EFFECT OF TRAINING MOTHERS AND MOTORCYCLE (BODA-BODA) RIDERS IN COMMUNITY-BASED REFERRALS ON MATERNAL OUTCOME IN EAST – CENTRAL, UGANDA

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Q97EA/37537/2017

A THESIS SUBMITTED IN FULFILLMENT OF THE REQUIREMENT FOR THE AWARD OF DEGREE OF DOCTOR OF PHILOSOPHY (HEALTH MANAGEMENT) IN THE SCHOOL OF PUBLIC HEALTH AND APPLIED HUMAN SCIENCES OF KENYATTA UNIVERSITY

JUNE, 2021

DECLARATION

This thesis is my original work and has not been presented anywhere for any award in any university.

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This work is dedicated to my father (RIP), mother (RIP), Fatuma N. N. Muluya (wife), children and Allie B. Kibwika Muyinda for the support and contributions during my study.

ACKNOWLEDGEMENT

I am deeply indebted to Dr. Muwanguzi David Gangu at the Iganga District Local Government Health Department. My sincere gratitude to my supervisors; Dr. Rucha Kenneth Kibaara, Dr. Peter Kithuka (Faculty of Health Management and Informatics, Kenyatta University) and Prof. John Francis Mugisha (Cavendish University Uganda) for the critical guidance offered during compilation of this document and to colleagues in the Faculty of Health Management and Informatics, I have learnt a lot from you, part of which has been used to modify this document.

Special thanks to the following offices, facilities and individuals for their contributions towards the development and enrichment of this report; Iganga and Bugiri District Health Offices, Heads of Health Facilities of Nawandala HCIII, Nambale HCIII, Kasambika HCIII, Namusiisi HCIII, Bugono HCIV, Bunyiiro HCIII, Busesa HCIV and Makuutu HCIII in Iganga District, Mayuge-Bukooli HCIII and Nabukalu HCIII in Bugiri district, the research assistants Ogara Collin, Wananda Irene, Muhammedi Mukalu and Male Ronald and lastly Peter Mamai, for his tireless guidance at the university whenever I approached him.

To all respondents, thank you so much for enabling me complete the work. Special thanks go to all who encouraged me while working on this report.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABBREVIATIONS AND ACRONYMS

ANC	**:**	Antenatal Care
CBO	**:**	Community Based Organisation
CHEWs	**:**	Community Health Extension Workers
CHW	:	Community Health Worker
CMV	**:**	Common Methods Variance
CUG	:	Closed Caller User Group
CVI	**:**	Content Validity Index
DHIS2	**:**	District Health Information System 2
DID	:	Difference-in-difference
EmOC	**:**	Emergency Obstetric Care
FGDs	**:**	Focus Group Discussions
HCIII	**:**	Health Centre Three
HCIV	**:**	Health Centre Four
HCs	**:**	Health Centres
HF	:	Health Facility
HIV/AIDS	**:**	Human Immunodeficiency Virus & Acquired Immunodeficiency Syndrome
HMIS	**:**	Health Management Information System
HW	**:**	Health Worker
HWs	**:**	Health Workers
IDI	:	In-Depth Interview
IRB	:	Institutional Review Board
KII	:	Key Informant Interview
MCH	**:**	Maternal and Child Health
MMR	**:**	Maternal Mortality Ratio
MNCH	**:**	Maternal Neonatal and Child Health
NCS&T	:	National Council of Science and Technology

NGO	**:**	Non-Government Organisation
NMR	**:**	Neonatal Mortality Rate
PATH	**:**	Program for Appropriate Technology in Health
PHC	**:**	Primary Health Care
PNC	:	Postnatal Care
QMHS	**:**	Quality of Maternal Healthcare Services
RFs	**:**	Research Forms
SDGs	**:**	Sustainable Development Goals
TBAs	**:**	Traditional Birth Attendants
TV	**:**	Television
UBOS	**:**	Uganda Bureau of Statistics
UNFPA	**:**	United Nations Population Fund
USAID	**:**	United States Agency for International Development
VHTs	**:**	Village Health Teams
WHO	**:**	World Health Organisation

DEFINITIONS OF OPERATIONAL TERMS

TERM	DEFINITION
ATTITUDES	A combination of beliefs and feelings that influence a person's mindset to behave in a certain way.
CLOSED CALLER USER GROUP (CUG)	This is an innovation where mothers, boda-boda riders and other key stakeholders are registered in a group by a telecommunication company and have free calls when communicating to one another.
COMMUNICATION SYSTEM	A communication system is one composed of two inter-connected parties/devices/strategies that exchange information or messages from one end to another or vice versa and give feedback.
COMMUNITY-BASED MATERNAL REFERRAL	This should be understood as a time when an expectant mother makes a decision to take herself to a health facility upon contacting a boda-boda rider for transport. It is at times referred to as self/individual referral. This is when an expectant mother seeks care by herself deciding to move to the healthcare centre of low or high level (Sanders *et al.*, 1998 cited in Pembe, 2010).
COMMUNITY HEALTH WORKERS	These should be understood as people/personnel who have direct responsibility in the management of maternal and neonatal health care and referrals. These include majorly the midwives and Village Health Teams (VHTs)
INCOME STATUS	This refers to the level of earning of an individual involved in this study. S/he can have low, middle or high income level as determined by the fulfillment of the basic needs. Low income when you can not afford the five basic needs of life; middle income if you can afford the five basic needs of life; and high income you can afford and help others with basic needs of life.

LEVEL OF EDUCATION	This is referred to as the qualification one attained while in school.
MAMA – BODA-BODA TRANSPORT GROUPS	These are organised groups of boda-boda riders tasked to transport mothers from community to health centres.
MARITAL STATUS	This defines a person's family attachment; that is, single, engaged, cohabiting, married, divorced and widowed.
MATERNAL OUTCOME	These are supervised deliveries as a result of boda-boda transport to the health centres.
MOTORCYCLE (BODA-BODA) RIDERS	These are locally available commercial boda-boda riders in Uganda involved in the transportation of people (mothers inclusive) for a financial gain.
RESIDENCE	This is the area where the respondent lives. It can be urban or rural. Urban residence is one with in town or city setting while as rural residence is one in the countryside (outside town).
TRAINING OF MOTHERS AND MOTORCYCLE (BODA-BODA) RIDERS TEM	This is the process of passing on information to pregnant mothers and boda-boda riders with the intention of promoting the adoption of healthy individual practices.
TRANSPORTATION SYSTEM	This is the system which is used to transfer a mother to and from the village to a health centre.

ABSTRACT

Uganda has a reproductive health situation characterized by delayed community maternal referrals; and yet timely referral to skilled care is essential for pregnant mothers who are at high-risk, to have immediate access to appropriate health care. This has led to few safe deliveries at health centres (52 percent in east – central region compared to 74 percent nationally). Maternal mortality ratio (MMR) at 346 per 100,000 live births and neonatal mortality rate (NMR) at 27 per 1,000 live births respectively in east – central Uganda is high compared to 211 per 100,000 live births and 20 per 1,000 live births respectively globally. This study aimed at training expectant mothers and boda-boda riders on innovation, communication and technology, fleet management, the roles of the different stakeholders and the prevention and management of emergencies. This enabled the establishment of the effect of training of boda-boda riders and expectant mothers in community-based referrals on maternal outcome. This study used a non randomized control trial study design of community intervention. Four sub-counties were selected in the intervention and 4 in the control arms respectively. The study population consisted of 503 pregnant mothers in their third trimester and 192 boda-boda riders randomly and conveniently sampled respectively. Self administered questionnaires, in-depth and key informant interviews, focus group discussions, and secondary records were used to collect both quantitative and qualitative data. Descriptive and inferential data analysis methods using STATA *version* 14 was conducted for quantitative data. Thematic analysis was done using Ti 7 software atlas. Findings revealed that 70.5% of mothers used boda-boda transport to health centres to deliver, of whom 69.4% were trained boda-boda riders in the intervention arm. Only 51.2% of mothers used boda-boda transport in the control arm. Socio-demographic characteristics of mothers; age (25 – 34 years OR=17.581, p=0.001 and 35 – 44 years OR=247.660, p=0.000), religion (Protestants OR=0.122, p=0.013 and Moslems OR=0.197, p=0.050) and means of transport used by mothers (Motorcycle OR=5.132, p=0.001 and Walking OR=35.732, p=0.000) influenced the maternal outcome. Only age and ownership of motorcycles for the boda-boda riders influenced maternal outcome (25 – 34 years OR=11.351, p=0.000; Personal ownership OR=3.549, p=0.002 respectively). Also, attitude of mothers on comfort of boda-boda transport influenced the maternal outcome (OR=8.352, p=0.011). Communication systems, that is, possession of phones by mothers (OR=4.200, p=0.000) and time interval boda-boda rider took to respond when contacted (21 – 30 minutes OR=0.124, p=0.002 and 31 – 60 minutes OR= 0.003, p=0.000) had effect on the maternal outcome. Lastly, knowledge attained during training by boda-boda riders on fleet management and referral systems had effect on maternal outcome (OR=1.202, p=0.022). For mothers, knowledge attained on the roles of stakeholders and fleet management and referral systems had effect on maternal outcome (OR=2.290, p=0.011 and OR=0.117, p=0.009 respectively). In conclusion, increase in knowledge of mothers and boda-boda riders, system of communication, attitude of mothers and socio-demographic characteristics increased supervised deliveries and have demonstrated its potential in addressing the challenges associated with community referral needs in rural settings. This adds credence to the need for rolling out of training of mothers and boda-boda riders to a greater geographical area. It will also be useful to policy makers whose efforts are geared towards increasing health facility-based deliveries to reduce MMR and NMR.

CHAPTER ONE: INTRODUCTION

1.1 Background to the study

Community maternal referral is crucial to ensure that pregnant mothers who are at high-risk have immediate access to appropriate health care including health facility-based deliveries (Pembe *et al*., 2017). A weak referral system delays expectant mothers from accessing health care early enough which in some cases impacts negatively on the survival of the mother and the baby (WHO, 2019).

Globally, 81 percent of the childbirths take place in the presence of skilled personnel (WHO, 2019). Maternal mortality ratio (MMR) and neonatal mortality rate (NMR) is at 211 per 100,000 live births and 20 per 1,000 live births respectively (WHO, 2019). However, approximately 1000 women die from preventable pregnancy and childbirth related causes every day (WHO, 2015). Ninety-nine (99) percent of all maternal deaths occur in developing countries (Patel *et al.*, 2016). About 3.6 million children die in the first four weeks after birth (neonatal period) annually, and 30.1 per 1,000 live births come from Africa (WHO, 2015; Afolabi, 2017; Lawn, 2010).

Expectant mothers in low and middle income countries (LMICs) suffer disproportionately from maternal deaths due to complications of pregnancy and childbirth when delayed to reach health centres (WHO, 2013). Further, neonatal death rates are also high in these settings. According to the World Health Organisation (2013), maternal and neonatal deaths are still a challenge much as improving access to antenatal care (ANC) during pregnancy may improve outcomes for women and neonates.

Several interventions have been in place to improve on ANC attendance and health facility deliveries. However, many pregnant mothers continue to miss out on this level of care. This is either because they have knowledge gaps on the importance of ANC or they have failed to get means to reach the facility in time (WHO, 2013).

Trainings of health workers and political leaders among other stakeholders on Maternal Child Health (MCH) have been conducted in the past as a strategy to improve MCH (Ssebunya & Matovu, 2016). However, commercial motorcycle riders (locally known as boda-boda riders) who transport majority of rural mothers from community to health centres have often been excluded in such trainings. Boda-boda riders therefore lack knowledge on MCH.

Whereas pregnant mothers are being health educated when they come for ANC at facilities on birth preparations (WHO, 2013), topics on boda-boda transport are often missed out. Fortunately, midwives and village health teams (VHTs) have been equally trained in emergency obstetric care (EmOC) and family linkage to the health centre in the different regions and parts of the world (Namazzi *et al.*, 2017; Ssebunya & Matovu, 2016).

In Africa, maternal mortality reduction remains a priority under "Goal 3: Ensure healthy lives and promote well-being for all at all ages" in the new Sustainable Development Goals (SDGs) agenda through 2030 (Kaye, Kakaire & Osinde, 2011). However, its provision in Africa is hindered by poverty, poor access to quality services and commodities and communication gaps especially in the rural areas (Health, 2010). Generally, the high maternal mortality ratio at 525 per 100,000 live births (WHO, 2019)

and neonatal mortality rate at 30.1 per 1,000 live births (WHO, 2015) are as a result of majorly the first and second delays, that is, decision made by a mother to go to the health centre, and the time taken to reach the health centre (Thaddeus, 1994 cited in MacDonald *et al.,* 2018). The delays are as a result of different factors which this study intended to find out.

In East Africa, the situation was not different. The high maternal mortality ratio and neonatal mortality rate were attributed to failure of mothers to go to health centres and deliver under skilled personnel (PATH, 2013; Ssebunya & Matovu, 2016; Pembe *et al*., 2017). Comparatively, the MMR and NMR in Kenya is 400 per 100,000 live births and 26.3 per 1,000 live births respectively (WHO, 2015), Tanzania is 410 per 100,000 live births and 20.1 per 1,000 live births (WHO, 2015), and Rwanda is 320 per 100,000 live births and 20.7 per 1,000 live births (WHO, 2015). The country's performance was measured by the impact of the "three delays" (Orcutt, 2013; UBOS and ICF, 2017). This study found it necessary to address such gaps.

In Uganda alone, health facility-based deliveries are at 74 percent and maternal mortality ratio at 336 per 100,000 live births (UBOS and ICF, 2017). For every maternal death in Uganda, at least six survive with chronic and dilapidating health. The neonatal mortality rate in Uganda stands at 21.4 per 1,000 live births (UBOS and ICF, 2017). Maternal and child healthcare is generally achieved when the "three delays" are addressed (MacDonald *et al.,* 2018; PATH, 2013). In this case, community-based referral of expectant mothers to health centres to deliver is important (Ssebunya &

Matovu, 2016). The first place of community-based referral is home to health centre and then from one health centre to another (Pembe, 2010; MOH, 2014).

In the east – central districts of Uganda, community-based referrals of mothers especially in the rural areas during emergency, were lacking. An appropriate means of transport for a mother to reach a health facility in time to deliver is important (Munjanja, 2012). The failure in communication especially for an affordable, comfortable and safe transportation of mothers in labour and other complications to health centres has created the need for affordable and comfortable alternatives.

1.1.1 Operationalization of ambulances in the study area

Communities, such as those in Iganga and Bugiri have built and are using vehicle/motorcycle ambulances. This has seemingly eased transportation of expectant mothers to nearby health centres. Iganga and Bugiri districts have each obtained one functional government vehicle ambulance (MOH, 2017). These ambulances hardly pick mothers from their homes or even from the lower health facilities when there is an emergency (MOH, 2014). Yet available evidence suggests that use of motorcycle ambulances can help to improve health facility deliveries (Ssebunya & Matovu, 2016); however, few studies have explored the motivators for and barriers to their usage. The factors associated with utilization of motorcycle ambulances by pregnant women in eastern Uganda were explored (Ssebunya & Matovu, 2016). These included; level of income, marital status, age of mother, sharing of the birth plan between the mother and the husband, decision making by the husband, mothers' knowledge on the availability

of the ambulances and discussion by a traditional birth attendant (TBA) to allow a mother seek attention at a health facility, amongst others (Ssebunya & Matovu, 2016).

As a remedy, donations of motorcycle ambulances were made to three sub-counties in Iganga district (Nawandala, Nabitende and Nambale sub-counties) and one in Bugiri district (Budaya sub-county). Only one motorcycle ambulance was donated to each sub-county. While these were donations made to the local and needy community, they were inadequate. Locally available commercial boda-boda riders were taken as the other alternative and this study sought to find out whether optimal training of both mothers and boda-boda riders in the basic areas of MCH and management of maternal referrals could yield positive results.

1.1.2 Boda-boda transport for mothers to reach health centres

Boda-boda riders are commercial riders with the core value of transporting people (pregnant mothers inclusive) for a financial gain. This is not very different from Raynor (2014), who defined a boda-boda rider as an operator of the motorcycle. Much as mothers are at the exposure of boda-boda riders, their transportation to health facility to deliver has been affected due to lack of knowledge on the maternal and child health services by the boda-boda riders. Similarly, mothers have not been knowledgeable on the role played by the locally available boda-boda riders.

Guided by the Shannon & Weaver communication model as well as David Berlo's model of communication and informed by the social cognitive, individual differences, agenda-setting and the human motivation theories, this study sought to investigate the effect of training mothers and boda-boda riders in community-based referrals for

maternal outcome in the east – central region of Uganda. In Mali, Sierra Leone, Malawi, India, China amongst other countries studies on transport and communication have been conducted (PATH, 2013; Kalinowski, 2012), though least, if not at all on the boda-boda transport and effective communication.

Therefore, this study intended to form "Mama-Boda-boda Transport groups" at different points and train them to get basic information in maternal and child health (community-based referrals). However, it was deemed necessary for the health workers (midwives and VHTs) to be part of the training to share experiences with the mothers and boda-boda riders. This created a defined bond between the different stakeholders in this study. The areas of focus in the training included; fleet management and referral systems, the roles of the different stakeholders (riders, midwives and VHTs), prevention and basic management of maternal and child health emergencies and lastly on innovation, communication and technology. The purpose was to coordinate mothers, riders, health workers and other relevant stakeholders in a better community-based referral network. Lastly, there was signing of agreements/consents required by the different stakeholders (boda-boda riders and mothers) to participate in the study.

1.2 Statement of the Problem

Delayed and weak community-based referrals to skilled care in east – central Uganda is evident and put pregnant mothers at high-risk. Mothers end up being attended to by unskilled personnel at their homes causing maternal and neonatal deaths (Atukunda *et al.,* 2020). Maternal health indicators like health facility-based deliveries in the east – central Uganda was low at 52 percent (UBOS and ICF, 2017) compared to 74 percent at

national level (UBOS and ICF, 2017). The MMR stands at 346 per 100,000 live births and NMR at 27 per 1,000 live births in the east – central Uganda (UBOS and ICF, 2017) compared to MMR at 211 per 100,000 live birth and NMR at 20 per 1,000 live births globally (WHO, 2019). Many interventions like securing vehicle ambulances for all hospitals, donation of motorcycle ambulances to sub-counties and giving out phones to health workers in health facilities for communication (MOH, 2014; PATH, 2013; Ssebunya & Matovu, 2016) have proved to be futile; prompting this study with a focus on training of mothers and the boda-boda riders in community-based referrals. Boda-boda riders are presumed to be critical stakeholders in the resource constrained east – central Uganda since they are the only people with quick means of transport for expectant mothers to reach the health centres. Therefore, training mothers and boda-boda riders in community-based referrals was required to give a clear communication link between them for transport to health centres.

1.3 Justification of the Study

A timely and functional referral system for mothers in the community is important as it backs up antenatal care, labour and delivery at low and high level health facilities (Pembe, 2010). It reduces the risks of mothers delivering at homes (Husein, 2011). Boda-boda riders play a crucial role of helping rural women with transport to go to health centres to deliver, like the motorcycle ambulance riders transported patients (pregnant women inclusive) to hospitals to offer emergency obstetric care (Ssebunya & Matovu, 2016).

Boda-boda riders have been transporting pregnant women to health centres. However, the documentation on their knowledge and roles in community maternal referrals was lacking. Therefore, the study was to investigate and document on the roles of boda-boda riders in community-based referrals and its impact on maternal outcomes. In one of the studies, motorcycle ambulances riders played role in improving maternal and child health (Ssebunya & Matovu, 2016), but there was limited documentation on the factors that were affecting the utilization of motorcycle ambulances by pregnant women living within the catchment areas served by these ambulances. Exploration of these factors in order to inform the future promotion and eventual utilization of boda-boda transport by mothers was necessary.

Most studies have focused on the costs of operations and referral time (Ssebunya & Matovu, 2016); the perceptions towards their utilization, conditions of patients transported using the ambulances and the accessibility and feasibility of using them (Green, 2013; Gabrysch, 2011). Efforts have been directed to the assessment of referral care systems for ill children from first level to second and third levels of health care provision by the district managers (Cervantes, 2015). Another scholar focused on communication in public health emergency preparedness (Savoia, 2013), and some on the emergency medical service call patterns for motor vehicle ambulances in the specified localities in China (Kalinowski, 2012), and contribution of these studies cannot be underscored. However, there were no evident studies on community-based referrals by boda-boda riders and supervised deliveries in health centres as maternal outcome.

Training of mothers and boda-boda riders imparts knowledge on the management of community-based referrals to increase on the supervised deliveries in health centres. Therefore, a well-informed study that demonstrated the effect of training in community-based referrals on maternal outcome was carried out. The findings of this study are to be used by policy makers, implementers, reviewers, analysts and critiques, especially those whose efforts are geared towards increasing health facility-based deliveries.

1.4 Research Questions

1. What is the influence of socio-demographic characteristics of (i) mothers and (ii) boda-boda riders on maternal outcome in east – central Uganda?

2. What is the influence of attitude of mothers towards community-based referrals on maternal outcome in east – central Uganda?

3. What is the effect of communication systems for community-based referrals on maternal outcome in east – central Uganda?

4. What is the effect of knowledge attained during training in community-based referrals by (i) mothers and (ii) boda-boda riders on maternal outcome in east – central Uganda?

1.5 Research hypothesis

1. Socio-demographic characteristics of (i) mothers and (ii) boda-boda riders do not have a significant influence on maternal outcome in east – central Uganda.

2. Attitude of mothers towards community-based referrals do not have a significant influence on maternal outcome in east – central Uganda.

3. Communication systems for community-based referrals do not have a significant effect on maternal outcome in east – central Uganda.

4. Knowledge attained during training in community-based referrals by (i) mothers and (ii) boda-boda riders does not have a significant effect on maternal outcome in east – central Uganda.

1.6 Objectives

1.6.1 General Objective

To investigate the effect of training mothers and boda-boda riders in community-based referrals for better maternal outcome in east – central Uganda.

1.6.2 Specific objectives

1. To find out the influence of socio-demographic characteristics of (i) mothers and (ii) boda-boda riders on maternal outcome in east – central Uganda.

2. To ascertain the influence of attitude of mothers towards community-based referrals on maternal outcome in east – central Uganda.

3. To establish the effect of communication systems for community-based referrals on maternal outcome in east – central Uganda.

4. To determine the effect of knowledge attained during training in community-based referrals by (i) mothers and (ii) boda-boda riders on maternal outcome in east – central Uganda.

1.7 Limitations and delimitations of the study

Study limitations are factors that affect the validity of the information gathered by the research (Simon & Goes, 2013). Delimitations are the choices made by the researcher to remove obstacles that may affect the study (Simon & Goes, 2013). Whilst this study makes several contributions to healthcare research, it had several limitations which were addressed accordingly. For instance, the target respondents were few; this prompted the re-examination of the conceptual model developed for the study to increase on the sample size which represented the larger population.

Secondly, there were concerns of study data generated using the self-rated method of questionnaires where a respondent rated him/herself on the questions posed. Podsakoff *et al.* (2003) argued that such approaches are one of the outlets that lead to the emergence of Common Methods Variance (CMV). Common Method Variance refers to the amount of spurious covariance shared among variables because of the common method used in the collection of data (Malhotra, Kim & Patil, 2006). Therefore, mark variable technique was employed to identify theoretically unrelated variables to the substantial variables for better correlations.

The boda-boda riders who were targeted to transport mothers to health facilities feared to offer the service at night due to insecurity reasons. However, thorough sensitization of the community and boda-boda riders was done because security starts with the community members. The mode of communication between the mother and rider was systemized to avoid individual targeting either way.

Absenteeism and shortage of health workers (midwives) at the health facilities compromised the quality of services offered and data collected. Absenteeism is an employee's intentional or habitual absence from work (Cucchiella, Gastaldi & Ranieri, 2014). Health worker absenteeism in health facilities of east – central Uganda cripples health service delivery (Wananda *et al*., 2015) thereby keeping away mothers which frustrates effective maternal referral efforts. However, prior communication was made to the heads of the health facilities where the study was being conducted to mobilize their health workers (midwives inclusive) to offer services as required and record mothers accurately in the registers. Additionally, health workers (midwives) were duly alerted about impending community maternal referrals by VHTs.

At the same time, if mothers were not properly recorded by the midwives, it would make the study difficult more especially in tracing mothers with unique information for interview. Therefore, health workers within the facilities of research interest were informed in time to properly capture bio data for mothers who had come for ANC at the facility.

Some respondents were not willing to participate in the study. Respondents were allowed to exit the study at any moment they felt unwilling to continue with the study. This slightly prolonged the period for the study and data collection.

1.8 Theoretical and Conceptual framework

1.8.1 Theoretical explanation

Different theories mostly related to behavioural change and communication were explored to conceptualise this study. The theories were important in defining some of

the communication procedures and referral processes and how they affected one another. It helped guide humans who were in position to acclimatize to change after exposure to training and other forms of stimuli.

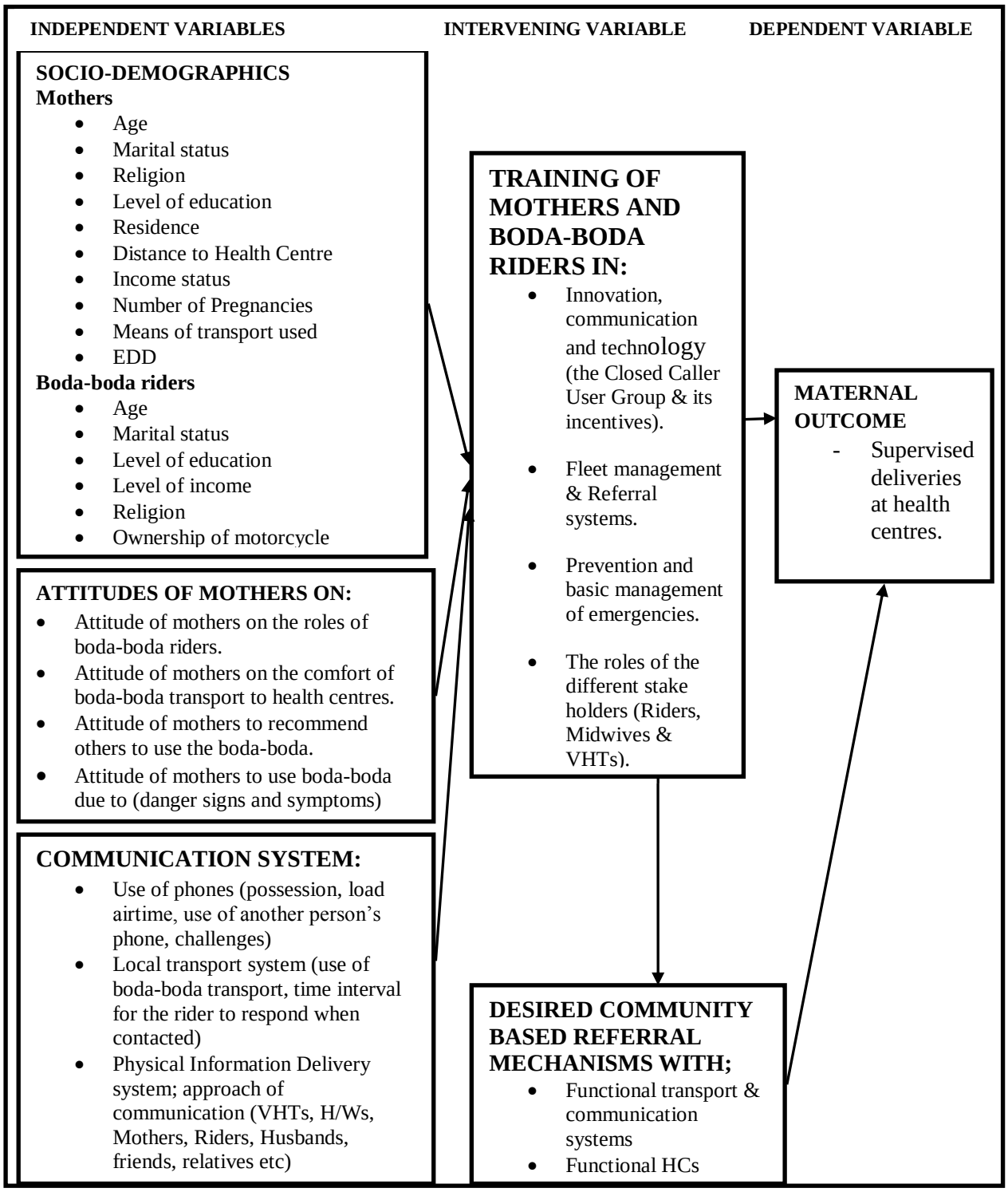
According to Mugisha (2015) the sensory stimulation theory explains that effective learning occurs with stimulation of human senses. Mugisha (2015) continues to enlighten that 75% of knowledge held by adults is learned through seeing, 13% through hearing and 12% through other senses – touch, smell and taste. Therefore, projections during training of boda-boda riders and mothers in addition to the facilitators' explanations stimulated their senses. Individual differences found were compared to those of the study theories. Some of the theories considered for this study included; "the learning and teaching theory" (social cognitive theory), "human motivation theory" and "mass media theories of communication" (Individual differences theory and Agenda-setting theory) as cited by Mugisha (2015), Kaya (2016), Just and Carpenter (1992), Motowildo, Borman and Schmit (1997) and Shaw (1979).

In addition to the theories, there are other two communication models, that is, Shannon and Weaver model of communication and David Berlo's model (Shannon, 1964; Munjanja, 2012). These theories have not been previously used in the context of training mothers and boda-boda riders and it leaves everything to a standstill on its contribution in increasing supervised deliveries at health centres. At the end, the study clinched to the guidance of these theories and models which were instrumental. Training enabled mothers and boda-boda riders to attain knowledge used to make important decisions to reach health centres to deliver in time.

1.8.2 Conceptual Framework

This study was guided by other studies and theoretical arguments adopted from Jacobs *et al.* (2011), PATH (2013), Yanagisawa (2015), Munjanja (2012) and Shannon (1964) which postulated relationships between the various variables. As noted in figure 1.1, these studies and theories explained the independent variables which included; socio-demographic characteristics of mothers and boda-boda riders, attitude of mothers and communication system, and the dependent variable was the maternal outcome (supervised deliveries at health centres). These were catalysed by the intervening variable which required training of the mothers and boda-boda riders on the innovation, communication and technology, fleet management and referral systems, roles of the different stakeholders and basic prevention and management of emergencies.

The socio-demographic characteristics of mothers included the following; income level, education, age, marital status, residence, number of pregnancies, distance to the health facilities, means of transport used and religion. Socio-demographic characteristics of boda-boda riders included; age, marital status, level of education, religion, income level and ownership of motorcycle. Variables for attitude of mothers towards community-based referrals included; attitude on the roles of boda-boda riders, attitude on the use of boda-boda transport due to the signs and symptoms, attitude on the comfort of boda-boda transport and lastly, attitude of mothers towards recommending another person to use boda-boda transport. Communication system variables included the following; mobile phones, availability of local transport and individuals for physical delivery services.



Sources: [Adopted by the researcher (2020); and Modified from Jacobs *et al.* (2011); PATH (2013); Yanagisawa (2015); Munjanja (2012) and Shannon (1964)]

Figure 1.1: Conceptual Framework of the study

1.9 Significance of the study

The study generally aimed at finding out the effect of training mothers and boda-boda riders and specifically focused on the socio-demographic characteristics of mothers and boda-boda riders, attitude of mothers, communication systems and the knowledge attained during training by the boda-boda riders and mothers in community-based referrals on maternal outcomes in east – central region, Uganda. The intention was to have mothers deliver in health centres. After the intervention, results would provide information necessary in the reduction of MMR and NMR. The Government, Non-Government Organizations (NGOs) and Community Based Organizations (CBOs) may use these findings to improve on the quality of life of mothers and children. It would also enable mothers to make decisions of going to health facilities with the help of readily available means of transport hence minimizing the first and second delays. More research work may be further developed by academicians basing on the findings from this study.

1.10 Summary of the chapter

This first chapter explains the conceptual and theoretical background of the study and the statement of the problem to portray the importance of the study, that is, training of mothers and boda-boda riders in community-based referrals. Research questions were highlighted to guide the study, followed by the hypothesis and objectives of the study. Chapter two explored a detailed review of literature in line with the stated objectives in chapter one. In chapter two still, both theoretical and empirical reviews of literature were considered to identify gaps which the study sought to address.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This chapter presents literature reviews from other related studies in Uganda, East African region, African continent and globally. The literature review section provides the framework for understanding key concepts, methods and approaches used in the study. The literature review portrays the existing gaps and how these affect service delivery in line with maternal and child health especially in the study area. In this study, the objectives were sequentially followed when writing the literature. The reviewed literature related to this study. Therefore, it was necessary to share experience from other researchers about this topic: effect of training mothers and boda-boda riders in community-based referrals on maternal outcomes in east – central region, Uganda. The literature was sequentially examined as: health facility-based deliveries and its challenges, socio-demographic factors, attitude of mothers, communication systems, maternal healthcare related context, community-based referral situation in Uganda, referral systems in rural settings, training of mothers and boda-boda riders in community-based referrals, transport as means of referral system, and payment for transport fare. However, sub topics/themes emerged during literature reviews which were important for this study. Lastly, there was summary of the findings in the literature with identified gaps which guided the study.

2.2 Theoretical Review

A single theory may not be sufficient to explain every detail of the study, different theories can be utilized to provide theoretical cross-pollination or cross-fertilization of ideas and increase richness of the study (Jeppsson, 2004, p. 65, as in Mugisha, 2015).

Theoretical review covered the Learning and Teaching Theory (Cognitive Learning Theory or Social Cognitive Theory), mass communication theories and models (individual differences theory, agenda setting theory, Shannon and Weaver model of communication and David Berlo's model) and human motivation theories (agenda-based economic theory, processes theories, McGregor's X and Y theories and Herzberg theory). These theories were related to behavioural change and communication explored to conceptualise this study.

Learning and teaching theory is at times referred to as Cognitive Learning Theory or social Cognitive Theory (Mugisha, 2015). This is one of the theories with narrative communication for behavior change. Learning is one of the most long-running and unquestionably important processes in the lives of human beings (Kaya, 2016). In addition to their native behaviours, acquiring new knowledge, skills and attitudes through the experiences over various processes, human beings direct their lives in accordance with their learning (Kaya, 2016). What is so common with this theory is that the process of narrating works best when the person doing it is seen to be culturally similar to the listeners who are to change their behaviours (Kaya, 2016). Commercial boda-boda riders and mothers in this case who were the learners or listeners had common characteristics and learning environment similar to that of the trainers who imparted the knowledge in them. These cognitive characteristics included; the working memory of learners, the attention given to the learning sessions by the learners, self-concept to bring out the real picture of an individual including their societal roles, beliefs and values, motivation, amongst others. These were defined and linked with the environmental socio-demographic characteristics of the learners; for example, working

memory with the different ages of the learners; what is the best age of learning? self-concept and religion for the individual values and beliefs, motivation and the choices made by the learners to access maternal services, amongst others. However, the theory did not clearly state the individual characteristics that learners have in common to improve on their socio-demographic wellbeing.

Individual qualities of the learners/listeners are most of the time shaped according to the quality of the environment. Taking an example of teaching, reading and writing is more common in the first grade primary education. You realize that some of the first grade students learn how to read and write earlier, and then others learn later than them. The most important factor here is individual differences. Similarly, mothers who will come early to the facility for ANC will be in position to learn and acquire knowledge on availability of trained boda-boda riders for maternal referrals from the community than those who will come later. However, this may be attributed to other intervening factors and in this case, cognitive (Kaya, 2016). It intermediates the stimuli and the response, and this is so necessary when it comes to decision making for a mother to reach a health facility.

Another theory is individual differences theory. This theory portrays that there can be differences in the opinion of an individual, attitude or view towards what is communicated to the people and how it is perceived (Just & Carpenter, 1992). The factors determining such differences are – selective exposure, selective perception and selective retention.

When people living in a society expose themselves to any forms of communication but selectively, this is selective exposure (Motowildo, Borman & Schmit, 1997). This actually means that people only use information/messages to which they are exposed and which is in accordance with their thinking or beliefs. Mothers especially the expectant ones are supposed to be exposed to information which they believe in to make decisions to go to health facilities in time when the need arises. Moreover, commercial boda-boda riders make decisions to quickly respond to mothers' calls because of the information they have been exposed to. In this study, the intervention of training aimed at providing health information to boda-boda riders and mothers for better decision making.

During training, emphasis was on mothers' use of already trained boda-boda riders for transport to health facilities. The systems being effective in transmission of information believed by mothers was a matter of contention. This was addressed with specific communication systems taken into consideration which this study was looking forward to exhaust and conceptualize according to their differences.

According to this theory, people also perceive information differently since their attitudes are different. The information delivered may be taken as risky or beneficial to them. With Motowildo, Borman, & Schmit (1997), this is termed as selective perception. Many studies have been conducted to determine the attitudes of mothers towards the different maternal areas; though little if not nothing has been done towards boda-boda riders. The perception has been on family planning (FP), immunization, HIV/AIDS amongst others. For example, some of the studies have shown no utilization

of health facilities by women to receive MCH services specifically family planning in Nigeria due to the perceived risks (Onwuhafua, 2005). However, in another study, they had a positive attitude towards immunization of their children (Chris-Otubor, 2015). Therefore, the way information is communicated to both mothers and boda-boda riders will determine their perception or views.

Lastly, the selective retention factor enables a mother and boda-boda rider to remember information which is useful to them or forget what is not of their interest. Some of the socio-demographic factors and the communication system in place influence the use of information to decide quickly and reach the health facility in time for a mother to deliver. This theory did not come out clearly on decision making by pregnant mothers to reach health centres for skilled delivery. Yet, selective and retention exposure to the information, could influence their decisions to deliver from health centres.

According to Shaw (1979), agenda-setting theory describes the "ability to influence the prioritization of topics on the public agenda." For instance, if a news item is covered frequently, the audience will regard the issue as more important. Media or individuals can select information or a particular subject for emphasis, which can affect the audience positively (Shaw, 1979). The impact of agenda setting theory is undoubtedly of very high degree. Interventions to manage maternal referrals have been prioritized in many countries. These include; Mali, Malawi and others on the African continent and a slight improvement in some maternal indicators has been registered (PATH, 2013).

China prioritized and improved accessibility to maternal services, for instance when it reduced the geographical radius to 3 – 5 km for mothers to easily reach health centres to

deliver (Lo *et al.,* 2012). Similarly, mothers in China were privileged to have a communication system in place to enable them programme with ambulance drivers for transport to health centres to deliver. However, it is critiqued for not helping needy mothers in rural areas, thus calling for this study.

Shannon and Weaver 1949 model designed a technology of using the radio and telephone (Shannon, 1964). It consisted of three primary parts: sender, channel and receiver. The person who spoke into the telephone was the sender, the telephone itself, the channel and the part of the phone where one could hear the other person, the receiver. This model of communication is critiqued for not elaborating on the information/message transferred from the sender to the receiver to impact on behavioral change. Also, it has got challenges of communication interference as it is concurred with (Munjanja, 2012). In the rural community where majority of mothers are in need of communication systems, there is an interference with the signals and lack of the gadgets specifically phones for some mothers.

In the 1960s, David Berlo expanded on the Shannon and Weaver's 1949 linear model of communication and created the Sender-Message-Channel-Receiver (SMCR) model of communication (Stead, 1972; Kikoski, 1993). The Sender-Message-Channel-Receiver model of communication has also been expanded upon by other scholars (Stead, 1972; Kikoski, 1993). David Berlo went into details to expound on the factors which affect the four elements (SMCR). These included; skilled communication, attitude, knowledge, culture amongst others of the sender and the receiver, content of the message, and the type of communication system for transmission (Kikoski, 1993).

The training conducted influenced skilled communication, knowledge and perhaps attitude of commercial boda-boda riders, mothers and other stakeholders.

For effective uptake of the training intervention, incentives to mothers, boda-boda riders and other stakeholders were important. This was a motivation to the study participants. Different theories of motivation were considered to support the east – central Uganda study.

According to Goodman (2011), incentives given to participants led to improved performance. This is well explained by the agency-based economic theories. In management, organizational employees are expected to produce results as explained also by the agency-based economic theories but their commitment alone did not produce results (Johns, 2010). This confers the reason for giving incentives to employees. In this case, commitment alone of the recruited boda-boda riders was not enough for their productivity especially helping in the transportation of mothers. Operational mechanisms of how external incentives lead to performance improvement at the front line were a central concern of the field of organizational psychology (Bjrkman, 2010). External incentives for mothers, boda-boda riders and other stakeholders included training allowances, free calls and bonus airtime, refreshments and recognition of best performers (helmets given to riders).

Further, process theories of motivation explained the contributing factors for employees to yield results for the institution or organization. Boda-boda riders acted as employees for the study and increased deliveries in health centres were the required results. External incentives were provided which the study investigated to conclude their

relationship with better community-based referral and health facility-based deliveries. Process theories refer to a system of ideas or statements that account for or explain a group of facts or phenomena related to the implementation of activities, that is, how they should be planned, organized, and scheduled in order to be effective (El-Jardall *et al.,* 2011). Process theories explain why behaviours are initiated. Process theories range from those seeking to explain the organizational targets and how to hit the targets. Motivation, perceptions, organizational resources and support systems, and financial incentives can enable an organisation meet its targets.

Motivation has contributed to individual performances of employees in the business sector and recently, attention has turned to the psychosocial dimensions of employee productivity in the health sector (Klassen, 2010; Knyphausen-Aufseβ, 1997; Collier, Green & Kim, 2011). The psychosocial dimension of productivity of boda-boda riders was transportation of mothers to health centres and mothers to deliver from health centres. Other key stakeholders motivated were midwives and VHTs. A worker adopts organizational goals as a result of the intrinsic and extrinsic rewards from the work; he/she mobilizes personal resources/skills to achieve goals and depends on perception of competence, availability of resources and work environment (Collier, Green & Kim, 2011). In the east – central study, boda-boda riders and mothers picked courage to train and contributed to the improved community-based referrals and deliveries in health centres.

