use perhaps using edutainment as it has the potential of role modelling and building self-efficacy to use ITN. As noted in a research primer (88), SBCC programs that use the EPPM should emphasize efficacy rather than threat constructs and provide just enough threat messaging to motivate action.

Malaria messaging targeting pregnant women should emphasize the usefulness of ITNs in averting the disease, as majority of participants held low perceptions about the effectiveness of ITNs (low response efficacy). Communication should highlight the strong relationship between use of Insecticide Treated Nets and malaria prevention.

With perceptions of malaria threat being already high among the majority of pregnant women, communication campaigns should concentrate on increasing the levels of efficacy as further increasing the threat may lead to fear control responses. The fear management theory(4) maintains that in order for behaviour change to occur, efficacy variables must be higher than threat variables. Implementers of malaria programs should however ensure that they maintain the threat levels high as individuals are motivated to act only when they feel threatened by a health risk.

Research could be commissioned in conjunction with the net manufacturers on how to improve the designs of the ITNs in response to the user feedback regarding the nets being too hot as this was highlighted in this study as well as several previous studies as one of the main barriers to ITN use. Similarly, SBCC programs should consider some community

activities around net care and repair in response to the ITNs being worn out, as another reason for non-use.

There is need for further research in this area especially of a qualitative nature to provide more information and a better understanding of some of the external/environmental level factors that influence or determine the threat and efficacy perceptions.

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Appendix 1; Individual Questionnaire

Effect of Fear on the use of Insecticide Treated Nets amongst pregnant women aged 15-49 years in Tororo district, Uganda

INTERVIEWER VISITS				
	1	2	3	FINAL VISIT
DATE	_____	_____	_____	DAY |___|___| MONTH |___|___| YEAR |___|___|___|___|
INTERVIEWER'S NAME	_____	_____	_____	INT. NUMBER ___|___|___|
RESULT*	_____	_____	_____	RESULT |__
NEXT VISIT DATE	_____	_____		TOTAL NUMBER OF VISITS = |___|
TIME	_____	_____		

***RESULT CODES**

1	COMPLETED	3	REFUSED	5	_____
2	POSTPONED	4	PARTLY COMPLETED		(SPECIFY)

SUPERVISOR	RESEARCH ASSISTANT	KEYED BY
NAME _____	|___|___|	|___|___|

SECTION 1: RESPONDENT'S BACKGROUND			
NO.	**QUESTION**	**CODING CATEGORIES**	**SKIP**
101	RECORD THE TIME	HOURS……|___|___| MINUTES…… |___|___|	
Let us begin. Please remember that everything you tell me will be kept secret.			
102	How old were you at your last birthday?	RECORD AGE IN COMPLETED YEARS ……|___|___|	
103	How many children have you given birth to?	0 (pregnant with 1st child) ……1 1……2 2……3 3……4 4……5 5……6 6……7 7……8	Skip to 106

		8 or more……9	
104	How old were you when you had your first child?	14 or Younger……1 15……2 16……3 17……4 18……5 19……6 20 and over……7	
106	Have you ever attended formal school?	YES……1 NO…… 2	→skip to 108
107	What is the highest level of education that you attained?	PRIMARY INCOMPLETE……2 COMPLETED PRIMARY……3 SECONDARY INCOMPLETE……4 COMPLETED SECONDARY……5 MORE THAN SECONDARY……6 DON'T KNOW……9	
108	Does your household have: a) Electricity? b) A radio? c) A cassette player? d) A television? e) A mobile phone? f) A fixed phone? g) A refrigerator? h) A table? i) A chair? j) A sofa set? k) A bed? l) A cupboard? m) A clock?	YES/ NO a) ELECTRICITY . . . . . ……1 / 2 b) RADIO . . . . . ……1 / 2 c) CASSETTE PLAYER . . . . . ……1 / 2 d) TELEVISION . . . . . ……1 / 2 e) MOBILE PHONE . . . . . ……1 / 2 f) FIXED PHONE . . . . . ……1 / 2 g) REFRIGERATOR . . . . . ……1 / 2 h) TABLE . . . . . ……1 / 2 i) CHAIRS . . . . . ……1 / 2 j) SOFA SET . . . . . ……1 / 2 k) BED . . . . . ……1 / 2 l) CUPBOARD . . . . . ……1/ 2 m) CLOCK. . . . . ……1/ 2	
109	Are you currently married or living together with someone as if married?	YES……1 NO……2 DON'T KNOW……9	
110	How many people <u>including yourself</u>, live in your home?	0 (staying alone) ……1 1……2 2……3 3……4 4……5 5……6 6……7 7……8 8……9 9……10 10 or more……11	
111	How many sleeping places do you have in your home?	1……2 2……3 3……4 4……5 5……6 6 or more……7	
112	Do you live within the city/town or in the village?	Town……1 Village……2	