Theories have been advanced to understand an individual's intrinsic and extrinsic motivation for work. These include those that seek to identify the factors essential for

an individual's motivation (content theories) such as Maslow's hierarchy of needs, McGregor's X and Y theories and Herzberg theory (Tumushabe, 2010). These theories address the human needs that give rise to motivated behaviour. These theories identify various "needs" essential for employee motivation, satisfaction and continued commitment to work. The needs arising from these theories range from basic ones such as food and shelter to higher ones such as recognition, growth and sense of accomplishment. Other needs relate to relationships with others and a sense of belonging. For this study, quarterly review meetings with boda-boda riders, VHTs and midwives were conducted and best performers were recognized and rewarded. Allowances given to health workers, boda-boda riders and other individuals triggered their performance.

Similarly, in the context of human resource management related to community-based referral and transportation of mothers to health centres to deliver, as an explicit concern for sustained health facility performance, Herzberg's motivation-hygiene theory offers more explanatory potential (Chen, 2014). It identifies the short and long term factors as well as personal and environmental factors for boda-boda riders' motivation. In brief, motivation-hygiene theory posits that two factors namely; motivators and satisfiers have different causal elements. The motivators relate to what a person does while the satisfiers relate to the situation in which the person does her work. For example, supervision, interpersonal relations, organizational rules, working conditions and salary are short-term satisfiers rather than motivators. The boda-boda riders' satisfiers were allowances given during training, payments made by mothers when transported, free calls to those who were in the closed caller user group and an airtime bonus.

The absence of hygiene factors can create job dissatisfaction, but their presence does not necessarily motivate or create satisfaction. The motivators are related to elements that enrich a person's job; such as achievement, recognition, the work itself, responsibility, and advancement. These motivators are associated with long-term positive effects in job performance (Machingura, 2011). In this case, training of the boda-boda riders increased on their knowledge to improve on the performance. In particular, the use of financial rewards such as salary and bonuses are classified as hygiene factors with transient effects on results. The two-factor theory has found broad application especially in managing and motivating knowledge-based productivity where tasks involve broad discretionary space from the employee. This situation is similar to health facility care and the community management of referrals where decision making is delegated to health professionals, boda-boda riders and mothers (McCoy, Hall & Ridge, 2012).

2.3 Empirical Review

2.3.1 Health facility deliveries and its challenges

According to Moindi *et al.* (2016), deliveries in health centres were still very low at 62 percent in Kenya. This was not different from the Emelumadu *et al.* (2014) study where only 13.9 percent of deliveries were from rural health centres compared to 78.8 percent from urban hospitals in south – east Nigeria. Only 35.9 percent of the deliveries in Bangaladesh were attended to by skilled birth attendants (Al Kibria *et al.,* 2017). Out of 35.9 percent of the skilled deliveries, only 44.2 percent of the mothers attended at least one of the four antenatal care visits (Al Kibria *et al.,* 2017; WHO, 2013).

Many challenges have been spotted for the failure of mothers to deliver from health centres in rural areas. These range from socio-demographic characteristics of individuals to institutional and technical challenges. It was spotted by Manyeh *et al.* (2017) in rural southern Ghana that out of the 98.3 percent mothers who attended antenatal care, only 68.9 percent delivered from health centres. It was influenced by maternal age, level of education, parity, socioeconomic status, antenatal care and skilled attendants at delivery (Manyeh *et al.,* 2017). This has resulted into mothers delivering from homes and traditional birth attendants.

In Kenya alone, 26 percent of the deliveries occurred at home (Moindi *et al.*, 2016). Like Manyeh et al. (2017), Moindi et al. (2016) also affirmed that both mother and the partner's old age, being in a polygamous marriage, being a mother of at least two children and staying ≥5 Kms radius from the nearest health facility were associated with higher risk of delivering at home (crude $P < 0.05$). Other barriers of the health service delivery system in Uganda including but not limited to policy matters, medical staff, transport, distance and referral mechanism, drugs and medical facilities, costs and financing of services, corruption and bribery, culture and attitudes amongst others (Madinah, 2016).

This study sought to find out the socio-demographic characteristics of mothers and boda-boda riders that influenced deliveries at health centres. Similarly, attitude of mothers towards community referral and communication systems amongst others were deemed important for the study to find out its influence on deliveries.

2.3.2 The socio-demographic characteristics of mothers and boda-boda riders

Supervised deliveries by skilled personnel in health centres were the primary outcome of this study. Improved deliveries were attributed to; knowledge attained by mothers and the use of boda-boda transport by the mothers. Health facility-based deliveries were expected to reduce neonatal mortality rate and maternal mortality ratio. Many factors influenced mothers to contact commercial boda-boda riders for transport to the health centres when emergencies arose. This study assessed factors that prompted mothers to deliver from health centres in the selected districts of east – central region.

The socio-demographic characteristics of mothers in this study included: the mother's level of income, age, number of pregnancies, level of education, residence, marital status, religion, distance to the health facility and the means of transport to the health centre amongst others. For the boda-boda riders, socio-demographic characteristics included; age, marital status, level of income, level of education, religion and ownership of the motorcycle. These are believed to be key determinants of a mother's ability to manage her transport with support of boda-boda riders to the health centre in time to deliver and receive specialized and quality services (Gabrysch, 2011). However, this can be affected by other factors. It was found necessary for the above characteristics to form the background upon which this study was carried out.

The burden of mothers paying for transport, communicating to the riders, buying supplies and other requirements for themselves, and their newborn babies, usually rests on them as household members, and few women can afford to fund themselves. Those who can afford to save the little for communication and transport purposes divert the

money to cater for domestic needs like food, school fees, and general welfare (Namazzi *et al.*, 2017). This could be a possible cause of untimely or failed maternal referrals for mothers to deliver in health centres.

According to Moindi *et al.* (2016), the age of the mother and other related characteristics determines the mother's decision to deliver at a health facility under the care of a qualified person. This was revealed in a study conducted in Kenya when investigating the factors associated with home deliveries. From the univariate analysis, both the mother and the partner's old age were associated with higher risk of delivering at home [crude $P < 0.05$] (Moindi *et al*., 2016). This was in Kenya. However, in the study conducted by Ssebunya and Matovu (2016) in eastern Uganda, age differed from that Moindi et al. (2016) where mothers 25 – 34 years and 35+ years were transported by the motorcycle ambulances to deliver from health centres. Similarly, to motorcycle ambulance riders, those aged 25 years and above were able to transport mothers to health centres to deliver (Ssebunya & Matovu, 2016). These findings concurred with the Namazzi *et al.* (2017) study in which community extension workers of ages 25 – 34 years contributed to better outcomes. This study therefore sought to establish the different ages associated with the community-based referrals for mothers to deliver in health centres in the east – central region, Uganda. Little or nothing has been said about the age of the local boda-boda riders. Equally, different ages of boda-boda riders can be tested by the study to find out the association with health facility-based deliveries in east-central Uganda.

In the same study by Moindi *et al.* (2016), higher education level of both the mother and the partner and supportive stakeholders were associated with a protective effect on the risk of delivering at home as Mazalale (2015) affirms. Women without formal education and multi gravidae were more likely to deliver outside a health facility at 10% level of significance (Mazalale, 2015). Educated women tend to give birth to few children and deliver at a health facility compared to women with little or no education (Moindi *et al.,* 2016). For the case of boda-boda riders, studies do not clearly state the influence of education on maternal outcomes. For instance, in the eastern Uganda study conducted by Ssebunya and Matovu (2016), motorcycle ambulance riders' level of education did not influence transportation of mothers to health centres. Motorcycle ambulance riders are not very different from the locally available boda-boda riders.

The study conducted by Namazzi *et al.* (2017) in eastern Uganda stated that women who are poor stay in rural villages and are hand tied to reach health facilities and they resort to delivering at home. This study came up with interventions (training of mothers and boda-boda riders on the closed caller user group) to foster improvement in the MCH services right from the community to the health centres for rural mothers to benefit. Namazzi *et al.* (2017) concurred with Al Kibria *et al.* (2017) on the issue of poor mothers staying in rural areas. Women living in rural areas were less likely to be delivered by skilled birth attendants. Similar to the motorcycle ambulance riders, low-income earners did not transport mothers to health centres (Ssebunya & Matovu, 2016). Therefore, the east- central Uganda study found it necessary to investigate the level of income of local boda-boda riders influencing deliveries at health centres.

Allegri (2015) also concurs with Moindi *et al.* (2016) and Namazzi *et al.* (2017) on most of the factors in their studies, apart from marital status. It is stated that in Malawi, unmarried women were significantly more likely to deliver outside a facility (Mazalale, 2015). Also, marital status of motorcycle ambulance riders did not influence transportation of mothers to deliver from health centres (Ssebunya & Matovu, 2016). This prompted this study to find out if it was the same in east-central region, Uganda and the contributing factors to that effect. In such situations, the study found it also necessary to find out the association of marital status of boda-boda riders with deliveries at health centres.

Religion of mothers was found also to be significantly associated with their delivery in health facilities (Kifle, 2017). This was evident in the study conducted in Ethiopia, though results consistent with institutional delivery services showed that Muslim mothers were 89% less likely to seek delivery services and postnatal health care services than their counter parts. In the eastern study, mothers who were catholics were more likely to be transported to health centres to deliver (Ssebunya & Matovu, 2016). However, for the boda-boda riders, only the catholic religion was significantly associated with the use of motorcycle ambulances for transport to health centres and the rest did not (Ssebunya & Matovu, 2016). The east-central study necessarily delved into boda-boda riders' religious denominations which were deemed to affect the study differently.

According to Kananura (2016), 45 % of the respondents had carried at least 5 pregnancies. They did not want to go to health centres to deliver; instead, they opted to

stay at home to deliver under the care of either relatives or TBAs (Kananura, 2016). Mothers who have previously delivered successfully with no complications tend to deliver at home than the young new mothers (Moindi *et al.,* 2016). This resulted into higher risk of neonatal death compared to those with parity of 4 and less. This was consistent with other studies which indicate that frequent births as well as high parity predispose both the mothers and newborns to higher risks of unfavorable health outcomes. Also, mothers tend to avoid going to health centres because of the experiences acquired with the previous births. However, it was different in the study conducted by Jallow (2007), a mother of para 3 stated that she has never visited a health centre of all the pregnancies for ANC or delivery. The study intended to find out whether mothers' number of pregnancies determines deliveries in health centres.

Distance between homes and health facilities determined the utilisation of health centres by the mothers. In developed countries, distance determined only the movement of vehicles to pick mothers when contacted. For example, in 1997, a communication system in China specifically in Shenzhen was designed to respond to emergencies in hospitals, but mothers did not directly call the vehicle ambulance driver. It was also very difficult for the vehicle to move beyond the radius of 3-5 km (Kalinowski, 2012). In the developing countries and Uganda in particular, the 3-5 km radius is the distance patients walk to health centres (UBOS, 2017). Like Malawi and Gambia, the distance between homes and health facilities is in the radius of 3 kilometers (Mazalale, 2015; Semwanga-Rwashana, 2014). However, it is not a walkable distance especially for a pregnant mother. For Kenya, distances to health centres were extremely long (Mang'ong'o, 2013). This study sought to find out if mothers are able to walk that

distance or contact boda-boda riders in order to deliver from health centres despite the fact that 87 percent of the Ugandan population can access health services within the reach of 5km radius (UBOS, 2017).

There was also a cross-sectional mixed-methods study conducted among 391 women who delivered at four health facilities supplied with motorcycle ambulances as means of transport in Mbale district, eastern Uganda, between April and May 2014 (Ssebunya & Matovu, 2016). Data was computed relating the characteristics of women using motorcycle ambulances and a logistic regression model was used to assess the correlation in the utilization of motorcycle ambulances. The results were as follows; of the 391 mothers, 189 (48.3%) reported that they had ever utilized motorcycle ambulances. Of these, 94.7% were currently married or living together with a partner while 50.8% earned less than 50,000 Uganda shillings (US $20) per month. Factors independently associated with use of motorcycle ambulances were: older age of the mother, sharing a birth plan with the husband, husband participating in the decision to use the ambulance and having discussed the use of the ambulance with a traditional birth attendant (TBA) before using it. Qualitative findings indicated that community members were aware of what motorcycle ambulances are meant for and appreciated their role in taking pregnant women to health facilities. In Kenya, according to Orcutt (2013) it was also clearly demonstrated in an early study of linkages between hospital utilization and transport means used by mothers. The availability of motorcycle ambulances was evident in easy access to hospitals by mothers (Orcutt, 2013).

Different stakeholders contribute to the transportation of mothers to health centres. The ambulance services (both vehicles and motorcycles) in Uganda are partly contributing to service delivery to mothers (MOH, 2017). The vehicle ambulances in Uganda are owned by the government of Uganda and some are donations from prominent political leaders. However, there are also privately owned motorcycle ambulances in the east – central region. Motorcycle ambulances have been donations in the region and they are not enough to transport mothers (Ssebunya & Matovu, 2016). The locally available boda-boda transport is owned by individuals, the riders themselves and business men. Therefore, the study deemed it necessary to find out the influence of ownership of motorcycles on the deliveries at health centres in the east-central region.

2.3.3 Attitudes of mothers towards community based referrals

In the review of literature on the attitudes of mothers towards maternal referrals, one of the known definitions of attitude is the mental or neural state of readiness, organized through experience, exerting a directive or dynamic influence on the individual's response to all objects and situations to which it is related (Allport, 1935). However, it can be simply defined as a mindset or tendency to act in a certain way due to both an individual's experience and temperament (Albarracin, 2005). A few studies talk about attitude of mothers and deliveries in health facilities.

Attitude studies have received marked attention in both behaviour and health care research. In the study of the evaluation of knowledge, attitudes and practices of health care providers towards HIV positive patients in Tanzania, it was found that almost all providers (97%) expressed at least one negative attitude towards people with HIV/AIDS

who came for maternal and child health services (USAID, 2007). However, the study did not specifically indicate the categories of people receiving the MCH services. Therefore, apart from attitude to HIV/AIDS patients, pregnant mothers were targeted by this study. Furthermore, on the beliefs regarding difficulties and ease of care, the three most frequently reported difficulties were medicine and supply shortages (28% of all responses), lack of patient cooperation (22%), and facing hopelessness (12%) among patients (USAID, 2007). This was a projection of an attitudinal problem that this study found relevant because expectant mothers may as well present such an attitude.

In some studies, attitude of clients and in this case the mother is less talked about when discussing delivering in health facilities with help of skilled health personnel. Studies by Shahabuddin (2011) and Fisseha (2017) about mothers' perception on the capability of service providers in managing complicated child births revealed to the contrary that mothers perceived that service providers at the nearby health facilities were capable of managing complicated child birth. The mothers also believed that in the delivery rooms, equipment were available. Mothers' attitude being a multivariate concept that can not be measured in a single direction, this study considered it to be of utmost relevance.

Another study conducted by Onwuhafua (2005) focused on attitude of mothers and the use of health facilities in Nigeria. One of the reasons that were identified for their non-use of health facilities by mothers when community health extension workers (CHEWs) interviewed them, were; non-friendly health workers, distance to the health centre, and lack of transport means to the health centre. Moindi *et al.* (2016) also attributes the failure of mothers to deliver at health facilities to distance from the homes of mothers.

This was relevant to this study that focuses on the rural women in east – central region who have different reasons for their failure to go to health facilities to deliver.

When comparing attitudes of people in relation to quality of maternal child healthcare, good health care leadership at health centres should be demonstrated as it affects the quality of health care and its financial management. The behaviours of the leaders determine the wellbeing of the health staff to portray a positive attitude which contributes to the good care of referred mothers to the health facility (WHO, 2012). The concern of non-friendly health workers can be solved by good leadership (Obiajulu, 2009). According to Wananda *et al.* (2015), effective management practices play a significant part in influencing positive workplace behavior among employees. However, this cannot be conclusive as other factors are crucial and preempts for this study. A leader is a stakeholder in the health care of an expectant mother. Their state and status matter profoundly in the maternal referrals to health centres.

Still in Nigeria, a study was conducted to determine the attitude of mothers towards immunization. Accordingly, only a small percentage of women (less than 3%) gave reasons for their failure in availing their children for immunization (Chris-Otubor, 2015). Three percent of women failing to present their children for immunization may be considered minimal yet crucial in decision making. The three percent of these women who view immunization of their children as bad automatically fail to attend antenatal, natal and post-natal care considered important in maternal health management (Chris-Otubor, 2015). If not considered in the management of the health of mothers in time, this attitude may be fatal not only to mothers but also to babies as well.

According to Chris-Otubor (2015), the most popular reasons given for their failure to take children for immunization were “mother being too busy” and “there was a family problem”. Mothers are the caregivers to their families; therefore, their poor health or even absence jeopardizes family health and tranquility. This is why this study found it necessary to focus on the mother’s attitude towards her health so that she can remain alive to continue taking care of the family. The least reasons given by mothers were “did not know place and time of immunization”, “long queue and waiting time”, “strike by health workers” and “lack of money.” While these reasons may sound reasonable in the true sense of the matter, they show utter ignorance of the mother. This may not be an attitude problem but knowledge gap that this study was expected to address.

In the same study of Chris-Otubor (2015), the lack of vaccines as a reason for not being immunized was given by only 2.3% of women. This as well is not an attitudinal problem and this cannot be tagged to the mother since she does not procure the vaccine. This however informed this study on the nature of stakeholders and the challenges they face in the management of maternal health. Most of the reasons proffered by the women only show the lack of education in the women. This is a serious gap. Addressing it becomes the cornerstone of complete management of maternal health comprehensively. If mothers were better sensitized on the importance of immunization and the need for it to be taken at the right time, they probably would not have excuses for not showing up for immunization. Similarly, the attitude of mothers towards community-based referrals may be reasoned out in line with the distance to the facility, lack of funds to pay, unfriendly health workers to mothers, long waiting time, amongst others (PATH, 2013).

A mother's attitude can be determined by the freedom given to her especially in making decisions. This was experimented in Egypt on women who were consulting service providers for maternal healthcare. Findings showed their positive attitude towards maternal health care (Do & Kurimoto, 2012); though their freedom of movement did not address challenges of maternal referrals from the community. This prompted this study to consider the introduction of training of boda-boda riders and mothers as well as their registration in the closed caller user group to mitigate the challenges faced by mothers.

Traditionally, maternal referral programmes have been directed towards women, since they are the ones who become pregnant with the related risks to them and the children. This is only obvious save for the role of stakeholders. The aim of sensitizing stakeholders (mothers and boda-boda riders) is to find out which crucial role they take in decision making to reach the health facility in time with the target of improving on obstetric outcomes. A woman must recognize that she is experiencing an obstetric emergency in order to make a decision to move to a health facility (Namazzi *et al*., 2017). Her family must equally be supportive of her seeking care at a health facility as soon as possible. She must be able to access transportation and successfully get transported to the appropriate health facility (Ssebunya & Matovu, 2016). Upon arrival, she has to receive the care that she needs (PATH, 2016).

Nnebue (2014) attempted to make an assessment of the attitude of clients' satisfaction with the quality of maternal health care services (QMHS) given by service providers in Nnewi, Nigeria. This study used a cross-sectional survey with a multistage sampling

technique on a sample of 280 women utilizing maternal healthcare services from randomly selected PHC facilities. The results demonstrated that as far as knowledge is concerned, 89 (31.8%) did not report any knowledge about QMHS. Moreover, the level of satisfaction was not different among women of different socio-economic groups (p> 0.05). However, the attitude of health care providers towards the clients was reported as not good. The attitude and perception of health care providers is important in the attraction of mothers to come to health facilities (Nnebue, 2014).

In summary, literature reviewed on mothers' attitude towards community-based referrals indicated that most mothers express mixed feelings and therefore mixed attitudes. Healthcare providers loathe offering care to their clients yet it is their duty. Some feared to take their children for immunization which could be the case with community-based referrals. It is therefore vital for expectant mothers to have the right mindset so as to avert delivery challenges.

2.3.4 Communication systems in health referral mechanisms

Any thought which is not shared with people or the whole world and reserved to an individual, is of no use (Flynn, 2010). It must come out to benefit the people and it is the primary responsibility of key stakeholders in the study to share their thoughts and ideas with the rest of the world.

A communication system enables successful transmission of ideas or any other important information to people. A communication system is one composed of two connected parties or strategies used to exchange information or messages from a

transmitter to the receiver through a medium (Flynn, 2010). This study aimed at introducing the exchange of information/messages between the mother and the rider for transport through a closed caller user group (CUG).

There are many types of communication systems ranging from road signs or flags, telephones, radios, TVs, personal digital assistants, internet access, and telemedicine (PATH, 2013). However, management of maternal referrals remains a challenge. This study therefore set out to establish an appropriate communication system for mothers to be transported in time to health facilities for obstetric emergencies.

According to the many studies conducted (Patel *et al.*, 2016; PATH, 2013; MOH, 2014), people facing communication challenges are mothers and especially those in rural communities. Unfortunately, phones are not given to them and their communication to riders and other people for transport to health facilities is not defined which contributes to delayed arrival at health centres for pregnancy related emergencies. Little has been said about the need for a mother to communicate directly to the ambulance riders and drivers for transportation. This affects the number of mothers who opt to deliver in health centres under skilled health personnel.

The Mali government developed a program to strengthen its referral communication system by investing in radio communication between referral centres and procuring vehicles for patient transport (PATH, 2013). Indeed, it yielded results by increasing on deliveries in health facilities. It used to take a whole day for mothers to travel to a health centre, but with the intervention, it reduced to a few hours.

Similarly, in Sierra Leone, investment in vehicles and improved referral communication systems where patients and in this case expectant mothers were transported from one level of care to another, led to a doubling of use of emergency obstetric care (EmOC) and a 50% reduction in case fatalities (PATH, 2013). However, the intervention in Malawi was the use of radio-telephones in health centres. The use of radio-telephones in the Mother Care project in Malawi helped to handle the "second delay" as it helped to reduce average transport delays from six hours to three hours (PATH, 2013). In Uganda, the RESCUER project came with a solar-powered VHF radio communications system with a fixed base station at health centres and walkie-talkies for Traditional Birth Attendants (TBAs). Its impact was not literally felt leaving most of the MCH indicators bothering the country.

The integrated communication system during times of emergencies for referral in rural communities in developing countries especially in the sub-Saharan Africa and Asia is inappropriate if not lacking (Patel *et al.*, 2016). It hinders service delivery especially to the rural population. This is because of the unfavorable environments for the known types of communication systems to be effected. Outside Africa, in rural India, the use of telemedicine (telephones, video, email, and website-based consultations) reduced barriers of distance and time in obstetric referrals and showed some success in making neonatal referrals more appropriate (Kalinowski, 2012). Only that this communication system works best in an urban setting.

Surprisingly, all the above studies do not clearly state the sole use of phones for communication in the referral of mothers in rural settings. Mobile phones play different

roles when it comes to healthcare (PATH, 2013). However, the study by PATH (2013) does not talk about the information or message exchange between mothers and commercial motorcycle riders commonly known as boda-boda; an aspect this study sought to explore. Similarly, in 1997, a communication system was designed and it worked well to respond to emergencies in hospitals in China specifically in Shenzhen, but mothers did not directly call the vehicle ambulance driver and it was very difficult for the vehicle to move beyond the radius of 3 – 5 km (Kalinowski, 2012).

Literature has been read extensively but little or nothing has been said about means of transport and human beings as a sub component of communication systems. Any communication by a mother without transport in place may not be impactful. The availability and accessibility of means of transport complement a lot on communication and drastically reduces maternal mortality as mothers are attended to in health centres (Ssebunya & Matovu, 2016). It is the reason why this study emphasized the involvement of the boda-boda riders to transport mothers to health facilities when called or texted. In Kenya, it was clearly demonstrated in an early study of linkages between hospital utilization and transport means used by mothers (Orcutt, 2013). The availability of motorcycle ambulances was evident in easy access to hospitals by mothers (Orcutt, 2013).

Whileas the ambulances used for maternal referrals in developed countries are motor vehicles which are well equipped with monitoring tools, this type of ambulance works best in urban settings and developed countries. This can not work well in the rural parts of Uganda where this study concentrated. This is due to; limited numbers of motor

vehicle ambulances, it is also hard to access the ambulance drivers and the roads are impassable yet the demand for ambulance services is very high. Therefore, other forms of transport like the locally available commercial boda-boda riders were tested by this study.

During times of emergency, community members have a tendency of calling or shouting for help. This prompts the person at the receiver end to respond either by quickly running to the place of emergency or ignore. This implies that there was communication between the two parties (Flynn, 2010). This study therefore took humans as a sub component of a communication system termed as "Physical Information Delivery System" and these included husbands, relatives, friends and VHTs amongst other people, and how they can influence maternal referrals from the community.

2.3.5 Maternal healthcare related context

With a Total Fertility Rate (TFR) of 6.7 births per woman, the population in Uganda is still growing. It is estimated that only Qatar, Zimbabwe and Niger have a higher population growth rate than Uganda (Cervantes, 2015), which thus takes the fourth place in the list of countries ranked in order of their population growth rate. The present poorly functioning health system does not have the resilience to cope with the ever expanding population (MOH, 2014). The maternal and child health conditions in Uganda account for 20.4% of the total burden of disease. This is the highest contribution to the burden of disease.

Uganda experienced a significant reduction of the MMR in the period ranging from 1990 till 2010. It decreased by 47%, from 600 towards 310 deaths per 100,000 live births (WHO, 2012). However, the total number of maternal and neonatal deaths a year is still unnecessarily high (Namazzi *et al*., 2017; Ssebunya & Matovu, 2016). The lack of access to effective quality care, communication and transport systems throughout Uganda is a major cause of this problem. A positive relationship between poverty and access to healthcare can be distinguished (Rahman, 2008) which unfortunately targets the largest share of Uganda's population. Thus, the poor and vulnerable specifically mothers in this low-income country in sub–Saharan Africa suffer from a disproportionate burden of disease, due to restricted access to quality care.

Health services in Uganda are provided through public and private operating facilities. Public health services are provided free of charge since March 2001 (Nabyonga-Orem, 2008) and are delivered through the following hierarchical referral pathway namely: Health Centres (HC) I, II, III, IV, General Hospital, Regional Referral Hospital and National Referral Hospital. Only that accessing the free health services is quite challenging.

2.3.6 Community-based maternal referral mechanisms

Maternal referral is defined as a health care process that results in the transfer of a mother from a village to a health centre and the transfer back when and if appropriate. PATH (2013) and Yanagisawa (2015) further explain that effective referrals are defined as having a functional means of communication between mother and health facility staff

at all levels, transporting mothers to referral centre, coordinating care among the levels of healthcare provision, and ensuring quality of care at all levels.

Maternal and neonatal mortality is as a result of majorly the first and second delays that is; decision made by a mother to go to the health centre, and the time taken to reach the health facility for medical attention (Thaddeus, 1994). Therefore, decision making and transport to reach the health centre in time is necessary. Maternal and neonatal mortalities are higher in rural areas with less educated people, poor communication networks and roads (WHO, 2013), which greatly contribute to delay in making the decision to seek medical attention (Nabudere, Asiimwe & Amandua, 2012), resulting into complications for maternal referrals, though delayed (WHO, 2013). Other reasons for the delay according to PATH (2013) include; difficult geographical terrain, cost of transport, lack of phones and vehicles, sub optimal distribution and location of health facilities, and poor decision-making of health professionals. These delays affect both urban and rural areas but are more common and severe in rural areas where health care professionals may not be available. These delays contribute to maternal and neonatal deaths in Uganda in addition to the limited numbers of midwives (UNFPA, 2017).

In Uganda, causes of death of mothers and children are preventable. These causes may include; medical staff inefficiencies and absence, distance and referral mechanism, transport, drugs and medical facilities, costs and financing of services, culture, attitude, corruption and bribery, and policy matters, amongst others (Madinah, 2016; Allegri, 2015). All the causes of death cannot be addressed at once. However, improving on the

number of deliveries conducted in facilities should be addressed immediately by the study interventions conducted.

Only 43 percent of deliveries are conducted in facilities in Kenya (Mang'ong'o, 2013), not so much deviating from the Ugandan situation. Other reasons for limited deliveries in Kenya are inaccessibility of health facilities due to long distances, limited time of service provision and other cultural issues. As a result, one of five babies is lost during a woman's lifetime (Mang'ong'o, 2013). Therefore, there is need to improve on the antenatal care attendance (first and fourth), delivering under qualified personnel and management of maternal emergencies as well as improvement on health education and limiting discrimination.

The situation in Gambia is quite different when it comes to accessibility and availability of health facilities. Over 85 percent of the population lives within 3 kilometers radius of a primary health care or outreach health post and 97% of the population within 5 kilometers radius tremendously enabling access of health workers and the required health services (Semwanga-Rwashana, 2014). Despite the high ANC coverage at 96%, only few deliveries take place in health facilities (Semwanga-Rwashana, 2014), and supervised deliveries are estimated at 44%.

Much as interventions have been cited in Gambia to improve on the deliveries in health facilities, the situation has not improved. The cost of antenatal services has been low and registration done once in the four visits, charges for the normal deliveries and caesarean section reduced and also the distance to the facility very short, but deliveries in facilities remain low. Instead, mothers deliver from home and are attended to by

Traditional Birth Attendants (TBAs) or a relative (Semwanga-Rwashana, 2014). It is concluded by other studies that the costs involved in service delivery greatly deter mothers from going to the health centres (Fisseha, 2017) as Kananura (2016) also narrates that low utilization of health facilities as a result of limited antenatal attendance in particular and lack of home visits contribute to low deliveries in health centres and high neonatal deaths in Uganda.

Like in Gambia, specifically 87 percent of the Ugandan population can access health services within the reach of 5km radius according to UBOS (2017) but the fourth ANC attendance is low, deliveries in health centres are low, maternal mortality ratio and neonatal mortality rate are very high. The transport means to health centres for mothers with maternal challenges are also limited, if not available. Much as health education is conducted at the time of ANC visit at all health facilities in East Central Uganda and Uganda at large, it is limited to a few mothers who attend ANC. The time given to health education may not be sufficient to deliver all the necessary information on maternal child health. This study sought to give lengthy sessions for mothers who came for ANC services in east – central Uganda.

In summary, maternal referral is still a challenge in the developing countries and specifically in the rural areas. Many reasons have been cited which include; difficult geographical terrain, cost of transport, lack of phones and vehicles, sub optimal distribution and location of health facilities, poor decision making of health professionals, inadequate health workers, limited information to the mothers, amongst others.

2.3.7 Referral systems in the health sector of Uganda

Every health unit within the referral system (from HC II till the NRH) should ideally be able to deal with basic emergency obstetric complications. Referral cases can be from community to health centre or from health centre to health centre. However, it appears from the 2011 annual health sector review that in the area of Kampala, only 24% of the HCs were properly functioning. Some of the HCs did not provide any maternal care, while some provided only basic services with no functional theatre (MOH, 2014). The referral system in Uganda is not functioning as it is intended to. The different levels of the system are supposed to reinforce and complement each other. Ideally, a mother should visit a health centre (HC), for example a HC III, which is accessible to her. Once she experiences complications, she can be referred to the next level, which would be a HC IV or possibly a General Hospital in this case. If she experiences extreme complications, she can be referred to a Regional Referral Hospital (RRH) or a National Referral Hospital (NRH). This study sought to unveil the approach and role of community referral in the reduction of maternal and neonatal deaths in the east – central region, Uganda.

The referral system embodies a hierarchy of quality care and research. The higher the level of health facility, the better the healthcare services offered. At least, that is how the referral system should be experienced but it is not operating as intended, and that is the core of the problem. A high-level health centre is supposed to deal with more complicated clinical cases, but the quality of offered care and the organizational capacity should be the same at all levels.

Figure 2.1 below depicts the regular procedure of a pregnant mother who seeks care. If she experiences complications, she is referred to the next level. If this referral pathway would function properly, it would enable women to access care from a nearby area instead of having to travel a long distance to reach a more upgraded health facility. Also, if it were functioning properly, the referral pathway would allow health workers to practice their profession as they are supposed to: without time, money and resource constraints. The state of many HCs is not as wished, which results in health workers attempting to handle complications for which they do not have the required resources. Besides that, there is a tremendous shortage of human resources for health (Chen, 2014; Nabudere, Asiimwe & Amandua, 2012).

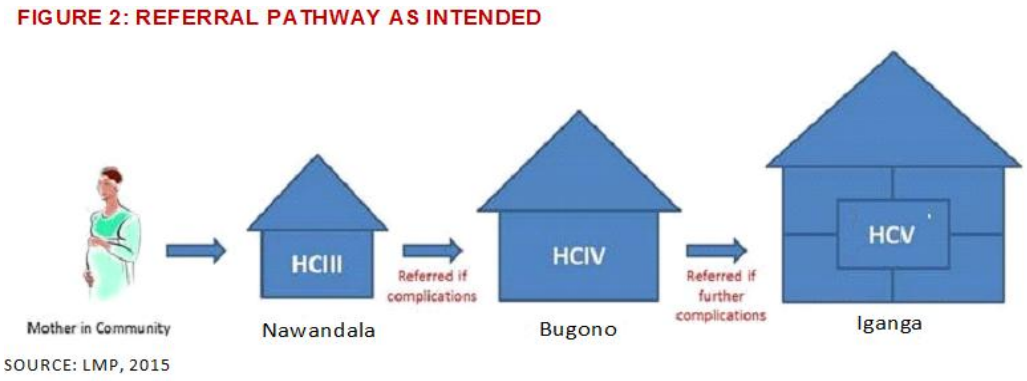
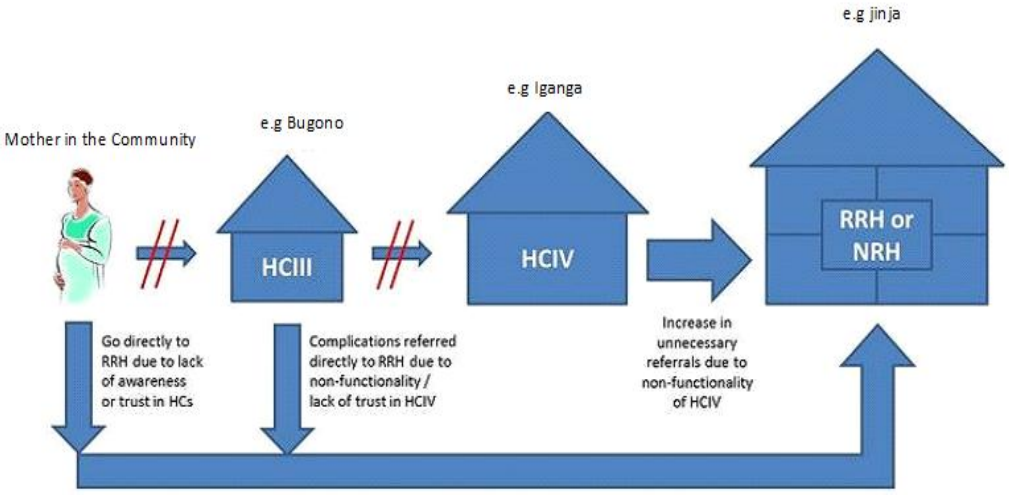


Figure 2.1: Referral pathway as intended

Figure 2.2 below depicts the failing referral system. Many HCs are not functioning properly and therefore the mother has no choice but to bypass them. In this case, the mother does not have a choice; she simply cannot receive any care at the facility. Sometimes the mother does have a choice to go to a lower-level health centre, but she might not want to take the risk of not being able to reach the HC or arrive there to find

that no one is available or capable of dealing with her health issues. If the mother is not well informed about the referral system, this affects her decision making regarding which facility to seek medical attention from. A mother's decision is also determined by other factors like availability of transport means or money to pay amongst others. The mother takes the matter into her own hands and 'self refers' straight towards the hospital (Munjanja, 2012). Self referral is often described as a phenomenon taking place among 'women with means' (Yanagisawa, 2015). Either way, the referral pathway is disturbed. This study sought to find out the communication processes and means of transport the mothers use to reach the health facilities.

FIGURE 3: DISTURBED REFERRAL PATHWAY



SOURCE: LMP, 2015

Figure 2.2: Disturbed referral pathway

The core of the problem is that mothers do not have access to the care they want which results in high neonatal and maternal mortality rates. It is a reinforcing loop: mothers do not trust the quality of services at the HCs and the referral system that should function if complications occur. Therefore, they go straight to the Regional Referral Hospital,

National Referral Hospital and for the rural mothers to the TBAs. Majority of hospital-based deliveries are not referred by a health professional, and are self referrals (Pacagnella, 2012). This study sought to find out the quick decisions made by mothers to use the locally available means of communication for transport to deliver in health facilities.

However, with the forced referrals and self referrals to the health centres, it is difficult for the HCs to upgrade its functioning. This is most likely to affect the number of deliveries conducted at health facilities. This study found out some of the effects of self referrals to the health facilities. However, the number of deliveries may also be attributed to the strong social and political characters of the different stakeholders. Secondly, the health system consists of clear tangible (infrastructure, equipment supply) and intangible elements (health sector reforms, governance) amongst others (Kranti & Vora, 2009). Thirdly, health systems are constantly coping and adapting to actions or changes in other parts of the system (Semwanga-Rwashana, 2014). Altogether, the health system is an interconnected mechanism that should be studied from a holistic perspective to grasp a full understanding of its functioning. Intervening in the system produces ripple effects and therefore a gap is often experienced between written down policies and the actual implementation of those plans. The disparity between the theoretical hierarchical ‘referral pyramid’ and ‘actual practice’ should be reduced (Pacagnella, 2012) to provide mothers with quality care. We should however not perceive the pathway as a single object of study.

2.3.8 Referral systems in rural settings from developing countries

The aim of this study was to evaluate the effectiveness of the maternal referral system by ascertaining; the proportion of mothers reaching the hospitals or health centres after referral advice, appropriateness of the referral indications, and reasons for non-compliance and to find out if compliance to referrals makes a difference in the peri-natal outcome (Pembe, 2010).

Patients, in this case, mothers are at times referred to a specialist when more specialized care is needed (Pembe, 2010). It has however been shown that the process by which patients are referred could be improved. Some mothers may be referred to a specialist inappropriately or not be referred when they should have, or when they were referred to have unnecessary tests or procedures (Akbari *et al*., 2008). Therefore, self referral is not common here when referred from one health facility level to another. This should be understood as a time when a mother takes herself from the community to a health facility.

Reviews from a Cochrane library found 17 studies that evaluated educating health care professionals about referrals, change of referral system and changing the fees or payments for referrals, as this could improve the referral process (Akbari *et al*., 2008). In addition, 14 out of the 17 reviews showed that the referral process will most likely improve when guidelines for referral are distributed with standard referral forms and when the health care professionals who are the consultants are involved in teaching about referral (Akbari *et al*., 2008). But simply distributing guidelines and providing health care professionals with feedback about how they are referring may not

conclusively improve the process (Akbari *et al*., 2008). Therefore, the study sought to involve health care professions and boda-boda riders in the management of referrals of mothers to deliver from health facilities. Interventions to check the affordability of mothers to leave communities for services at health centres, included; registration of rural mothers and boda-boda riders in CUG for free communication and subsidized payment of transport fares for mothers in the study.

The review from the Cochrane library also shows that there is little evidence about proper institutional (health facility-based) management of referrals. However, providing a second opinion to a patient (mothers inclusive) before referring or enhancing the services provided before a referral is necessary (Young *et al*., 2017). For example, providing a mother access to a midwife/doctor may guide her decision making to improve on the referral process. In rural communities, VHTs are encouraged to guide and give referral notes to mothers in case of any illnesses or complications. For east – central Uganda, the study registered mothers, boda-boda riders, midwives and VHTs in the CUG for free communication with the intention of improving the referral processes in the rural setting.

2.3.9 The transport system as a means of referral

Transport from community to a health centre and between different health facilities at the time of referral is a major concern (PATH, 2013; Pembe, 2013; Ssebunya & Matovu, 2016). Having realised it in Kabarole district, a total of three ambulances were availed to transport needy mothers to health centres during times of emergency. Two ambulances were provided by an NGO; Baylor College of

Medicine Children's Foundation – Uganda (referred to as Baylor Uganda), and the third one by the Ministry of Health. This worked well for the inter facility referrals. Whenever a health worker made a decision to refer a mother, s/he would call for the ambulance to pick up the mother and bring her to a higher-level facility. Due to the low number of ambulances, the referral process could take a long time; sometimes the ambulance could be just on its way to another health facility, or it could be stationed at some other health facility far away from the health centre in need of the same ambulance for referral purposes. In Kabarole, the transport system concentrated on inter-facility referral and not community to health facility referral of mothers which this study sought to investigate.

Research was carried out where six mothers were interviewed in Buhinga after they had been referred and had a caesarean section according to Baylor Uganda (n/d). From these six mothers, only two were transported to Buhinga by an ambulance. The remaining four women all came by boda-boda, matatu taxi or walking. Two mothers were on a boda-boda for 20 minutes, another mother was on the boda-boda for two hours and the last mother travelled for 4 hours to reach Buhinga. She took a boda-boda to the main road, and then took a matatu taxi (public transport) to reach Fort Portal and then she walked from the matatu stage to Buhinga. On probing further, one lady said, '*They just wrote me a referral note and told me to go. No transport arrangement was made'* (Interview mother Buhinga 6, 2015). This study took interest in establishing such occurrences in east – central region, Uganda.

Being transported by an ambulance is definitely not the expectation of most Ugandan mothers. They assume they have to take care of their own transport, which is also a reason why they wish to prevent a referral. It can cost a lot of money, cause a serious delay and worst of all, death. *'She was referred when the baby was still alive. But due to the distance and the means of transport, by the time she had reached Buhinga, the baby had died'* (Interview mother Kagote 13, 2015).

2.3.10 Training of mothers and boda-boda riders in community-based referrals

Maternal and child health continues to be a largely overlooked aspect of the health care system leading to major risks associated with pregnancy and child birth (PATH, 2013). This could be associated with lack of information/awareness of especially the rural mothers (Patel *et al.,* 2016; Lawn, 2010). The only solution is to provide information through training/health education programs to the boda-boda riders, mothers and other key stakeholders in the referral system.

A study in the United States of America was conducted on maternal education and health related parenting of the children. Maternal education aimed at enabling health workers and CHEWs to transmit information to mothers at the facility and community (Prickett & Augustine, 2015). Results showed that higher levels of maternal education improved the behaviour of children at every level of development (Prickett & Augustine, 2015). However, little has been discussed on the maternal referrals from community as a result of training boda-boda riders to improve deliveries in health centres; an issue this study sought to address.

Another study was conducted in Afghanistan which aimed at promoting mothers' adoption of healthy home practices for improved nutrition and illness prevention in the first 1000 days of life from conception (Cimini, 2017). Nutrition education was needed for improvement in the weights of babies at birth to reduce neonatal mortality rate. Therefore, health education sessions conducted by healthcare providers improved on the knowledge of mothers. This study sought to train boda-boda riders to improve on their knowledge and support community-based referrals.

Also, the Hunger Project (2017) in Ghana in partnership with the Ghana Health Service (GHS) conducted training of Community Health Nurses (CHN) as midwife assistants in form of workshops, mentorships and coaching for them to have enough information to give mothers, for them to be able to record properly in registers and report in time. Community Health Nurses recorded mothers properly in the relevant registers for easy tracinig during the time of follow up and interviews.

Accordingly, some training interventions of community health workers have yielded results (Namazzi *et al.*, 2017). In eastern Uganda, CHWs' knowledge of MNH improved from 41.3% to 77.4% after training and to 79.9% 1 year later after post training (Namazzi *et al.*, 2017). In India, the educational intervention found out that, only 51% of women had at least 3 antenatal checkups, only 41% of women had institutional deliveries, vaccination coverage was at 44% and 49% of the deliveries were assisted by health professionals (Tiwari, 2014). Little or nothing was said about training of boda-boda riders. This study therefore focused on training the boda-boda riders and orientation of health workers to deliver information to expectant mothers

with the aim of having mothers deliver in health centres to reduce on the maternal and infant mortality.

2.3.11 Fleet management and transport fares of boda-boda services for mothers

Governments are looking for ways to increase the access to and quality of health care services in low-income and middle-income countries. One system that is not connected to the public sector has been to provide health services through a franchise, called social franchising. The concept of franchising for health services is similar to franchises in business.

Franchising is defined as a system of marketing goods and/or services and/or technology, which is based upon a close and ongoing collaboration between legally, and financially separate and independent undertakings, the franchisor and its individual franchisees (Koehlmoos, 2009). Simply, it is defined as authorization granted by a government or project to an individual or group enabling them to carry out specified commercial activities.

Specifically in this study, a group was formed called Mama Boda-boda Transport System (MBTS) which picked interest in boda-boda transport and communication link between mainly the boda-boda riders and pregnant mothers. The intention was to have mothers deliver in health facilities under skilled personnel to reduce on the maternal and neonatal mortality rates. Both boda-boda riders and pregnant mothers were to benefit from the innovation. Boda-boda riders were to benefit from the transport fares paid by the mothers while the mothers were to automatically enjoy the privilege of having transport at their exposure. The franchisor in this case was the mama – boda-boda

transport system which granted individual franchisees (mothers and boda-boda riders) the right and obligation to conduct business in accordance with the franchisor's/study concept. It entitles and compels the individual franchisee, in exchange for a direct or indirect financial consideration, to use the franchisor's trade name, and/or trade mark and/or service mark, know-how, business and technical methods, procedural system, and other industrial and/or intellectual property rights (Seitz *et al.*, 2013). This is supported by the continuing provision of commercial and technical assistance within the framework and for the term of a written franchise agreement, concluded between parties for this purpose (Koehlmoos, 2009; Seitz *et al.*, 2013).

A social granter develops a successful way to provide the health services, and then other franchisees copy the model in other franchises. Each franchisee, though, has to follow the original model. There is also usually specific training, protocols and standards to follow, monitoring, and a brand name or logo which identifies that the provider is part of a granter (Koehlmoos, 2009). There is a mutual agreement for each party to benefit and at a relatively good cost. Terms of payment for the service may be agreed on by the two parties. However, in this study, the concept of saving money in a small box (also locally termed as savings box) to enable a mother to pay the boda-boda rider when referred to a health centre was necessarily adopted. The intention was to enable mothers to pay riders for the transport services. In the savings box concept, mothers save money in this box and break the box when going to health facilities to deliver. Saving money is usually a tedious task that requires a high degree of self-control for many of the mothers (Seitz *et al.*, 2013). During the training, mothers were equipped with knowledge about saving, the savings box as well as its merits. In this study, there were no terms agreed

on for mothers when paying the boda-boda riders. The terms of payment for boda-boda transport services were mutually agreed upon between the mothers and the boda-boda riders in accordance with the distance travelled to reach the health facility.

There is hope and early work reports that social franchising may quickly spread health services in low-income and middle-income countries to improve the health of mothers. But this Cochrane review (2018) did not also find any rigorous evidence to demonstrate the effect of social granting on access to and quality of care in low-income and middle-income countries (Chen *et al.*, 2018). The study had to find out the importance of the savings box model in relation to franchising model.

2.3.12 Summary of literature review

Literature reviewed gives basic information for benchmarking the east – central Uganda study. Despite the fact that most studies were informative on maternal child health, a lot was left untouched on the effect of training mothers and boda-boda riders in community-based deliveries on maternal outcome (deliveries at health centres).

According to literature, the trainings conducted focused on only medical workers including VHTs (Prickett & Augustine 2015; Hunger project Ghana, 2017; Namazzi *et al.,* 2017). Those which targeted mothers (Cimini, 2017; Tiwari, 2014) did not investigate training of mothers and boda-boda riders in community-based referrals. Therefore, the study sought to train the two stakeholders.

In the same vein, there were no clear forms/guidelines designed to improve the referral process according to the Cochrane library. The east – central study found it necessary to design forms which midwives at the health centres used to capture information from

boda-boda riders who transported mothers from the community. These forms determined the number of mothers who utilized boda-boda transport to the health centres for the services; thus, enabling the east – central study to establish the applicability of the boda-boda role in community-based referrals after training.

Only health workers were in possession of the telephones for communication (Patel *et al.,* 2016; PATH, 2013; MOH, 2014) and deliveries at health centres slightly improved and remained low. Instead, the study targeted mothers who possessed phones and registered in closed caller user group (CUG) for direct communication to boda-boda riders for transport to health centres.

Different factors were discussed in the different studies to have influenced deliveries in health centres (PATH, 2013; Ssebunya & Matovu, 2016; MOH, 2017; Orcutt, 2013; Kalinowski, 2012; UBOS, 2017). However, literature did not spell out clearly some of the socio-demographic characteristics that expedite community-based referrals. Similarly, mothers should have the right mindset towards the locally available boda-boda riders so as to avert delivery challenges, which this study was to investigate.

The cognitive learning theory has been singled out to guide in adult learning (Mugisha, 2015). According to Mugisha (2015), adults learn more on viewing than hearing or testing. Much has been written and read about the communication and behavioral change theories and models, but little or nothing has been mentioned on the link between them and community-based referrals. For instance, on learning and teaching, cognitive theory did not clearly define age and memory suitable for learning.

CHAPTER THREE: MATERIALS AND METHODS

3.0 Introduction

The previous chapter examined the theoretical and literature review which informed the researcher of what is already known and not known and firmed up the gaps in knowledge which this study intended to address. This chapter describes in detail the methodology which was followed in conducting this study. It deals with planning for data collection, analysis, and interpretation.

3.1 Research Design

The study used a 2 arm non randomized control trial study design; with an intervention and control group from the selected sub counties where some health centres and communities, as the units of non-randomization were selected. Non-randomized trials are interventional study designs which compare a group where an intervention was performed with a group where there was no intervention (Thiese, 2014). This is a prospective study design performed which puts forward the relationship between the intervention and the outcome (Thiese, 2014). In such a study design, an investigation for outcomes is conducted from the baseline measures and follow-up enhanced up to the study exit in the intervention arm in comparison with the control arm (Schmidt, 2017). The study intervention took place for a period of six months in the east – central Uganda.

3.1.1 Community Trial Study Description

In community trials, researchers design the interventions (Andersson, 2017; Labrique & Katz, 2014). These interventions have programmes which are important in preventing

health threats in the community (Andersson, 2017). The east – central trial had two arms, namely; the intervention and control arms. Mothers and boda-boda riders' trainings were conducted in the intervention arm for better referral of mothers while in the control arm, no single training took place. In order to have a meaningful training as observed in other studies (Namazzi, *et al*., 2017; Prickett & Augustine 2015; Cimini, 2017), innovation, communication and technology was required in the coordination of every participant in the east – central study. It is upon this background that a closed caller user group (CUG) was formed to coordinate the participants.

Similarly, fleet management and referral systems (which included mothers' saving culture for transport fares), prevention and management of emergencies and the roles of the different stakeholders were part of discussion in this community trial. All the above programmes may contribute to good referral mechanism and increased deliveries in health centres and improved health of mothers and babies.

3.2 Variables

3.2.1 Dependent variable

Maternal outcome; the main outcome of the study was supervised deliveries at health centres as a result of mothers using boda-boda transport.

3.2.2 Independent variables

3.2.2.1Socio-demographic characteristics

These are conceptualized to refer to individual characteristics including; age, level of education, marital status, religion, number of pregnancies, area of residence, level of income, distance to health centre and means of transport to the health centre for

mothers. However, individual knowledge on the expected date of delivery (EDD) for mothers was paramount for the study. It guided the research assistants on the period to follow up mothers for the post interviews or administering of questionnaires. Meanwhile, age, level of education, religion, level of income, marital status and ownership of the motorcycle were the socio-demographic characteristics for the boda-boda riders.

3.2.2.2 Attitude of mothers

Attitude of mothers was categorized into four areas; attitude on the roles of boda-boda riders and their intentions to use boda-boda transport to go to health centres; attitude on the comfort of boda-boda transport as an initiator or driver of mothers to use boda-boda transport to go to health centres; attitude of mothers to recommend others to use the boda-boda transport to go to health centres; and attitude of mothers to use boda-boda transport when they experience pregnancy related complications (danger signs and symptoms).

3.2.2.3 Communication system

The communication system comprised of three fundamental variables. These included; local mobile phones, local transport system and the physical information delivery system. Those three were fundamental in the formation of the closed caller user group.

3.2.3 Intervening variable

This variable was basically on training of boda-boda riders and mothers in community-based maternal referral. The purpose of training was to improve on the community referral processes for mothers to deliver from health centres.

3.2.3.1 Training as an intervention

Training is the development of a particular skill to a desired standard by instruction and practice (Worsley, Webb & Vaux, 2016). In the east – central study, training was basically for mothers and boda-boda riders; however, midwives and VHTs were invited to the trainings to share experiences with mothers and boda-boda riders. Training was for members who had joined the mama – boda-boda transport connect group in their areas of residence to supplement on the less functional motorcycle ambulances.

Based on the Uganda ministry of health (MOH) VHT participant manual/guide, key areas for maternal referral and basic management of emergencies were considered and modified to suit this study. Considering tasks 2, 3 and 4 of the VHT manual, topics of training of mothers and boda-boda riders were extracted and modified as; innovation, communication and technology (CUG), fleet management and referral systems (savings to pay transport fares), the roles of the different stake-holders (mothers, riders, midwives and VHTs) and prevention and basic management of emergencies.

The training was participatory and with role plays for adults to understand the concepts very well. In the process, participants made reactions to the presentations and facilitators made responses. Discussions guided by the facilitators were made for better action plans. This resulted in well articulated action plans for better implementation of the study project in the selected sub counties in east – central Uganda. Mothers and boda-boda riders were periodically reminded about the action plans and shared challenges experienced.

3.2.3.1.1 Fleet management and referral systems

Mothers were encouraged to have a saving culture to afford payments for boda-boda transport to health centres. Depending on the franchisor – franchisee model, boda-boda riders and mothers are suitable for comparison in this study. There is a mutual agreement for each party to benefit and at a relatively good cost for the services (Koehlmoos, 2009). With reference to the boda-boda riders and the mothers, terms of payment for the transport service were agreed upon by the two parties. The savings box concept in this study was adopted to financially empower mothers to afford to pay the transport fare to the boda-boda rider as well as buying other medical requirements when referred to health centres. A mother would break the wooden savings box to access the money therein for use at onset of labour. This essentially implies that in the absence of her husband or even relatives, a mother was already necessarily well prepared to reach a health facility for delivery; by way of communication to a boda-boda rider for transport to the health facility.

This study was to produce evidence to demonstrate the effect of the box savings for mothers to access quality healthcare services in east – central Uganda. This was emphasized in the four sub counties of Nawandala, Nambale, Nabitende and Budaya with the savings box aimed at bringing boda-boda riders in the struggle of timely referral of pregnant mothers to health centres for ANC and delivery under the care of skilled personnel.

3.2.3.1.2 The Closed Caller User Group – CUG

Realizing the need for a clear channel of communication between the riders and mothers and other key stakeholders, the researcher appreciated the need to cover the communication gap through training and the initiation of a closed caller user group (CUG). This was termed as a model of communication tool for transport commonly called "Mama – Boda-boda Transport Connect". The group was introduced and centrally managed by a telecommunication company known as MTN–Uganda upon process initiation by the Principal Investigator / Researcher. Therefore, mothers who possessed only MTN numbers were recruited for the study. Interestingly, the study did not consider specific brands or types of phones.

The selected users of this group comprised of mothers, boda-boda riders, midwives, VHTs and the research team. A total of 375 users were registered in the CUG. Having one's telephone number registered onto this caller group enabled him/her to make telephone calls free of charge to all other registered users strictly on the MTN network. Additionally, the users were also given bonus airtime of Uganda shillings 10,000 (Ten thousand shillings) to enable their communication to other network users whenever the need arose. Prior to the operationalization of the CUG, all the selected users underwent intensive training through which they were equipped with knowledge on the mode of operation and benefits of the CUG in addition to other MCH related topics that emphasized the participants' respective roles in MCH and maternal referral.

The CUG lasted for a period of 6 months during the study. Telephone numbers of potential CUG members were registered and shared amongst participants during their

training and health education sessions. These were later confirmed by the research team and shared amongst the CUG members at the beginning of the intervention. Training of mothers and boda-boda riders on the introduction of the CUG was timely to improve the referral process and deliveries in the study health centres of east – central Uganda.

Table 3.1: Categories of participants registered in the CUG (intervention) arm

Categories of respondents	Total number of respondents	Sub counties of intervention
Boda-boda riders	100	Budaya, Nawandala, Nabitende and Nambale sub counties
Midwives	12	
Mothers	255	
VHTs	8	
Total	**375**	

3.2.3.1.3 Prevention and basic management of emergencies

Other fundamental areas for discussion in the training included prevention and basic management of emergencies. Obstetric emergencies are the main causes of deaths in our communities (Tonato *et al*., 2017). Some of the emergencies commonly experienced by pregnant mothers include; vaginal bleeding, eclampsia (hypertension), vomiting, frequent foetal movement, appetite loss, malaria in pregnancy and other related complications. Mothers, boda-boda riders and other stakeholders were equipped with knowledge about the prevention and basic management of the aforementioned emergencies in pregnancy.

3.2.3.1.4 Roles of the different stakeholders

Different roles of different stakeholders were discussed during training. The different stakeholders in this study included; mothers, boda-boda riders, VHTs, midwives amongst others. Midwives helped in the recruitment, training and registration of

mothers during ANC visits. They also helped in the administering of questionnaires. Together with the boda-boda riders, they filled boda-boda forms on delivery of mothers to health centres which were filed.

Village Health Teams (VHTs) played a role of follow up and referral of pregnant mothers from the community to health centres for delivery and other emergency complications. Mothers and boda-boda riders were encouraged to make rightful and timely decisions of contacting and responding to the use of boda-boda transport. VHTs also alerted midwives about impending community maternal referrals to health facilities by way of the caller user group; this enabled the midwives to ensure their availability and preparation for the referral beforehand.

3.3 Location of the Study

This study was conducted in east – central region, Uganda. The east – central region is composed of 16 districts partly bordering with Kenya, Tanzania and South Sudan. The study setting covers about 10,000 square kilometers with latitude 00^0 45^I 00^{II} N and longitude 33^0 30^I 00^{II}E (See appendix XIII for the map). The population of east – central region is approximately 9 million people according to UBOS and ICF (2017). These comprised of farmers engaged in food production for consumption and trade and or working in public offices. Basically, the study was conducted in the districts of Iganga and Bugiri with a population projected at 1,051,102 people (UBOS and ICF, 2017). Specifically, the study was conducted in the sub counties of Nabitende, Nambale, Nawandala and Budaya as the intervention arm where motorcycle ambulances partially operated and where the local boda-boda groups were mobilised

with the aim of having additional means of transport used in referring mothers for further management at the different levels of health facilities. Some sub counties where there was no intervention (control arm) included; Ibulanku, Makuutu and Nawaningi in Iganga district and Nabukalu in Bugiri district. The total populations of sub counties in the intervention and control arms were 158,955 and 129,639 respectively.

3.4 Study Population

The main study populations consisted of pregnant mothers who were in their third trimester and boda-boda riders from east – central region of Uganda, specifically Iganga and Bugiri districts, in the sub counties of Nabitende, Nambale, Nawandala and Budaya for the intervention arm, and Nawaningi, Makuutu, Ibulanku and Nabukalu for non-intervention (control) arm.

For respondent mothers, sample selection was derived from a total of 14,430 expectant mothers in both the intervention and control arms according to the MOH (2017) projection. These are the mothers who were interviewed to explore whether training improved the utilization of health facilities for skilled deliveries.

Boda-boda riders were the catalysts for mothers to get transport means to the health centres. The population of boda-boda riders was estimated at 2,231 riders according to the boda-boda associations' data (2017) in Iganga and Bugiri districts (un-published data). However, rural sub counties had scanty population of the boda-boda riders. Boda-boda riders who meet the criteria to be selected for the study were not many.

Other stakeholders including VHTs and midwives were required in the enrichment of the study. These stakeholders were invited to participate in the training. Exactly 138 health workers in the intervention arm and 112 health workers in the control arm at the different health facilities (HRIS, 2017 data at DHO's office un-published) formed the population of health workers from which participants who were involved in the study were extracted. Lastly, 965 VHTs from 193 villages in both arms (Iganga & Bugiri District Health Department, 2017 un-published data) constituted the population from which an extract of VHTs involved in the study was obtained.

3.4.1 Inclusion criteria for participants

a) Pregnant mothers in their third trimester.

b) The participant must be a female member of one of the villages in the study districts.

c) Pregnant mothers who must be willing to participate in the community trial.

d) Boda-boda riders belonging to one of the selected stages and willing to participate in the community trial. These riders must have worked at that stage for at least three months to understand their credibility and getting familiar with the geographical area. This enabled the boda-boda riders locate mothers easily when conducted for transport to health centres.

e) Health workers willing to participate in the study and working in ANC, PNC and maternity ward/department at the selected health centre for at least 6 months prior to the commencement of the study. Health workers have shifts and off in their

schedules of duty. Therefore, a health worker was supposed to work for 6 months to have the required experience for participation in this study and for minimal supervision.

f) Mothers with a personal telephone contact (or that of their husbands / next of kin) for the registration into the closed caller user group and easy follow up.

3.4.2 Exclusion Criteria for participants

a) Pregnant women with visible signs and symptoms of mental instability and those who were terminally ill could not be trained and were therefore excluded from participating in the study.
b) Boda-boda riders who did not have telephone contacts through which mothers could contact them in the intervention arm were also excluded from participation in the study. This was not considered for the control arm.
c) Also, boda-boda riders with known history of indulgence in crime whom community members voluntarily reported to police and informed the investigation team, were as well excluded from the study.
d) All male health workers and nurses were left out at all health facilities in both the control and intervention arm. They lacked knowledge and experience in the ANC, maternity and PNC services.

3.5 Sampling techniques and sample size

3.5.1 Sampling techniques

Combinations of sampling techniques were explored at different stages of the study. These included convenience, systematic and simple random and purposive sampling techniques.

3.5.1.1 Study area

The east – central region of Uganda was purposively selected for the study. It was one of the regions with many districts performing poorly in most of the indicators when annual performance reports were released. Purposive sampling strategies are designed to enhance understanding of selected individuals or groups' experience(s) or for developing theories or concepts. Researchers seek to accomplish this goal by selecting "information rich" cases, that is, individuals, groups, organizations, or behaviors; in this case, districts that provide the greatest insight into the research question (Devers & Frankel, 2000; Nyaga, 2017). For this study in east – central Uganda, the two districts of Iganga and Bugiri out of the sixteen districts, were purposively selected. Iganga and Bugiri districts were the only districts having a few sub counties with partial motorcycle ambulance services. This was supplemented with local boda-boda transport groups, and mama – boda-boda transport connect communication strategy for mothers to be easily picked and transported to health centres.

3.5.1.2 Intervention and non-intervention sub counties

The four sub counties of Nabitende, Nambale, Nawandala and Budaya were purposively selected from Iganga and Bugiri districts respectively. These four aforementioned sub counties had the uniqueness of operationalization of motorcycle

ambulances. The four sub counties for comparison were randomly selected from the remaining sub counties of the already identified districts of Iganga and Bugiri by simply picking from a container with sub county names written on pieces of papers. These sub counties had geographical characteristics similar to those in the intervention arm. Characteristics included; a sub-county comprising of villages which had at least ten births within the past 3 months prior to the study, had one or more active VHTs who were responsible for reporting specifically mothers who had delivered either from the health centre or in the village for follow up and lastly had at least one boda-boda stage with at least 10 boda-boda riders.

3.5.1.3 Health centres for intervention and non intervention arms

These health centres were purposively selected because they are the only health facilities according to the ministry of health structure which are permitted to conduct deliveries in the selected sub-counties. Some of these facilities also were experienced in community trials and it was an added advantage to this study. In the intervention arm, 5 health centre IIIs and one health centre IV were selected and 3 health centre IIIs and one health centre IV were selected in the control arm. An average of 25 deliveries was expected in each health facility selected for this study per month; a six months period was deemed enough for completion.

3.5.1.4 Primary respondents

3.5.1.4.1 Pregnant mothers

Systematic random sampling was used to select mothers from the ANC registers on the day they came for ANC at the facility in each sub county for both the intervention and

non-intervention arms. Mothers who were eligible and consented to participate in the study were selected from the ANC registers on the day they came for ANC at the facility in each sub county for both the intervention and non-intervention arms. Systemic random sampling is used to select a study sample from a large population at a fixed interval. The required sample size was almost half of the population of mothers in third trimester. Therefore, the research team skipped only one mother and selected the next one in the ANC register to participate in the study on consent.

3.5.1.4.2 Boda-boda riders

Boda-boda riders were conveniently selected from sub counties at their respective stages/groups. Convenient sampling is a type of non-probability sampling that involves the sample being drawn from that part of the population that is close to the hand. Only the active and well established boda-boda riders in the community were selected to participate in the study upon recommendation by their respective stage supervisors. Mugenda (2003) as cited in Nyaga (2017) stated that in fewer populations respondents can be conveniently selected by researchers to use cases that seem important for the study being carried out. The active and established motorcycle riders were therefore identified and handpicked by their willingness to be trained and support community-based referral.

3.5.1.5 Key informants

Key informants for this study included; midwives, VHT coordinators and boda-boda stage chairpersons. Midwives were purposively selected at their respective health facilities as key informants. Midwives were the cadres directly involved in the study.

Only midwives working as heads of maternity departments for ANC clinic, maternity/labour ward and PNC clinics were selected. Those who had worked for a period of 6 months prior to the commencement of this study were considered in the purposively selected health centres.

VHT sub county coordinators who participated in the study were also purposively selected as key informants. Sub county coordinators were selected VHTs who had the experience after working for a long period of time in the sub county. Similarly, boda-boda stage chairpersons were purposively selected to enrich the study. These were respected individuals who were selected to lead fellow boda-boda riders and who seemed experienced to provide information concerning the study.

3.5.1.6 Focus group discussions

Participants in the focus group discussions were purposively selected to give additional information for the study. Eight (8) focus group discussions were conducted in both the intervention and control arms. Focus group discussion members included; community leaders (LCI, administrators of boda-boda riders), mothers, husbands, boda-boda riders, VHTs and other health workers from facilities amongst others. Participants in the FGDs were organised in groups of 7 – 11 people for easy management.

3.5.1.7 Community dialogue meetings

Participants in the community dialogue were purposively selected for discussion on the introduction of the new study in the 4 intervention sub counties. Four (4) community dialogue meetings were conducted. Each community dialogue meeting consisted of 20 – 25 participants. Different categories of people were involved in these meetings including; the LC1 leaders, religious leaders, political leaders, cultural leaders, VHTs,

boda-boda riders, husbands and mothers. Meetings were conducted in the intervention arm only. During the discussions, important information concerning the study was recorded and notes taken.

3.5.2 Sample size determination

Sample size determination is the act of choosing the number of observations or replicates to include in a statistical sample. The sample size is an important feature of any empirical study in which the goal is to make inferences about a population from a sample (Mack *et al.,* 2005). The population characteristics for a particular study determined the number of people selected to participate (Mack *et al.,* 2005). Additionally, the information the population held also determined the sample size. The more the information the population holds, the less the size of the sample (O'Reilly, 2013). This was termed as information power of the study, and it was suitable for comparison of two groups as explained by the Singh *et al.* (2018) study.

3.5.2.1 Sample size of mothers

Sample size calculation for pregnant mothers who visited health centres for ANC in both the interventional and non-interventional arms, was obtained from the formula below as recommended by Charan and Biswas (2013) for non randomized community trials.

$$n = \frac{2(Z\alpha + Z\beta)^2 P (1 - P)}{(P1 - P2)^2}$$

Where n = Sample size

$Z\alpha$ = value corresponding to 95% level of significance, which is 1.96 from the Z table at 5% error.

$Z\beta$ = value corresponding to at least 90% power, which is 1.28 from the Z table according to the previous study (Singh *et al.,* 2018).

P is the pooled proportion of pregnant mothers who are eligible to be subjected to maternal referral during times of emergencies which is 47.6% (Singh *et al*., 2018), after adding for both groups and dividing by 2.

P1 – P2 is the difference in the proportion of events basing on the previous studies. P1 is proportion for intervention and P2 for non-intervention. For purposes of this study, P1 is 40.6% and P2 is 54.6% respectively, based on the previous study (Singh *et al.,* 2018)

From the formula $n = \dfrac{2 \times (1.96 + 1.28)^2 \times 0.476\,(1 - 0.476)}{(0.406 - 0.546)^2}$

= 267

Therefore, for both arms, the sample size was **534**

The sample of mothers for each sub county is summarized in the tables 3.2 and 3.3.

Table 3.2: Summary of sample size per Sub County in the intervention arm

Names of sub counties	Number of Health facilities	Number of villages	Population	Sample size
Nawandala	2 HCIII	31	34,605	58
Nambale	1 HCIII	24	52,085	87
Nabitende	1 HC III & 1 HC IV	27	31,145	53
Budaya	1 HCIII	21	41,120	69
Total	**06**	**103**	**158,955**	**267**

Table 3.3: Summary of sample size per Sub County in the control arm

Names of sub counties	Number of Health facilities	Number of villages	Population	Sample size
Ibulanku	1 HCIV	24	32,415	67
Nawaningi	1 HCIII	21	27,856	60
Makuutu	1 HCIII	24	33,617	72
Nabukalu	1 HCIII	21	31,820	68
Total	**04**	**90**	**125,708**	**267**

3.5.2.2 Sample size of boda-boda riders

The sample size of boda-boda riders was drawn from the sample size table. According to Krejcie and Morgan (1970) cited in Bukhari (2021), sample size table determines the sample size of a given population for easy reference. Here, the formula is not required. Considering the population of boda-boda riders per Sub County, averagely 30 boda-boda riders were registered according to the boda-boda riders association (2017) un-published. Therefore, the total population of boda-boda riders was 120 in the four sub counties in the intervention arm. Similarly, 120 boda-boda riders were the total population for the four sub counties in the control arm.

The sample size representative for the boda-boda riders in the intervention arm is 112. It was determined based on the Krejcie and Morgan (1970) sample size calculation as summarized in the sample size table. The Krejcie and Morgan's sample size calculation was based on $p = 0.05$ where the probability of committing error was less that 5 percent ($p > 0.05$). The same sample size of 112 boda-boda riders was for the control arm.

Table 3.4: Sample size for populations

Required sample size								
	Confidence = 95				Confidence = 99			
Population size	Margin of error				Margin of error			
	5.00%	3.50%	2.50%	1.00%	5.00%	3.50%	2.50%	1.00%
10	10	10	10	10	10	10	10	10
20	19	20	20	20	19	20	20	20
30	**28**	29	29	30	29	29	30	30
50	44	47	48	50	47	48	49	50
75	63	69	72	74	67	71	73	75
100	80	89	94	99	87	93	96	99
150	108	126	137	148	122	135	142	149
200	132	160	177	196	154	174	186	198
250	152	190	215	244	182	211	229	246
300	169	217	251	291	207	246	270	295
400	196	265	318	384	250	309	348	391
500	217	306	377	475	285	365	421	485
600	234	340	432	565	315	416	490	579
700	248	370	481	653	341	462	554	672
800	260	396	526	739	363	503	615	763
1,000	278	440	606	906	399	575	727	943

Source: Adapted from Krejcie & Morgan (1970)

3.5.2.3 Sampling Strategy for the qualitative study participants

Purposive sampling strategy was adopted for the qualitative component of this study. The respondents were drawn from participating midwives (head of departments), VHT coordinators and chairpersons of boda-boda stages. The researchers had prior knowledge and information of the study participants being studied and were in accordance with Bernard (2006) who asserted that such purposively selected participants are subjected to semi structured interviews. These are based on an interview guide which is comprised of a list of questions or topics (Bernard, 2006). In effect, they were selected with a specific purpose in mind, and that purpose reflects the particular

qualities of the subjects chosen and their relevance to the investigation in the qualitative study.

Considering the phenomenological aspect of the rest of the categories of respondents, 10 midwives who are the heads of maternity department were selected and participated in key informant interviews (KII). All the midwives selected for the study were attached to ANC, PNC and maternity clinics and wards in their respective health centres who had gathered enough experience in the department. Also, 8 VHTs coordinators were purposively selected to enrich the study. Each sub county had one VHT coordinator. These were small numbers of the population required to enrich the study. Gay (1981) as cited in Nyaga (2017) stated that ten percent of accessible population is enough in descriptive studies. Lastly, 10 boda-boda stage chairpersons were purposively selected for key informant interviews for both study arms.

Mothers were as well involved in in-depth interviews in both the intervention and non-intervention arms. A total of 24 mothers were purposively selected for in-depth interviews for both study arms. These interviews were conducted before and after delivery at the health facility/community for mothers who used either the boda-boda riders or the closed caller group to contact boda-boda riders for transport to the health facility.

Table 3.5: Number of participants for the key informant and in-depth interviews

Categories of participants	Number of participants in the intervention arm	Number of participants in the control arm
Mothers	12	12
Boda-boda riders	5	5
Midwives	6	4
VHTs	4	4
Total	**27**	**25**

3.5.3 Training of mothers and boda-boda riders

Mothers and boda-boda riders were trained separately. Mothers were trained from health centres when they visited for ANC while boda-boda riders were trained from sub county headquarters in the intervention arm.

3.5.3.1 Recruitment process of mothers for training

Pregnant mothers often visit health centres for ANC services. This is expected from the time of conception. Mothers are expected to have 4 – 8 visits for the whole gestation period. The study targeted mothers from 28 – 36 weeks of gestation (approximately 7 – 9 months) for the training. Mothers were selected from the existing list of mothers who attended ANC on heavy clinic days. A tracking log was introduced at the health centre where particulars of the mothers were captured for easy follow up (see appendix II).

Upon consenting to participate in the study, telephone contacts of the recruited mothers for the study were immediately registered in the closed caller user group after the first session of training. The study considered mothers who were in possession of telephones or those with husbands, relatives and friends with telephone contacts.

Also, mothers did not miss out on other ANC services. The services provided on the first visit include; infection screening (HIV and syphilis), nutrition advice (folic acid and other vitamins), health education on pregnancy and birth warning signs and care of the new born amongst others. Mothers who declined to participate in the study were offered the usual standard health care services as prescribed by WHO/MOH and their data was not included in the study. Once included, the mother and her baby remained in the study until the exit interview was conducted, irrespective of their child's mode or place of birth or complications.

3.5.3.2 Training of mothers in community-based referrals

This was conducted at health centres by either midwives or research assistants to give general information and services. Mothers recruited in the study had knowledge gaps on the availability of locally trained boda-boda riders in community-based referral which could hinder them from reaching health centres in time to deliver. Training of pregnant mothers took place for about 2 – 3 hours at the health centres after the routine ANC services. Considering their vulnerability, mothers needed short term training sessions. Mothers in the third trimester visited health centres 4 times in two consecutive weeks to complete the training before delivery.

Like the boda-boda training, the topics of discussion during the training of mothers were; innovation, communication and technology and formulation of the closed caller user group and its mode of operation, fleet management and referral systems (mothers' saving culture for the transport fares), the roles of stakeholders (mothers, boda-boda riders, health workers and VHTs) and prevention and basic management of

emergencies. During the training, mothers were told about the availability of local boda-boda riders and the importance of delivering from health facilities.

Boda-boda riders' telephone contacts were written in the mothers' passports (ANC books) and also displayed in a visible place within the ANC rooms at the study health facilities in the intervention arm. This gave the assurance that mothers got the phone numbers. The display of boda-boda riders' contacts in health centres also benefitted the community since people outside this study also made use of this opportunity to acquire and utilize telephone contacts of the riders for transport services. Information about the importance of obtaining telephone numbers of boda-boda riders was disseminated to mothers during training sessions on each ANC visit during the study period. During the training, mothers in the intervention arm were informed about the CUG and registered for easy communication to the boda-boda riders and other relevant stakeholders.

3.5.3.3 Recruitment process of boda-boda riders for the training

The recruitment process involved identifying the different boda-boda stages in the different sub counties. Through their stage chairpersons and LCI leaders, boda-boda riders were mobilized for dialogue meetings during which they accepted to participate in the training. Each of the sub counties in the study arms had one to two reorganized boda-boda stages. Boda-boda stages acted as riders' addresses for easy contact. Boda-boda riders who were in possession of their motorcycles for 24 hours a day were preferably considered. Recommendations were made by the boda-boda stage leadership.

A total of 112 boda-boda riders from 4 sub counties in the intervention arm were recruited to participate in the study. Consent forms were signed for acceptance of active

participation in the study for the 6 months and only 100 boda-boda riders met the criteria. Therefore, stakeholders analysis by the investigating team was undertaken through three major phases 1) Identification of stakeholders, who included; the boda-boda riders participating in the study 2) Assessing and documenting aspects that identified the drivers associated with the community that improved maternal and neonatal health outcomes among the rural communities in the study sub counties and villages against a comparison with those in the control arm and 3) Development of an appropriate strategy on how best to interact and engage these community based stakeholders to improve maternal and neonatal health outcomes.

3.5.3.4 Training of boda-boda riders in community-based referrals

Training of boda-boda riders was one of the channels for the riders to attain knowledge or information for the better management of community referrals. As earlier stated, it started with community engagement to mobilize and recruit the participants for the training. The boda-boda riders were the key people for this training. However, other stakeholders (VHTs and the midwives) were invited to the training for experience sharing. Physical introduction of health workers to the boda-boda riders in order to build rapport was done during training. In the control arm, boda-boda riders were not trained at all.

Training of boda-boda riders in community-based referrals took 5 days. The trainings were conducted at the sub county headquarters. The VHT national training manual/module guide of the ministry of health in line with referral of clients/mothers was referred to and modified for use in this study. Key topics of the training were

similar to those of mothers and included; innovation, communication and technology (the closed caller user group and its mode of operation), fleet management and referral systems, the roles of stakeholders (mothers, boda-boda riders, health workers and VHTs) and prevention and basic management of emergencies were extracted and modified from tasks 2, 3 and 4 of the training manual. Pre and post test assessment was done to find out if there was knowledge attained amongst the participants.

3.5.4 Training incentives to the study participants

According to Mduluza *et al.* (2013), incentives to research participants is simply reward in any form offered to participants to improve on their participation in research.

1. All participants in the training especially the boda-boda riders were facilitated with safari day allowance (SDA) and compensated for the days they attended the training since some of the riders did not own the motorcycles, and were supposed to deposit their usual commissions to the motorcycle owners.

2. Training sessions were conducted for 5 hours a day (9am – 2pm) to allow the riders to continue with their daily work, since there was demand for their services. However, VHTs and health workers were also facilitated in the training.

3. For the little time spent at health centres for training in community-based referrals, mothers were provided with refreshments (a snack and drink). This was done on each ANC visit the mother made to the health centre.

3.5.5 Other study incentives to participants

1. The cost of calling the participating boda-boda riders, VHTs or health workers by the pregnant mother and vice versa was covered by the study through a closed caller user group (CUG). Calls were made at no cost.

2. Airtime bonus of Ushs. 10,000 (ten thousand shillings) was given to all participants who were included in the CUG. This was to enable participants in the CUG to also contact other participants who were either not part of the caller group or subscribed to a different telecommunication company from the one utilized by the study.

3. The study incorporated a savings system for the expectant mothers; mothers were encouraged to own a savings box in their respective households and to save a minimum of Ushs. 200 (two hundred) a day for at least 3 months before their expected date of delivery. This money was intended to cater for the basic needs of a mother during delivery including transporting them to the health centre upon onset of labour.

4. A financial incentive was given to the midwives and VHTs to link mothers to the riders. Upon discovering a mother's urgent need of the transport services of a boda-boda rider, midwives and/or VHTs took the initiative to connect the riders to the mothers to eliminate delays in the maternal referral process. Midwives were also screening mothers for eligibility to participate in the study. A motivational allowance was given to the midwives for the service of recruiting mothers to participate in the study.

5. Recognition and rewards were given to midwives, boda-boda riders and VHTs in appreciation of their outstanding performance in the study. This was done during the review meetings with the boda-boda riders and VHTs in the different sub counties and at the health centres for the health workers.

3.5.6 Comparison of the study arms

Comparison was between the intervention and control arms. Training of boda-boda riders and mothers was conducted in the intervention arm. The study assessed improvement in terms of maternal outcome (deliveries at health centres) associated with; mother and boda-boda training and their communication link being simplified by the CUG in the intervention arm. Consenting pregnant mothers in the control arm were monitored and followed up in the same way as those in the intervention arm. Similarly, consenting boda-boda riders were given a pre test on day one and post test on day five. Training was not conducted at all in the control arm.

In addition, there was comparison of results before and after the intervention from the community trial. The trial sought to measure the efficacy and efficiency of using the boda-boda and the CUG compared to the conventional standard modes of care in relation to improved maternal outcome. This was followed with reports and recommendations to enhance knowledge among the stakeholders to improve maternal outcome (supervised deliveries at health centres). See figure 3.1 is the flow diagram for comparison of the two arms of the study.

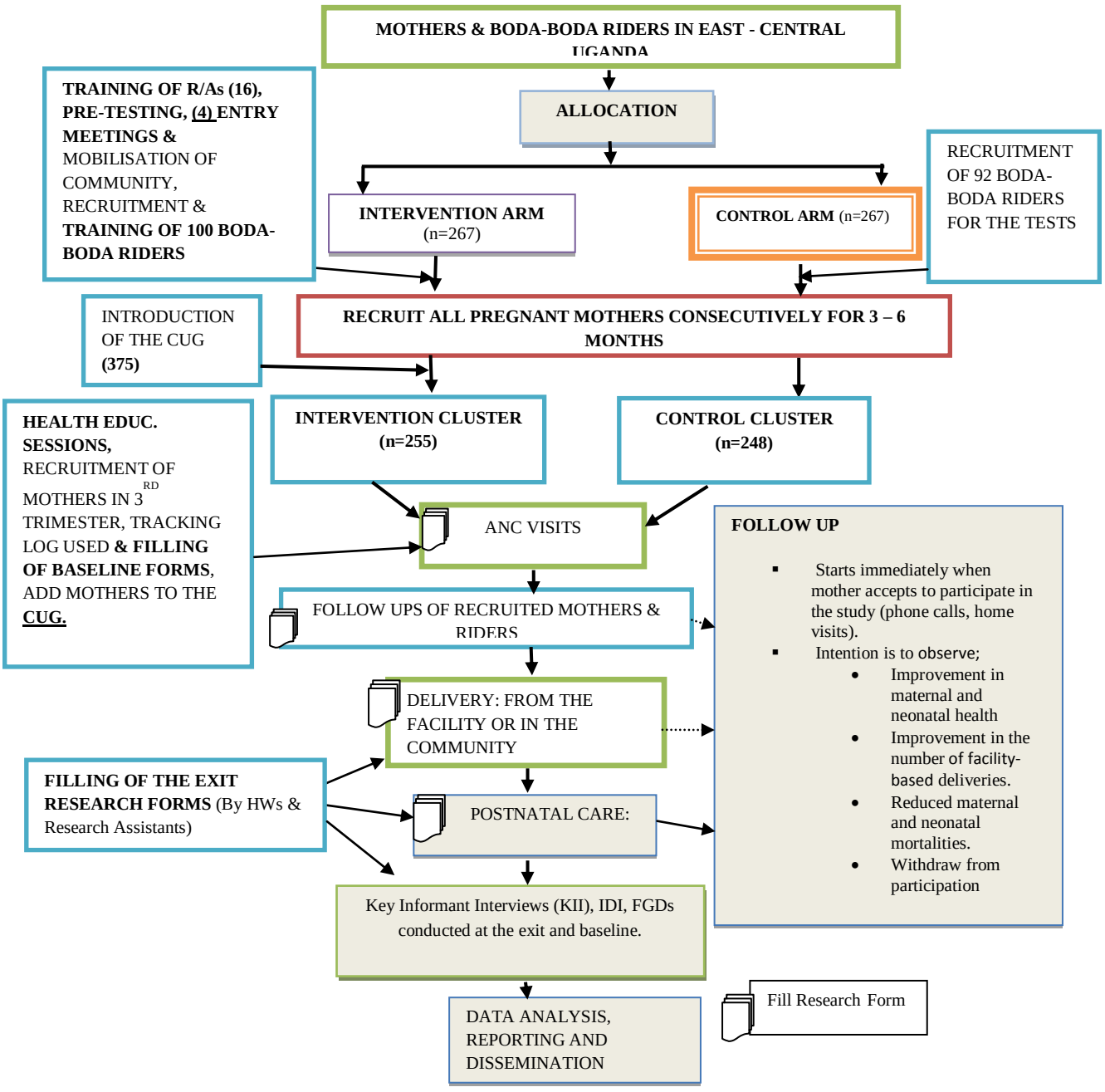


Figure 3.1: Trial Flow Chart

3.5.7 Follow-up procedure

Participating mothers remained in contact with the village health workers commonly known as VHTs situated in each village until the exit interview was completed. Contact numbers of mothers on the tracking log made it easier for the research team to follow up mothers even before giving birth.