SECTION 2: MOSQUITO NET ACCESS AND USE

NO.	QUESTION	CODING CATEGORIES	SKIP
201	How many Mosquito bed nets do you have in your home?	0 (No nets) .....1 1.....2 2.....3 3.....4 4.....5 5.....6 6 or more.....7	
202	Did you sleep under a mosquito net last night?	YES.....1 NO.....2 DON'T KNOW.....9	→skip to 204
203	What is the main reason that you did not sleep under a mosquito bed net last night? **RECORD ONE ANSWER**	TOO HOT.....1 TOO COLD.....2 NOT ENOUGH NETS.....3 NET NOT HUNG UP.....4 NET USED BY SOMEONE ELSE.....5 NET WORN OUT/POOR CONDITION.....6 NET BAD FOR HEALTH.....7 OTHER _____8 (SPECIFY) DON'T KNOW.....9	
204	In general, how often do you sleep under a mosquito bed net? – every night, most nights, some nights, very few nights or never?	EVERY NIGHT.....1 MOST NIGHTS.....2 SOME NIGHTS.....3 VERY FEW NIGHTS.....4 NEVER.....5 DON'T KNOW.....9	
205	How likely is it that you or someone in your household will purchase a mosquito net in the next year – very likely, somewhat likely, or very unlikely?	VERY LIKELY.....1 SOMEWHAT LIKELY.....2 VERY UNLIKELY.....3 DON'T KNOW.....9	
206	Have you ever used a mosquito net for any of the following: **MULTIPLE RESPONSES POSSIBLE** **CIRCLE YES or NO for ALL RESPONSES** **PROBE ONCE:** Anything else?	YES / NO FISHING..... 1 / 2 COVERING/PROTECTION.....1 / 2 SCREENS FOR WINDOWS.....1 / 2 CLOTHING.....1 / 2 OTHER _____ (SPECIFY) DON'T KNOW.....9	
207	During this pregnancy, did you take any medicine to prevent you from getting malaria? **EMPHASIZE 'PREVENT'. DO NOT CIRCLE 1 IF SHE WAS ONLY GIVEN DRUGS BECAUSE SHE HAD MALARIA.**	YES.....1 NO.....2 DON'T KNOW.....9	

SECTION 3: THREAT OF MALARIA

PERCEIVED SUSCEPTIBILITY TO MALARIA: I am going to read a series of statements about malaria to you and I would like you to tell me how much you agree with them. For each statement, please tell me if you strongly agree, somewhat agree, somewhat disagree, or strongly disagree with it. INTERVIEWER: DO NOT READ DON'T KNOW OR UNCERTAIN RESPONSE AND ONLY USE OF RESPONDENT IS NOT ABLE TO PROVIDE ANOTHER ANSWER

		STRONGLY AGREE	SOMEWHAT AGREE	SOMEWHAT DISAGREE	STRONGLY DISAGREE	DK/UNCERTAIN
301 Inv	During the rainy season, I worry almost every day that someone in my family will get malaria	1	2	3	4	9
302 Inv	When someone I know gets malaria, I usually expect them to completely recover in a few days	1	2	3	4	9
303	My children are so healthy that they would be able to recover from a case of malaria	1	2	3	4	9
304	People in this community only get malaria during rainy season	1	2	3	4	9
305	People only get malaria when there are lots of mosquitoes	1	2	3	4	9
306	Pregnant women are still at risk for malaria even if they take the medicine that is meant to keep them from getting malaria	1	2	3	4	9

PERCEIVED SEVERITY OF MALARIA: I am going to read a series of statements to you and I would like you to tell me how much you agree with them. For each statement, please tell me if you strongly agree, somewhat agree, somewhat disagree, or strongly disagree with it. INTERVIEWER: DO NOT READ DON'T KNOW OR UNCERTAIN RESPONSE AND ONLY USE OF RESPONDENT IS NOT ABLE TO PROVIDE ANOTHER ANSWER