Once a mother in the study gave birth, the VHTs notified the research team who visited the mother and collected data about the birth and newborn at the initial postnatal visit within the first three weeks. The research team also conducted a formal end-of study assessment of the mothers and infants in their homes within their first three months of life. Women were also encouraged to receive their routine postnatal checks at their nearest community health facilities as per routine practice (that is, at 6 hours, 6 days and 6 weeks after birth).

The 255 participants (mothers) recruited for the intervention arm and 248 for the control arm were eligible for follow up. However, a big number of participants sampled for the study contributed to the extension of the recruitment period so as to observe quality in recruitment and follow-up.

3.5.8 Study Outcome and Measurement

The outcome was assessed by measuring deliveries conducted by skilled personnel at health centres for mothers who were transported by boda-boda riders (trained and un-trained) at baseline and end of the study. Data extracted from; questionnaires, the modified secondary records amongst others were analyzed to depict the general impact of the intervention. Improvements in maternal outcome were considered after

interventions targeting pregnant mothers in their third trimester. Targeted mothers were transported by the boda-boda riders to health centres to deliver. This was supported by remarkable improvement in data capture at the health centres by health workers and reporting by VHTs when they visited homes of mothers.

3.5.9 Summary of the study intervention

The study intervention is summarized as reflected in table 3.6. It explains the study common interventions and unique interventions in the intervention and control arms which were required to improve community-based referrals for better maternal outcomes for mothers in the east – central Uganda.

Table 3.6: Summary of the study interventions

Study arm	Unique Intervention	Common Intervention
Intervention arm (Sub counties which initially had motorcycle ambulance services)	1. Training of mothers and boda-boda riders in community-based referral. a) Selection of boda-boda riders for training. b) Selection of mothers for the study to check use of boda-boda riders. c) Selection of midwives for experience sharing during training. d) Selection of VHTs for experience sharing.	**1. Community sensitization** • Dialogue meetings • FGDs • Training of boda-boda riders, midwives and VHTs. • Training of mothers at the HCs. • Savings box model **2. 3 – 6 months assessment** • Baseline survey/pre interview / administering of questionnaires to mothers. • Follow ups of mothers, boda-boda riders, VHTs and midwives. • Post interview/ administering of questionnaires to mothers. • Pre and post test assessment of boda-boda riders. • Capture of success stories from the mothers, boda-boda riders, HWs, VHTs amongst others.

Study arm	Unique Intervention	Common Intervention
	2. Formation of closed caller user group (CUG). a) Selection of mothers for inclusion in CUG. b) Selection of midwives for inclusion in CUG. c) Selection of boda-boda riders for inclusion in CUG. d) Selection of VHTs for inclusion in CUG.	• In addition to all common interventions of training mothers & boda-boda riders, registration of mothers, boda-boda riders, VHTs and midwives for the CUG was conducted.
Control Arm (Sub counties/health centres without motorcycle ambulance services)	1) Selection of mothers for the study. 2) Selection of midwives for the study. 3) Selection of boda-boda riders (not trained) for the study.	• Routine health services accessed by the mothers. • Baseline survey/pre interview/administering of questionnaires to mothers. • Post interview/administering of questionnaires to mothers. • Follow up of mothers. • Pre and post test for knowledge assessment of boda-boda riders. • FGDs at community level. • Key Informant and in-depth interviews.

3.6 Research Instruments

Clifton & Handy (2001) stated that, "making a choice among the different data collecting tools involves considering their appropriateness and relative strengths and weaknesses." In this study, combinations of tools were used, that is, questionnaires and interview guide. These tools were designed using the key study themes / objectives. The secondary data collection tools included different registers at health facilities and health management information system at the district offices. The tool used to extract data from the registers was the Health Unit Outpatient Monthly Report (HMIS 105).

3.6.1 Questionnaire

A questionnaire is a set of written questions stemming from the objectives of the study and literature review which is developed by the researcher and administered to a selected group of respondents (Clifton & Handy, 2001). It is more preferable especially when dealing with respondents who do not offer time for interview and are very free and open when it comes to putting their views on paper. Questionnaires were administered to the consenting respondents (mothers) at the health facilities and boda-boda riders at the sub counties during the training. Questionnaires were filled by the research assistants for respondents who did not know how to read and write. The questionnaire was also translated into the local language used in the study area for easy comprehension and convenience of the respondents who preferred the translated version of the tool.

3.6.2 Interview Guide

An interview guide is simply a list of high-level topics with formulated questions that are planned to be covered during an interview with participants (Ryan, Michael & Patricia, 2009). It can be used in the Key Informant Interviews (KII), In-Depth Interviews (IDI) and Focus Group Discussions (FGDs) or community dialogues. This qualitative data collection tool was used in this study to ease the verbal interaction with interviewees as guided by the researcher. The tool consisted of specific questions formulated in line with the study objectives. Responses were duly recorded and notes taken during the interviews.

3.6.3 Document / Records Review Checklist

A checklist was a tool designed to capture information extracted from the health unit outpatient monthly report (HMIS 105) and management information system. Data filled in HMIS 105 was extracted from the already existing registers in health centres and later entered in MIS at the district head offices. Registers are simply defined as primary tools in which health information is recorded and can be retrieved (Gliklich, Dreyer & Leavy, 2014). These provided secondary data in most cases which enriched the study with information deemed necessary.

There are different types of registers at health centres. For this particular study, the registers of importance were; antenatal registers for recruitment purposes, the maternity/delivery register to track the health facility deliveries (summarized in HMIS 105) at baseline and exit transported by boda-boda riders and the postnatal registers for exit interviews and follow up of the conditions of the mothers and babies.

The management information system (MIS) comprises of the health management information system (HMIS) and the district health information system 2 (DHIS2). HMIS is one of the systems with all the primary tools used for collection, processing, storage, retrieval and dissemination of health information for decision making (Shaikh & Rabbani, 2005). This data may be reported daily, weekly, monthly and at times quarterly. Completeness and timely reporting of data in the HMIS is paramount from all levels of health centres. This system was used to extract data on deliveries at the baseline for all health centres in the study. The average deliveries in the intervention and control arms at baseline were determined.

DHIS2 is also a system where data from HMIS is summarized. It is managed by ministry of health and can only be accessed with authorization. A password is used in order to access the system. It helps to accurately and timely collect, aggregate, store, analyze and evaluate health related data from health centres to the national level (Dehnavieh *et al.,* 2018). Data on different indicators is summarized for decision making at national, regional, district and health sub district levels (Dehnavieh *et al.,* 2018). The study compared the routinely collected and analyzed data from health centres with results obtained from respondents (mothers) for the few selected indicators. In the league tables, specific indicators were observed to tell whether the intervention contributed to its improvement or not.

3.7 Pre-testing the study instruments

Pre-testing of the tools was conducted from a HCIV in the district of Namutumba. Namutumba has similar characteristics like Iganga and Bugiri districts. Pre-testing was done to verify the target audience and the relevance of the questions posed for the study. The pre-test sample size was predetermined by the investigator to be 7 pregnant mothers in the selected health centre and the same number for the boda-boda riders (7 riders). This was in line with Gay (1981) as cited in Nyaga (2017) who stated that ten percent of accessible population is enough for a pre-test (10 percent of 70 is approximately 7). These 14 participants were randomly selected from the list of 70 women in Namutumba district at Nsinze health centre IV and a nearby boda-boda stage. Corrections were made in the tools where they seemed inappropriate especially in the length of the study tools and repetition of questions.

3.7.1 Validity

Validity is another quality check that was observed. It is defined as the degree to which a test or measuring instrument actually measures what it purports to measure or how well a test or an instrument fulfills its function (Anastasi & Urbina, 1997). Content Validity Index (CVI) was performed based on items derived from extant literature and volunteer evaluators (4 academic experts: who have published in the areas of Public Health) were requested to rate the items in the questionnaire. Each one rated the questions on a two-point rating scale *of* ***Relevant (R)*** and ***Irrelevant (IR)***. Thereafter, the computation of CVI was done by summing up the judges' rating on either side of the scale and dividing the two to obtain the average using the following formula:

$$\textbf{CVI} = \frac{n}{N}$$ where ***n***= Number of items rated as relevant, and ***N***= Total number of items in the instrument.

The minimum CVI cut-off of survey data with the recommendation of 0.7 was observed as suggested by Amin (2005).

3.7.2 Reliability

Reliability is defined as the degree of consistency to which (a tool) measures what it is measuring according to Yount (2006), which is assessed by calculating the Cronbach's Alpha coefficient. Reliability tests on each construct were done under the guidance of the threshold of above 0.70 set by Nunnally (1978). Details of the reliability results are presented in table 3.7.

Table 3.7: Reliability (Cronbach Alpha) Results

No.	Variable	No of items	Cronbach Results		Average
			Pre	Post	
1.	Socio-demographic characteristics of mothers	9	0.943	0.943	0.943
2.	Socio-demographic characteristics of boda-boda riders	6	0.798	0.813	0.806
3.	Attitude of mothers	4	0.879	0.898	0.889
4.	Communication systems	7	0.527	0.514	0.521
5.	Knowledge attained by mothers	4	0.824	0.833	0.829
6.	Knowledge attained by boda-boda riders	10	0.972	0.579	0.776

Table 3.7 indicates that Cronbach Alpha results varied according to variables. Socio-demographic characteristics of mothers comprised of 9 items which had an average of 0.943 of the Cronbach Alpha score and this was very reliable. Similarly, socio-demographic characteristics of boda-boda riders were reliable with average Cronbach score of 0.806 from 6 items. Attitude of mothers towards community-based referral comprised of four items with an average Cronbach Alpha score of 0.889 making it very reliable. On the other hand, communication systems to support community-based referral were measured by seven items, whose reliability score was determined using Cronbach Alpha Model generating an average of 0.521 coefficients, which also indicates that results were reliable. In the same way, boda-boda riders' and mothers' knowledge gain was measured by ten (10) items and four (4) items respectively, whose Cronbach Alpha results were reliable at an average of 0.776 and 0.829 for both the pre and post intervention results and were also very reliable.

3.8 Data collection techniques

Different tools and techniques were used in the collection of both qualitative and quantitative data namely; administering of questionnaires, reporting of extracted data from registers and health information system for the quantitative data collection and FGDs, KIIs, IDI and dialogue meetings for the qualitative data collection. Pre-testing of these tools was done for use in the main study. To effectively apply the techniques in the collection of data, different data collection processes were considered. One of the processes was training of the research assistants, translation of data collection tools into the local language and identification of data collection points.

3.8.1 Training of research assistants

Research assistants were selected basing on their research experiences especially in data collection. They were trained for two days to understand the study purpose, tools and data collection schedule. Priority was given to research assistants who were fluent in the local language used in the study area. Four research assistants who had at least 4 years experience in data collection were recruited for this study.

3.8.2 Quantitative data collection

3.8.2.1 Administering of Questionnaires

A questionnaire was used to collect majorly quantitative data. The questionnaire was filled with the help of the researcher or research assistants for mothers and boda-boda riders who could not read and write. This data was collected from mothers at the health centres before delivery and in the community shortly after giving birth in both the intervention and control areas. Also, data was collected from the boda-boda riders

during the training. Informed consent was sought from all respondents before administration of the questionnaires.

3.8.2.2 Document / Records Review

Another technique for data collection is document / records review. HMIS 105 was reviewed. HMIS 105 is one of the reporting tools where data is collected and submitted for further analysis and better use. This was secondary data obtained from the maternity register at the health centres. Permission was obtained from the district authorities to access this information. Specifically, this was done in the offices of the District Health Officers (DHOs) of Iganga and Bugiri districts respectively.

Research assistants counted deliveries in the maternity register and verified with the HMIS (105) tool or MIS at the district. This technique was necessary to determine the average deliveries in both the intervention and control arms at baseline of the study. Lastly, the study sought to compare the routinely collected and analyzed data from health centres with results obtained from respondents (mothers) for the few selected indicators.

3.8.3 Qualitative data collection

3.8.3.1 Use of Key Informant and In-depth Interviews

For qualitative data, in-depth and key informant interviews were conducted. Selected mothers, health workers (VHTs and midwives) and boda-boda riders were interviewed to provide information concerning the socio-demographic factors, attitude of mothers, communication systems and maternal referrals from community to health centres. Key informants and in-depth interviewees were purposively selected to provide unique or

detailed information. Arrangements were made by the research assistants to conveniently meet the key informants for the interviews.

3.8.3.2 Community dialogue meetings

At the beginning of the study, four (4) community dialogue meetings were conducted. The venue, date and time for the meeting were set. Each community dialogue meeting consisted of 20 – 25 participants. Important recordings and notes were taken by the research assistants during the dialogue meetings and this was useful for the study. Dialogue meetings which were also considered as entry meetings were conducted at the beginning of the study. Dialogue teams were built and helped in the hosting of the event.

Different categories of people were involved in these meetings including; the LC1 leaders, religious leaders, political leaders, cultural leaders, VHTs, boda-boda riders, husbands and mothers. Meetings were conducted in the intervention arm only. However, the purpose of the meetings in the intervention arm was to mobilize community members and brainstorm on the upcoming intervention. During the discussions, important information concerning the study was recorded and notes taken.

3.8.3.3 Focus Group Discussion

Focus Group Discussion (FGD) is where a group of purposively selected people gather to discuss issues of interest in details (Nyumba *et al.,* 2018). These people in most cases share a similar background or experience (Nyumba *et al.*, 2018). Participants for the FGDs were purposively selected to participate in the study. Eight (8) FGDs were conducted, 4 at the beginning of the study in the intervention arm and 2 at the end of the

study in both the intervention and control arms. Each FGD consisted of 7 – 9 participants. The participants were selected from those recruited for training and they included; mothers, boda-boda riders and health workers (VHTs and midwives). Also, key stakeholders like LCI chairpersons, religious leaders amongst others were involved in the FGDs. Appropriate venues were gazetted for participants to meet conveniently for these planned discussions which were in line with the study objectives. Note taking and recordings were done by the research assistants after seeking consent from the study participants.

3.8.4 Protection of Participants

In order to minimize access to sensitive information about the participants, the study materials had limited access controls on all study participants' information. In the consent forms, raw individual participants' data was captured using a number of direct identifiers (typically participants' name, address was based on unique participant ID number) to allow access to specific participants' records such as location and facility attended. The study procedures restricted access to the raw individual participant's data in the intervention as well as in the control arms, and direct identifiers of the participants were removed. This reduced the overall sensitivity of the file. However, participants' files contained indirect identifiers (for instance village, health facility they attended and sub county) and other identifying characteristics like gender, data on enrolment and visits during the study that could be used to re-identify specific individuals. Consequently, this data was still protected by the Family Education Rights and Protection Act (FERPA). This has the regulations considered for the protection of clients' records in this study.

3.9 Data Analysis

Data analysis was computed using STATA *version* 14 for the quantitative data. Tests of independence were used to determine the statistical significance of different variables. The *p*-value set at 0.05 was used to determine the statistical significance of the associations between independent and dependent variables at 95 percent confidence intervals (CI).

Logistic regression model was used to ascertain the statistical relationship between independent variables and maternal outcome (health facility-based supervised deliveries). It derived regression odds ratios and p-values which were used to determine which variables impacted on the topic of study. Furthermore, multiple logistic regression of independent variables which were statistically significant, were considered to confirm whether they were the predictors of the maternal outcome.

Notably, the likert scale was used to measure the degree of opinions for attitudinal variables. The different opinions included; Strongly Agree and Agree (for positive attitude), Do not know (as neutral) and Disagree and Strongly Disagree (for negative attitude). The qualitative constructs were quantified for logistic regression analysis to determine whether attitude of mothers was statistically significant to influence health facility-based deliveries.

Effect of intervention (training of mothers and boda-boda riders) was determined using difference-in-difference (DID) model. The DID model is defined as the difference in average outcome in the intervention group before and after intervention minus the difference in average outcome in the control group before and after intervention (Wing, Simon & Bello-Gomez, 2018). The simplest form of the DID design is a special case in

which there are only two groups observed in two time periods. In the first period, both groups (intervention and control arms) are exposed to the usual service delivery standards and in the second period, the intervention rolls out in another group (intervention arm) but not in the other group (control arm) as clarified by Wing, Simon and Bello-Gomez (2018).

In order the study to be reasonably confident that the difference in the deliveries at the health centres (change effect) was caused by only training of mothers and boda-boda riders, and to make DID model powerful, mothers in intervention and control arms were not allowed to interact (crossover). Distant geographical locations of the two arms were important. Similarly, follow-ups of mothers and boda-boda riders were conducted to minimize their dropping out of the study to maintain a larger sample size fit of DID model analysis. The model also tested whether the change effect after training was statistically significant.

Atlas Ti *version* 7 was used for qualitative analysis. It involved re-reading the interview transcripts to identify themes and sub themes that emerged from the respondents' answers during the FGDs, KIIs and IDIs. The arrangement for analysis was based on the topics and questions formulated for the interviews in order to synthesize the answers to the proposed questions. Topics and questions were designed according to the study objectives from which themes and sub themes were extracted. Relevant quotations were used to validate the quantitative findings. Purposely, it enabled the description of the effect of training mothers and boda-boda riders on maternal outcome. Verifying of the qualitative data is required which involves checking the credibility of the information gathered using a method called triangulation. Triangulation involves using multiple

perspectives to interpret a single set of information. This study used triangulation to examine the social and community perspectives on the use of the boda-boda riders as a means of transport to the health facilities by pregnant mothers and its implications on health seeking. It required interviewing at least three groups of participants comprising of pregnant mothers, health workers and the boda-boda riders. When each group said the same thing in the interviews, then the information that resulted was considered valid.

3.10 Logistical and Ethical Considerations

Kenyatta University postgraduate school approved the study before it was conducted. Ethical approval to conduct the study was provided by the Institutional Review Boards (IRB) of Kenyatta University Ethical Review Board (PKU/2015/11163) and Uganda Martyrs University - Nsambya hospital (UG-REC-020) as well as Uganda National Council for Science and Technology (UNCST), under number (SS 4813). Voluntary informed consent was then individually obtained from all the study participants and authorities in the study area. Privacy and confidentiality of the information was assured to the respondents; names of respondents were not indicated on the questionnaires. The respondents consented to participate in the study and were assured of their right to withdraw from the interview at their will. This is a key aspect of the consenting process for the study participants. Different stakeholders (mothers, boda-boda riders and health workers) were given incentives in form of transport refund to those who participated in the training and bonus airtime was also added to the caller user group (CUG) for the free calls. Allowances were given to those involved in the recruitment of mothers at the health centres.

CHAPTER FOUR: RESULTS

4.0 Introduction

This chapter presents an in-depth analysis and presentation of findings of the study aimed at exploring the effect of training mothers and boda-boda riders in community-based referrals on maternal outcome in the selected districts of east – central Uganda. The results of this study are presented and interpreted independently under each objective. The chapter covers; response rate, socio-demographic characteristics of mothers and boda-boda riders, community-based referrals and the maternal outcome, attitudes of mothers towards community-based referrals, communication system for community-based referrals; and lastly, knowledge gained by boda-boda riders to support community-based referrals. Descriptive regression results as well as responses from the research questions are presented simultaneously and chronologically.

4.1 Response Rate

The study response rate is summarised in table 4.1 for both intervention and control arms. Responses were obtained from mothers and boda-boda riders as main respondents and midwives, boda-boda stage chairpersons and VHTs sub county coordinators recruited for the study. The response rate for mothers in the intervention arm was 97.7 percent and 93.1 percent in the control arm. It contributed to an average response rate of 95.4%. In addition, boda-boda riders had 89.3 percent response rate at the time of their training in the intervention arm. In the control arm, only 82.1 percent of boda-boda riders responded for the tests. However, other respondents were for key informant and in-depth interviews. Midwives, VHTs coordinators and boda-boda stage chairpersons responded 100 percent in both the intervention and control arms.

Table 4.1: Categories of respondents in both intervention and control arms

Categories of respondents (**sample size for the intervention & control**)	Total number of respondents	
	Intervention = n (%)	Control = n (%)
Boda-boda riders (**each arm 112**)	100(89.3)	92(82.1)
Midwives (**6 intervention & 4 control**)	6(100)	4(100)
Mothers (**each arm 267**)	255(97.7)	248(93.1)
Village Health Team Members (**each arm 4**)	4(100)	4(100)
Boda-boda stage chairpersons **(each arm 5)**	5(100)	5(100)

4.2 Socio-demographic characteristics of mothers and boda-boda riders

The socio-demographic characteristics were for both mothers and boda-boda riders. The socio-demographic characteristics for mothers on which the first specific objective was determined included; age, marital status, religion, level of education, residence, distance to health centre, means of transport to the health centre, income status and number of pregnancies for each mother. The socio-demographic characteristics for boda-boda riders included; age, marital status, level of education, level of income, religion and ownership of the motorcycle.

4.2.1 Socio-demographic characteristics of mothers

The age of respondents was determined using the lowest age group as ≤15 years and highest age group being mothers of 45 years and above. Table 4.2 indicates that approximately 70% of the mothers in both the intervention and control arms were less than 35 years old. The least percentage (8.3%) represented mothers aged 45 years and above in the intervention arm. The rate of literacy among mothers was moderate. In both arms, majority of the women were primary school drop-outs. However, the intervention arm comprised of more women who attended secondary school (approximately 40%) as compared to the control arm which comprised of

approximately 26% with secondary school qualifications. It is also clear that in both arms, majority of the mothers in east – central region are low income earners (64.6% and 59.4% for the intervention and control arms respectively). Almost all mothers in both the intervention and control arms were married (97.6% married in the intervention and 98.8% in the control).

Findings showed that the intervention arm comprised of mostly Muslims with representation of 38.5% followed by Catholics with a representation of 31.6%. In the control arm, all religions were represented but the Catholics were the majority among all with a representation of 32.7% and this representation was almost equal to the 31.9% for the Muslim religion. Most importantly, responses were obtained with representation from all religious denominations. In terms of the number of pregnancies, most of the mothers were carrying their $3^{rd} – 4^{th}$ pregnancy in both the intervention and control arms (51.4% and 46.7% respectively). A reasonable number of mothers also had 5 – 6 pregnancies in the intervention and control arm (29.7% and 27.8% respectively). Only 18% and 23.2% of the mothers had 1 – 2 children in both the intervention and control arms.

According to results, the distance between their homes and health centres was said to be 3-4 kilometres (40.6% in the intervention arm and 37.6% in the control arm). Furthermore, in the intervention arm, 38.8% of the mothers had a distance of 5 – 6 kilometres to the health centres and 34.8% in the control arm. There were also mothers for the distance between 1 and 2 kilometres in the intervention and control arms (17.8% and 20.8% respectively). The means of transport used mostly in both arms was motorcycle (70.5% for the intervention arm and 51.2% control arm respectively).

Table 4. 2: Socio-demographic characteristics of mothers in the intervention and control arms

Variable	Measure	Intervention		Control	
		N= 255	Percent	N=248	Percent
1. Age	≤15 – 24	88	34.6	100	40.6
	25 – 34	88	34.6	78	31.3
	35 – 44	58	22.5	36	14.5
	45 and above	21	8.3	34	13.6
2. Educational Level	None	19	7.4	16	6.5
	Primary	136	52.4	154	62.1
	Secondary	101	39.7	64	25.9
	Tertiary	1	0.5	14	5.5
3. Level of income	Low	165	64.6	147	59.4
	Middle	80	31.3	84	33.8
	High	10	4.1	17	6.8
4. Marital status	Not married	0	0.0	0	0.0
	Married	249	97.6	245	98.8
	Divorced	6	2.4	3	1.2
5. Religion	Catholic	81	31.6	81	32.7
	Protestant	49	19.3	56	22.4
	Moslem	98	38.5	29	31.9
	Others	27	10.6	32	13
6. Number of pregnancies	1 – 2	46	18	56	23.2
	3 – 4	131	51.4	117	46.7
	5 – 6	76	29.7	69	27.8
	7 and above	2	0.9	6	2.3
7. Means of transport used	Vehicle	7	2.5	19	7.7
	Motor cycle	180	70.5	127	51.2
	Bicycle	38	15	53	21.4
	Walk	30	12	49	19.7
8. Average distance to HC	1 – 2	46	17.8	53	20.8
	3 – 4	104	40.6	93	37.6
	5 – 6	99	38.8	86	34.8
	7 – 8+	7	2.8	16	6.8
9. Residential place	Rural	231	90.6	212	85.3
	Urban	24	9.4	36	14.7

Source: *Primary Data, 2019*

4.2.2 Socio-demographic characteristics of boda-boda riders

Of the 100 boda-boda riders administered with the questionnaires during the time of training in the intervention arm, 2.0% were below 18 years, 33.0% were between 18 – 24 years, and 57.0% between 25 – 34 years and 8.0% were above 35 years as shown in table 4.3. In the control arm, none of the boda-boda riders was below 18 years. However, 20.7% were between 18 – 24 years, 68.5% between 25 – 34 years and 10.8% were 35 years and above.

Regarding the educational levels of the respondents, majority of boda-boda riders attained primary level of education and below both in the intervention and control arms (61.0% and 54.3% respectively). Only 2.0% attained higher education levels in the intervention arm and none in the control arm, and the rest (37.0%) attained secondary level in the intervention arm and 45.7% in the control arm. Only 42.0% of the boda-boda riders in the intervention arm had low income compared to 53.0% of them with middle income. The rest of the boda-boda riders were of high income. In the control arm, 58.7% of the boda-boda riders were of low-income level, 38.0% middle level and 3.3% high level of income. Accordingly, 19.0% of the boda-boda riders recruited in the intervention arm were not married and the rest (81.0%) were married. In the control arm, 16.3% of the boda-boda riders were not married and 83.7% were married.

Concerning religion, 29 percent of the boda-boda riders in this study were Catholics, 33 percent were Protestants, 35 percent were Moslems and 3 percent were of other religions. Other religions included; born again, Jehovah's Witness and seventh day Adventists. In the control arm, 27.2% were Catholics, 53.2% were Protestants, 10.9%

were Moslems and the rest belonged to other religions. Exactly 54 percent of the boda-boda riders owned the motorcycles and only 46 percent of them were using other people's motorcycles in the intervention arm. In the control arm, 42.4% had their own motorcycles while 57.6% were riding other people's motorcycles.

Table 4.3: Socio-demographic characteristics of boda-boda riders in the intervention and control arms

SN	Variables	Intervention arm		Control arm	
		N=100	Percent	N=92	Percent
1.	Age				
	<18 yrs	2	2.0	0	0.0
	18 – 24	35	35.0	19	20.7
	25 – 34	57	57.0	63	68.5
	35 and above	8	8.0	10	10.8
2.	Level of education				
	≤ Primary	61	61.0	50	54.3
	Secondary	37	37.0	42	45.7
	Tertiary	2	2.0	0	0.0
3.	Level of income				
	Low	42	42.0	54	58.7
	Middle	53	53.0	35	38.0
	High	5	5.0	3	3.3
4.	Marital status				
	Not-married	19	19.0	15	16.3
	Married	81	81.0	77	83.7
5.	Religion				
	Catholic	29	29.0	25	27.2
	Protestant	33	33.0	49	53.2
	Moslem	35	35.0	10	10.9
	Others	3	3.0	8	8.7
6.	Ownership of motorcycle				
	Personal	54	54.0	39	42.4
	For another person	46	46.0	53	57.6

Source: *Primary data, 2019*

4.3 Maternal outcome (supervised deliveries at health centres)

Responses varied between the pre and post intervention results in both the intervention and control arms. Findings on supervised deliveries from health centres were as indicated in figure 4.1. Without considering any means of transport for mothers to go to

health centres at baseline, the average deliveries extracted from the maternity register and HMIS report (105) were 33.4 percent in the intervention arm and 48.4 percent in the control arm. After the intervention, deliveries in the intervention arm drastically increased to 70.5 percent and lethargically to 51.2 percent in the control arm.

Basing on the difference-in-difference (DID) model; the average value was 0.314. The increased supervised deliveries at health centres after the intervention (training) was the change effect and statistically significant (p=0.000).

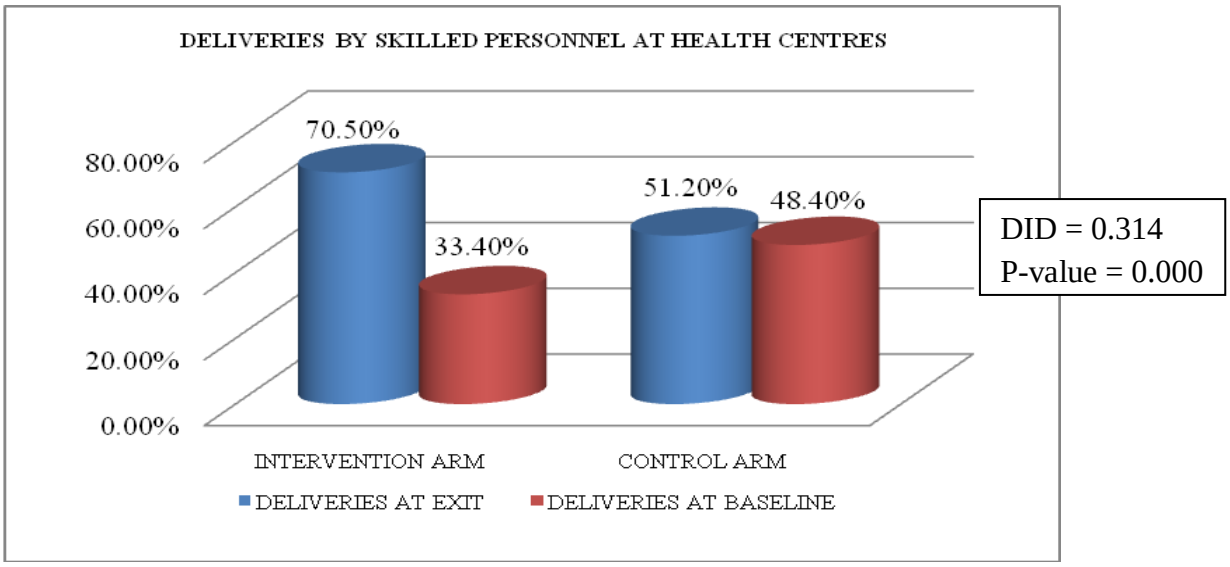


Figure 4.1: Deliveries by skilled personnel at health centres

Further, the study sought to find out whether mothers who delivered from health centres were transported by trained or un-trained boda-boda riders. This was investigated in only intervention arm where the training of boda-boda riders took place. Results indicated that more of the mothers who delivered from the health centres were transported by trained boda-boda riders as shown in figure 4.2.

There was a drastic increase in supervised deliveries at health centres from 0.0% in the pre intervention phase to 69.4% in the post intervention phase. However, there were a small number of mothers transported by un-trained boda-boda riders to health centres to deliver. It increased from 0.0% in the pre intervention phase to 30.6% in the post intervention phase.

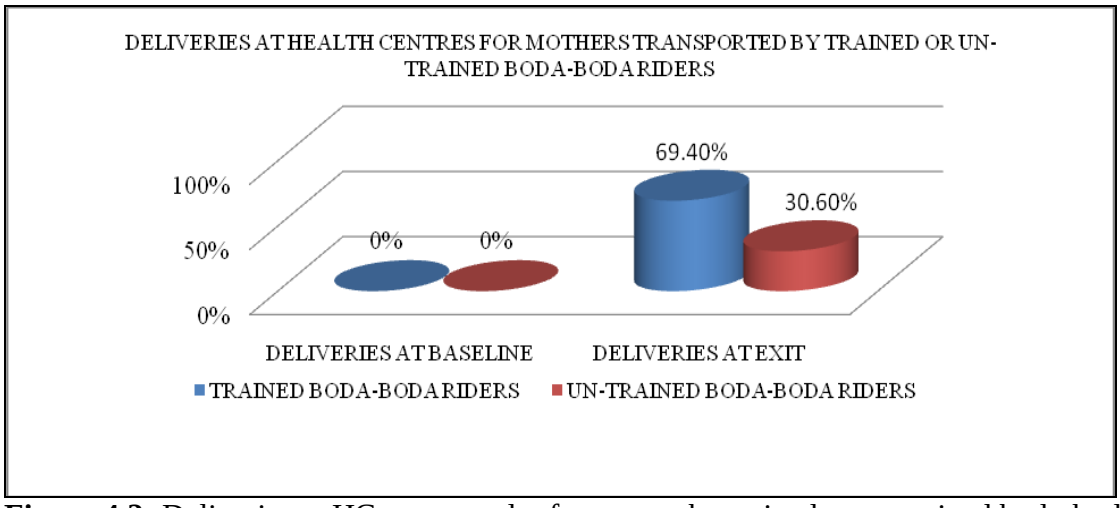


Figure 4.2: Deliveries at HCs as a result of transport by trained or un-trained boda-boda riders

4.4 Influence of socio-demographic characteristics on maternal outcome

The influence of socio-demographic characteristics on maternal outcomes was determined by using the logistic regression model. There are variations in responses based on the different socio-demographic characteristics for mothers and boda-boda riders respectively.

4.4.1 Influence of socio-demographic characteristics of mothers on maternal outcome

According to the marital status, a high proportion of mothers in both the control and intervention arms (98.8% and 97.7% respectively) were married and the rest divorced.

On logistic regression analysis, marital status had no statistically significant influence on health facility-based deliveries. However, in the FGDs conducted with the boda-boda riders, mothers and other stakeholders, it was noted that husbands have a key role to play in enabling mothers to go to health centres to deliver.

> *"…The distance between the health centres and households is not walkable. Husbands are expected to facilitate mothers with transport fares during ANC and labour*". One of the participants stated in the intervention arm.

Generally, the age of mothers was found to be significantly influencing the maternal outcome (supervised deliveries at the health centres) as seen in table 4.4. On logistic regression, there was statistically significant influence of the different age groups on maternal outcome apart from mothers 15 – 24 years. This age group had no association with supervised deliveries. Mothers between the ages of 25 – 34 years were 10.269 times more likely to deliver from health centres than any other age group (p=0.003 and CI = 2.232 – 47.259). Similarly, increase in the age of mothers (35 – 44 years) increased health facility-based deliveries with statistically significant influence as seen in table 4.4. Mothers between the ages of 35 – 44 years were 17.189 times more likely to deliver from health centres than any other age group (p=0.003; CI=2.598 – 113.748). Lastly, mothers who were 45 years and above were 5.1268 times more likely to deliver from health centres with statistically significant influence (p=0.000; CI=2.204 – 11.926). This indicated that the different age groups of pregnant mothers (25 – 34 years, 35 – 44 years and 45 years and above), greatly influenced deliveries of mothers conducted by health workers at health centres.

Contrary to results from the administered questionnaires to mothers, in the FGDs conducted with the boda-boda riders and VHTs, the age of mothers did not determine their health facility-based deliveries. The age differences of mothers who were contacting and using boda-boda riders for transport to health centres to deliver was not a concern. One of the boda-boda riders said;

> *"…Different categories of ages of expectant mothers have contacted me. They all call when in labour and it becomes very difficult to transport them using locally available motorcycles. There is no difference between the young mothers and the old ones. To my thinking, old mothers were supposed to detect labour signs and symptoms early to move to the health facilities, but I have seen no differences in the ages".*

This concurred with one of the mothers who said in an in-depth interview that she did not hurry to go to the health facility to deliver this time.

> *"…This is my third pregnancy, at least I know how labour pains present. There is no need of hurrying to the health centre. I feel okay when I arrive at the health centre and deliver immediately".*

This was in the intervention arm where mothers were expected to make decisions of going to health facilities to deliver as early as possible.

Additionally, the education level of pregnant mothers was found to be significantly influencing supervised deliveries in health centres. Interestingly, primary education level of mothers did not have influence on health facility-based deliveries. Only secondary level of education of pregnant mothers had a significant influence on health facility-based deliveries. Secondary school mothers were 41.500 times more likely to deliver from health facilities compared to those with any other level of education ($p=0.000$ and CI=10.697 – 161.004). However, based on the information obtained from

KIIs with respondents, it can be argued that majority of mothers did not achieve higher education levels, and thus, are semi-illiterates.

> *"...Mothers in this sub county produce when they are teenagers and drop out of school as early as primary level"* One chairperson of a boda-boda stage in the intervention arm stated (respondent 13, 2019).

Further, in the intervention arm, another boda-boda stage chairperson stated that with his experience, majority of mothers had attained primary education level, in the east – central study. However, mothers did not stop to be transported to health centres to deliver after acquiring knowledge on the existence of the CUG during training. This was as a result of boda-boda riders encouraging mothers to contact them.

> *"...Much as you trained us, we have continuously encouraged fellow boda-boda riders to help mothers get transported to health centres to deliver"* stage chairperson of boda-boda riders in an intervention sub county stated (respondent 9, 2019).

Health facility-based deliveries were statistically significantly influenced by religion. Much as there was a reasonable number of catholic mothers in both control and intervention arms (32.7% and 31.8% respectively), did not influence supervised deliveries at health centres. Meanwhile, Protestants, Moslems and other religious believers, statistically significantly influenced deliveries at health centres as seen in table 4.4. Protestant mothers were 0.089 times less likely to deliver from health centres compared to catholics and other religions (p=0.002 and CI=0.019 – 0.420). Similarly, Moslem mothers were 0.019 times less likely to deliver from health centres compared to other religions (p=0.000 and CI=0.003 – 0.122). Lastly, mothers from other religions (born again, seventh day Adventists, Jehovah's witnesses amongst others) were 0 .001

times less likely to deliver from health centres compared to other religions (p=0.000 and CI=0.000 – 0.007). This was protective for Protestants, Moslems and mothers of other religions to deliver from health centres. In one of the FGDs conducted in the intervention arm, the LC1 chairperson of that particular village lamented on the irresponsibility of some of the religious leaders:

> *"…Style up religious leaders. The only challenge experienced in my village is that some of the religions here pray from morning to evening. Such mothers miss a lot of information delivered by health workers during health education at the health centres. Therefore, I call upon political leaders at the district and above to engage the religious leaders of such sects".*

Interestingly, the income level of pregnant mothers had no significant influence on deliveries at health centres. Both low income and middle-income levels of mothers had no influence on health facility-based deliveries. Much as many mothers were low-income earners, they did not effectively utilize the health facilities at the time of giving birth. Similarly, high level of income had no significant influence on health facility-based deliveries (p=0.397).

> *"…Our mothers do not have money. Even their husbands are poor. They get challenges in paying us. Infact most of them end up going to mulelwa (traditional birth attendant) nearer to them. But with the training we underwent, we are able to transport mothers on credit and husbands pay later".* One boda-boda stage chairperson narrated in a key informant interview (respondent 9, 2019).

Men were in position to take up the responsibility of enabling mothers reach health centres to deliver which was evident in the FGD in the intervention arm. This study programme encouraged the involvement of men to support mothers especially with low

income. During the FGDs, men revealed that they support the programme strongly and would like to see it continue for a longer time.

> *"...I accept that the burden of paying for transport costs, buying the supplies and other requirements for the mother and the newborn baby usually rests on me as the household head",* a man said.

During health education sessions at the health facilities, mothers were encouraged to save money in the savings boxes. This money was purposely for paying the transport fares despite the fact that mothers are very poor.

> *"...I saved eighteen thousand Ugandan shillings for the last two months and I was able to pay for the transport fare to Mayuge-Bukooli health centre III. I got this knowledge from the health worker when I went for my first antenatal visit"* a happy mother said during an in-depth interview in Kitoda village (respondent 2, 2019).

Boda-boda riders expressed interest in knowing how beneficial this study would be to their commercial riding business since the pregnant mothers whom they were to transport to health facilities were mostly low-income earners. During the FGDs, boda-boda riders believed that the mothers have no money and after the project, they would not be able to pay for transport fares.

> "…*This practice can only exist for a short time. At the beginning, they will actively participate because of the free calls and saving in the box. How best can we help them to keep paying for the transport fares? And we wholesomely agree that much as it is the responsibility of the man, let mothers continue saving with the box".*

With reference to the boda-boda riders and the mothers, terms of payment for the transport service were agreed upon by the two parties. One of the boda-boda riders said during the FGDs at the baseline survey:

> *"...Most riders don't own motorcycles. The people who buy for them tend to take it back home at night. Secondly, the owners of the motorcycles want the money paid immediately, therefore becoming very difficult for mothers who do not possess money at the time. In most cases we need payments for transport fares made immediately"* This was a boda-boda rider at Buzaya stage. *"Many times, women and their families cannot or do not pay, even after taking them to the health facility. Families do not adequately prepare for the expense of boda-boda transport during labour. That is why at times we tell them to pay for the transport before leaving for the health centre"* another boda-boda rider added.

However, majority of mothers saved money in the boxes which they paid to boda-boda riders and 70.5 percent of the mothers used boda-boda as transport means to the health facilities in the intervention arm.

> *"...I had no challenge in paying for my transport fare to the health centre to deliver my baby because I saved money in the box."* A mother said in an in-depth interview (respondent 14, 2019).
>
> This was supported by a boda-boda rider's interview (respondent 27, 2019) who said; *"...This time round, mothers are in better position to pay for their own fares without begging men. Out of the twelve mothers I transported to the health facilities, ten were able to pay me on arrival. Only two mothers referred me to their husbands."*

The parity (number of pregnancies) of mothers at the time of this study did not significantly influence the maternal outcome. Mothers with number of pregnancies 3 – 4 and 5 – 6 had no statistically significant influence on health facility-based deliveries ($p>0.05$). This was not different for the rest of the ranges of numbers of the pregnancies for mothers in this study. It appears as though majority of mothers were young but with close observation, it reveals that they had given birth to a bigger number of children. In the key informant interviews with health workers at Nambale and Nawandala HCs, their

opinions were not very different when describing the number of children of these young mothers:

> "*…For the 8 years I have worked in this health centre, majority of mothers delivering their first or second babies are teenagers. But also, many mothers come to our health centre giving birth to their third or fourth baby. We have gotten the challenge of lack of houses for the midwives until one time we lost a teenage mother.These mothers need to be given so much attention. This prompted the in-charge to improvise a room for midwives to work even at night"* (Respondent 5, 2019) of one of the health centres in the intervention arm.

The in-charge of the health facility (respondent 6, 2019) added;

> *"...It was necessary to utilize a little of the primary health care (PHC) funds to furnish one room for the midwives to save young mothers at night who are giving birth all the time."*

Critically looking at distance from homes to the health facilities and its relationship with the maternal outcome was not very different from number of pregnancies of mothers. A statistically significant influence of distance between health centres and homes of mothers was not realized with health facility-based deliveries. For majority of mothers, distance between their homes and a health centre was 3 – 4 km and 5 – 6 km respectively. This is not a walkable distance especially for a pregnant mother. At Kiwanyi boda-boda stage in the intervention arm, in a FGD, a member who is a VHT said;

> "*…It is a long distance between Kiwanyi village and Nawandala HCIII, a mother cannot walk that distance, and more so when in labour, let husbands take it into consideration to pay for transport of mothers."*

Notably, means of transport used by pregnant mothers to reach health centres significantly influenced health facility-based deliveries. In both the control and

intervention arms, majority of the mothers used motorcycles (boda-boda) as means of transport to the health centres. Bicycle as a means of transport had no association with health facility-based deliveries. Mothers who used motorcycle as a means of transport to health centres were 2.432 times more likely to deliver from health centres. Motorcycle as a means of transport had statistically significant influence on health facility-based deliveries (p=0.001; CI=1.419 – 4.168). Similarly, mothers walking as a means of transport to health centre were 15.532 times more likely to deliver in health centres than those with vehicles and bicycles and was statistically significant (p=0.000; CI=7.941, 30.382). Due to lack of transport means for some mothers, some time back, mothers used to deliver from homes under the care of their relatives and TBAs.

> *"…Long ago, we used to deliver from banana plantations and on the way, which made us get problems while giving birth. So, this project has saved us from all those problems, we are now very happy, let the project continue."* This was stated during the FGD in the intervention arm.

Residential places for mothers had no significant bearing on health facility-based supervised deliveries. Rural residents had no association with deliveries at health centres. Also, urban residents statistically significantly did not influence health facility-based deliveries. At the end of the study when an in-depth interview was conducted at Bugono health centre IV one of the health centres in rural community, a midwife (respondent 19, 2019) stated that their number of deliveries had started increasing.

> *"…Mothers have been delivering one or two babies a day but for the last few months, 4 to 5 babies are delivered daily…"* Midwife at Bugono HCIV stated (respondent 19, 2019).

Table 4.4: Influence of socio-demographic characteristics of mothers on maternal outcome

Predictive variable	Control N=248 (%)	Intervention N=255(%)	Odds ratio (95% CI)	P-value
Marital status				
Divorced/Seperated	3 (1.2)	6 (2.4)	*1*	
Married	245 (98.8)	249 (97.7)	0.329 (0.009, 0.169)	0.086
Age				
≤15-24 years	100(40.3)	88(34.5)	*1*	
25-34 years	78(31.5)	88(34.5)	10.269 (2.232, 47.259)	0.003
35-44 years	36(14.5)	58(22.8)	17.189 (2.598, 113.748)	0.003
45 and above	34(13.7)	21(8.2)	5.1268 (2.204, 11.926)	0.000
Educational level				
None	16(6.5)	19(7.5)	-	
Primary	154(62.1)	136(53.3)	*1*	
Secondary	64(25.8)	100(39.2)	41.500 (10.697, 161.004)	0.000
Higher	14(5.7)	0(0.0)	-	
Level of income				
Low	147(59.3)	165(64.7)	-	
Middle	84(33.9)	80(31.4)	*1*	
High	17(6.9)	10(3.9)	0.566 (0.152, 2.114)	0.397
Religion				
Moslem	81(32.7)	81(31.8)	*1*	
Catholic	56(22.6)	49(19.2)	0.089 (0.019, 0.420)	0.002
Protestant	29(11.7)	98(38.4)	0.019 (0.003, 0.122)	0.000
Others	82(33.1)	27(10.6)	0 .001 (0.000, 0.007)	0.000
Number of pregnancies				
1-2	56(22.6)	46(18.0)	*1*	
3-4	118(47.6)	131(51.4)	0.196 (0.096, 0.399)	0.070
5-6	68(27.4)	76(29.8)	0.336 (0.137, 0.998)	0.062
7+	6(2.4)	2(0.8)	-	
Distance from HCs				
Less than 1	16(6.5)	7(2.8)	*1*	
1-2	53(21.4)	46(18.0)	0.031 (0.011, 0.048)	0.085
3-4	93(37.5)	104(40.8)	0.130 (0.233, 1.647)	0.051
5-6+	86(34.7)	98(38.4)	0.986 (0.066, 1.329)	0.073
Means of transport used				
Bicycle	53(21.4)	38(15)	*1*	
Motorcycle	127(51.2)	180(70.5)	2.432 (1.419, 4.168)	0.001
Vehicle	19(7.7)	7(2.5)	-	
Walk	49(19.5)	30(12)	15.532 (7.941, 30.382)	0.000
Residence				
Rural	212(85.5)	231(90.6)	*1*	
Urban	36(14.5)	24(9.4)	33.494 (11.143, 100.680)	0.077

Note: the italic *1* in the OR is the controlled variable used.

4.4.2 Influence of socio-demographic characteristics of boda-boda riders on maternal outcome

Considering results in table 4.5, socio-demographic characteristics of boda-boda riders were also analysed using the logistic regression model. This was aimed at determining the socio-demographic characteristics for boda-boda riders that influence health facility-based deliveries.

Marital status had no statistically significant influence on health facility-based deliveries. However, boda-boda riders who were married had a role in the improvement of health facility-based deliveries. In the FGDs conducted with the boda-boda riders, mothers and stakeholders, it was noted that boda-boda riders referred to themselves as mature people and were knowledgeable about what mothers experienced during pregnancy.

> *"…We have been missing movers in the management of mothers and more so those in labour. As a married man with three children, I have seen my wife hussle with pain. Therefore, I am going to help mothers whenever contacted*."

The age of boda-boda riders was found to be significantly influencing health facility-based supervised deliveries as seen in table 4.5. On logistic regression, there was statistically significant influence of only age group 25 – 34 years on maternal outcome (p=0.001). Mothers exposed to boda-boda riders who were between the ages of 25 – 34 years were 2.021 times more likely to deliver from health centres compared to other age groups (p=0.001 and CI = 1.388 – 2.989).

In one of the in-depth interviews with boda-boda riders, he attached his role in helping mothers to his age. He said (respondent 43, 2019);

> *"...I am 32 years of ages. I am in a better position to understand what mothers go through and initially I was transporting them though not very serious. I am now conscious after the sensitization and training that I will be responding in time when contacted by a mother and this will show my maturity."*

The education level of boda-boda riders was found to be significantly influencing deliveries in health facilities. Both primary and secondary levels of education of the boda-boda riders had statistically significant influence on health facility-based deliveries. Mothers transported by boda-boda riders who had never attended school or with primary level of education were 0.875 times less likely to deliver from health facilities compared to other levels (p=0.007 and CI=0.662 – 1.237). Meanwhile, mothers transported by boda-boda riders of secondary level of education were 1.442 times more likely to deliver from health facilities compared to other levels of education (p=0.000 and CI=0.985 – 4.067).

However, this was not the case in an in-depth interview with one of the boda-boda riders. He refuted being bothered with the work of transporting people due to lack of higher-level qualifications.

> *"...I stopped in primary five. I am not affected at all with my level of education in the transportation of mothers."* A boda-boda rider (respondent 41, 2019) stated.

Health facility-based deliveries were not statistically significantly influenced by religion (p=0.211*)*. Catholics, Protestants, Moslems and other religious believers, statistically had no significant influence on deliveries at health centres.

> *"…The community I serve with the boda-boda transport is mixed with different religions. Personally, I have always transported mothers who are not of my religion. I pray on Sundays but I have been contacted when there is an emergency and run very fast to save mothers and babies."* This was during one of the FGDs during the study exit in the intervention arm.

Similarly, the income level of boda-boda riders had no significant influence on deliveries at health facilities. However, middle income level of the boda-boda riders had a statistically significant influence on health facility-based deliveries. Mothers exposed to boda-boda riders who had middle level of income were 0.224 times less likely to deliver in a health centre compared to other levels of income (p=0.045; CI = 0.083 – 0.697).

> *"…Like mothers, we boda-boda riders do not have money. Instead, we have good Samaritans giving us motorcycles to engage in boda-boda transport. Few of us own motorcycles."* One boda-boda stage chairperson narrated in a key informant interview (respondent 8, 2019).

Ownership of the motorcycle had a statistically significant influence on the health facility-based deliveries. Mothers who got in contact with boda-boda riders who owned the motorcycles were 1.274 times more likely to deliver from health centres compared to when boda-boda riders did not own motorcycles (p=0.002; CI =0.872 – 3.094). Boda-boda riders were encouraged to work hard and own motorcycles.

> *"…Most riders don't own motorcycles. The owners of the motorcycles want the money paid immediately; it becomes very difficult for mothers who do not possess money at the time."* This was a boda-boda rider at Buzaya stage during FGD. He continued; *"…Many times women and their families cannot or do not pay, even after taking them to the health facility. In such situations, it needs when the motorcycle belongs to you."*

Table 4.5: Socio-demographic characteristics of boda-boda riders influencing maternal outcome

Variables	Intervention N = 100 (%)	Control N = 92 (%)	OR (95% CI)	P-value
Age				
<18 yrs	2 (2.0)	0 (0.0)	-	
18 – 24	33 (33.0)	19 (20.7)	*1*	
25 – 34	57 (57.0)	63 (68.5)	2.021 (1.388 – 2.989)	0.001
35 and above	8 (8.0)	10 (10.8)	-	
Level of education				
Tertiary	2 (2.0)	0 (0.0)	*1*	
Secondary	37 (37.0)	42 (45.7)	1.422 (0.985 – 4.067)	0.000
≤ Primary	61(61.0)	50 (54.3)	0.875 (0.662 – 1.237)	0.007
Level of income				
Low	42 (42.0)	54 (58.7)	*1*	
Middle	53 (53.0)	35 (38.0)	0.224 (0.083 – 0.697)	0.055
High	5 (5.0)	3 (3.3)	-	
Marital status				
Not-married	19 (19.0)	15 (16.3)	*1*	
Married	81(81.0)	77 (83.7)	3.426 (1.685 – 6.933)	0.102
Religion				
Catholic	29 (29.0)	25 (27.2)	*1*	
Protestant	33 (33.0)	49 (53.2)	0.772 (0.336 – 1.438)	0.067
Moslem	35 (35.0)	10 (10.9)	0.375 (0.228 – 0.919)	0.066
Others	3 (3.0)	8 (8.7)	-	
Ownership of the motorcycle				
For another person	46 (46.0)	53 (57.6)	*1*	
Personal	54 (54.0)	39 (42.4)	1.274 (0.872 – 3.094)	0.002

Note: the italic *1* in the OR is the controlled variable used.

4.4.3 Socio-demographic characteristics as predictors of maternal outcome

The study aimed at establishing the predictors of maternal outcome (health facility-based supervised deliveries) in the east – central region, Uganda. The study subjected the socio-demographic characteristics that showed a significant influence to the outcome to a multiple logistic regression model and results were presented.

Also, a multiple logistic regression analysis was performed to test the first hypothesis of the study. The sig. value which promotes the judgment of results either significant or not, was 0.05. Table 4.6 indicates results of the multiple logistic regressions of the socio-demographic characteristics for the mothers and boda-boda riders.

Age, religion and means of transport for mothers, ownership of motorcycle and age of the boda-boda riders were 1.128 times more likely help mothers deliver from health centres compared to other characteristics. Generally, the influence of socio-demographic characteristics was found to be statistically significant (p=0.003). It can be rightly reported at this level that the first null hypothesis which states that socio-demographic characteristics of mothers and boda-boda riders do not have a significant influence on maternal outcome is rejected.

Table 4.6 indicates further how each of the socio-demographic characteristics of the mothers and boda-boda riders predicts maternal outcome in the east – central Uganda. In interpreting the results, not all socio-demographic characteristics predict changes in deliveries from health centres.

To this effect, age, religion and means of transport used by mothers to reach health centres were the only socio-demographic characteristics for mothers which statistically significantly predicted health facility-based deliveries.

Mothers who were between 25 – 34 years were 17.581 times more likely to deliver from health centres than those below 25 years and above 45 years (p=0.001; CI=3.361 – 91.981). Similarly, mothers who were between 35 – 44 years were 247.660 times more

likely to deliver from health centres compared to mothers below 25 years and above 45 years (p=0.000; CI=13.519 – 4536.879).

Notably, mothers who were protestants, were 0.122 times less likely to deliver from health centres compared to other religions but had statistically significant influence on maternal outcome (p=0.013; CI=0.023, 0.636). This was similar to Moslem pregnant mothers who were 0.197 times less likely to deliver from health centres compared to other religions and with statistically significant influence on maternal outcome (p=0.050; CI=0.022, 1.796). Other religions had no significant influence on maternal outcome (p=0.064). However, Catholic as a religion of pregnant mothers had no association with health facility-based deliveries.

Lastly, there was a relationship between the means of transport used by the mothers to reach health centres and health facility-based deliveries on further regression analysis. Transport means included; vehicles, motorcycles, bicycles and walking to the stage on foot. Mothers using motorcycles as means of transport were 5.132 times more likely to deliver from health centres compared to using other means of transport, and had a statistically significant influence on maternal outcome (p=0.001; CI=1.017 – 42.168). Walking to the health centre to deliver was not different from motorcycle transport. Mothers were 35.732 times more likely to deliver from health centres and also had a statistically significant influence on the maternal outcome (p=0.000; CI=9.541, 130.360).

For the case of boda-boda riders, ages between 25 – 34 years statistically significantly influenced health facility-based deliveries. Mothers who contacted boda-boda riders of

that age group were 11.351 times more likely to deliver from health centres compared to other age groups (p=0.000; CI=2.785 – 53.284).

Like age, ownership of the motorcycles by the boda-boda riders statistically significantly influenced health facility-based deliveries. Boda-boda riders who had their personal motorcycles statistically influenced deliveries at health centres. Mothers who contacted boda-boda riders having personal motorcycles were 3.549 times more likely to deliver from health centres compared to those who had motorcycles of other people (p=0.002; CI=0.992 – 8.658).

Table 4.6: Socio-demographic characteristics of mothers and boda-boda riders as predictors for maternal outcome

Predictive variable	OR (95% CI)	P-value
Socio-demographic characteristics		
Control	*1*	
Intervention	1.128 (0.133, 7.497)	0.003
Mothers' characteristics as predictors		
Age		
≤15-24 years	*1*	
25-34 years	17.581 (3.361, 91.981)	0.001
35-44 years	247.660 (13.519, 4536.879)	0.000
Education		
Primary	*1*	
Secondary	8.100 (1.778, 36.890)	0.077
Religion		
Catholic	*1*	
Protestant	0.122 (0.023, 0.636)	0.013
Moslems	0.197 (0.022, 1.796)	0.050
Others	0.211 (0.007, 6.086)	0.064
Means of Transport		
Vehicle	-	
Bicycle	*1*	
Motorcycle	5.132 (1.017, 42.168)	0.001
Walk	35.732 (9.541, 130.360)	0.000
Boda-boda riders characteristics as predictors		
Age		
<18 yrs	-	
18 – 24	*1*	
25 – 34	11.351 (2.785 – 53.284)	0.000
35 and above	-	
Level of education		
Tertiary	*1*	
≤ Primary	0.225 (0.098 – 1.130)	0.051
Secondary	1.093 (0.546 – 4.437)	0.063
Ownership of the motorcycle		
For another person	*1*	
Personal	3.549 (0.992 – 8.658)	0.002

Note: the italic *1* in the OR is the controlled variable used.

4.5 Attitude of mothers towards community based maternal referral

This subsection unfolds the yard stick in the measurement of attitudes of mothers as positive or negative if mothers agreed or disagreed respectively with community-based referral mechanism and how it affects deliveries in health centres as shown in table 4.7. According to the responses, attitude of mothers on the roles played by the boda-boda riders in transporting mothers to health centres was different when contacted. However, in the post intervention phase, mothers positively responded depicting a positive attitude as shown in table 4.7. Here, 97.2% of the mothers in the post intervention phase in the intervention arm agreed that boda-boda riders play a role in their transportation to the health centres to deliver; and only 38.8% of the mothers agreed in the control arm. However, it is noted in the pre intervention phase that 67.5% of mothers' attitude was positive in the intervention arm and 32.5% negative. In the control arm and in the pre intervention phase of the study, 38.3% were positive and 61.7% negative.

In order to determine the impact of the intervention, DID model was considered. The average value which determined the impact of intervention (change effect) for the attitude of mothers on the roles of boda-boda riders in the transportation of mothers to health centres was -1.028, and had a statistically significant influence (p=0.000).

During the baseline survey, few mothers had experienced signs and symptoms of pregnancy complications which included vaginal bleeding, fever, pressure, headache/blurred vision amongst others in the intervention arm (11.4%) compared to 10.1% in the control arm. Exactly 88.2 percent of the mothers were positive on the use of boda-boda transport to go to health centres after experiencing the signs and symptoms of pregnancy complications in the intervention arm. In the control arm,

69.4% of the mothers also had a positive attitude on the use of boda-boda riders after experiencing the signs and symptoms of pregnancy complications.

DID model was used to determine the average value and the impact of intervention (change effect after training of mothers) at -2.956, which was a statistically significant association with the positive attitude of mothers (p=0.000).

According to the respondents (mothers), 70.2% of them in the intervention arm had a positive attitude on the comfort of the locally available means of transport since that is what was at their exposure, while 29.8% had a negative attitude on the comfort of the boda-boda transport for the pre intervention phase. This was not different from the control arm, where 54.8% of the mothers had a positive attitude towards the comfort of the boda-boda transport to the health centres while 45.2% had negative attitude towards the comfort of boda-boda transport in the pre intervention phase. However, mothers became more comfortable with the locally available boda-boda transport and 91.3% had a positive attitude in the intervention arm in the post intervention phase compared to 49.6% in the control arm as shown in the table 4.7. The average value when the DID model was applied to determine the change effect, was statistically significant (DID= -0.654; p=0.000).

Mothers further believed that it was necessary to recommend fellow mothers to use the locally available boda-boda transport to health centres. In the pre intervention phase, 71% of the mothers had a positive attitude towards recommending fellow mothers to use the available boda-boda transport, while the attitude of 29% of mothers was negative in the intervention arm. In the control arm, 53.3% of the mothers had a positive attitude towards recommending fellow mothers to use boda-boda transport and 46.7%

of the mothers had negative attitude. In the post intervention phase, 81.2% of the mothers in the intervention arm had a positive attitude towards recommending fellow mothers to use boda-boda transport and only 47.9% in the control arm. The average value to determine the change effect was statistically significant (DID = -0.421; p=0.029).

Table 4.7: Attitudes of mothers towards community-based referrals

		Pre		**Post**		**DID**	**P-value**
SN	Attitude of mothers	Interv. N= 255	Control N=248	Interv. N=255	Control N=248		
1.	Attitude 1**(Positive)**	172 (67.4%)	95 (38.3%)	148 (97.2%)	98 (38.8%)	-1.028	0.000
2.	Attitude 2 **(Positive)**	29 (11.4%)	25 (10.1%)	225 (88.2%	172 (69.4%)	-2.956	0.000
3.	Attitude 3 **(Positive)**	179 (70.2%)	136 (54.9%)	133 (91.3%)	123 (49.6%)	-0.654	0.000
4.	Attitude 4 **(Positive)**	181 (71%)	132 (53.3%)	207 (81.2%)	119 (47.9%)	-0.421	0.029

Attitude 1: Attitude of mothers on the roles of boda-boda riders to transport mothers.
Attitude 2: Attitude of mothers on the use of boda-boda transport on experiencing pregnancy related signs and symptoms.
Attitude 3: Attitude of mothers on the comfort of using boda-boda transport.
Attitude 4: Attitude of mothers on recommending fellow mothers to use of boda-boda transport.

4.5.1 Influence of the attitude of mothers on maternal outcome

The influence of attitude of mothers towards community-based referrals on maternal outcome was determined by using the logistic regression model. According to table 4.8, there were variations in responses based on the different attitude variables. Results in table 4.8, generally, a mother with a positive attitude towards community-based referral was 0.467 times less likely to deliver from a health centre compared to those with

negative attitude but with a statistically significant influence (p=0.022; CI=0.243 – 0.898).

Specifically, considering the roles of boda-boda riders in transporting pregnant mothers to health centres, mothers who had a positive attitude towards the roles of boda-boda riders were 2.439 times more likely to deliver from health centres compared to those with negative attitude towards the roles of boda-boda riders. Positive attitude of pregnant mothers on the roles of boda-boda riders had a statistically significant influence on the health facility-based deliveries (p=0.003; CI=1.351, 4.403). In a FGD during exit in the intervention arm, boda-boda riders appreciated the impact of training mothers. One boda-boda rider said;

> *"…Instead, it was us the boda-boda riders who had a negative attitude towards transporting mothers to health centres. We thought they have no money to pay for their transport, being that you cannot make an appointment with the labour pains. I think the attitude of mothers has also changed. Why do I say so? Mothers have seriously saved money in the boxes to pay us when we transport them. Having realized our roles, they also positively changed their attitudes towards us. That is why they save in the boxes."*

Attitude of mothers to use boda-boda transport when they experience pregnancy related signs and symptoms did not have a statistically significant influence on health facility-based deliveries (p=0.456), despite the fact that mothers had positive attitude to use the boda-boda riders. Pregnant mothers with positive attitude towards the use of boda-boda riders when they experience signs and symptoms of pregnancy complications, were 1.310 times more likely to deliver from health centres compared to those with negative attitude (p=0-456; CI= 0.644 – 2.666). The mothers with positive attitude to use boda-boda riders when they experienced complications were very few and even after the intervention, the number did not improve, which affected deliveries in health centres.

> *"…There is no reason for me to spend money for transport going to the health centre when not having any problem with my pregnancy"* ... a mother said during an in-depth interview (respondent 2, 2019).

On the contrary, during the in-depth interview, a boda-boda rider (respondent 16, 2019) in one of the sub counties of intervention said;

> *"…All the mothers I transported to the health centres seemed to be having labour pains. I'm just a boda-boda rider who may not know all the signs and symptoms for the labour pains, but during the training, trainers told us that bleeding and other fluids are one of them. This meant that they saw blood and fluids before calling for transport. This implied that their attitude became positive and they contacted the boda-boda riders."*

The attitude of mothers on the comfort to use boda-boda transport to health centres, had a significant influence on deliveries in health facilities. Pregnant mothers who had a positive attitude on the comfort of using boda-boda transport, were 4.010 times more likely to deliver from health centres compared to those with negative attitude (p=0.005; CI= 1.520 – 10.583).

> *"…There is no other option for transport to the health centre; instead, a boda-boda will do it for you. Our village is remote, it has no vehicles."* One of the mothers said in an in-depth interview (respondent 4, 2019).

However, one of the VHT coordinator (respondent 7, 2019) retaliated that much as boda-boda riders were there to offer transport services, it was difficult for them to offer the required services especially to mothers already experiencing labour pains.

> *"…It will require two people on a boda-boda if a mother waited to have labour pains before going to the health centre to deliver. This is quite expensive for a rural mother to pay transport fares for two people. Surely, mothers opt for plan B. Being a trained person, I always advise mothers to consider going to health centres early to deliver."*

Finally, mothers had a positive attitude on the recommendation of fellow mothers to use boda-boda transport to go to health centres to deliver. Pregnant mothers with positive attitude to recommend fellow mothers to use boda-boda transport to reach health centres

were 0.274 times less likely deliver from health centres compared to mothers with negative attitude but with statistically significant influence (p=0.006; CI= 0.108, 0.695).

> *"…We wholesomely recommend all mothers in our community to always contact boda-boda riders for transport to health centres when in labour and other pregnancy related complications."* This was during the two FGDs before and after the interventions.

However, one of the boda-boda riders in one of the two FGDs cautioned fellow men not to mistake them for loving their women.

> *"…Men are funny. They do not stay at home with their wives. In fact, most of them are in trading centres. But they even beat the pregnant wives because of calling someone. Therefore, I encourage fellow men to change our ways."*

Table 4.8: Attitude of mothers influencing maternal outcome

Variables	**Odds ratio (CI 95%)**	**P-value**
Attitude of mothers		
Control	*1*	
Intervention	0.467 (0.243, 0.898)	**0.022**
Boda-boda riders play a role in transporting mothers to health centres		
Disagree	*1*	
Agree	2.439 (1.351, 4.403)	**0.003**
Pregnancy related danger signs and symptoms preempt mothers to use boda-boda transport to health centres.		
Disagree	*1*	
Agree	1.310 (0.644, 2.666)	0.456
Boda-boda transport is comfortable		
Disagree	*1*	
Agree	4.010 (1.520, 10.583)	**0.005**
I can recommend another pregnant woman to utilize the Mama – boda-boda transport services		
Disagree	*1*	
Agree	0.274 (0.108, 0.695)	**0.006**

4.5.2 Attitudes of mothers as predictors of maternal outcome

The study aimed at establishing the predictors of maternal outcome (health facility-based supervised deliveries) in the east – central Uganda. The study subjected the attitude variables that showed significant relationship with the maternal outcome to a further logistic regression model and results were presented as shown in table 4.9. This was also used to test the second hypothesis based on the significant value 0.05 to to promote the judgement of results.

Mothers with positive attitude were 56.962 times more likely to deliver from health centres compared to those with negative attitude. The association was found to be strong and statistically significant (p=0.000). Since the results have been found to be significant, it can be reported at this level that the second null hypothesis which states that attitudes of mothers towards community-based referral do not have a significant influence on maternal outcome in east – central Uganda, is rejected.

Table 4.9 indicates further how each of the attitude variables predicts maternal outcome in the east – central Uganda. In interpreting the results, not all attitude variables predict changes in community-based referral for maternal outcome just as it is noticed that all did not have an influence with positive implications.

To this effect, only attitude of mothers on the comfort of boda-boda transport for pregnant mothers to health centres statistically significantly predicted health facility-based deliveries as seen in table 4.9. Pregnant mothers with positive attitude on the comfort of boda-boda transport for mothers to health centres, were 8.352 times more

likely to deliver from health centres compared to those with negative attitude (p=0.011; CI= 1.620 – 43.048).

Attitude of mothers on the roles of boda-boda riders to transport mothers to health centres and the recommendation of fellow mothers to use boda-boda transport did not statistically significantly influence health facility-based deliveries (p=0.087 and p=0.653 respectively).

Table 4.9: Attitude of mothers as predictors of maternal outcome

Predictive variable	**Odds ratio (CI 95%)**	**P-value**
Attitude of mothers		
Control	*1*	
Intervention	56.962 (10.043, 99.738)	**0.000**
Boda-boda riders play a role in transporting mothers to health centres		
Disagree	*1*	
Agree	0.324 (0.089, 1.180)	0.087
Boda-boda transport is comfortable		
Disagree	*1*	
Agree	8.352 (1.620, 43.048)	**0.011**
I can recommend another pregnant woman to utilize the Mama – boda-boda transport services		
Disagree	*1*	
Agree	1.472 (0 .274, 7.916)	0.653

4.6 Communication system for community-based referrals

Results were provided for the pre and post intervention phases for comparison in the control and intervention arms. The study sought to find out whether mothers could use phones to communicate for transport to reach health centres.

From table 4.10, the mothers who possessed phones and were to use their phones to contact the boda-boda riders in the intervention arm were 67.6% in the pre intervention, while in the control arm, only 35.4% of mothers possessed phones to contact the boda-boda riders for transport. In the post intervention phase, the proportion of mothers who possessed phones and contacted the boda-boda riders using their phones was 86.3% in the intervention arm and only 41.6% in the control arm. With DID analysis, the average value for mothers who possessed phones was -0.053. There was a change effect as a result of the intervention of training. However, it was not statistically significant (p=0.385).

Much as majority of mothers possessed phones, some mothers used other people's phones to contact boda-boda riders. In the pre intervention phase, 24.7 percent mothers in the intervention arm and 26.9 percent in the control arm used another persons' mobile phone to communicate to the boda-boda riders for transport to health centres. In the post intervention phase, only 23 percent of mothers in the intervention arm and 41.2 percent in the control arm used another persons' mobile phone to communicate to boda-boda riders for transport. In finding out whether mothers used other people's phones to communicate, the average value attained to determine the change effect was -0.052, with no statistically significance of the change effect (p=0.354).

Majority of mothers used their husbands' phones to contact the boda-boda riders for transport. In the pre intervention phase, 66.7% of mothers in the intervention arm and 57.7% of mothers in the control arm used husbands' phones to communicate; whereas, 75.2% of mothers in the intervention arm and 54.9% of mothers in the control arm used

husbands' phones to communicate in the post intervention phase. However, few mothers used friends', relatives' and neighbours' mobile phones to communicate to boda-boda riders for transport as seen in table 4.10. Considering DID analysis for mothers' relationship with the person whose phone the mother used to communicate for transport, the average value was 0.256 and the change effect was found to be not statistically significant (p=0.063) as seen in table 4.10.

However, for mothers to call boda-boda riders and vice versa, they were supposed to use the free calls when registered in the CUG or load airtime. Mothers and boda-boda riders also loaded their phones with airtime although they had received bonus airtime of ten thousand shillings (Uganda shilling) in addition to the free calls made to other members who were in the CUG. Only 51% of mothers accepted to load airtime in the intervention arm compared to 38 percent in the control arm. Interestingly, some mothers in the intervention arm loaded their phones with airtime to call the boda-boda riders for transport to the health centres. Only 38% of the mothers loaded airtime in the intervention arm compared to 36% in the control arm. The average value for mothers loading airtime on their phones was -0.411and its change effect was also not statistically significant (p=0.226).

The study was to find out the approaches which mothers used to contact the boda-boda riders. Many options were in place which included; phone calls, sending a message, sending a person to the boda-boda stage or the mother walking to the stage. In the pre intervention phase, specifically in the intervention arm, mothers who made phone calls to the boda-boda riders for transport to the health facilities were only 18.8%. However,

many mothers sent a person to pick the boda-boda rider for transport to the health facility (60%). Similarly, in the control arm, few mothers made phone calls (17.3%), 61% sent a person and 20.5% walked to the stage to get a boda-boda rider.

At the exit of the study, majority of the mothers made phone calls to the boda-boda riders for transport (79.2% in the intervention arm). The rest of the mothers walked to the stage or sent someone to pick the rider. Only 35% of the mothers in the control arm made phone calls. Other mothers just walked to the stage of the boda-boda riders and the rest sent someone to pick the riders (22.3% and 42.7% respectively). Equally, the average value for the approaches used by pregnant mothers to communicate to boda-boda riders for transport and other key stakeholders was -0.500, and the change effect was found to be statistically significant (p=0.001).

Most of the mothers estimated 31 – 60 minutes which boda-boda riders took to arrive at the homes of mothers when they called for transport to the health facility in the pre intervention arm. This was in both the intervention and control arms (54.9% and 53.2% respectively). However, a big number of mothers also believed that the riders would arrive between 21 to 30 minutes (31.4% in the intervention arm and 37.1% in the control arm). After the intervention, there was an improvement in the post intervention where boda-boda riders took 21 to 30 minutes to reach 69.6% of the mothers when contacted in the intervention arm. While in the control arm, it took a big number of boda-boda riders 31 to 60 minutes to reach 41.2% of the mothers when contacted as shown in table 4.10. The average value for the time interval boda-boda riders took to

arrive when contacted was 0.391and the change effect was statistically significant as shown in table 4.10 (p=0.000).

Mothers and boda-boda riders experienced challenges when communicating to each other for transport. In the pre intervention phase, specifically in the intervention arm, 45.9% of the mothers confirmed the switching off of the phones by the boda-boda riders. Then 38.4% acknowledged network unavailability and 15.7% believed that the boda-boda riders did not want to pick phone calls. This was not different in the control arm, where 50.2% of the mothers said boda-boda riders switched off their phones, 31.6% for network challenge and the rest (18.2%) not being picked by the boda-boda riders.

There was not much difference in the post intervention phase, where 43.5% of the mothers said boda-boda riders switched off their phones, 42.2% acknowledged network unavailability and 14.3% of the mothers' calls were not picked by the boda-boda riders in the intervention arm. In the control arm, 49.7% of the mothers confirmed that boda-boda riders switched off their phones, 36.2% experienced network challenges and the rest were not picked by the boda-boda riders. Like in time intervals for the boda-boda riders to arrive, the challenges experienced by mothers in their communication had an average value of -0.987, and the change effect was statistically significant (p=0.000).

Table 4.10: Communication system for community-based referrals

Variables		**Pre**		**Post**			
Communication sustem variables	Sub variables	Interv. N=255	Control N=248	Interv. N=255	Control N=248	DID	P-value
Communication 1 (Yes)		167 (67.5%)	88 (35.4%)	220 (86.3%)	103(41.6%)	-0.053	0.385
Communication 2 (Yes)		88 (34.5%)	160 (64.5%)	35 (13.7%)	145 (58.5%)	-0.052	0.354
Communication 3 (Yes)	Husband	58 (66.7%)	92 (57.7%)	26 (75.2%)	80 (54.9%)	0.256	0.063
	Relative	5 (5.4%)	14 (8.4%)	1 (2.4%)	2 (1.6%)		
	Friend	11 (12.3%)	26 (16.4%)	3 (7.8%)	32 (22.1%)		
	Neighbor	14 (15.6%)	28 (17.5%)	5 (14.6%)	31 (21.4 %)		
Communication 4 (Yes)		130 (51%)	94 (38%)	97 (38%)	89 (36%)	-0.411	0.226
Communication 5 (Yes)	Phone call	48 (18.8%)	43 (17.3%)	202 (79.2%)	87 (35%)	-0.500	**0.001**
	Messaging	0 (0%)	3 (1.2%)	3 (1%)	0 (0%)		
	Send a person	153 (60%)	151 (61%)	38 (15%)	106 (42.7%)		
	Walking to them	54 (21.2%)	51 (20.5%)	12 (4.8%)	55 (22.3%)		
Communication 6 (Yes)	5-20 minutes	11 (4.3%)	18 (7.3%)	54 (21.3%)	41 (16.7%)	0.391	**0.000**
	21-30 minutes	80 (31.4%)	92 (37.1%)	177 (69.6%)	100 (40.3%)		
	31-60 minutes	140 (54.9%)	132 (53.2%)	16 (6.2 %)	102 (41.2%)		
	60+ minutes	24 (9.4%)	6 (2.4%)	8 (2.9%)	5 (1.8%)		
Communication 7 (Yes)	Phone off	117 (45.9%)	125 (50.2%)	111 (43.5%)	123 (49.7%)	-0.987	**0.000**
	No network	98 (38.4%)	78 (31.6%)	108 (42.2%)	90 (36.2%)		
	Does not pick	40 (15.7%)	45 (18.2%)	36 (14.3%)	35 (14.1%)		

Communication1: Possession of phones by mothers.
Communication2: Use of another person's phone to communicate to the boda-boda rider.
Communication3: Relationship between the owner of the phone and the mother.
Communication4: Loading of airtime on phones of mothers.
Communication5: Ways mothers use to communicate to the boda-boda riders.
Communication6: Time interval taken for the boda-boda rider to arrive when contacted by the mother.
Communication7: Challenges faced by mothers in communication.

4.6.1 Effect of communication system on maternal outcome

Communication system was based on seven sub variables used to establish its effect on health facility-based supervised deliveries as an outcome of community-based referrals in the east – central Uganda.

On logistic regression, results showed that there was a statistically significant effect of communication system on health facility-based deliveries. Pregnant mothers who accessed the communication system were 1.173 times more likely to deliver from health centres compared to those who did not access the communication system (p=0.001; CI=0.760 – 4.501).

Mothers possessed phones to determine the effect on deliveries from health centres. From the results in table 4.11, there was significant effect of phone possession on deliveries in health centres (p=0.003). Mothers who possessed phones were 3.813 times more likely to deliver from a health centre compared to those without phones (p=0.003; CI=1.559 – 9.324).

> *"…Fortunately, with this study, majority of mothers recruited had their own phones despite the fact that only one telecommunication network was needed."* A midwife who worked as a maternity in-charge (respondent 24, 2019) narrated.

She further explained that very few mothers registered other people's numbers for easy communication especially for the follow up.

> *"…Most of the mothers who had no phones were able to register numbers of other people. These mothers included those who had no MTN line. But they were not very many."* This was stated during an in-depth interview in the intervention arm.

This was not different in the control arm according to the key informant interview with one of the midwives (respondent 28, 2019) who was also recruiting mothers for the study.

> *"...Mothers possessed phones. They had different numbers of telecommunication networks. However, most of them had Airtel and MTN lines."*

A mother who used another person's phone to contact the boda-boda rider for transport to the health centre was 1.372 times more likely to deliver from a health centre (p=0.539; CI=0.500 – 3.764) but had no statistically significance to the supervised deliveries in health centres.

Also, in the entire study area, it was clearly noted that other people had phones which mothers could use to contact boda-boda riders. These included; the spouses (husbands), relatives (who included siblings, parents and in laws), friends and even the VHTs. For mothers who did not possess phones, very few used friends' and relatives' phones to contact boda-boda riders. Majority of mothers used their husbands' phones to contact the boda-boda riders for transport.

During an in-depth interview with a midwife in the intervention arm (respondent 23, 2019) she stated that with the exception of few mothers, most mothers possessed phones.

> *"...Few of the mothers do not have phones. Some mothers say phones were spoilt. They opted to register the husbands' telephone numbers. Much as some of them were not comfortable using their husbands' contacts for communication,"* she narrated.

More people with phones close to pregnant mothers were still needed to help mothers to deliver in health centres. Pregnant mothers who had registered to use husbands' phones to communicate to the boda-boda riders for transport to the health centres were 1.604 times more likely to deliver from health centres compared to those who registered phones not belonging to their husbands (p=0.297; CI=0.661 – 3.896). However, it had no statistically significant relationship with deliveries at health centres. Supportive information was captured during the focus group discussion in the intervention arm.

> *"…We are all people of the same village. We need to help one another. Today is me and the other day will be you. Therefore, let us help each other in all ways to enable mothers go to health centres."* This was one member during a FGD in the intervention arm.

> *"…Really, I cannot see my wife interested in calling a boda-boda rider for transport to a health centre and I refuse to give her a phone. Whose baby is she going to give birth to? Men get serious."* A male VHT in that same FGD in the intervention arm added.

Similarly, pregnant mothers who had friendship with persons whose phones were registered to communicate to the boda-boda riders for transport to the health centres were 4.166 times more likely to deliver from health centres compared to those who were not friends (p=0.105; CI=0.743 – 23.343) but had no statistically significant effect.

Pregnant mothers who had relatives whose phones were used to communicate to the boda-boda riders for transport to the health centres were 0.211 times less likely to deliver from health centres compared to those with no relatives (p=0.031; CI=0.051 – 0.868) and had a statistically significant effect. Pregnant mothers who registered neighbours' phones to communicate to the boda-boda riders for transport to the health centres had no effect on health facility-based deliveries as seen in table 4.11.

Mothers were then asked if they loaded airtime on their phones; thereby enabling the study to establish the relationship between having airtime on phone and the maternal outcome. Despite the fact that mothers who loaded airtime on their phones were 1.110 times more likely to deliver from health centres, it had no statistically significant effect as seen in table 4.11 (p=0.466; CI=0.544 – 2.566).

From the results, it is clearly shown that there were increased deliveries when mothers loaded phones with airtime. The improvement in the number of mothers loading airtime on phones and the health facility-based deliveries was supported by the different stakeholders in the in-depth interviews.

> *"…Sensitization of mothers was continuously done during antenatal care by health workers at health facilities and VHTs in the community. Some of us know the importance of having airtime on phone."* This was during an in-depth interview in the intervention arm with a mother (respondent 22, 2019) who gave birth from a health centre.

The mother loaded her phone with airtime to call the boda-boda riders for transport to the health centres even after receiving the bonus airtime. From an in-depth interview of the same mother in the intervention arm; several reasons for loading phones with airtime were given.

> *"…The ten thousand airtime is little and not limited to calling any telecommunication network. I used it to call even people outside the study. However, with the knowledge attained, my phone was to have airtime all the time, so I had to load it."* A mother said.

Loading airtime did not prevent different stakeholders in the CUG enjoy the previlages. A midwife in the control arm in one of the health centres who was stranded with a mother at 2am who had obstructed labor and was referred to Iganga General Hospital

for further management but with no readily available transport means to effect the referral, testifies. Upon calling a member on the research team, the efforts made to help this mother were fruitful.

> *"...I made a phone call to one of the research assistants for coordination of transport to save the mother and indeed I was successful. You know, it is difficult to get transport here. Even boda-boda riders are difficult. However, one of them from this area known to some of the CUG members was conducted."* A midwife at Makuutu health centre III in the control arm narrated in an in-depth interview following the scenario of saving the mother with transport to the main hospital.
>
> *"...I don't know how we can tame these boda-boda riders to help mothers with transport to health centres."* She continued.

This study tested the approaches which mothers used to communicate to the boda-boda riders for transport to the health centres. These included; making a phone call, sending a message, sending a person to the boda-boda stage or walking to the stage. From the findings in table 4.11, approaches of communication to the riders by the pregnant mothers statistically significantly had effect on health facility-based deliveries.