		STRONGLY AGREE	SOMEWHAT AGREE	SOMEWHAT DISAGREE	STRONGLY DISAGREE	DK/UNCERTAIN
401	I don't worry about malaria because it can be easily treated	1	2	3	4	9
402	Every case of malaria can potentially lead to death	1	2	3	4	9
403	I cannot remember the last time someone I know became dangerously sick with malaria	1	2	3	4	9
404	Nearly every year, someone in this community gets a serious case of malaria	1	2	3	4	9

SECTION 5: SELF-EFFICACY QUESTIONS

I am going to ask you about a series of actions you could take, and I would like you to tell me how confident you are that you could actually do that action successfully. For each action, please tell me if you think you definitely could, probably could, probably could not or definitely could not do each action successfully. INTERVIEWER: DO NOT READ DON'T KNOW OR UNCERTAIN RESPONSE AND ONLY USE IF RESPONDENT IS NOT ABLE TO PROVIDE ANOTHER ANSWER

		DEFINITELY COULD	PROBABLY COULD	PROBABLY COULD NOT	DEFINITELY COULD NOT	DK/UNCERTAIN
501	I can easily protect myself from getting malaria	1	2	3	4	9
502	I am confident that I can get enough bed nets to cover all of the sleeping spaces in my household	1	2	3	4	9
503	I am confident that I can sleep under a bed net for the entire night when there are lots of mosquitoes	1	2	3	4	9
504	I am confident that I can sleep under a bed net for the entire night when there are few mosquitoes	1	2	3	4	9
505	I am confident that I can consistently use a bed net even in temporary sleeping places	1	2	3	4	9

SECTION 6: RESPONSE EFFICACY QUESTIONS

		STRONGLY AGREE	SOMEWHAT AGREE	SOMEWHAT DISAGREE	STRONGLY DISAGREE	DK/UNCERTAIN
601	My chances of getting malaria are same whether or not I sleep under a bed net	1	2	3	4	9
602	Many people who sleep under mosquito nets still get malaria	1	2	3	4	9
603	Bed nets only prevent mosquito bites when used with certain types of beds	1	2	3	4	9
604 Inv	I have noticed my family gets sick less often since we begun sleeping under nets.	1	2	3	4	9
605	More expensive bed nets are more effective than less expensive or free bed nets	1	2	3	4	9
606	The insecticide on bed nets can be dangerous to people who sleep under them	1	2	3	4	9

SECTION 7: EXPOSURE TO MALARIA MESSAGES

NO.	QUESTION	CODING CATEGORIES	SKIP
701	How often do you listen to the radio in a week?	NONE ..... 0 ONCE A WEEK ..... 1 2-3 TIMES A WEEK ..... 2 4-5 TIME A WEEK ..... 3 MORE THAN 5 TIMES A WEEK 4	
702	How many times in a week do you watch television?	NONE ..... 0 ONCE A WEEK ..... 1 2-3 TIMES A WEEK ..... 2 4-5 TIME A WEEK ..... 3 MORE THAN 5 TIMES A WEEK 4	
703	In the past year have you heard or seen any messages about malaria prevention or treatment?	YES ..... 1 NO ..... 2 DON'T KNOW 9	
704	What were these messages about? PROBE ONCE: Anything else? ALLOW MULTIPLE RESPONSES	MOSQUITO BEDNETS ..... 1 RETREATMENT ..... 2 ACT ..... 3 TREATMENT FOR PREGNANT WOMEN ..... 4 TREATMENT FOR SMALL CHILDREN ..... 5 SEVERITY OF MALARIA ..... 6 RISK OF MALARIA ..... 7 INDOOR RESIDUAL SPRAYING ..... 8 OTHER ..... 9 DON'T KNOW 10	

Appendix 2: Consent Form

Participation in this survey is voluntary, and if we should come to any question you don't want to answer, just let me know and I will go on to the next question; or you can stop the interview at any time. However, we hope you will participate in the survey since your views are important.

At this time, do you want to ask me anything about the study? May I begin the interview now?