Phone calling as an approach used to contact boda-boda riders had no effect on health facility-based deliveries. Pregnant mothers who sent telephone messages as an approach to use to contact boda-boda riders for transport to health centres, were 7.963 times more likely to deliver from health centre compared to those who could not affort to send a telephone message (p=0.029 CI=1.242 – 51.055). Sending telephone messages statistically had significant effect on deliveries at health centres.

Similarly, a mother sending a person as an approach to contact a boda-boda rider for transport was 10.561 times more likely to deliver from a health centre compared to

those who did not send people (p=0.023; 1.377 – 80.965). Sending telephone messages statistically significantly had effect on deliveries at health centres as shown in table 4.11.

Finally, for the approaches used by mothers to communicate, walking to the boda-boda stage was 39.117 times more likely to enable mothers deliver at health centres compared to other approaches (p=0.001; CI= 4.380 – 349.383). Walking to the stage had a statistically significant effect on health facility deliveries.

> *"…Initially, I used to walk to the boda-boda stage when I was to go to the health centre. For sure I was a little lazy. But when the study included me in the caller group, I called and directed the boda-boda rider to my home when I had a complication with my pregnancy. It was the same when I went to deliver."* This was narrated by a mother during an in-depth interview (respondent 33, 2019) in the intervention arm.

However, in the control arm, it was slightly different. Most of the mothers did not call boda-boda riders for transport to the health centres; they instead walked or sent someone to the stage.

> *"…I'm used to walking to the boda-boda stage or sending one of my children to call the boda-boda riders" …*A grown up mother (respondent 29, 2019) stated.

She further explained that she had no phone since it got spoilt, and therefore had no other options to get boda-boda riders apart from sending some body or walking to the stage.

> *"…The advantage is that the stage of boda-boda riders is near; I can force myself to walk to them and they take me to the health facility. After all, my husband who has the phone is not always at home. Therefore, calling boda-boda riders for transport is very difficult. Also, they are difficult people to be called"*

> ... This was during an in-depth interview with a mother in the control arm (respondent 11, 2019).

When boda-boda riders were contacted by mothers for transport to the health centres, they took different time intervals to arrive. Some took less than 20 minutes, others between 21 – 30 minutes, 31 – 60 minutes and above 60 minutes. Generally, time taken for the boda-boda rider to arrive when contacted by the mother had a statistically significant effect on the health facility-based deliveries as shown in table 4.11.

The 5 – 20 minutes interval which boda-boda riders took to arrive when contacted by mothers had no association with deliveries at health centres. Pregnant mothers who contacted boda-boda riders for transport to health centres and took 21 – 30 minutes to arrive were 0.344 times less likely to deliver from health centres compared to those who arrived in different time intervals (p=0.000; CI=0.189 – 0.626) but statistically significant to the effect on supervised deliveries at health centres as seen in table 4.11.

The time interval of 31 – 60 minutes had no difference with time interval of 21 – 30 minutes. Pregnant mothers who contacted boda-boda riders for transport and it took them 31 – 60 minutes to arrive, were 0.027 times less likely to deliver from health centres compared to those who arrived in the different time intervals with statistically significant effect (p=0.000; CI=0.007 – 0.103). Similarly, the time interval of 31 – 60 minutes for mothers to be transported to health centres was protective to health facility-based deliveries.

During a dialogue meeting in the intervention arm specifically in the pre intervention phase, boda-boda riders were encouraged to be quick and respond whenever a mother contacts them.

> *"...Do not take much time to go to mothers whenever they call you. Just know, that is a hard moment especially when in labour. Mothers cannot walk at that time. These are our relatives, wives, daughters and sisters. Learn to rush to them."* One of the members of the meeting urged the colleagues.

During the period when mothers contacted boda-boda riders, mothers experienced very many challenges in their communication. Boda-boda riders switching off their phones had no association with health facility-based deliveries. However, lack of network affected mothers not to access boda-boda riders for transport to health centres. These mothers were 0.828 times less likely to deliver from health centres and not statistically significant (p=0.637).

Similarly, when boda-boda riders refused to pick phone calls when contacted, it affected deliveries in health centres. However, mothers found others means of reaching the health centres. Pregnant mothers whose calls were not picked by boda-boda riders were 15.616 times more likely to deliver from health centres compared to mothers who experienced other challenges but had no statistically significant effect (p=0.102; CI=5.109 – 47.729). During the focus group discussions, most of the challenges discussed above were highlighted. This was evidenced in the focus group discussion in the post intervention phase where one of the mothers said;

> *"...The problem we face in calling for transport is the network and also boda-boda riders switching off their phones and not picking calls at night."*

Table 4.11: Effect of communication system on maternal outcome

Variables		Odds ratio (95%)	P-value
Communication system variables	Control	*1*	
	Intervention	1.173 (0.760, 5.501)	**0.001**
Communication 1		3.813 (1.559, 9.324)	**0.003**
Communication 2		1.372 (0.500, 3.764)	0.539
Communication 3	Neighbor	*1*	
	Husband	1.604 (0.661, 3.896)	0.297
	Friend/VHT	4.166 (0.743, 23.343)	0.105
	Relative	0.211 (0.051, 0.868)	**0.031**
Communication 4		1.110 (0.544, 2.566)	0.466
Communication 5	Phone call	*1*	
	Send a message	7.963 (1.242, 51.055)	**0.029**
	Send a person	10.561 (1.377, 80.965)	**0.023**
	I walk to them	39.117 (4.380, 349.383)	**0.001**
Communication 6.	5 –20 minutes	*1*	
	21-30 minutes	0.344 (0.189, 0.626)	**0.000**
	31-60 minutes	0.027 (0.007, 0.103)	**0.000**
Communication 7.	Phone switched off	*1*	
	No network	0.828 (0.379, 1.812)	0.637
	Does not pick phone call	15.616 (5.109, 47.729)	0.102

Communication1: Possession of phones by mothers.
Communication2: Use of another person's phone to communicate to the boda-boda rider.
Communication3: Relationship between the owner of the phone and the mother
Communication4: Loading of airtime on phones of mothers.
Communication5: Ways mothers use to communicate to the boda-boda riders.
Communication6: Time interval taken for the boda-boda rider to arrive when contacted by the mother.
Communication7: Challenges faced by mothers in communication.

4.6.2 Communication system as predictors of maternal outcome

The study further aimed at establishing the predictors of health facility-based deliveries in the east – central Uganda. The study subjected communication system variables that showed significant effect on the maternal outcome to a multiple logistic regression analysis and results were presented. The regression model was automatically generated at 95% confidence interval leaving the acceptable error at less than 0.05. There was a

statistically significant effect of communication system on health facility-based deliveries (p=0.000). The null hypothesis that communication system for community-based referrals does not have a significant effect on maternal outcome in the selected districts of east – central Uganda, at this point is rejected. Pregnant mothers exposed to the communication system were 4.173 times more likely to deliver from health centres compared to those without access to the communication system.

Possession of phones by mothers and the time interval taken by boda-boda riders to arrive when contacted statistically had a significant effect on maternal outcome ($p < 0.05$). Mothers who possessed phones to contact boda-boda riders for transport to health centres were 4.200 times more likely to deliver from health centres compared to mothers who had no phones and had a statistically significant effect on the outcome (p=0.000; CI=2.063 – 8.552).

Similarly, the different time intervals boda-boda riders took to arrive when contacted by mothers affected the outcome differently. The time interval of 5 – 20 and 60 and above minutes had no association with health facility-based supervised deliveries. Basically, 21 – 30 minutes interval which boda-boda riders took to arrive when contacted had a statistically significant effect on deliveries at health centres. Pregnant mothers whose boda-boda riders arrived in 21 – 30 minutes were 1.124 times more likely to deliver from health centres and had a statistically significant effect on the outcome (p=0.002; CI=0.934 – 5.452). On the contrary, pregnant mothers whose boda-boda riders arrived in 31 – 60 minutes when contacted were 0.003 times less likely to deliver from health centres and with a statistically significant effect on the outcome (p=0.000; CI=0.001 – 0.022).

Table 4.12: Communication system as predictors of maternal outcome

Predictive variable		Odds ratio (95%)	P-value
Communication system variables			
	Control	*1*	
	Intervention	4.173 (0.960, 32.661)	**0.000**
Communication 1		4.200 (2.063, 8.552)	**0.000**
Communication 3			
	Relative	0.431 (0.151, 0.784)	0.051
	Neighbor	*1*	
Communication 5			
	Phone call	*1*	
	Messaging	0.678 (0.046, 10.030)	0.778
	Send a person	0.097 (0 .004, 2.239)	0.145
	Walking to them	0.030 (0.001, 1.165)	0.060
Communication 6			
	5-20 minutes	*1*	
	21-30 minutes	1.124 (0.934, 5.452)	**0.002**
	31-60 minutes	0 .003 (0.001, 0.022)	**0.000**
	60+ minutes	-	

Communication1: Possession of phones by mothers.
Communication3: Relationship between the owner of the phone and the mother.
Communication5: Approaches mothers use to communicate to the boda-boda riders.
Communication6: Time interval taken for the boda-boda rider to arrive when contacted by the mother.

4.7 Knowledge attained by mothers during training in community-based referrals

Before the start of the training, mothers were given research questionnaires to answer the questions after consenting. When mothers gave birth, they were given the same questionnaire to answer. Four fundamental areas were considered to test the knowledge levels of mothers. Generally, there was an increase in the level of knowledge of mothers from 43.2 percent to 92.7 percent in the intervention arm. In the control arm, there was a slight increase in the level of knowledge for mothers from 42.4 percent to 43.5 percent.

As fundamental area one, only one question tested knowledge level of mothers on the innovation, communication and technology (CUG). Exactly 38.4% of the mothers in the pre intervention phase had knowledge on the closed caller user group in the intervention arm compared to 25.5% of mothers in the control arm at the baseline. There was a drastic improvement in the knowledge level of mothers in the intervention arm after training. It improved to 98.6% in the intervention arm and to only 37.2% in the control arm. The average value for the innovation, technology and communication was 0.485, and the change effect was found to be statistically significant (p=0.049).

On fleet management and referral systems, 65.1% of mothers in the pre intervention phase in the the intervention arm agreed to save money for transport fares. In the control arm, only 18.7% of the mothers took the advise to save money for transport fares. It was completely different in the post intervention phase; 92.2% of mothers agreed to being advised to save money for transport fares in the intervention arm and only 22.5% in the the control arm. Similarly, the average value for the knowledge assessed on fleet management and referral systems was 0.233 and the change effect with the intervention was statistically significant (p=0.005).

On the third fundamental area; role of the different stake holders (boda-boda riders, midwives and VHTs), 56.3% of the mothers in the intervention arm knew boda-boda as the only means of transport for mothers when they wanted to deliver or when they had complications. Only 53.2% of mothers knew in the control arm. In the post intervention phase, 89.5% of mothers knew about boda-boda transport in the intervention arm and only 49.7% in the control arm. The average value of the change effect on knowledge

increase in fleet management and referral systems was 0.367, and was statistically significant (p=0.012).

Finally, on prevention and basic management of emergencies, mothers were tasked to list any three signs and symptoms of pregnancy complications. Only 12.8 percent of mothers were able to list the signs and symptoms in the intervention arm at baseline and only 23.6% in the control arm. In the post intervention phase, 90.3% of mothers in the intervention arm listed at least three signs and symptoms of pregnancy compared to 26.9% in the control arm. There was no statistically significant effect of the knowledge increase by mothers in the prevention and basic management of emergencies (p=0.063) at an average value of 0.742.

Table 4.13: Knowledge of mothers on community-based referrals before and after training

		Interv. arm	**Control arm**		
Thematic areas	**Questions**	**Pre (Post) N=255**	**Pre (Post) N=248**	**DID**	**P-value**
Innovation, communication and technology (CUG).	Do you have any knowledge on the closed caller user group? (Yes)	38.4% (98.6%)	25.5% (37.2%)	0.485	**0.049**
Fleet management & referral systems.	Have you ever been advised to save money for transport fare to HCs? (Yes)	65.1% (92.2%)	18.7% (22.5%)	0.367	**0.012**
The roles of the different stake holders (Riders, midwives and VHTs).	Have you been advised to use boda-boda as the only MOT from community to health centre when in labour or with other complications? (Yes)	56.3% (89.5%)	53.2% (49.7%)	0.233	**0.005**
Prevention and basic management of emergencies.	Can you list at least 3 signs and symptoms of pregnancy complications? (Yes)	12.8% (90.3%)	23.6% (26.9%)	0.742	0.063

4.7.1 Effect of knowledge attained by mothers on maternal outcome

Health facility deliveries are expected to improve as a result of knowledge increase for mothers after training. Knowledge attained was based on four fundamental areas with different guiding questions to establish the aspects of association with the maternal outcome.

From the results in table 4.14, knowledge attained by mothers had a statistically significant association with supervised deliveries at health facilities. Pregnant mothers who attained knowledge during the training were 1.043 times more likely to deliver from a health centre compared to those who did not attain knowledge at all (p=0.031; CI=0.122 – 2.921).

On innovation, communication and technology, the study was interested in determining the knowledge of mothers on the availability of the CUG for mama – boda-boda transports connect to improve health facility-based deliveries in the intervention area. There was no association and significance at all after the logistic regression analysis (p-value >0.05). However, in an in-depth interview at the exit with one of the mothers (respondent 44, 2019) in the intervention arm, there was praise for the innovation of the CUG.

> *"...It is sad that this study is ending. But thank you so much for thinking about us, the poor rural women. In the training at the health centre, we were told that we shall be registered to have free communication with boda-boda riders for transport. The 3 times I went to health centres for ANC, I was reminded about my ability to call for transport at no cost."*

One of the maternity wards in-charge appreciated the innovation and attributed the improvement in the deliveries at the health centre to the available communication

technology for mothers' transport. She narrated during a key informant interview in the intervention arm (respondent 30, 2019).

> *"…We have been informing mothers on the availability and importance of the technology. I have seen a rise in the number of deliveries at the health centre, and these mothers are transported by boda-boda riders."*

There were mixed responses on fleet management and referral systems. Mothers were encouraged to save money for transport and other supplies. It had a statistically significant effect on health facility-based deliveries (p=0.005). Mothers who were encouraged to save money for transport and supplies, were 7.290 times more likely to deliver from health centres compared to those who missed information about saving (CI= 3.624 – 16.013).

> *"…When mothers save money in the boxes, it is good for both of us. That is what they use to pay us. Since riders will be expecting their pay, they will easily run to these mothers when contacted for transport to health centres."* One of the boda-boda riders (respondent 40, 2019) affirmed during an in-depth interview in the intervention arm.

On the roles of different stakeholders including mothers, boda-boda riders, midwives, VHTs amongst others, understood that boda-boda was the only means of transport for pregnant mothers used to go to health centres. According to results in table 4.14, collectively having knowledge increase on the roles of the stakeholders had a significant effect on deliveries at health centres. The main role was to advise mothers use the available local boda-boda transport to health centres. Pregnant mothers who were adised to use boda-boda riders were 2.814 times more likely to deliver from a health centre compared to mothers with different ideology (p=0.040; CI= (1.561 – 5.099). In an in-

depth interview with a mother (respondent 42, 2019) in the intervention arm, she commended boda-boda riders;

> *"…Boda-boda riders are helping us to reach health centres in time. Thank you for coming up with an idea of uniting mothers and boda-boda riders. One of these days they (boda-boda riders) treat us fairly and they care. They are aware of being the only ones available to transport us."*

Mothers have come to appreciate boda-boda riders because of the change in their behaviours. This was firmed during an exit interview with one of the boda-boda riders (respondent 32, 2019), he said;

> *"…Thank you for the training. I did not know that I'm very important in transporting mothers to health centres and saving their lives. This is a rural village with mothers who need to be helped. I can say I am fully available to transport mothers when they contact me for transport."*

On the prevention and basic management of emergencies, bleeding of a pregnant mother calls for urgent attention since it is a pregnancy complication. Other emergencies include; anemia, blood pressure, malaria in pregnancy amongst others. Pregnant mothers who mentioned at least three signs and symptoms of pregnancy complications or emergencies were 1.598 times more likely to deliver from health centres (CI= 0.457, 3.321). However, it had no statistically significant effect on deliveries (p=0.166). Initially, mothers did not know the signs and symptoms of pregnancy complications until they were told during training.

> *"…This is my first pregnancy; I have no much experience with the signs and symptoms of pregnancy. It sounds common when you are told that pressure [hypertension], vaginal bleeding, malaria and others are complications in pregnancy. Initially, we had no knowledge on this. The training we went through was very important."* One of the mothers (respondent 31, 2019) said during an in-depth interview at the end of the study.

Table 4.14: Effect of knowledge attained by mothers on maternal outcome

Thematic areas	Questions	OR (95% CI)	P-value
	Control	*1*	
	Intervention	1.043 (0.122, 2.921)	**0.031**
Innovation, communication and technology (CUG).	*Do you have any knowledge on the CUG*		
	No	*1*	
	Yes	0.155 (0.097, 1.172)	0.057
Fleet management & referral systems.	*Have you ever been advised to save money?*		
	No	*1*	
	Yes	2.814 (1.561, 5.099)	**0.040**
The roles of the different stake holders (riders, midwives and VHTs).	*Have you ever been advised to use boda-boda as the only means?*		
	No	*1*	
	Yes	7.290 (3.624, 16.013)	**0.005**
Prevention and basic management of emergencies.	*List 3 signs & symptoms of complications?*		
	No	*1*	
	Yes	1.598 (0.457, 3.321)	0.166

4.8 Knowledge attained by boda-boda riders during training in community-based referrals

Another assessment of the knowledge level was performed on the boda-boda riders before and after training. Pre and post test assessment was subjected to the boda-boda riders to find out if there was knowledge increase after training. Knowledge assessment of the boda-boda riders was in four fundamental areas as shown in table 4.15.

Generally, in the control arm, the level of knowledge of boda-boda riders in the pre and post test had no much difference. The average mark of the 92 participants in the control arm was 43.8% in the pre test and 45.2% in the post test. In the intervention arm, the average mark of the 100 participants (boda-boda riders) in the pre test was 49.1% and 79.0% in the post test. It was reflected that all the boda-boda riders attained knowledge after their training on the different fundamental areas in the intervention arm.

In one of the training discussions, one of the participants said;

> *"...I have learnt a lot from this training, for example the importance of taking mothers to the health centre in time. I will never ignore any call of a mother when contacted."*

While another participant indicated that in the past, he did not find it necessary to prioritize transporting of mothers in labour or with birth related complications to the health centre.

> *"...What we have learnt today is very important and I am committed to participating in this study to save mothers, even if it means taking them to the health facility on credit and they pay later."*

The health workers noted the need for team work and commitment by all those involved in the study to be able to meet the needs of mothers who are in dire conditions of child birth.

Much as the VHTs were not subjected to pre and post test assessments, they participated in the in-depth interviews. One of those who attended the training indicated that this training was very timely especially for the boda-boda riders. This was in an in-depth interview (respondent 20, 2019) where she said;

> *"...Knowledge building and sharing on understanding of MCH is necessary and should be observed among the participants, especially the boda-boda riders who now know the need to support the mothers especially on transporting them to the health centre to deliver.*"

The common questions which were asked in the pre and post test assessments are shown in table 4.15, which required answering either **true** or **false** and each correct answer carried a mark. Therefore, all correct answers carried ten marks and depending on what each person scored, they were marked out of ten.

Only one question tested knowledge on the availability of the communication technology. Exactly 51% of the boda-boda riders had knowledge on the mama – boda-boda transport connect (simply termed as closed caller user group) in the intervention for pre test assessment, while in the post test assessment, 100 percent of the boda-boda riders confirmed having knowledge at that time. In the control arm, the level of knowledge was limited. It only improved from 14% to 25% in the pre and post test assessment respectively. The average value for the innovation, technology and communication was 0.195, and the change effect was found to be not statistically significant (p=0.773).

Another fundamental area measured in the test during the training was fleet management and referral systems. Three questions were asked and these included; if only vehicles transport mothers. Some of the boda-boda riders believed that only vehicles can transport pregnant mothers to health facilities. As seen in table 4.15, 45 percent of riders said true in the pre test and only 4 percent in the post test for the intervention arm. In the control arm, there was decline in the knowledge on the

falsehood from 51% to 49% in the pre and post tests respectively. On further testing whether boda-boda riders encouraged mothers to save money for transport when in labour, only 45% in the pre test and 88% in post test encouraged mothers to save money for transport fare. It was also noted in the control arm when boda-boda riders encouraging mothers to save money increased from 34% to 40% in the pre and post tests respectively. Lastly, it was tested whether community maternal referral is the transportation of mothers to the health centres. 42 percent of the boda-boda riders truly mentioned in the pre test and 92 percent in the post test. Instead, it declined by 2 percent in the control arm as seen in table 4.15. There was a statistically significant effect of knowledge increase in fleet management and referral systems at an average value of 0.315.

Looking at the third fundamental area, which is the role of the different stake holders; the following questions were paramount; whether boda-boda riders transport only healthy people; surprisingly, boda-boda riders thought they were supposed to transport only healthy people as evidenced in the pre test with 43 percent. However, with the post test, it was revealed that boda-boda riders could as well transport sick mothers to health centres for medication or giving birth (98 percent). There was an increase by 2 percent of boda-boda riders suggesting that boda-boda transport is only for healthy people in the control arm. The study also found out whether mothers are not supposed to call for transport. In the pre test, 62 percent agreed to while in the post test declined to 2 percent in the intervention arm. In the control arm instead increased from 53% in the pre test to 57% in the post test. Similarly, the average value for the knowledge tested in the pre

and post assessments on the roles of the different stakeholders including the boda-boda riders was 0.294 and had a statistically significant change effect (p=0.043).

Lastly, there was an area concerning prevention and basic management of emergencies. The questions of interest by the study on this fundamental area included; whether bleeding mothers can not sit on a boda-boda, and also if the following (vaginal bleeding, long hair and red eyes) are the signs and symptoms of pregnancy. Only 63 percent of boda-boda riders avowed that bleeding mothers cannot sit on boda-boda to be transported to a health centre during the pre test compared to 10 percent in the post test. Boda-boda riders in the control arm continued to believe that bleeding mothers can not sit on motorcycle as noted by the results in table 4.15. On the signs and symptoms of pregnancy related complications, only 35 percent of the riders in the pre test confessed knowing vaginal bleeding and 98 percent in the post test. Knowledge of boda-boda riders on the signs and symptoms of pregnancy complication was assessed and it had increased by 10 percent in the control arm. Unbelievably, 28 percent of the boda-boda riders thought long hair is a sign and symptom of pregnancy complication. However, in the post test, 100 percent of the boda-boda riders said it is false. Boda-boda riders in the control arm continued to be limited with knowledge on whether long hair is a sign or symptom of pregnancy complications. 53 percent of boda-boda riders said red eyes were signs and symptoms of pregnancy complications in the pre test and 12 percent in the post test. There was a little decline on the falseness of red eyes being a sign or symptom of pregnancy complications in the control arm. On the contrary, there was no statistically significant effect of change despite of the average value of -0.081.

Table 4.15: Boda-boda riders' knowledge before and after training

			Interv. arm	Control arm		
Thematic areas	**Questions**		**Pre (post test) N=100**	**Pre (post test) N=92**	**DID**	**P-value**
Innovation, communication and technology (CUG).	Do you have knowledge on mama-boda transport connect and use of the CUG (**True**)		51% (100%)	14% (25%)	0.195	0.773
Fleet management & referral systems.	Only vehicle transport mothers (**True**)		45% (4%)	51% (49%)	0.315	**0.000**
	Boda-boda riders encourage mothers to save money (**True**)		45% (88%)	34% (40%)		
	Community maternal referral is the transport of mothers to HCs (**True**)		42% (92%)	55% (53%)		
The roles of the different stake holders (riders, midwives & VHTs).	Boda riders transport healthy people (**True**)		43% (2%)	44% (46%)	0.294	**0.043**
	No calling boda when in labour (**True**)		62% (2%)	53% (57%)		
Prevention and basic management of emergencies.	Bleeding mothers do not sit on boda (**True**)		63% (10%)	56% (54%)	-0.081	0.561
	Pregnancy signs and symptoms (**True**)	Vaginal bleeding	35% (94%)	29% (41%)		
		Long hair	28% (0%)	20% (18%)		
		Red eyes	53% (12%)	52% (49%)		

4.8.1 Effect of knowledge attained by boda-boda riders on maternal outcome

In this case, deliveries in health facilities were expected to improve as a result of knowledge increase for boda-boda riders. Pregnant mothers who were transported by the boda-boda riders as a result of the knowledge attained during the training, were 5.373 times more likely to deliver from a health centre compared to mothers who were not transported by trained boda-boda riders and had a statistically significant effect on the outcome (p=0.000; CI=2.189 – 9.626).

Looking at specific fundamental areas, there was no statistically significant computation of knowledge attained by the boda-boda riders on innovation, communication and technology. Despite the positive statements from some of the participants, there was no association and significance at all after the logistic regression analysis.

> *"...I recall their first time they came to our village. They wanted to know if we are interested in the study. Of course, we did not know the study until we requested for the explanation. From that time, I understand this study."* This was one of the boda-boda riders (respondent 35, 2019) during an in-depth interview in one of the sub counties at the end of the study.

In one of the focus group discussions in the control arm, different participants reacted differently in the different areas of discussion. One participant who introduced himself as a boda-boda rider in the control arm said;

> *"...Mama – boda-boda project is not known to them. As a senior boda-boda rider, I have never heard what you are talking about. Can you explain more for us to know about it? You never know it may be helpful to us."*

On fleet management and referral systems, boda-boda riders differently understood which transport means pregnant mothers use to go to health centres. Some thought only vehicles are used to transport pregnant mothers. However, after the training, majority of the boda-boda riders noticed that other than vehicles, mothers can be transported using other means of transport to health centres. Results in table 4.16 indicate a significant effect of vehicle use as the only means of transport for mothers to deliver at health centres. Pregnant mothers who were transported by boda-boda riders who thought that only vehicles can transport pregnant mothers, were 1.891 times more likely to deliver from a health centre compared to boda-boda riders with different thought (p=0.000; CI=1.051 – 3.401). As mothers got exposed to boda-boda riders who had the mentality

that it is a vehicle that transports a pregnant mother to the health facility, the more deliveries were experienced at health centres. In an in-depth interview with a boda-boda rider in the intervention arm, it was different. A boda-boda rider (respondent 36, 2019) said;

> *"…For my case, I have been already transporting mothers using my motorcycle. As a fact, I will continue transporting mothers using my motorcycle. I know the importance of taking them to health centres."*

Boda-boda riders were encouraging mothers to save money for transport and other supplies. It had a statistically significant effect on health facility-based deliveries (p=0.001). During entry meetings and recruitment periods, mothers were encouraged to save money for transport fares. This was also encouraged during antenatal care in the health centres.

> *"…When mothers save money in the boxes, it is good for both of us. That is what they use to pay us. Since riders will be expecting their pay, they will easily run to these mothers when contacted for transport to health centres."* One of the boda-boda riders (respondent 40, 2019) said during an in-depth interview in the intervention arm.

Majority of boda-boda riders knew that community referral involves transfer of mothers from their homes to health centres. However, it had no statistically significant effect on health facility-based deliveries (p=0.767). According to the KII with one of the maternity in-charges (respondent 30, 2019) in a health centre III, she said;

> *"…Many mothers are being transported by boda-boda riders to this facility. Very few mothers come to the health centre without boda-boda means. This has drastically changed ever since boda-boda riders had training. This implies boda-boda riders and mothers have embraced the community referral mechanism."*

On the roles of different stakeholders including boda-boda riders, the study wanted to find out if it is only healthy people who are transported by boda-boda riders. It was not necessary for boda-boda riders to transport only healthy people but also mothers with pregnancy related challenges. Interestingly, boda-boda riders transporting only healthy people had a significant effect on deliveries at health centres. Pregnant mothers who were transported by boda-boda riders who believed they transport only healthy people, were 0.245 times less likely to deliver from health centres (p=0.511; CI=0.160 – 0.376). Transportation of only healthy people was protective to pregnant mothers to deliver from health centres. There was no statistically significant effect of knowledge gained by the boda-boda riders and this was evident with the information in the in-depth interview with one of the boda-boda riders in the intervention arm (respondent 39, 2019).

> *"...But why transport only a healthy person to the health centre? It has never happened to me. I'm always transporting sick people and pregnant mothers who are in labour to the health centres."*

However, he confessed that in the past boda-boda riders were charging highly people who were sick when they wanted their services.

> *"...I thought the sick people disturb a lot. You do not ride very fast. Secondly, majority will want to have an attendant. This contributes to the consumption of a lot of fuel. But the training we took has greatly changed my thinking."*

Majority of boda-boda riders understood after the training that mothers are supposed to call them when labour starts. They were urged to respond very fast as soon as they received the calls. However, there was a possibility that mothers can as well fail to call boda-boda riders. This was evident during the assessment of boda-boda riders. Some boda-boda riders believed that it was correct for mothers not to call boda-boda riders

when in labour and it had a significant effect on health facility-based deliveries. Pregnant mothers who were transported by boda-boda riders who thought mothers could not call them for transport to health centres when in labour, were 8.176 times more likely to deliver from health centres (p=0.000; CI=3.637 – 18.377). During the baseline interview with one of the boda-boda riders (respondent 32, 2019), he said;

> *"…A mother in labour is delicate. I fear to transport her on my boda-boda. Anything can happen on the way yet I can not do anything."*

However, after the training, many boda-boda riders became interested in transporting mothers even when they were experiencing labour pains. Interestingly, when the same person was interviewed in the post intervention phase after their training, the rider seemed knowledgeable.

> *"…Thank you for the training. I did not know that I'm very important in transporting mothers to health centres and saving their lives. This is a rural village with mothers who need to be helped. I can say I am fully available to transport mothers when they contact me for transport."*

On the prevention and basic management of emergencies, bleeding of a pregnant mother calls for urgent attention since it is a pregnancy complication. Interestingly, bleeding of pregnant mothers and their being unable to sit on a boda-boda had statistically significant effect on the health facility-based deliveries. Pregnant mothers who were transported by boda-boda riders who thought bleeding mothers can not sit on a boda-boda, were 2.432 times more likely to deliver from health centres (p=0.103; CI=1.419 – 4.168) but not statistically significant. From other sources, boda-boda riders did not have any serious challenges in transporting bleeding mothers.

> *"…A pregnant mother will bleed when she wants to give birth. Maybe when she is not due, the mother has fears for a miscarriage. It is thought by most of us (boda-boda riders) that such mothers can not sit on boda-boda because the baby may come out unknowingly. Usually, mothers will find means of reaching the hospital. However, very many of the mothers have sat on my motorcycle for transport to the health centre. They can not access any other means in the rural villages."* This was during an in-depth interview with one of the boda-boda riders (respondent 38, 2019) in the intervention arm.

Interestingly, at the end of the training of boda-boda riders, they were able to differentiate the signs and symptoms of pregnancy complications. Vaginal bleeding of mothers was realized by the riders to be one of the signs and symptoms of pregnancy which prompt mothers to go to health centres to deliver. However, statistically, it had no significant association with health facility-based deliveries (p=0.800). During the training and post test assessments, long hair and the red eyes were identified not to be signs and symptoms of pregnancy complications. On logistic regression analysis, statistically significant values were not computed. Red eyes had no effect as well on deliveries at health centres.

> *"…There are very many signs and symptoms mothers face. Next to pressure [hypertension] is vaginal bleeding. Initially, we had no knowledge on this. The training we went through was very important. I am willingly helping mothers to avoid further complications."* One of the boda-boda riders (respondent 38, 2019) said during an in-depth interview at the end of the study.

Table 4.16: Effect of knowledge attained by boda-boda riders on maternal outcome

Thematic areas for training	Questions			OR (95% CI)	P-Value
	Control			*1*	
	Intervention			5.373 (2.189, 9.626)	0.000
Innovation, communication and technology (CUG).[a]	Have knowledge on mama-boda project and use of CUG **(True)**			-	-
Fleet management & referral systems.	Boda-boda riders encourage mothers to save money.		False	*1*	
			True	8.176 (3.637, 18.377)	0.000
	CMR is the transport of mothers to HCs.		False	*1*	
			True	2.952 (1.650, 5.282)	0.037
The roles of the different stake holders (riders, midwives & VHTs).	Boda riders transport healthy people.		False	*1*	
			True	1.611 (1.131, 4.921)	0.005
	Mothers do not call boda when in labour.		False	*1*	
			True	1.391 (0.831, 2.329)	0.001
Prevention and basic management of emergencies.	Bleeding mothers do not sit on boda-boda.		False	*1*	
			True	2.432 (1.419, 4.168)	0.103
	Pregnancy signs and symptoms	Vaginal bleeding	False	*1*	
			True	8.176 (3.637, 18.377)	0.800
		Red eyes	True	*1*	
			False	1.891 (1.051, 3.401)	0.711

4.9 Knowledge of mothers and boda-boda riders as predictors of maternal outcome

The effect of knowledge attained during training by mothers and boda-boda riders on health facility-based deliveries was established using a multiple regression analysis. The points of significance were determined at 0.05 level of acceptable error.

Table 4.17 shows that there was strong significant effect of knowledge increase on health facility-based deliveries. By implication, pregnant mothers were 1.352 times more likely to deliver from health centres (p=0.045; CI= (0.591, 3.042) as a result of

knowledge attained during training. Knowledge increase, statistically significantly predicted deliveries in health facilities. Basing on the significance of results, it can be rightly reported at this level that the fourth null hypothesis which states that knowledge attained during training in community-based referrals by mothers and boda-boda riders does not have a significant effect on maternal outcome in east – central Uganda, is rejected.

Table 4.17 indicates how each of the fundamental areas of knowledge predicted maternal outcome in the east – central Uganda. For mothers, only fleet management and referral systems and roles of different stakeholders had statistically significant effect on maternal outcome as seen in table 4.17 ($p<0.05$). For boda-boda riders, only fleet management and referral systems had statistically significant effect on maternal outcome as a result of training boda-boda riders to transport pregnant mothers ($p<0.05$) as seen in table 4.17.

Table 4.17: Knowledge attained by mothers and boda-boda riders as predictors of maternal outcome

Predictors for mothers and boda-boda riders			**OR (95% CI)**	**P-Value**
	Control		*1*	
	Intervention		1.352 (0.591, 3.042)	0.045
Predictors for mothers				
Fleet management & referral systems	Have you ever been advised to save money?			
		No	*1*	
		Yes	0.117 (0.135, 2.374)	0.009
The roles of the different stake holders (riders, midwives & VHTs)	Have you ever been advised to use boda-boda as the only means?			
		No	*1*	
		Yes	2.290 (1.001, 5.216)	0.011
Predictors for boda-boda riders				
Fleet management & Referral systems.	Boda riders encourage mothers to save money	False	*1*	
		True	1.202(0.042,2.966)	0.022
	CMR is the transport of mothers to HCs	False	*1*	
		True	1.192 (0.944, 3.003)	0.000
The roles of the different stake holders (Riders, HWs and VHTs).	Boda riders transport healthy people	False	*1*	
		True	0.146 (0.092, 1.169)	0.053
	Mothers do not call boda when in labour	False	*1*	
		True	0.801(0.278,2.307)	0.680

4.10 Chapter summary

This summary is based on the research findings; these include; socio-demographic characteristics for mothers and boda-boda riders, attitude of mothers towards use of boda-boda riders, the communication system used in contacting boda-boda riders for transport of mothers and knowledge attained during training by mothers and boda-boda riders to enable improved community-based referrals for better maternal outcome.

For socio-demographic characteristics of mothers, results from regression model showed that age, religion and means of transport strongly significantly influenced health

facility-based deliveries as a result of improved community-based referral (p value < 0.01). Marital status, level of education, level of income, distance to the health facility, and number of pregnancies and area of residence had no statistically significant influence on health facility-based deliveries (p value > 0.05). However, socio-demographic characteristics for the boda-boda riders indicate that only age and ownership of motorcycles were statistically significantly influencing health facility-based deliveries (p value < 0.05).

Similarly, with regards to attitude of mothers towards community-based referrals; results showed that it has influence on maternal outcome. Specifically, apart from attitude of mothers on the comfort of using boda-boda transport, the rest had no statistically significant influence on maternal outcome. The effect of communication system for community-based referral on maternal outcome was also tested. It was noted that mothers were able to contact boda-boda riders using their personal phones for transport to health facilities and it was statistically significant ($p<0.01$). Similarly, time interval taken for a boda-boda rider to respond when contacted, had statistically significant effect on supervised deliveries at health centres ($p<0.01$).

Lastly, results showed that training of mothers and boda-boda riders was of importance. There was statistically significant effect of knowledge attained during training on health facility-based deliveries ($p<0.01$). For mothers, roles of the different stakeholders and fleet management and referral systems were statistically significant, and for boda-boda riders only fleet management and referral systems had statistically significant effect on health facility-based deliveries ($P<0.05$).

CHAPTER FIVE: DISCUSSION, CONCLUSION AND RECOMMENDATIONS

5.0 Introduction

Discussions, conclusions and recommendations of the study are based on the findings of the study in relation to the study objectives. Both qualitative and quantitative findings of the study are interpreted according to the literature reviewed. Comparisons are made with other studies to draw better conclusions. This chapter includes; socio-demographic characteristics of mothers and boda-boda riders, attitude of mothers, communication systems and knowledge gain of the boda-boda riders and mothers in relation to the maternal outcomes (health facility-based deliveries).

5.1 Discussion

5.1.1 Socio-demographic characteristics

The east – central Uganda study was in agreement with some studies which considered different ages of mothers and ambulance riders influencing the maternal outcome (Ssebunya & Matovu, 2016). The age of mothers and the locally available boda-boda riders (25 – 34 years and 35 – 44 years) for only mothers was found to be associated with the maternal outcome (health facility-based deliveries) for this study. However, this was in disagreement with Moindi *et al.* (2016) and Kananura (2016) studies were mothers older in age remained at home to deliver. Inspite of the ages of mothers, they were expected to make decisions of going to health facilities to deliver as early as possible. It is concluded in the east – central study that the best age for mothers and boda-boda riders to respond to maternal referrals is 25 – 34 years. Inspite of the cognitive theory not speculating the best age of learning (Kaya, 2016), the east – central

Uganda study justified that mothers and boda-boda riders learn better at 25 – 34 years of age. This gap of the cognitive theory therefore, was addressed.

On the other hand, the most important age of boda-boda riders to influence maternal outcome was age 25 – 34 years. This age was instrumental in the transportation of mothers to health centres to deliver, with statistical evidence. However, the findings of other studies regarding age group of riders did not concur with the east – central Uganda study, apart from Ssebunya and Matovu (2016) where ambulance riders of ages 25 – 34 years and 35+ years transported mothers to health centres to deliver. Namazzi *et al.* (2017) in the eastern study pointed out ages 35 – 44 years of the community extension health workers influencing the outcomes. Community extension health workers are health service providers to the mothers like the boda-boda riders.

Most of the mothers were carrying their third to fourth pregnancy in the east – central Uganda study. Number of children a mother possessed determined her decision of going to the health centre to deliver. Many mothers with 3 to 4 children in the east – central Uganda study went to health centres to deliver contrary to Gambia (Jallow, 2007) where such mothers opted to be attended to by relatives or TBAs in the villages. Further, Kananura (2016), like Jallow (2007) stated that 45% of the mothers who had carried at least 5 pregnancies did not want to go to health centres to deliver; they instead opted to stay at home to deliver with the help of relatives or TBAs. Perhaps in these studies, mothers lacked information and means to reach health centres. It clarifies on the need for training of mothers and boda-boda riders to attain knowledge for better maternal outcomes. Mothers and boda-boda riders in the east – central Uganda study perceived

and retained information. This concurs with the individual differences theory (Motowildo, Borman & Schmit, 1997).

In terms of literacy levels, by the time of this study, majority of mothers like boda-boda riders had highly attained primary level of education and did not influence deliveries in health centres. Like in the east – central Uganda study, Moindi *et al.* (2016) and Mazalale (2015) concurred that higher levels of education were associated with health facility-based deliveries. Women without formal education were more likely to deliver outside a health facility (Mazalale, 2015). Therefore, it can be argued that the majority of respondents did not achieve higher education levels, and thus, were semi-illiterates. This is one of the gaps that were not addressed in the east – central Uganda study which may require further research.

By the fact that mothers were staying in rural areas, this confirmed the failure of mothers not to fully deliver from health centres without boda-boda transport to health centres. Several studies (Namazzi *et al.*, 2017; Ssebunya & Matovu (2016) and PATH (2013) agree on the difficulties experienced by mothers in the rural setting. It should be noted that rural areas tend to have terrain and network challenges for the transporters and mothers. On this note, residential places of mothers in the east – central Uganda study had no strong significant bearing on health facility-based deliveries. Therefore, rural mothers should be considered for most of the maternal interventions as supported by agenda setting theory which allows managers to prioritize for the rural populations (Shaw, 1979).

Namazzi *et al.* (2017) found out in eastern Uganda that mothers were hand tied to reach health centres to deliver and instead resort to delivering from home. The level of income of the rural mothers in east – central Uganda study was low and did not influence deliveries in health centres. This was not different with the boda-boda riders. Without support of free communication and subsidized transport costs, mothers could not afford to pay. Instead, little money for communication and transport purposes could be diverted to domestic needs like food, school fees, and general welfare as affirmed in other studies (Namazzi *et al.,* 2017; Ssebunya & Matovu, 2016); since most of the burdens usually rested on them as household members, and few women could afford to fund themselves. Free boda-boda transport for mothers to health centres was not prioritized like other services (calls at no cost). Similarly, low income earning boda-boda riders could not transport mothers on credit since they did not own motorcycles. However, mothers were encouraged to save in the savings boxes to afford the transport fares. The savings motivated boda-boda riders to easily transport mothers to health centres as informed by Goodman (2011) in other studies. As Shaw (1979) considered agenda setting theory for prioritization of services, the east – central Uganda study did not prioritize free transport for low income earning rural mothers.

The mix of religions (Catholics, Protestants, Moslems and others) of mothers unlike boda-boda riders determined deliveries at health centres. Religion of boda-boda riders affected the east – central Uganda study differently compared to Ssebunya and Matovu (2016). For mothers, Kifle (2017) concurred with Ssebunya and Matovu (2016); as evidenced in the study conducted in Ethiopia, though results for institutional delivery services showed that Muslim mothers were 89% less likely to seek delivery services

and postnatal health care services than their counter parts (Kifle, 2017). Generally, in the east – central Uganda study, many Catholics, Protestants and Muslims gave birth from health centres. The attention given to the self-concept to bring out the real picture of an individual including their societal roles, beliefs and values, amongst others (Kaya, 2016); it requires a religious individual of good working memory (cognitive characteristic), and these were the mothers.

As Mazalale (2015) stated it after conducting a cross sectional study in Malawi that marital status does not influence deliveries at health centres; this was not different in the east – central Uganda study where marital status of mothers and boda-boda riders had no influence on health facility-based deliveries. In Malawi, mostly unmarried women delivered outside a health facility (Mazalale, 2015). Much as the majority of mothers in this study were married and had support of their husbands, it had no impact on the health facility-based deliveries. This was contrary to other studies where couples (husbands) played a key role in enabling mothers reach health centres to deliver (Moindi *et al.*, 2016; Namazzi *et al.*, 2017; Mazalale, 2015).

Distance between homes of mothers and health centres did not influence health facility-based deliveries. Results showed that the distance between their homes and health centres was said to be 3 to 4 kilometers similar to the Malawi's distance of radius 3 kilometers (Mazalale, 2015). Conversely, the average distance between homes and health centres in Uganda is 5 kilometers radius (UBOS, 2017). Like Uganda, Malawi and Gambia, the health facility based deliveries did not improve as a result of the short

distances to health centres (UBOS, 2017; Mazalale, 2015; Semwanga-Rwashana, 2014). On the other hand, it is not a walkable distance especially for a pregnant mother.

Means of transport of mothers to reach health centres contributed highly to the deliveries from health centres. The easiest transport used in this study was mostly boda-boda transport. Most of the studies singled out motorcycles as mostly used means of transport to health centres (PATH, 2013; Namazzi *et al.*, 2017; Ssebunya & Matovu, 2016; Lo *et al*., 2012). This literally addressed the challenges faced with the rural mothers to reach health centres in time. Therefore, the training of locally available boda-boda riders was timely and necessary.

Considering the socio-demographic characteristics of the boda-boda riders, religion, education, level of income and marital status, did not influence maternal outcome. It was not different from the eastern study by Ssebunya and Matovu (2016). Here, motorcycle ambulance riders did not influence transportation of mothers to health centres by their religion, education, income and marital status. Similarly, locally known boda-boda riders did not influence deliveries at health centres based on such characteristics.

Lastly, ownership of the motorcycle equally influenced the maternal outcome. Mothers confessed that they were able to easily access boda-boda riders even at night when boda-boda riders owned the motorcycles. Other studies typically discussed availability of motorcycle ambulances. According to Ssebunya and Matovu (2016) and PATH (2013), ownership of the ambulances was communal. However, it was difficult to contact the riders at any one point for transportation especially at night since the

motorcycle was stationed in one place and difficult for the rider to access it at night. Ownership of the motorcycles by boda-boda riders addressed the challenge of delays to transport mothers to health centres when contacted.

5.1.2 Attitude of mothers towards community based referrals

Attitude is the tendency to act in a certain way due to both an individual's experience and temperament (Albarracin, 2005). The study considered the positive or negative attitude of mothers towards the role of boda-boda riders, signs and symptoms experienced by mothers during pregnancy which influenced the use of boda-boda riders to go to health centres, the comfort of using boda-boda transport and the recommendation of fellow mothers to use boda-boda transport.

Attitude of mothers on the roles of boda-boda riders was positive. This was attributed to change of mindset of the mothers to use boda-boda transport to the health centres. However, it was less likely to influence deliveries in health centres much as majority of the mothers used boda-boda transport to health centres. The east – central Uganda study showed that more mothers were happy with the roles of boda-boda riders and more so when they managed time when contacted for transport to health centres to give birth. Similarly, boda-boda riders liked their role of transporting mothers. This was attributed to the incentives which motivated boda-boda riders to perform (Goodman, 2011; Bjrkman, 2010). In some studies, attitude of clients and in this case the mother was less talked about when discussing delivering in health centres with the help of skilled health personnel.

Findings from studies conducted by Shahabuddin (2011) and Fisseha (2017) about mothers' attitude on the capability of service providers in managing complicated child births; revealed that mothers perceived that service providers at the nearby health centres were capable of managing complicated child birth. Mothers trusted the roles of health workers. Similarly, the training of mothers and boda-boda riders in the east – central Uganda contributed to increased trust of boda-boda riders on their role of transport by the mothers.

Unfortunately, some mothers had a negative attitude towards the roles of the riders in community-based referrals. This was attributed to lack of information on their roles especially those who missed out the health education sessions during ANC. Not contrary to other studies, delayed transportation of mothers to health centres was associated to lack of information/awareness for the rural mothers (Patel *et al.,* 2016; Lawn, 2010). However, this study was able to address this gap as evidenced by the increased number of mothers knowing the roles of boda-boda riders.

Signs and symptoms of pregnancy related complications experienced by the mothers (vaginal bleeding, fever, blurred vision and others) had no influence on health facility-based deliveries. The signs and symptoms of pregnancy complications contributed to the use and calling of the boda-boda riders for transport to the health centres. Mothers were also required to use boda-boda transport during ANC attendance.

Mothers had negative attitude towards use boda-boda transport when they had not experienced signs and symptoms of pregnancy. However, the attitude of mothers changed when they experienced signs and symptoms of pregnancy complications

especially during labour time. Signs and symptoms experienced by pregnant mothers are part of the maternal complications which need urgent attention (Nabudere, Asiimwe & Amandua, 2012). Appropriate and prompt decision making is paramount to reduce on the delay and risk (PATH, 2013; Thaddeus, 1994). Because of the negative attitude, mothers delayed to make decisions to go to health centres especially in the early pregnancies. The gestation period at baseline was 28 weeks with least complications attributed to negative attitude. This was against the WHO (2013) recommendation that mothers are encouraged to visit health facilities whenever they experience pregnancy related complications. However, training of boda-boda riders, health education sessions to mothers during ANC and improved communication (CUG) changed the attitude of mothers and reduced the delays with better decision to use the boda-boda transport to quickly move to health centres to deliver or when faced with a complication.

The attitude of mothers on the comfort of boda-boda as means of transport to the health centres influenced health facility-based deliveries. Most of the mothers had a positive attitude on comfort of the locally available means of transport since that is what was at their exposure. Much as boda-boda riders' role was to offer transport, it was not different from health workers who managed complications of child births in health facilities (Shahabuddin, 2011). Non-friendly health workers lead to poor service delivery (Obiajulu, 2009). The same applied to boda-boda riders who had to be friendly to the mothers and offer quality services. Perhaps mothers were comfortably using boda-boda transport because of the good customer care offered by the boda-boda riders. The perception of mothers on the capability of service providers in managing complicated child births was good (Shahabuddin, 2011), signaling that every service

provider has to be good. It was to the contrary in Tanzania where 97 percent of health care providers towards HIV positive patients expressed at least one negative attitude towards people with HIV/AIDS who came for maternal and child health services (USAID, 2007). Therefore, boda-boda riders had to be good at providing transport services to pregnant mothers. This was the reason for the positive attitude of mothers on the comfort of boda-boda transport in the intervention arm.

Without comfort of services to the mother, services may not be consumed as required. In Nigeria, three percent of women were not comfortable with the immunization of their children (Chris-Otubor, 2015). They missed antenatal and post-natal care visits for better explanation in maternal child health management sessions. Interventions of training boda-boda riders and the health education sessions conducted at health facilities during ANC were necessary for the east – central Uganda study for detailed explanations. Like other studies which looked at arrival of mothers at the health centres for maternal services, they had to receive the care that they needed (PATH, 2016). Similarly, mothers were comfortable with the boda-boda riders because of the care provided. Nnebue (2014) attempted to make an assessment of the attitude on clients' satisfaction with the quality of maternal health care services (QMHS) given by service providers. The health care services have to be good in order to attract mothers to comfortably come to health facilities (Nnebue, 2014).

Mothers recommending fellow mothers to utilize boda-boda transport had no influence on health facility-based deliveries. Mothers believed that it was necessary to recommend fellow mothers to use the locally available boda-boda riders for transport to

health centres. In Egypt, mothers had freedom to decide upon any maternal services (Do & Kurimoto, 2012). With the positive attitude of mothers towards provision of maternal health care services, recommendations were made for others to receive the services (Do & Kurimoto, 2012). Boda-boda transport was among the maternal services offered to mothers in the east – central Uganda study. The intention of the health education sessions was to improve on the attitude of mothers for positive and timely decisions. Some mothers had made decisions and utilized boda-boda riders in the east – central Uganda. Therefore, it was easier for mothers to recommend fellow mothers to use boda-boda transport to health centres in the study area. However, recommendations were made after prior knowledge on the availability and importance of boda-boda riders in the transportation of mothers to health centres. Secondly, boda-boda riders were friendly to mothers who wanted their services.

Training of boda-boda riders and health education sessions conducted for the mothers improved on the relationship of boda-boda riders with mothers and ability to recommend others for the services. Unlike in the east – central Uganda study, in Nigeria mothers did not recommend fellow mothers to use health facilities when community health extension workers (CHEWs) interviewed them (Onwuhafua, 2005). Different reasons were given which included; non friendly health workers, distance to the health centre, and lack of transport means to the health centre (Onwuhafua, 2005; Moindi *et al.*, 2016). This concurred with the east – central study in Uganda where non friendly boda-boda riders like the health service providers contributed to failed recommendation by mothers to use boda-boda transport.

5.1.3 Communication system for community-based referrals

The number of mothers who possessed phones to contact the boda-boda riders for transport to health centres had an effect on health facility-based deliveries. According to several studies conducted (Patel *et al.*, 2016; PATH, 2013; MOH, 2014), mothers have not been given phones for communication. This is how rural mothers have been missing to contact ambulance drivers and riders. In the east – central region, majority of mothers were mobilised and sensitised about the CUG and those with phones were recruited into the study and results showed increased use of boda-boda transport to health centres especially during the time for delivery.

However, for the mothers to call the boda-boda riders, they were supposed to use the free calls when registered in the CUG or load their phones with airtime. Mothers also received bonus airtime of ten thousand shillings (Uganda shillings) in addition to the free calls made to other members who were registered in the CUG. Sensitisation of mothers was continuously done during antenatal care by health workers at health facilities and VHTs in the community. Some mothers loaded their phones with airtime to call the boda-boda riders for transport to the health centres. Despite the fact that mobile phones play different roles when it comes to healthcare (PATH, 2013), no single study pointed at loading airtime on these phones; yet free airtime can be an incentive. Process theories of motivation, motivates individuals or organisations with financial incentives to influence results (El-Jardall *et al.*, 2011). There was need to constantly load airtime for mothers on their phones. However, airtime was loaded once and it affected the utilisation of boda-boda transport by mothers to health centres.

Much as majority of the mothers possessed their own phones, some of them used other people's phones to communicate. In 1997, China designed a communication system to respond to emergencies in hospitals specifically in Shenzhen, but mothers did not directly call the vehicle ambulance driver, they instead called the control centre as it was a hotline (Kalinowski, 2012). Similarly, it was very difficult for the vehicle to move beyond the radius of 3 – 5 km, yet the area of coverage was very big (Kalinowski, 2012). Therefore, mothers who had no phones could use another person's phone to call for other means of transport. This seemed easier because of the hotlines which did not require airtime. This was quite different in east – central Uganda, whereby the person assisting the pregnant mother had to load airtime in order to call the boda-boda rider for transport. Another person's phone was not registered in the closed caller user group which would have acted as an incentive for better utilisation of boda-boda transport to health centres as further explained by the theories of human motivation (Goodman, 2011).

For mothers who did not possess phones, very few used friends' and relatives' phones to contact boda-boda riders. Like in China, majority of mothers in east – central Uganda used their husbands' phones to contact the boda-boda riders for transport. Taking husbands as responsible people, they were entitled to prioritise assisting mothers to reach health centres for maternal services as per the agenda setting theory (Shaw, 1979).

The study was to find out the approaches used by mothers to contact the boda-boda riders. Many options were in place which included; phone calls, sending a telephone message, sending a person to the boda-boda stage or the mother walking to the stage.

The most used approach was phone call. Majority of the mothers made phone calls to the boda-boda riders for transport to health centres. The rest of the mothers walked to the stage or sent someone to pick the rider. In most studies, phones were a common means of communication used (Kalinowski, 2012; PATH, 2013) as reflected by the east – central region study in Uganda.

Most of the mothers estimated 21 – 30 minutes for a boda-boda rider to arrive at the homes of mothers when they called for transport to the health facility. The time taken by the boda-boda riders to arrive when mothers called them had an eefect on the deliveries conducted at the health centres. In Malawi, radio-telephones were used in health centres. The use of radio-telephones in the mother care project in Malawi helped to handle the "second delay" as it helped to reduce average transport delays from six hours to three hours (PATH, 2013; Thaddeus, 1994). This was not equally very good to mothers who were experiencing labour or pregnancy related complications. When the boda-boda riders got trained in maternal and child health services, they improved on the time of responding to the mothers' calls for transport to the health facilities. Therefore, it was rightly decided to train mothers and boda-boda riders in community-based referrals for increased deliveries from health centres. This was in line with the individual differences theory where individuals retain information and change the perceptions (Motowildo, Borman & Schmit, 1997) as supported by Chris-Otubor (2015).

The possible challenges mothers faced when communicating to boda-boda riders for transport included the following; the phones of the boda-boda riders being switched off,

no network or signals for particular locations, the boda-boda riders not picking the phone call and others. The integrated communication system during times of emergencies for referral in rural communities in developing countries especially in the Sub-Saharan Africa and Asia is inappropriate if not lacking (Patel *et al.,* 2016). It hinders service delivery, especially to the rural population. This is because of the unfavorable environments (networks) for the known types of communication systems to be effective. Unfavourable conditions in the east – central Uganda study were detected, especially poor networks for the phones.

5.1.4 Knowledge attained by mothers and boda-boda riders during training in community-based referrals

The overall intention of training mothers and boda-boda riders was to attain knowledge on community-based referral for better maternal outcome. Discussion was limited to innovation, communication and technology, roles of the different stakeholders, fleet management and referral mechanism and prevention and basic management of emergencies.

Only knowledge attained during training by boda-boda riders on fleet management and referral systems had a significant effect on health facility-based deliveries. For mothers, fleet management and referral systems and roles of the different stakeholders had an effect on health facility-based deliveries. According to findings, training of boda-boda riders, health workers (midwives and VHTs), and mothers amongst others was important in creating awareness about the intensity of care required by pregnant mothers. The mothers and boda-boda riders were attentive during the time of learning.

Different studies have been conducted for the betterment of the MCH indicators. For instance, Ssebunya and Matovu (2016) study was on utilization of the motorcycle ambulances by pregnant mothers to health centres in eastern Uganda. Motorcycle ambulances are not very different from the locally available boda-boda transport in the east – central Uganda study. Only 48.3 percent of mothers reported having utilized motorcycle ambulances (Ssebunya and Matovu, 2016) which was low compared to 70.5 percent of mothers in the east – central Uganda study who used the locally available boda-boda transport. Implying there was good learning as affirmed by the theory of learning and teaching (Mugisha, 2015; Kaya, 2016). Therefore, the local boda-boda riders played a great role in helping mothers get transported to health centres to deliver in east – central Uganda.

Similarly, mothers played their role of contacting boda-boda riders for transport in time. This was missed in China as a developed country, boda-boda transport is not commonly used; instead, vehicle ambulances were used to transport mothers to health centres when they contacted the ambulance drivers (Kalinowski, 2012). However, mothers faced challenges on calling vehicle ambulance drivers (Kalinowski, 2012) perhaps due to the missed training on the roles of different stakeholders in the management of maternal referrals.

Like in the east – central Uganda study, Namazzi *et al.* (2017) in eastern Uganda aimed at improving CHWs' knowledge of MNH (danger signs and essential home-based newborn care). Indeed, it improved from 41.3% to 77.4% after training and to 79.9% one year later after post training (Namazzi *et al.*, 2017). Community extension health

workers are not far from the boda-boda riders since they are all service providers. In the east – central study in Uganda, also knowledge for the boda-boda riders and mothers on prevention and basic management of emergencies (vaginal bleeding, blood pressure, and anemia amongst others) improved from 35% to 94% for the boda-boda riders and 12.8% to 90.3% for mothers.

Interventions to check the affordability of mothers to leave communities as it were in other studies (Munjanja, 2012; Yanagisawa, 2015) for services at health centres, included; training and registration of mothers and boda-boda riders in CUG for free communication and subsidized payment of transport fares for mothers in the study. Studies have also been used to concretize the relevance of training mother and boda-boda riders in community-based referrals to enhance maternal outcome. However, not much literature was discovered in support of training boda-boda riders on maternal health. Patel *et al.* (2016) observed that due to lack of adequate information on maternal health, a lot needed to be spread to different stakeholders including mothers and boda-boda riders. According to PATH (2013), different communication tools like phones, TVs, radios, flags, road signs amongst others were utilized in the different countries to improve on flow of information and improve the MCH indicators (Tiwari, 2014), but its impact was not as big as that experienced within the east – central study in Uganda. This was in line with David Berlo's argument on the flow of information in the communication model (Shannon, 1964; Munjanja, 2012). Boda-boda riders in the east – central study attained 100 percent knowledge on the availability and use of the CUG and 98.6% for mothers, of which 70.5 percent of mothers were transported by boda-

boda riders to deliver from health centres. It is therefore concluded that mothers and boda-boda riders training was necessary.

By the fact that midwives were invited during training of boda-boda riders and mothers in the east – central study in Uganda, the Hunger Project (2017) in Ghana which trained Community Health Nurses (CHN) as midwife assistants and a study in the United States of America conducted on maternal education and health related parenting of the children by the CHEWs (Prickett & Augustine 2015) aimed at physical transmission of information to mothers at the health centres and community. Physical information delivery system was part of the training deliverables in the roles played by the different stakeholders.

Not different from other studies like Pembe (2010), effective training of mothers and boda-boda riders in community maternal referral improves on the proportion of mothers reaching hospitals or health centres. It was noted that an energetic group of mothers and boda-boda riders (25 – 34 years of age) in the east – central Uganda study dominated the training and the results were convincing.

In general, the use of boda-boda transport by pregnant mothers improved as a result of training. Boda-boda riders noticed that boda-boda transport does not only cater for healthy people but can also be beneficial to mothers in labour and those with complications and mothers are willing to contact them. This study therefore focused on training the boda-boda riders and mothers for effective maternal referrals to health centres to deliver under skilled personnel.

5.2 Conclusion

The conclusions are made from the study findings and in line with the study objectives. This study concluded that;

i) Specifically looking at the socio-demographic characteristics for the mothers, age (25 – 34 years and 35 – 44 years), religion (Protestants and Moslems) and means of transport to the health centres (motorcycles and walking) influence deliveries in health centres. Similarly, the socio-demographic characteristics of boda-boda riders, age (25 – 34 years) and ownership of the motorcycle (personal) play a pivotal role in the improvement of health facility-based deliveries.

ii) It was noted that pregnant mothers were comfortable with boda-boda transport to the health centres during time of labour and when they had pregnancy related complications. They even contacted boda-boda riders for transport as a result of trust in them and riders responded positively. The positive response defines a good service provider as exhibited by the boda-boda riders for the transport services.

iii) The formulation of a closed caller user group (CUG) as an innovation under communication system and technology has demonstrated its potential in addressing the challenges associated with community referral needs. This is attained when pregnant mothers possess phones and boda-boda riders arrive on time when contacted for transport (< 31 minutes) in order to reduce on the maternal and neonatal challenges that may be caused by inadequate referral and transport to the health centres in rural settings. The closed caller user group has the potential to address the communication and transport linkage gaps in the maternal health structure of the health system for low resource settings like Uganda.

iv) In addition, training of mothers and boda-boda riders in community-based referrals (on innovation, communication and technology, fleet management and referral systems, roles of the different stakeholders and prevention and basic management of emergencies) has impacted on the maternal outcome in the study area. It has also made the process of referral and transportation of mothers better.

5.3 Recommendation

5.3.1 Recommendation from the study

1. Socio-demographic characteristics hindering good maternal outcomes should be addressed at different levels (advocacy inclusive). There is need to change the ANC curriculum such that midwives can encourage mothers during ANC sessions to have a saving culture (savings boxes) to have money to pay for transport fares. Also, local authorities should be advised to enact by-laws to protect young girls and reduce early pregnancies and encourage them to stay in schools.
2. Massively, boda-boda riders should be encouraged to form associations at their different stages for the government to subsidize on the costs of acquiring a boda-boda (motorcycle) and the running costs. This will enable more boda-boda riders to own motorcycles thus contributing to easy access to boda-boda transport services by the mothers. The associations especially with financial gain will act as incentives for the boda-boda riders to continuously transport mothers to health centres to deliver and during times of emergencies.
3. There is need to bring Implementing Partners (IPs) on board to help in the formation of a universal closed caller user group for all pregnant mothers to contact boda-boda riders. Also, support the branding of interested boda-boda riders for easy

identification through provision of T-shirts, aprons, helmets, identity cards among other identification requirements.

4. Training of mothers and boda-boda riders needs to be rolled out in more sub counties and districts regardless of the inclusion criteria at all levels. The study impact was exhibited in the shortest time of community involvement especially in the area of intervention. This study was in only two districts out of 16 districts in the region. Therefore, ministry of health should fully come out to enroll the training in community-based maternal referrals in different parts of the country.

5.3.2 Recommendation for further research

1. Instead of the closed caller user group, a communication App can be designed and installed on users/mothers' phones. The communication App will be continuously utilized by mothers compared to the CUG which is managed centrally by the company after payment is made.
2. A study should be designed to compare communication response between trained mothers and boda-boda riders in the closed caller user group and those trained but not in the closed caller user group.
3. This study concentrated majorly on community-based referrals from homes to health centres. However, mothers are equally referred from one health centre to another. Therefore, it is recommendable to have a study on referral of mothers by the boda-boda riders from one health centre to another.
4. Other maternal outcomes were not considered for this study. A study on effect of training boda-boda riders and mothers in community-based referrals on maternal mortality ratio and neonatal mortality rates can be carried out.

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APPENDICES

Appendix I: Consent Form

EFFECT OF TRAINING MOTHERS AND BODA-BODA RIDERS IN COMMUNITY-BASED REFERRALS ON MATERNAL OUTCOME IN EAST – CENTRAL REGION, UGANDA

Introduction:

Greetings,

My name is **Muluya Kharim Mwebaza (+256 704 887 896)** a student of Kenyatta University, pursuing postgraduate studies in Health Management and Informatics. As part of our study, we are required to conduct a research in the area of Public Health which will lead to the award of a PhD. Data is to be collected by the use of questionnaires and interviews. I am asking you for a little of your time, about 30-55 minutes, to help us in this study.

Purpose:

The study aims at finding out the socio-demographic factors, attitude of mothers, communication systems that determine their referrals from the community and the effect of knowledge attained during training on health facility-based deliveries in east – central region, Uganda. The intention is to have mothers deliver in health centres when supported by boda-boda riders for transport.

Benefits:

In the end, it is hoped that the information you give us could help to improve on the maternal referrals from the community in east – central Uganda such that mothers deliver from health centres. Results will also provide information necessary in the reduction of MMR and NMR.

Risks: There will be no harm done on you at all as a person arising from participating. There is no bodily pain involved in this study. We only aim at sharing information to improve on the maternal referrals from communities and mothers to deliver from health centres.

Voluntary participation

Taking part in this study is up to you and no one will be upset if you don't want to participate. Even if you agree to participate, but half way through the discussion you change your mind, nobody will be upset. You can ask me to stop the discussion at any time. It is also okay if you do not want to answer any particular question you find uncomfortable. But even though you have said "yes," you can still decide not to take part.

Confidentiality:

The interview involves intimate and private life questions. I would like to assure you that this privacy will strictly be maintained throughout. A code number will identify every participant and no name will be used. Your responses to any of the questions will not be given to anyone else and no reports of the study will ever identify you. If a report of results is published, only information about the total group will appear.

Consent:

The interview/answering the questionnaire is voluntary. Your participation / non-participation, or refusal to respond to the questions will have no effect now or in the future on services that you or any member of your family may receive from the interviewer.

Are you willing to participate in this study? **1. [ ] Yes. 2. [ ] No**

If yes, signature of the participant _____

Then start the interview (*if does not read or write).*

Name of interviewer _____ Signature _____ Date _____

NB: No need of forcing the clients to be included in the study.

01. Name of the village/facility where the questionnaire was distributed_____

02. Questionnaire identification no. _____ (***you can leave it out***)

03. Telephone contact of client: _____ (***if possesses and willing to give the tel. number***)

Thank you very much

Contacts of supervisors and authorization boards and councils for any other issues:

In case of any queries concerning this study, you are free to contact the listed people below who are my supervisors.

1. Dr. Rucha Kenneth Kibaara Telephone No: +254 723 227 480
2. Dr. Peter Kithuka Telephone No: +254 722 358 103
3. Prof. John Francis Mugisha Telephone No: +256 772 648 223 / +256 702 088 494

You can also freely contact the boards and council below in case of any querries concerninig this study;

1. Kenyatta University Ethical Review Committee Email: kuerc.chairman@ku.ac.ke; website: www.ku.ac.ke; and Fax: 8711242/8711575
2. St Francis Hospital – Nsambya (UMU) Institutional Review Board Telephone No: +256 414 267 012/3 Fax: +256 414 267 870 Email: nsambyahospital@nsambyahospital.or.ug
3. Uganda National Council for Science and Technology (UNCST) Telephone: +256 414 705 500 Fax: +256 414 234579 Email: info@uncst.co.ug Website: www.uncst.go.ug

EBIRETEBWAWO KULWO'KUSOMESA ABAVUZI BOBUPIKIPIKI KU KUWEREZA BANAKAZEIRE OKUVA MUBYALO
Okwandhulwa:

Nkulamuyisa:

Ninze **Muluya Kharim Mwebaza (+256704887896)** omusomi wa Kenyatta yunivasite nga ndikusoma emisomo egye ndabirira mubyobulamu era n'empulizigania mubyo. Nga ekimu ku misomo, kitwetagisa okukola enonereza mukitezo ekyobyobulamu ebyabantu ekidha okundetera okufuna diguli eya PhD. Amawulire geida kufunika nga tukozesa ebibuzo ebiwandiko era no'kubuzagania maiso ku maiso.

Ekigendererwa:

Omusomo gulubirira kutegera/kuzuula obungi obwabantu webwidha era nebyo ebibugemaku, embera da banakazeire era nemikutu egyempulizigania egisalawo kubawereza okuva mubyalo byobuvandhuba obwawaghati wa Uganda. Ekigendererwa kiri-kyakubona abobupikipiki (boda boda) ku ntambula yeibwe.

Emiganhulwo:

Munkomerero amawulire gooja okutuwa gayinza okuyamba ku bungi bwa bamaama abaazala abawerezebwa okuva mubyaalo ebyebuuwandhuba bwawaghati wa Uganda nga bazalira mu malwaliro. Ebinavamu bija kuyambaku okukendeza ku kukufa kwabakyala nga bazala nobwana obukaali kuweza mwezi.

Obuzibu

Tiwajakubaawo buzibu bujja kukutusibwa olwokuba wetyabye mu, tiwajakubaawo bulumi bwonabwona ku mubiri gwo olwo omusomo guno. Tulubirirwa kugabana ku mawulire okukulankulania okuwereza bamaama okuva mubyaalo bajja bazaalire mu madwaliro.

Byankizo innho

Embozi eno erimu ebibuzo nga byabulamu bwakyama innho era ndikwenda okukutegeza nti ekyama kino kiida kukumibwa. Era waliwo enamba egya okuwebwa bulimuntu okuzesebwa mukifo ehyerinalye. Endiraamu yo yokuwebwa eri muntu yenayena, era wazira bigema kubiva mu musomo guno bijja kukitegera nti niwe. Singa emivaamu biba biwandikiibwa, amawulire agabantu bonabona ababuzibwa naga nategerebwa.

Okwikiriza okwekyeyendere

Okwetaba mumusomo guno kwakyeyeendere. Okubaamukwo oba obutabaamu kwo oba okudhema okwiramu ebibuuzo tibikosa butti era nimumaiso kumperezaiwe n'abantu bbo jemufuna okuva eri oyo anabba nga naababuziyiza.

Olimwikiriza okwetaba mumusomo guno?

1. Yi 2. Mbe

Oba yi, gwebalikubuuza asaniyinge _____

Tandiika okubuuza ebibuuzo (*waaba tasobola kuwandiika)*

Erina eryabuza_____Omukono_____Olunaku_____

NB: wazira kukaka muntu yenayena kuba mumusomo guno

01. Erina eryekyalo akatabo akebibuzo wekagabwa_____

02. Ennamba eyakatabo _____

03. Enamba eye eisimu ey'alina akatabo _____

Webale innho

Appendix IIa: Quantitative Data Collection Instruments

RESEARCH FORM#01 *(BASELINE-MOTHERS)* INTERVENTION& CONTROL ARMS

Site and/Study number_____ Date_____

SECTION: A BIO DATA

A1. Expected date of delivery (EDD) _____

A2. Age

1. ≤15 – 24 years ☐
2. 25 – 34 years ☐
3. 35 – 44 years ☐
4. 45 years and above ☐

A3. Educational Level

1. None ☐
2. Primary ☐
3. Secondary ☐
4. Tertiary ☐

A4. Marital status of the respondent

1. Never got married ☐
2. Married ☐
3. Separated/Divorced ☐

A5. Level of income

1. Low ☐
2. Middle ☐
3. High ☐

A6. What is your religious denomination?

1. Catholic ☐
2. Protestant ☐
3. Moslem ☐
4. Others _____ ☐

A7. Number of pregnancies (include this one)

1. 1 – 2 ☐
2. 3 – 4 ☐
3. 5 – 6 ☐
4. 7 and above ☐

A8. Residence

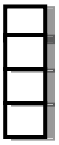
1. Rural ☐
2. Urban ☐

A9. Estimated distance from nearby health centre

1. 1 – 2 ☐
2. 3 – 4 ☐
3. 5 – 6 ☐
4. 7 – 8+ ☐

A10.Means of transport used to reach the health centre

1. Motorcycle
2. Bicycle
3. Vehicle
4. Walk



SECTION B: ATTITUDE OF MOTHERS TOWARDS COMMUNITY REFERRALS

Please indicate the extent to which you agree with the following statements that relate to ATTITUDE OF MOTHERS TOWARDS COMMUNITY REFERRALS

SECTION: B ATTITUDE OF MOTHERS ON COMMUNITY REFERRAL			
A11		Boda-boda riders play a role in transporting mothers to health centres	1. Strongly Agree 2. Agree 3. Do not Know 4. Disagree 5. Strongly Disagree
A12		Pregnancy related danger signs and symptoms prempt mothers to use boda-boda transport to health centres.	1. Strongly Agree 2. Agree 3. Do not Know 4. Disagree 5. Strongly Disagree
A13		Mama – Boda-boda transport is comfortable for pregnant mothers to use and reach health centres in time.	1. Strongly Agree 2. Agree 3. Do not Know 4. Disagree 5. Strongly Disagree
A14		I can recommend another pregnant woman to utilize the Mama – boda-boda transport services?	1. Strongly Agree 2. Agree 3. Do not Know 4. Disagree 5. Strongly Disagree

SECTION C: COMMUNICATION SYSTEMS

Please indicate the extent to which you agree with the following statements that relate to COMMUNICATION SYSTEMS

	CODE	MOBILE PHONESAND CLOSED CALLER USER GROUP (CUG)		
A15		Do you (mother) have a phone to use to communicate to the rider for a maternal referral from community to a health centre to deliver? **(If No, go to Question A21)**	1. Yes	1. No
A16		If **Yes**, do you always have your phone loaded with airtime to communicate to the rider for a maternal referral from community to a health centre to deliver?	1. Yes	2. No
A17		Do you use another person's phone to communicate to the rider for maternal referral from community to a health centre to deliver? (If **No, Go to Question A23**)	1. Yes	2. No
A18		If **Yes**, what is your relationship with the person whose phone is used?	1) Husband 2) Relative 3) Friend 4) Neighbor 5) Others_____	
A19		How do you communicate to them for a maternal referral from community to a health centre to deliver?	1. Phone call 2. Send a message 3. Send a person 4. I walk to them 5. Others_____	
A20		After contacting the boda-boda rider, how soon did s/he arrive at your home?	1. 5 – 20 minutes 2. 21 – 30 minutes 3. 31 – 60 minutes 4. 60+ minutes	
A21		What are the challenges experienced in the communication?	1. Phone switched off 2. No network 3. Does not pick phone call 4. Others_____	

SECTION D: KNOWLEDGE ATTAINED BY MOTHERS DURING TRAINING

Please answer Y = *Yes* or N = *No*

	CODE	KNOWLEDGE		
A22		"**Innovation, communication and technology"** *Do you have any knowledge on the closed caller user group?*	1. Y	1. N
A23		**"Fleet management & Referral systems"** *Do you use boda-boda as a means of transport from community to health centre when in labour or with other complications?*	1. Y	2. N
A24		**"The roles of the different stake holders (Riders, HWs & VHTs)"** *Have you ever been advised to save money for transport fare to health centres?*	1. Y	2. N
A25		**"Prevention and basic management of emergencies"** *Can you list at least 3 signs and symptoms of pregnancy complications?*	1. Y	2. N

SECTION E: MATERNAL REFERRAL OUTCOME

Y = *Yes* N = *No*

	CODE	OUTCOMES		
A26		Do you use boda-boda transport to the health facility to deliver?	1. Y	2. N
A27		Is the boda-boda rider transporting you to the health centre trained?	1. Y	2. N

Thank You So Much for Your Time

TRANSLATION: RESEARCH FORM#01 (BASELINE-MOTHERS/ BAMAMA ABALIKUNWA OBULEZI) <u>INTERVENTION & CONTROL ARMS</u>

Site and/Study number_____ Enaku Domweezi_____

SECTION: A BIO DATA/ EBIKUGEMAKU

A1. Olunaku lwosubila okuzaala_____

A2. Emyaka

1. ≤15 – 24 ☐
2. 25 – 34 ☐
3. 35 – 44 ☐
4. 45 no'kweyongerayo ☐

A3. Wasomaku

1. Mbe ☐
2. Pulayimale ☐
3. Siniya ☐
4. Eitendekelo ☐

A4. Olimufumbo

1. Tifumbirwangaku
2. Mufumbo
3. Twayawukana

A5. Ebyenfuna byo biribitya

1. Wansi
2. Wagati
3. Wayigulu

A6. Oli waidini kyi

1. Mukatuliki
2. Poletesitanti
3. Musilamu
4. Agandi _____

A7. Wakafuna amabunda emirundi emekaye

1. 1 – 2
2. 3 – 4
3. 5 – 6
4. 7 no'kweyongerayo

A8. Obawaa ye

1. Mukyaalo
2. Mu tawuni

A9. Obuwanvu okutuka kwiidwaliro eliri okumpi

1. 1 – 2
2. 3 – 4
3. 5 – 6
4. 7 – 8+

A10.Entabula ekozesewa okutuka kuyilwalirro

1. Motoka
2. Pikipiki
3. Kagaali
4. Bigere

SECTION B: ATTITUDE OF MOTHERS ON BODA-BODA TRANSPORT

Laga nga bwoikirizagania ne bidhubo okubigerengerania ne byentambula ediriwo

SECTION: B MAMA-BODA-BODA TRANSPORT CONNECT SERVICES			
A11		Abantu bano abebyentabula ya Mama – boda-boda transport connect bamugaso jooli	1. Ndikiriza inho 2. Ndikiriza 3. Tiyiidhi 4. Tiyikiriza 5. Tiyikiriza inho
A12		Wali ofunieku kububonero buno nga oli mabunda (nga Okulukuta omusayi okuva mubitundubyo ebyekyama, Omusudha, Omutwe okuluma/enzikiiza ku maiso) bwakusikiriza okukozesa boda-boda	1. Ndikiriza inho 2. Ndikiriza 3. Tiyiidhi 4. Tiyikiriza 5. Tiyikiriza inho
A13		Entabula Mama – boda-boda transport connect njiwuliliramu emirembe	1. Ndikiriza inho 2. Ndikiriza 3. Tiyiidhi 4. Tiyikiriza 5. Tiyikiriza inho
A14		Nsobola okuwa amagezi abakazi abandi abali amabunda okukozesa enkola eno eya Mama – boda-boda transport connect	1. Ndikiriza inho 2. Ndikiriza 3. Tiyiidhi 4. Tiyikiriza 5. Tiyikiriza inho

SECTION C: COMMUNICATION SYSTEMS/OKUWULIZAGANIA

Laga nga bwoikirizagania ne bidhubo okubigerengerania ne empulizigania ediriwo (Y=Yi and N=Mbe)

	CODE	**MOBILE PHONES/ amasiimu agomungalo**		
A15		Olina eissimu kwo yogerera nowabodaboda nga oyendha okuja mwiidwaliro okuzaala?	1. Y	**2. N**
A16		We kiba nti kitufu, eisumu libaku eyataimu okukubira owa bodaboda okwida okukutwala mwiidwaliro okuzaala?	1. Y	**2. N**
A17		Okozesa isiimu lyamuntu wundi mukyalo okwogera no waboda boda okwiida okukutwala mwiidwaliro okuzaala?	1. Y	**2. N**
A18		Nga omaze okwetesa owabodaboda, yamala ibangaki okwidda, dakika imeka?	1. 5 – 20 2. 21 – 30 3. 31 – 60 4. 60+	

A19		Wekiba nti kitufu nkolagana ki eriwo waghati wo noyo mwene isiimu lyokozesa?	1. Mwami 2. Muntu wange 3. Mukwano gwange 4. Mulilaano 5. Yogera abandi_____
A20		Oyogeragania nabo otyaye nga oyenda okuja kwiidwaliro okuzaala?	1. Nkuba eisimu 2. Mpereza bubaka 3. Ntuma muntu 4. Nja yali 5. Yogera ebindi_
A21		Bizibu ki byoyagana mumpulzagania eno?	1. Eisimu eviileku 2. Empulizigania ebuze 3. Tagema isimu 4. Yogera ebindi_____

SECTION D: OKUMANHA KWA BAMAMA OKUVIILE MUKUTENDEKEBWA

Eramu Y = *Yi* oba N = *Mbe*

	CODE	**OBUMANHI**		
A22		"**Okuyiya, empulizigania ne tekinologiya"** *Olina okumanhaku okwo kuwulizaganiaku nga kwawalala okwamasiimu?*	1. Y	2. N
A23		**"Okugemagania ebyentambula ne'byokweyongerayo awandi"** *Okozesa boda-boda nga entambula okuva weka okuja muyilwaliro nga olumwa?*	1. Y	2. N
A24		**"Omugaso ogwabantu ebendawulo (Riders, HWs & VHTs)"** *Bakuwawulaku okuteleka akasente ke'ntabula nga ojja kuyilwaliro?*	1. Y	2. N
A25		**"Okuziyiza no'kugemagania ebyetagisa obwangu"** *Osobola okumpaku obubonero busatu nga buzibu bwamabunda?*	1. Y	2. N

SECTION E: EBISUBILWA MUBYEKYIKYALA

Y = *Yi* N = *Mbe*

	CODE	**EBIVAAMU**		
A26		Okozesa ntambula ya boda-boda okutuka kuyilwaliro?	1. Y	2. N
A27		Owa boda-boda akuvuga yatendekebwa oba bbe?	1. Y	2. N

Webale inho nebisera byo

S/NO	NAME OF MOTHER	ANC REGISTER NO.	VILLAGE	PARISH	EDD	TELEPHONE CONTACT	NEXT OF KIN
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							

Appendix IIB: Tracking log #01a for mothers recruited inthe study:

Name of health centre_____

RESEARCH FORM #02 (EXIT-MOTHERS) <u>INTERVENTION & CONTROL ARMS</u>

Site and/Study number_____ Date_____

SECTION: A BIO DATA

B1. Date of delivery (DD) _____

B2. Age

1. ≤15 – 24 years ☐
2. 25 – 34 years ☐
3. 35 – 44 years ☐
4. 45 years and above ☐

B3. Educational Level

1. None ☐
2. Primary ☐
3. Secondary ☐
4. Tertiary ☐

B4. Marital status of the respondent

1. Never got married ☐
2. Married ☐
3. Separated/Divorced ☐

B5. Level of income

1. Low ☐
2. Middle ☐
3. High ☐

B6. What is your religious denomination?