Respondent Agrees To Be Interviewed ↓ : Does Not Agree To Be Interviewed - **END**

PROCEED

I hereby confirm that the person seeking my informed consent to participate in this study has given me information to my satisfaction. She/he explained to me the purpose, procedures involved, risk and benefits and my rights as a participant in the study. I have received the information leaflet for the study and have had enough time to read it on my own and ask questions. I feel that my questions regarding participation in the study have been answered to my satisfaction. I have been told that the information I give to the study will together with other information gathered from other people, be anonymously processed into a research report and scientific publications.

I am aware that it is my right to withdraw my consent in this study without any prejudice. I hereby, freely and voluntary give my consent to participate in the study.

Printed Name of participant:…….

Signature of Participant: …….

Date:……

If illiterate

I have witnessed the accurate reading of the consent form to the potential participant, and the individual has had the opportunity to ask questions. I confirm that the individual has given consent freely.

Print name of witness. ..... AND Thumb print of participant

Signature of witness.....

Date.....

I, _____ herewith confirm that the above participant has been fully informed about the nature, conduct and risks of the above study.

Research Assistant:

…….. ……

……..

Printed Name Signature Date and Time

START TIME: ……..HOURS END TIME:…… HOURS

Appendix 3: Ethics Approval HREC (Medical) R14/49

R14/49 Mr Charles Nelson Kakaire

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)

CLEARANCE CERTIFICATE NO. M140860

NAME: (Principal Investigator)	Mr Charles Nelson Kakaire
DEPARTMENT:	School of Public Health Tororo General Hospital, Uganda
PROJECT TITLE:	Effect of Fear on the Use of Insecticide Treated Nets Amongst Pregnant Women Aged 15-49 in Tororo District, Uganda
DATE CONSIDERED:	29/08/2014
DECISION:	Approved unconditionally
CONDITIONS:	
SUPERVISOR:	Ms Nicola Christofides
APPROVED BY:	Professor C Feldman, Co-Chairperson, HREC (Medical)
DATE OF APPROVAL:	17/12/2014

This clearance certificate is valid for 5 years from date of approval. Extension may be applied for.

DECLARATION OF INVESTIGATORS

To be completed in duplicate and **ONE COPY** returned to the Secretary in Room 10004, 10th floor, Senate House, University.

I/we fully understand the conditions under which I am/we are authorized to carry out the above-mentioned research and I/we undertake to ensure compliance with these conditions. Should any departure be contemplated, from the research protocol as approved, I/we undertake to resubmit the application to the Committee. **I agree to submit a yearly progress report.**

Principal Investigator Signature Date

PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES

Appendix 4: Hospital Letter of Permission

TORORO DISTRICT LOCAL GOVERNMENT
TORORO GENERAL HOSPITAL

Tel General Line: 0454445064
Tel for M.S 0774122456
Email: tororohospital@gmail.com.
In any correspondence on this subject
Please quote 05/1/6

P.O. Box 1,
Tororo
Uganda.

3rd . December, 2014

The Chairperson

Wits Human Research Ethics Committee

Attn: Prof. Peter Cleaton Jones

RE: AUTHORISATION TO CONDUCT RESEARCH AT TORORO GENERAL HOSPITAL.

This is to confirm authorization for Charles Neslon Kakaire to conduct his research on **Effect of fear on the use of insecticide Treated Nets amongst pregnant women aged 15-49years in Tororo District,** Uganda at the above hospital.

We shall accord him the necessary assistance.

Thank you

03 DEC 2014

Oboke Amos

For: Medical Superintendent.

Appendix 5: Ethics Approval (HREC)

MAKERERE UNIVERSITY

P.O. Box 7072 Kampala Uganda
Website: www.musph.ac.ug

Tel: 256 414 532207/543872/543437
Fax: 256 414 531807

COLLEGE OF HEALTH SCIENCES
SCHOOL OF PUBLIC HEALTH
HIGHER DEGREES, RESEARCH AND ETHICS COMMITTEE

27th November, 2014

Charles Nelson Kakaire
Principal Investigator, Protocol (256)
University of Witwatersrand, South Africa

Re: Approval of Proposal titled: Effect of fear on the use of Insecticide Treated Nets amongst pregnant women aged 15 – 49 years in Tororo district, Uganda

This is to inform you that, the Higher Degrees, Research and Ethics Committee (HDREC) has granted approval to the above referenced study, the HDREC reviewed the proposal during the 124th meeting held on 04th November, 2014 and made some suggestions and comments which you have adequately incorporated:

	Document Name	Version Number
1	Research Protocol	Version 3
2	ALL Informed Consent Documents	Version 3
3	Data collection tools	Version 3

Note that the initial approval date for your proposal by HDREC is 27th/11/2014, and therefore approval expires at every annual anniversary of this approval date. The current approval is therefore valid until: **26th/11/2015**.

Continued approval is conditional upon your compliance with the following requirements:

1) No other consent form(s), questionnaire and/or advertisement documents should be used. The consent form(s) must be signed by each subject prior to initiation of any protocol procedures. In addition, each subject must be given a copy of the signed consent form.

Makerere University School of Public Health
Valid Thru:
27 AUG 2015
Higher Degrees, Research and Ethics Committee

2) All protocol amendments and changes to other approved documents must be submitted to HDREC and not be implemented until approved by HDREC except where necessary to eliminate apparent immediate hazards to the study subjects.
3) Significant changes to the study site and significant deviations from the research protocol and all unanticipated problems that may involve risks or affect the safety or welfare of subjects or others, or that may affect the integrity of the research must be promptly reported to HDREC.
4) All deaths, life threatening problems or serious or unexpected adverse events, *whether related to the study or not*, must be reported to HDREC in a timely manner as specified in the National Guidelines for Research Involving Humans as Research Participants.

- Please complete and submit reports to HDREC as follows:

a) For renewal of the study approval – complete and return the continuing Review Report – Renewal Request (Form 404A) at least 60 days prior to the expiration of the approval period. The study cannot continue until re-approved by HDREC.

b) Completion, termination, or if not renewing the project – send a final report within 90 days upon completion of the study.

- Finally, the legal requirement in Uganda is that all research activities must be registered with the National Council of Science and Technology. The forms for this registration can be obtained from their website www.uncst.go.ug. Please contact Mr. Tusiime Wilson, Administrative Assistant of the Higher Degrees, Research and Ethics Committee at wtusiime@musph.ac.ug or telephone number (256)-41-543872 or +256772496136 if you encounter any problems.

Yours sincerely

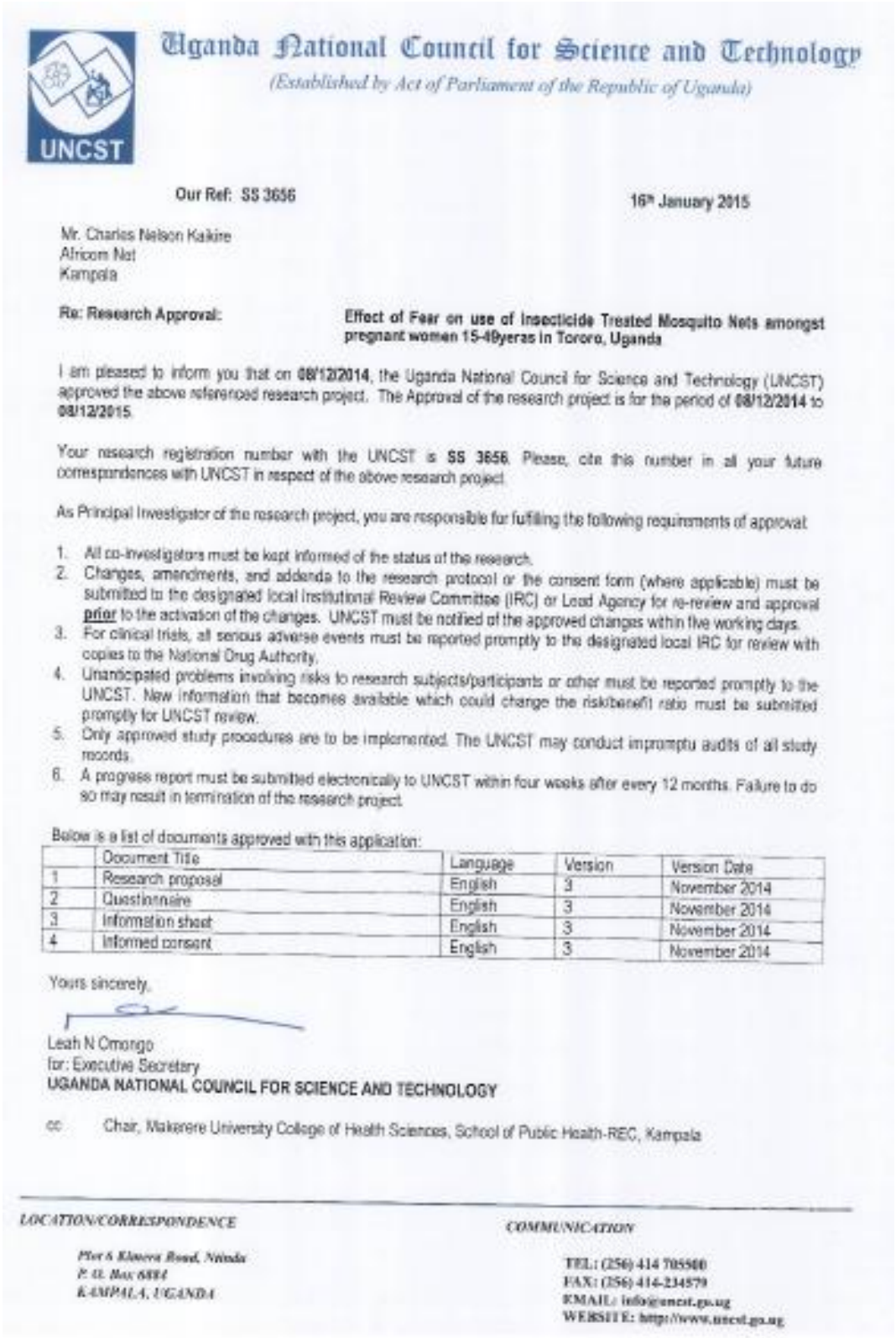
Makerere University School of Public Health Higher Degrees, Research and Ethics Committee
Valid Thru:
27 AUG 2015

Dr. Suzanne Kiwanuka
Chairperson: Higher Degrees, Research and Ethics Committee

Enclosures:

a) A stamped, approved study documents (informed consent documents):

Appendix 6: Ethics Approval – National Council for Science and Technology



Uganda National Council for Science and Technology

(Established by Act of Parliament of the Republic of Uganda)

UNCST

Our Ref: SS 3656

16th January 2015

Mr. Charles Nelson Kakire
Africom Net
Kampala

Re: Research Approval: **Effect of Fear on use of Insecticide Treated Mosquito Nets amongst pregnant women 15-49yeras in Tororo, Uganda**

I am pleased to inform you that on **08/12/2014**, the Uganda National Council for Science and Technology (UNCST) approved the above referenced research project. The Approval of the research project is for the period of **08/12/2014** to **08/12/2015**.

Your research registration number with the UNCST is **SS 3656**. Please, cite this number in all your future correspondences with UNCST in respect of the above research project.

As Principal Investigator of the research project, you are responsible for fulfilling the following requirements of approval:

1. All co-investigators must be kept informed of the status of the research.
2. Changes, amendments, and addenda to the research protocol or the consent form (where applicable) must be submitted to the designated local Institutional Review Committee (IRC) or Lead Agency for re-review and approval **prior** to the activation of the changes. UNCST must be notified of the approved changes within five working days.
3. For clinical trials, all serious adverse events must be reported promptly to the designated local IRC for review with copies to the National Drug Authority.
4. Unanticipated problems involving risks to research subjects/participants or other must be reported promptly to the UNCST. New information that becomes available which could change the risk/benefit ratio must be submitted promptly for UNCST review.
5. Only approved study procedures are to be implemented. The UNCST may conduct impromptu audits of all study records.
6. A progress report must be submitted electronically to UNCST within four weeks after every 12 months. Failure to do so may result in termination of the research project.

Below is a list of documents approved with this application:

	Document Title	Language	Version	Version Date
1	Research proposal	English	3	November 2014
2	Questionnaire	English	3	November 2014
3	Information sheet	English	3	November 2014
4	Informed consent	English	3	November 2014

Yours sincerely,

Leah N Omongo
for: Executive Secretary
UGANDA NATIONAL COUNCIL FOR SCIENCE AND TECHNOLOGY

cc: Chair, Makerere University College of Health Sciences, School of Public Health-REC, Kampala

LOCATION/CORRESPONDENCE

Plot 6 Kimera Road, Ntinda
P. O. Box 6884
KAMPALA, UGANDA

COMMUNICATION

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