1. Catholic ☐
2. Protestant ☐
3. Moslem ☐
4. Others _____ ☐

B7. Number of pregnancies (include this one)

1. 1 – 2 ☐
2. 3 – 4 ☐
3. 5 – 6 ☐
4. 7 and above ☐

B8. Residence

1. Rural ☐
2. Urban ☐

B9. Estimated distance from nearby health centre

1. 1 – 2 ☐
2. 3 – 4 ☐

3. 5 – 6
4. 7 – 8+

B10.Means of transport used to reach the health centr

1. Motorcycle
2. Bicycle
3. Vehicle
4. Walk

SECTION B: ATTITUDE OF MOTHERS TOWARDS COMMUNITY REFERRALS

Please indicate the extent to which you agree with the following statements that relate to ATTITUDE OF MOTHERS TOWARDS TRANSPORT SYSTEM

SECTION: B MAMA- BODA-BODA TRANSPORT CONNECT SERVICES			
B11		Boda-boda riders play a role in transporting mothers to health centres	1. Strongly Agree 2. Agree 3. Do not Know 4. Disagree 5. Strongly Disagree
B12		Pregnancy related danger signs and symptoms prempt mothers to use boda-boda transport to health centres.	1. Strongly Agree 2. Agree 3. Do not Know 4. Disagree 5. Strongly Disagree
B13		Mama – Boda-boda transport is comfortable for pregnant mothers to use and reach health centres in time.	1. Strongly Agree 2. Agree 3. Do not Know 4. Disagree 5. Strongly Disagree
B14		I can recommend another pregnant woman to utilize the Mama – boda-boda transport services?	1. Strongly Agree 2. Agree 3. Do not Know 4. Disagree 5. Strongly Disagree

SECTION C: COMMUNICATION SYSTEMS

Please indicate the extent to which you agree with the following statements that relate to COMMUNICATION SYSTEMS

	CODE	**MOBILE PHONESAND CLOSED CALLER USER GROUP (CUG)**		
B15		Do you (mother) have a phone to use to communicate to the rider for a maternal referral from community to a health centre to deliver? **(If No, go to Question A21)**	2. Yes	1. No
B16		If **Yes**, do you always have your phone loaded with airtime to communicate to the rider for a maternal referral from community to a health centre to deliver?	1. Yes	2. No

B17		Do you use another person's phone to communicate to the rider for maternal referral from community to a health centre to deliver? (If **No, Go to Question A23**)	1. Yes	2. No
B18		If **Yes**, what is your relationship with the person whose phone is used?	1) Husband 2) Relative 3) Friend 4) Neighbor 5) Others_____	
B19		How do you communicate to them for a maternal referral from community to a health centre to deliver?	1. Phone call 2. Send a message 3. Send a person 4. I walk to them 5. Others_____	
B20		After contacting the boda-boda rider, how soon did s/he arrive at your home?	1. 5 – 20 minutes 2. 21 – 30 minutes 3. 31 – 60 minutes 4. 60+ minutes	
B21		What are the challenges experienced in the communication?	1. Phone switched off 2. No network 3. Does not pick phone call 4. Others_____	

SECTION D: KNOWLEDGE ATTAINED DURING TRAINING BY MOTHERS

Please answer Y = *Yes* or N = *No*

	CODE	KNOWLEDGE		
B22		"**Innovation, communication and technology"** *Do you have any knowledge on the closed caller user group?*	1. Y	2. N
B23		**"Fleet management & Referral systems"** *Do you use boda-boda as means of transport from community to health centre when in labour?*	1. Y	2. N
B24		**"The roles of the different stake holders (Riders, HWs & VHTs)"** *Have you ever been advised to save money for transport fare to HCs?*	1. Y	2. N
B25		**"Prevention and basic management of emergencies"** *Can you list at least 3 signs and symptoms of pregnancy complications?*	1. Y	2. N

SECTION E: MATERNAL REFERRAL OUTCOME

Y = *Yes* N = *No*

	CODE	OUTCOMES		
B26		Did you use boda-boda transport to the health centre to deliver?	1. Y	2. N
B27		Was the boda-boda rider who transported you to the health centre trained?	1. Y	2. N

Thank You So Much for Your Time

TRANSLATION: RESEARCH FORM#02 (EXIT-MOTHERS/ BAMAMA ABAZAILE) <u>INTERVENTION & CONTROL ARMS</u>
Site and/Study number_____ Enaku Domweezi_____

SECTION: A BIO DATA/ EBIKUGEMAKU

B1. Olunaku lwewazaala_____

B2. Emyaka

1. ≤15 – 24 ☐
2. 25 – 34 ☐
3. 35 – 44 ☐
4. 45 no'kweyongerayo ☐

B3. Wasomaku

1. Mbe ☐
2. Pulayimale ☐
3. Siniya ☐
4. Eitendekelo ☐

B4. Olimufumbo

1. Tifumbirwangaku ☐
2. Mufumbo ☐
3. Twayawukana ☐

B5. Ebyenfuna byo biribitya

1. Wansi ☐
2. Wagati ☐
3. Wayigulu ☐

B6. Oli waidini kyi

1. Mukatuliki ☐
2. Poletesitanti ☐
3. Musilamu ☐
4. Agandi _____ ☐

B7. Wakafuna amabunda emirundi emekaye

1. 1 – 2 ☐
2. 3 – 4 ☐
3. 5 – 6 ☐
4. 7 no'kweyongerayo ☐

B8. Obawaa ye

1. Mukyaalo ☐
2. Mu tawuni ☐

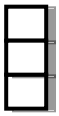
B9. Obuwanvu okutuka kwiidwaliro eliri okumpi

1. 1 – 2 ☐
2. 3 – 4 ☐
3. 5 – 6 ☐
4. 7 – 8+ ☐

B10.Entabula ekozesewa okutuka kuyilwalirro

1. Motoka ☐

2. Pikipiki
3. Kagaali
4. Bigere



SECTION B: ATTITUDE OF MOTHERS TOWARDS COMMUNITY REFERRALS

Laga nga bwoikirizagania ne bidhubo okubigerengerania ne byekutambula ediriwo

SECTION: B MAMA- BODA-BODA TRANSPORT CONNECT SERVICES			
B11		Abantu bano abebyentabula ya Mama – boda-boda transport connect bamugaso jooli	1. Ndikiriza inho 2. Ndikiriza 3. Tiyiidhi 4. Tiyikiriza 5. Tiyikiriza inho
B12		Wali ofunieku kububonero buno nga oli mabunda (nga Okulukuta omusayi okuva mubitundubyo ebyekyama, Omusudha, Omutwe okuluma/enzikiiza ku maiso) bwakusikiriza okukozesa boda-boda	1. Ndikiriza inho 2. Ndikiriza 3. Tiyiidhi 4. Tiyikiriza 5. Tiyikiriza inho
B13		Entabula Mama – boda-boda transport connect njiwuliliramu emirembe	1. Ndikiriza inho 2. Ndikiriza 3. Tiyiidhi 4. Tiyikiriza 5. Tiyikiriza inho
B14		Nsobola okuwa amagezi abakazi abandi abali amabunda okukozesa enkola eno eya Mama – boda-boda transport connect	1. Ndikiriza inho 2. Ndikiriza 3. Tiyiidhi 4. Tiyikiriza 5. Tiyikiriza inho

SECTION C: COMMUNICATION SYSTEMS/OKUWULIZAGANIA

Laga nga bwoikirizagania ne bidhubo okubigerengerania ne empulizigania ediriwo (Y=Yi and N=Mbe)

	CODE	**MOBILE PHONES/ amasiimu agomungalo**		
B15		Olina eissimu kwo yogerera nowabodaboda nga oyendha okuja mwiidwaliro okuzaala?	1. Y	**2. N**
B16		We kiba nti kitufu, eisumu libaku eyataimu okukubira owa bodaboda okwida okukutwala mwiidwaliro okuzaala?	1. Y	**2. N**
B17		Okozesa isiimu lyamuntu wundi mukyalo okwogera no waboda boda okwiida okukutwala mwiidwaliro okuzaala?	1. Y	**2. N**

B18		Nga omaze okwetesa owabodaboda, yamala ibangaki okwidda, dakika imeka?	1. 5 – 20 2. 21 – 30 3. 31 – 60 4. 60+
B19		Wekiba nti kitufu nkolagana ki eriwo waghati wo noyo mwene isiimu lyokozesa?	1. Mwami 2. Muntu wange 3. Mukwano gwange 4. Mulilaano 5. Yogera abandi_____
B20		Oyogeragania nabo otyaye nga oyenda okuja kwiidwaliro okuzaala?	1. Nkuba eisimu 2. Mpereza bubaka 3. Ntuma muntu 4. Nja yali 5. Yogera ebindi_
B21		Bizibu ki byoyagana mumpulzagania eno?	1. Eisimu eviileku 2. Empulizigania ebuze 3. Tagema isimu 4. Yogera ebindi_____

SECTION D: OKUMANHA KWA BAMAMA OKUVIILE MUKUTENDEKEBWA

Eramu Y = *Yi* oba N = *Mbe*

	CODE	OBUMANHI		
B22		"**Okuyiya, empulizigania ne tekinologiya"** *Olina okumanhaku okwo kuwulizaganiaku nga kwawalala okwamasiimu?*	1. Y	2. N
B23		**"Okugemagania ebyentambula ne'byokweyongerayo awandi"** *Okozesa boda-boda nga entambula okuva weka okuja muyilwaliro nga olumwa?*	1. Y	2. N
B24		**"Omugaso ogwabantu ebendawulo (Riders, HWs & VHTs)"** *Bakuwawulaku okuteleka akasente ke'ntabula nga ojja kuyilwaliro?*	1. Y	2. N
B25		**"Okuziyiza no'kugemagania ebyetagisa obwangu"** *Osobola okumpaku obubonero busatu nga buzibu bwamabunda?*	1. Y	2. N

SECTION E: EBISUBILWA MUBYEKYIKYALA

Y = *Yi* N = *Mbe*

	CODE	EBIVAAMU		
B26		Okozesa ntambula ya boda-boda okutuka kuyilwaliro?	1. Y	2. N
B27		Owa boda-boda akuvuga yatendekebwa oba bbe?	1. Y	2. N

Webale inho nebisera byo

RESEARCH FORM #03 (BODA-BODA RIDERS) <u>INTERVENTION & CONTROL ARMS</u>

Assessment (1) [Pre test]

Respondent identification number: _____

Qn	**Particulars of the boda-boda**			
1.	Name of the district:			
2.	Name of Sub-County:			
3.	Name of parish:			
4.	Name of village:			
5.	Group category/stage of ***Boda-boda riders***			
6.	Age of boda-boda rider			
7.	Marital status		01. Married ☐	02. Not married ☐
8.	Education level	01. ≤ primary ☐	02. Secondary ☐	03.Tertiary
9.	Level of income	01. Low ☐	02. Middle ☐	03. High ☐
10.	Religion 01.Protestant ☐	02. Catholic ☐	03. Moslem ☐	04. Others ☐
11.	Ownership of motorcycle		01. Personal ☐	02. Other person ☐
Innovation, communication and technology (CUG)				
12.	Have knowledge on mama – boda-boda transport connect which is a new innovation in the district where boda-boda riders are easily accessed by mothers for transport to health centres.			a) True b) False
Fleet management & Referral systems				
13.	Expectant mothers can be transported to health facilities by the only vehicle ambulances.			a) True b) False
14.	It is not necessary for a mother in labour to call a boda-boda rider for transport to the health facility. That responsibility is for the husband since is the head of the family.			a) True b) False
15.	Community referral involves transporting mothers from the community to the health centre and from one health centre to another.			a) True b) False
The roles of the different stake holders (Riders, HWs and VHTs)				
16.	The role of boda-boda riders is to transport healthy people ***not*** mothers in need of emergency care.			a) True b) False
17.	Boda-boda riders and other stakeholders are supposed to encourage mothers save money for transport and buying others supplies in preparation of delivering a baby.			a) True b) False

Prevention and basic management of emergencies		
18.	When a pregnant mother starts bleeding, it is ***not*** advisable to sit on a boda-boda to go to the health centre.	a) True b) False
19.	The following signs and symptoms call for emergency care for a mother who is her third trimester of pregnancy.	
	I. Vaginal bleeding.	a) True b) False
	II. Long hair which cannot allow water to reach the skin when bathing.	a) True b) False
	c) Eyes turning red.	a) True b) False

TRANSLATED: RESEARCH FORM #03 (BODA-BODA RIDERS) IN THE <u>INTERVENTION & CONTROL ARMS</u>

Okubuzibwa okusoka [Pre test]

Namba yaali kuyilamu: _____

Ebibuzo	**EBIGEMA KUWA BODA-BODA**			
1.	Elina lya disirikiti:			
2.	Elina lye'gombolola:			
3.	Elina lyo'muluka:			
4.	Elina lye'kyalo:			
5.	Sitegi gyovugirako ***Boda-boda***			
6.	Emyeka ejawa boda-boda			
7.	Obwobufumbo		01. Mufumbo ☐	02. Timufummb ☐
8.	Obwegerese	01. ≤ Wansi waekyomusanvu ☐	02. Wagati was p.7 ne etendekero ☐	03.Etendekero ☐
9.	Enfuna	01. Wansi ☐	02. Wagati ☐	03. Wayigulu ☐
10.	Eyidhini 01.Anglikani ☐	02. mukatuliki ☐	03. Musilamu ☐	04. Abandhi ☐
11.	Ownership of motorcycle		01. Personal ☐	02. Other perso ☐
Okuvumbula, okuwizigania ne tekinologiya (CUG)				
12.	Mama – boda-boda transport connect nebimu ebintu ebiyaaka ebiyidye mu disitirikiti nga aba boda-boda bavuga ba mama okubatwala mu malwaliro okuzala.			a) Kitufu b) Kifu
Okugemagania ebyentambula no'kuwereza abetaavu kuyidala elindi				
13.	Bamama abali kulumwa basobola otwalibwa muyilwaliro nga okozeyiza motoka eya'mulensi yonka			a) Kitufu b) Kifu
14.	Tikyetagisa mukyala alikulumwa kukubira waboda-boda kasiimu			a) Kitufu b) Kifu

	aidhe a mutwale muyilwaliro. Obwo buvunanizibwa bwa musadha kuba nakulira amaka.	
15.	Okutambuza bamama abamabunda kilimu okubatoola mukyalo okubatwala muyilwaliro nokubatola muyilwaliro lino okubatwala mulindi.	a) Kitufu b) Kifu
Omugaso ogwabantu ebendawulo (Riders, HWs and VHTs)		
16.	Omugaso gwaboda-bodakutambuza bantu balamu nga tibamama abali mumbela embi.	a) Kitufu b) Kifu
17.	Aba Boda-boda na'bantu abandhi bakubiliza bamama okutereka sente de'ntambula ne'bituntu ebindhi nga betegekera okuzala omwana muyilwaliro.	a) Kitufu b) Kifu
Okuziiza no'kugemagania ebyendha obwangu		
18.	Omukyala owendha watandika okuvamu omusayi tikilungyi kumutyamisa ku kaboda-boda kumutwala muyilwaliro.	a) Kitufu b) Kifu
19.	Obubonero obwetagisa okutamu obwangu eri omukyala atukiliyire okuzaala.	
	I. Okuva omusayi mu kyitundu ekyekyama	a) Kitufu b) Kifu
	II. Enviri empanvu kumutwe nga tidikiriza madhi kutuka kulususu lwo'mutwe.	a) Kitufu b) Kifu
	c) Maiso mamyuufu.	a) Kitufu b) Kifu

RESEARCH FORM #04 (BODA-BODA RIDERS) <u>INTERVENTION & CONTROL ARMS</u>

Assessment (2) [Post test]

Respondent identification number: _____

Qn	**Particulars of the boda-boda**				
1.	Name of the district:				
2.	Name of Sub-County:				
3.	Name of parish:				
4.	Name of village:				
5.	Group category/stage of ***Boda-boda riders***				
6.	Age of boda-boda rider				
7.	Marital status			01. Married ☐	02. Not married ☐
8.	Education level	01. ≤ primary ☐		02. Secondary ☐	03.Tertiary ☐
9.	Level of income	01. Low ☐		02. Middle ☐	03. High ☐
10.	Religion	01.Protestant ☐	02. Catholic ☐	03. Moslem ☐	04. Others ☐
11.	Ownership of motorcycle			01. Personal ☐	02. Other perso ☐
Innovation, communication and technology (CUG)					
12.	Have knowledge on mama – boda-boda transport connect which is a new innovation in the district where boda-boda riders are easily accessed by mothers for transport to health centres.				c) True d) False
Fleet management & Referral systems					
13.	Expectant mothers can be transported to health facilities by the only vehicle ambulances.				c) True d) False
14.	It is not necessary for a mother in labour to call a boda-boda rider for transport to the health facility. That responsibility is for the husband since is the head of the family.				c) True d) False
15.	Community referral involves transporting mothers from the community to the health centre and from one health centre to another.				c) True d) False
The roles of the different stake holders (Riders, HWs and VHTs)					
16.	The role of boda-boda riders is to transport healthy people ***not*** mothers in need of emergency care.				c) True d) False
17.	Boda-boda riders and other stakeholders are supposed to encourage mothers save money for transport and buying others supplies in preparation of delivering a baby.				c) True d) False
Prevention and basic management of emergencies					
18.	When a pregnant mother starts bleeding, it is ***not*** advisable to sit				c) True d) False

	on a boda-boda to go to the health centre.	
19.	The following signs and symptoms call for emergency care for a mother who is her third trimester of pregnancy.	
	I) Vaginal bleeding.	a) True b) False
	II) Long hair which cannot allow water to reach the skin when bathing.	a) True b) False
	III) 1Eyes turning red.	a) True b) False

TRANSLATED: RESEARCH FORM #04 (BODA-BODA RIDERS) IN THE <u>INTERVENTION & CONTROL ARMS</u>

Okubuzibwa okwokubiri [Post test]

Namba yaali kuyilamu: _____

Ebibuzo	**EBIGEMA KUWA BODA-BODA**			
1.	Elina lya disirikiti:			
2.	Elina lye'gombolola:			
3.	Elina lyo'muluka:			
4.	Elina lye'kyalo:			
5.	Sitegi gyovugirako ***Boda-boda***			
6.	Emyeka ejawa boda-boda			
7.	Obwobufumbo		01. Mufumbo ☐	02. Timufummb ☐
8.	Obwegerese	01. ≤ Wansi waekyomusanvu ☐	02. Wagati was p.7 ne etendekero ☐	03.Etendekero ☐
9.	Enfuna	01. Wansi ☐	02. Wagati ☐	03. Wayigulu ☐
10.	Eyidhini 01.Anglikani ☐	02. mukatuliki ☐	03. Musilamu ☐	04. Abandhi ☐
11.	Ownership of motorcycle		01. Personal ☐	02. Other perso ☐
Okuvumbula, okuwizigania ne tekinologiya (CUG)				
12.	Mama – boda-boda transport connect nebimu ebintu ebiyaaka ebiyidye mu disitirikiti nga aba boda-boda bavuga ba mama okubatwala mu malwaliro okuzala.			a) Kitufu b) Kifu
Okugemagania ebyentambula no'kuwereza abetaavu kuyidala elindi				
c)	Bamama abali kulumwa basobola otwalibwa muyilwaliro nga okozeyiza motoka eya'mulensi yonka			a) Kitufu b) Kifu
d)	Tikyetagisa mukyala alikulumwa kukubira waboda-boda kasiimu aidhe a mutwale muyilwaliro. Obwo buvunanizibwa bwa musadha kuba nakulira amaka.			c) Kitufu d) Kifu

e)	Okutambuza bamama abamabunda kilimu okubatoola mukyalo okubatwala muyilwaliro nokubatola muyilwaliro lino okubatwala mulindi.	c) Kitufu d) Kifu
Omugaso ogwabantu ebendawulo (Riders, HWs and VHTs)		
f)	Omugaso gwaboda-bodakutambuza bantu balamu nga tibamama abali mumbela embi.	c) Kitufu d) Kifu
g)	Aba Boda-boda na'bantu abandhi bakubiliza bamama okutereka sente de'ntambula ne'bituntu ebindhi nga betegekera okuzala omwana muyilwaliro.	c) Kitufu d) Kifu
Okuziiza no'kugemagania ebyendha obwangu		
h)	Omukyala owendha watandika okuvamu omusayi tikilungyi kumutyamisa ku kaboda-boda kumutwala muyilwaliro.	c) Kitufu d) Kifu
i)	Obubonero obwetagisa okutamu obwangu eri omukyala atukiliyire okuzaala.	
	I. Okuva omusayi mu kyitundu ekyekyama	a) Kitufu b) Kifu
	II. Enviri empanvu kumutwe nga tidikiriza madhi kutuka kulususu lwo'mutwe.	a) Kitufu b) Kifu
	III. Maiso mamyuufu.	a) Kitufu b) Kifu

Appendix IIC: Research form 04a Boda-Boda Transport Form

(Form to be filled by Health Worker with responses from Boda-boda Rider)

Name of Boda-boda:		
Telephone Contact		
Unique Identifier Number:		
Name of Stage:		
Village of mother: _____	Parish: _____	Sub County: _____
Health Centre where mother was referred to		
How much time was taken from the stage when called to pick the mothers to the health facility (Tick where appropriate)	**1.** 5-20mins **2.** 21-30mins **3.** 31-60mins **4.** 60+mins	
How was Boda-boda contacted:	1. Ordinary telephone call 2. Contacted using the closed caller user group 3. Others_____	
How easy it was to get to the direction of the mother's place:	_____	
How many mothers have you transported to the health facility since study began?	_____	

Signature of the Boda-boda rider_____

Name of the health worker (Midwife) _____

Signature of the health worker (Midwife) _____

RESEARCH FORM #05 DOCUMENT/ RECORDS REVIEW CHECKLIST

2.2 MATERNITY			**NUMBER**
MA01: Admissions			
MA02: Referrals to maternity unit	Total		
	From community service providers		
MA03 Maternity referrals out			
MA04: Deliveries in units	MA04a. Total	Below 15 years	
		15 – 19 years	
		20 – 24 years	
		25 – 49 years	
		50+ years	
	MA04b. Live births	Total	
		< 2.5 kg	
	MA04c. Fresh still births	Total	
		< 2.5 kg	
	MA04d. Macerated still birth	Total	
		< 2.5 kg	

Appenmdix III: Training Guide: Mothers & Boda-Boda Training Guide

1. Training Days	Five Days Training
2. Training model name	Knowledge on Maternal Referral from community and its Outcomes [Sensitization to mothers, motorcycle riders, VHTs and health workers].
3. Lead trainer	To be determined
4. Co-trainer(s)	To be determined
5. Training areas and themes	1. Panel Presentations and Emerging Themes 2. Fleet Management (Panel Presentation) 3. Staff Training & Links to Emergency Handling (Panel Presentation) 4. Innovation, communication and technology (Panel presentations) 5. Referral systems (community to health facility and facility to facility) 6. The role of motorcycle riders (Boda-boda) in emergency transport (panel presentations) 7. Birth /Saving plan during ANC 8. Preventing and basic management of emergencies: a) Labour pain b) Obstetric (unspecified) c) Obstructed/prolonged labour d) Intrauterine death e) Mal-presentation (hand) f) Ante partum hemorrhage 9. Monitoring and Evaluation
6. Pre-course preparations / trainings	This presentation will be presided by consultation with the stakeholders [the Boda-boda riders] and the health workers especially those who have offered and consented to participate in the trial.
7. Description of session	This session is based on training the riders and reorienting health workers and VHTs on how to improve maternal outcomes
8. Training Objectives	To provide the stakeholders on the basic ways to improve the management of community referral for mothers in their third trimester and transportation to the health centre to deliver.
9. Total duration	5 hours
10. Format	PowerPoint presentation
11. Room setup	A conference setting is very appropriate since the presentation is going to be power point.
12. Training Approaches	1) Pre-test questions will be done. 2) The presentation will be projected 3) Participants will be allowed to ask questions at whichever time of the presentation. 4) Post-test questions also done.

TRANSLATION: AKATABO AKASOMESA BA MAMA NE BODA-BODA NABEBYOBULAMU

1. Enaku ezomusomo	Enaku eitanu edho musomo
2. Erina eryo'musomo	Amagezi/okumanha kumpereza eyabakazi era nenzaala evamu Okukubiriza ba mama aba boda boda era nabe byobulamu
3. Akulembera abasomesa	Ekisalibwawo
4. Omusomesa amwiririra	Ekisalibwawo
5. Ebisomesebwa era nemitendera	a) Ebija okuwebwa yomulukiiko era nemitwe emikulu b) Okumakuma ebiwebwayo mulukiko c) Okusomesa abakozi era nebigema kuidagala d) Okwizamu amaani, endhogeragania era ni tekinologiya ebiwebwayo mulukiiko e) Omugaso gwaboda boda mu ntambula eyebigwa nga tibiraze; ebiwebwa mu lukiiko f) Okuziriza era n'engema eyebigwa tibiraze nga; i) Ebissa ii) Obuzibu mu bamabunda iii) Okulemererwa era n'okulwawo okuzaala iv) Omwana okufira munda v) Amabunda agatategerekeka vi) Ekikulukuto g) Okulondoola
6. Ebikolebwa mukusoka abasomesa byebalina okukola	Endogera dijja kuba nga dikolebwa abo bekigemaku okinsingira irala abo aba boda boda n'abasawo abeikiriza okwetaba mu kugesebwa
7. Omulundi/omusomo ogw'okwinonola	Omusomo guno gujja kusinzira ku kusomesa era n'okwandula abasawo ku kulankulania ebye enzaala eyabakazi
8. Ebigendererwa ebyomusomo	Okwegesa abo bekigemaku ebisokerwaku mu kulankulania empereza eyokuwereza abakazi abamabunda abali mumwezi esatu egisembayo nokutegera egigema ku byenzaala eyabakazi
9. Eibanga lyonalyona	Sawa 8
10. Engeri	Okulaga ebyo eby'amaani
11. Entegeka eye kiffo	Entegeka eye kiffo eky'omusomo ya nkizo innho kubanga ne aga ebyo eby'omugaso
12. Engeri ey'okusomesa	i. Ebibuuzo eby'okwenenia nga omusomo gukaali ii. Aisomo ligya kutebwa ku lutimbe iii. Abetabye mumusomo beidha kwikirizabwa okubuza ebibuuzo omusomo nga gugya mumaiso iv. Beidha kubuzibwa ebibuzo ng'omusomo guweire

Appendix IVA: Qualitative Data Collection Instruments

IN-DEPTH INTERVIEW / KEY INFORMANT INTERVIEW GUIDES: FOR HEALTH WORKERS, MOTHERS AND BODA-BODA RIDERS.

RESEARCH FORM #06 FOR HEALTH WORKERS IN THE INTERVENTION & CONTROL ARMS

Site and/Study Number: _____ Date _____

Introduction:

Greetings to you

My name is Muluya Kharim Mwebaza (+256 704 887 896), I would like to thank you for accepting to share your time with me today. I am a PhD student from Kenyatta University. Your thoughts and opinions are very valuable and I appreciate your willingness to help in the efforts to understand women's needs and experiences on effect of training mothers and motorcycle riders (boda-boda) in community-based maternal referrals on maternal outcomes in East – Central region, Uganda. This study is targets mothers in their 3rd trimester during ANC, delivery and post-natal care for improved neonatal and maternal outcomes. It also targets boda-boda riders transporting mothers to health centres to deliver.

As described in the consent process, I would like to meet with you two times over the course of your participation in this community trial. During those interviews, we would like to better understand your experiences taking part in knowledge on maternal community referral research and using alternative transport and communication systems. We are interested in knowing how these experiences might change over time.

As I ask you to describe your opinions and experiences, please keep in mind that there is no right or wrong answers to these questions. People have a lot of different views on these topics. I'm simply interested in your experiences. I am looking forward to learning more about these experiences from you. You are in the role of a teacher today and I am here to learn from you since you are an expert in your own life experiences, opinions, and viewpoints. Thank you for giving me your time. This interview should take around 30 – 45 minutes to complete. If, at any time, you have questions or something I say is not clear, please let me know and I'll try to clarify. Also, if, at any time, you need to take a break, please let me know.

Thank you and do you have any issue you want to raise that we have not discussed?

Interview 1: For the Midwives/VHTs/Maternity In-charge (Conducted at the beginning of the study)
I'd like to start today by just getting to know you a little. For example, it would be helpful to know more about your home life, and whom you live with and how you spend your time when you are not involved in clinic visits or trial-related activities.

A1. WORK EXPERIENCE AND ENVIRONMENT

1. Could you tell me a little about yourself and experience with community referrals for mothers with or without complications?
2. How long have you worked at this facility?
3. Do you have any challenges for the time you have worked in this facility?
4. If on duty how many mothers do you see and with what conditions?
5. Who contributes to the medical needs of the mother when at the facility? Is it the partner (if applicable)/in law/s or family?

A2. MOTIVATIONS FOR TRIAL PARTICIPATION (CUG & ALLOWANCES)

1. How did you learn about this community trial?
2. What intervention was being tested?
3. Can you tell me about your reasons for joining this trial?
4. In what ways do you think you might benefit from being in the trial?

A3. ATTITUDE OF HEALTH WORKERS ON SAFETY OF BODA-BODA TRANSPORT

1. What are your thoughts on the safety of using this mode of transport for women who are about to give birth?

2. Are there any ways to better safety for mothers?

A4. CIRCUMSTANCES AROUND USE OF THE CLOSED CALLER USER GROUP

1. How do you feel being selected to use the free telephone calls as a means of communication for transport to health facilities?
2. What are the benefits of being in the CUG?
3. What challenges are being experienced in using the CUG?

A5. TRAINING NEEDS AND KNOWLEDGE OF THE TRIAL

1. How much do you worry about the need to train boda-boda riders in maternal referrals for better practices to address maternal outcomes (still birth, over bleeding to death, uterus rupture amongst others)?
2. Have you undergone any health training in relation to ANC, delivery of mothers and post-natal care?
3. In which areas do you need more training?
4. Before joining this study, what have you done, if anything, as an alternative transport means for community referral for pregnant women to health facilities?
5. What is the main means of locating transport for a mother within the sub-county to the health facility?

Thanks, and do you have any comment or issue you want to raise that we have not discussed?

Time points 2: (conducted at the end of the study)

NOTE TO INTERVIEWER: Prior to conducting this 2rd interview visit, please review the transcript from the first interviews. Pay particular attention to how the participant has described her (potentially changing) home life and relationship context, as well as any attitudes and experiences s/he has described about the community trial and products. (Fill out the interview summary form for the1st interview prior to scheduling 2nd interview and bring the 1st forms with you for reference). Look for opportunities to build on information from the past interviews and to check on contradictions.
Now that your active participation in the study has ended, I would like to get some final thoughts from you about the different products you used in the trial. I would also like to get any recommendations you might have that would improve knowledge on community referral and alternative ambulance services for mother in the 3rd trimester and need to go to the health facility to improve maternal and neonatal outcomes for rural women.

B0. GENERAL TRIAL EXPERIENCES

1. Since joining this trial, how would you describe your experiences overall?
2. What have you liked the most about being in the trial?
3. What have you found the most difficult about being in the trial?

4. Would you say that community impressions about the trial have changed over time? If so, in what way?

B1. WORK EXPERIENCE AND ENVIRONMENT

1. Overall, in what ways did your participation in this community trial affect your life?
2. What about your relationship with your workmates?
3. How supportive were your workmates about your participation in the study?
4. Did their attitudes towards your participation change over time? In what ways?

B2. MOTIVATIONS FOR TRIAL PARTICIPATION (CUG & ALLOWANCES)

1. How did you feel about this community trial after participating?
2. Can you tell me if your reasons for joining this trial still stand and why?
3. Why did you choose to join this trial that is testing the choices and outcomes of using motorcycle riders as an alternative ambulance instead of another one?
4. Have you benefited from being in the trial and how?
5. Did the mothers use the free calls in the CUG or physically called you to link them to riders to transport them to the health facility when they were due for delivery?
6. How has your, experiences of supporting link the mother to the riders bettered your outcomes and delivery in this trial as compared to the past?
7. What did you like best about the study?
8. What did you like least about it?

B3. ATTITUDE OF HEALTH WORKERS ON SAFETY BODA-BODA TRANSPORT

1. Compared to before the study and now what are your thoughts on the safety of using this mode of transport for women who are about to give birth? Or are in labour
2. Any recommendations on how to better safety for mothers?

B4. CIRCUMSTANCES AROUND USE OF THE CLOSED CALLER USER GROUP

1. Which option worked better for you as you link mothers to the rider by either the telephone call or other means to transport them to health facilities and why?

B5. TRAINING NEEDS AND KNOWLEDGE OF THE TRIAL

1. At this point of exit, how much do you worry about the need to train you on maternal referral and better ambulances practices to address maternal outcomes (still birth, over bleeding to death, uterus rupture etc).
2. What other training areas do you think are key?
3. Comparing now and before joining this study, what would you have done, if anything, as a way of providing alternative community referral for pregnant women?
4. How able are you now to use a CUG and respond to a mother who needs to be taken to the facility for ANC, delivery and Post Natal Care?

Thank you and do you have any issues you want to raise that we have not discussed?

RESEARCH FORM #07 MOTHERS IN THE <u>INTERVENTION & CONTROL ARMS</u>

Site and/Study Number: _____ Date_____

Introduction:

Greetings to you

My name is Muluya Kharim Mwebaza (+256 704 887 896), I would like to thank you for accepting to share your time with me today. I am a PhD student from Kenyatta University. Your thoughts and opinions are very valuable and I appreciate your willingness to help in the efforts to understand women's needs and experiences on effect of training mothers and motorcycle riders (boda-boda) in community-based maternal referrals on maternal outcomes in East – Central region, Uganda. This study is targets mothers in their 3rd trimester during ANC, delivery and post-natal care for improved neonatal and maternal outcomes. It also targets boda-boda riders transporting mothers to health centres to deliver.

As described in the consent process, I would like to meet with you two times over the course of your participation in this community trial. During those interviews, we would like to better understand your experiences taking part in knowledge on maternal community referral research and using alternative transport and communication systems. We are interested in knowing how these experiences might change over time.

As I ask you to describe your opinions and experiences, please keep in mind that there is no right or wrong answers to these questions. People have a lot of different views on these topics. I'm simply interested in your experiences. I am looking forward to learning more about these experiences from you. You are in the role of a teacher today

and I am here to learn from you since you are an expert in your own life experiences, opinions, and viewpoints. Thank you for giving me your time. This interview should take around 30 – 45 minutes to complete. If, at any time, you have questions or something I say is not clear, please let me know and I'll try to clarify. Also, if, at any time, you need to take a break, please let me know.

Thank you and do you have any issues you want to raise that we have not discussed?

Interview 1: (for mothers conducted within 3rd trimester before delivery)
I'd like to start today by just getting to know you a little. For example, it would be helpful to know more about your home life, and whom you live with and how you spend your time when you are not involved in clinic visits or trial-related activities.

A1. MOTHER AND FAMILY CONTEXT

1. Could you tell me a little about your home life?
Where is your home located? (How far away from the clinic is it?)
Who are all the people you live with?
(If children) What are the ages of your children?
Is this your first pregnancy?
2. What kind of work or leisure activities do you have, when not involved in study activities?
If working, how long have you been working in this job?
If a student, what are you studying?
If you are a home maker, who else helps you with the household duties?
3. Who contributes to the medical costs for you?
Does s/he contribute all the expenses?

A2. MOTIVATIONS FOR TRIAL PARTICIPATION (CUG & ALLOWANCES)

1. How did you learn about this community trial?
2. Can you tell me about your reasons for joining this trial?
Why did you choose to join this trial that is testing maternal referral and the communication systems?
In what ways do you think you might benefit from being in the trial?
How important were the reimbursements for trial participation?
3. What kinds of stories did you hear about this study prior to joining it?
Where or from whom did you hear these stories?
4. How easy or difficult would it be for you to access the health facility, if you did not choose to join this trial?

A3. ATTITUDE OF MOTHERS ON SAFETY OF BODA-BODA TRANSPORT

1. What are your thoughts on the safety of using this mode of transport for women who are about to give birth?
2. Are there any ways to better safety for mothers?

A4. CIRCUMSTANCES AROUND USE OF THE CLOSED CALLER USER GROUP

1. How do you feel being selected to use either the personal telephone calls or CUG as a means of communication for transport to health facilities?

A5. TRAINING NEEDS AND KNOWLEDGE OF THE TRIAL

1. How much do you worry about the need to train mothers in maternal referrals for better practices to address maternal outcomes (still birth, over bleeding to death, uterus rupture amongst others)?
2. What other trainings do you think are key and for which categories of stakeholders? In which areas do you need more training?
3. Before joining this study, what have you done, if anything, as an alternative transport means for community referral for pregnant women to health facilities?
4. What is the main means of locating transport for a mother within the sub-county to the health facility?
5. Are you able to use a CUG as a mother to contact a rider to transport you to the facility for ANC, delivery and Post Natal Care?
6. What would be your preference, the direct telephone call or a CUG and why?

Thank you and do you have any issues you want to raise that we have not discussed?

Time points 2: (at delivery, or not more than 1 month after delivery)

NOTE TO INTERVIEWER: Prior to conducting this 2rd interview visit, please review the transcript from the first interviews. Pay particular attention to how the participant has described her (potentially changing) home life and relationship context, as well as any attitudes and experiences she has described about the community trial and products. (Fill out the interview summary form for the1st interview prior to scheduling 2nd interview and bring the 1st forms with you for reference). Look for opportunities to build on information from the past interviews and to check on contradictions.
Now that your active participation in the study has ended, I would like to get some final thoughts from you about the different products you used in the trial. I would also like to get any recommendations you might have that would improve knowledge on community referral and alternative ambulance services for mother in the 3rd trimester and need to go to the health facility to improve maternal and neonatal outcomes for rural women.

B0. GENERAL TRIAL EXPERIENCES

1. Since joining this trial, how would you describe your experiences overall?
What have you liked the most about being in the trial?
What have you found the most difficult about being in the trial?

2. Would you say that community impressions about the trial have changed over time? If so, in what way?
3. How similar or different were your own experiences from others you may have heard about who participated in this trial?

B1. MOTHERS AND FAMILY CONTEXT

1. Overall, in what ways did your participation in this community trial affect your home life?
What about your relationship with your partner or with other family members?
2. How supportive were your partner/s or family members about your participation in the study?

B2. MOTIVATIONS FOR TRIAL PARTICIPATION (CUG & ALLOWANCES)

1. How did you feel about this community trial after participating?
What should be done better if any?
2. Can you tell me if your reasons for joining this trial still stand and why?
Have you benefited from being in the trial and how?
3. Did you use the CUG or physical call the participating riders to transport you to the health facility when you were due for delivery?
a. If yes, why?
b. If no, please do you mind explaining why?
4. How has your, experiences being supported by the riders and partner/ family bettered your outcomes and delivery in this trial as compared to the past?
What did you like best about the study?
What did you like least about it?

B3. ATTITUDE OF MOTHERS ON SAFETY OF BODA-BODA TRANSPORT

Compared to before the study and now what are your thoughts on the safety of using this mode of transport for women who are about to give birth? Or are in labour
Do you have any recommendations on how to better safety for mothers in the area?

B4. CIRCUMSTANCES AROUND USE OF THE CLOSED CALLER USER GROUP

1.Which option worked better for you as a link you the mother to the rider or health facility worker by either the telephone call or other means to transport you to health facilities and why?

B5. TRAINING NEEDS AND KNOWLEDGE OF THE TRIAL

1. At this point of exit, how much do you worry about the need to train you on maternal referral and better ambulances practices to address maternal outcomes (still birth, over bleeding to death, uterus rupture etc).
2. What other trainings do you think are key?
In which areas do you need more training?
3. How easy was it to locate the boda-boda riders you contacted on the telephone calls or the apps in terms of reaching you within the sub-county where you reside?
4. How able are you now to use a CUG as a mother who needs to be taken to the facility for ANC, delivery and Post Natal Care?
Thank you and do you have any issues you want to raise that we have not discussed?

OMUSOMO OGUGEMA KU BUNGI OBWEBYO EBIVIRE MUKOTOLA BA MAAMA ABA MABUNDA MUKYAALO (INTERVENTION & CONTROL ARMS)

Mbalamwisa inho, ameina ninze Muluya Kharim Mwebaza (+256704887896) ndha kuba nga nkola embuliriza eno lero. Ndi musomu ali kwidaala lya Phd mu Kenyatta yunivasite. Nsokera irala okukwebaza okumpa akeire okwogera ku ninze-olunaku luno olwalero. Ebidhubo era nebirowozo byo bya muwendho mungi inho era nkwebaza olwo kwikiriza okutuyamba mukwewayo keife mutetegera ebyetaago ebya abakazi era n'okumanha obulungi obwokuwereza ba maama abamabunda mukyaalo era nentambula enangu ekozesebwa mu mitendera esatu gino, okunhwa idagala (ANC) okuzaala era nga baibo (nakawere) okwongera okutereza obulungi obw'abaana abawere era ni banakawere.

Nga bwekinongoilwa mundikirizagania, twidha kwenda okutyama niiwe emirundu ebiri mulegendo luno olw'okwetaba mukugezesa okwekitundu. Mu kwebuza kuno twidha kuba nga twenda kutegeirera irala obumanirivu bwo mukumanha ekitunda okusinzira ku nonhereza eyo kutola abamabunda mukyaalo ngabakozesa entambula enangu era nebyempulizagania ebiriwo. Tulikwendera irala okutegera embera eno bweyinza okuluka mu bisera eby'omumaiso.

Nga bwenkusaba okwinongola ebidhuubo era n'obumanirivu bwo, tegera nti ezira kwiramu kufu oba kulungi eri ebibuzo bino. Abantu balina ebidhuubo bingi inho ebyendawulo ku musomo guno. Ndi kwendabwenda tugera bumanirivu. Ndikwenda kweyongera kwega okusinzira kumanirivu bwo. Oliwo mwituluba ery'omusomesa olunaku luno olwolwalero era ngandi wano kwega okuva yoli okusinzira nti iwe oli kakensa mu bumanirivu obwobulamu bwo, ebidhuubo era nensonga edha amaani. Nkwebaziza inho olwakeire ko. Embozi eno ejakutwaala edaakika 30-45 okuwha.

Bwobanga olina ekibuuzo kyonakyona nga byendikwongera tibirikutegerekeka, mbuza neyongere okutangaza. Era bwobanga mukesera kona kona eyenda yo okuwumulamu nsaba otengeze.

Webale inho, olina yo ensonga yona yona yoyenda okuntegera nga titujogeireku.

Okwebuuza okusooka 1: (Abamabunda abali mumyezi esatu egisembayo)

Nsaba kutandike lero nakukutegera ku akatontono, okugeza kiidha kuba kyamugaso inho nze okutegera ekisinga mu bulamu bwo obwo mumaka, anni gwoba naye era nibwomala obwiirebwo nga tokyeire kwiidwaliro.

A1. EBIGEMA KU MAKA

1. Osobola okunkuberaku bitono kubigema ku bulamubwo obwomumaka?
a) Amaka ggo gaali luyi waye? Lugendo buwanvu ki okutuka kwiidwaliro?
b) Ibanga ki lyomaze mukitundu ekyo?
c) Bantu ki booba nabo?
d) (Webaba baana) ba myaka emeka ye?
e) Omwana ono, naasoka?

2. Okola mirimu ki oba mubisera byo ebyeidhembe okola ki, ngatoli mu misomo gyo?
a) Olunaku lwo olumala otya ye?
b) Weguba mukozi, ibanga lyomaze ng'okola omulimo guno?
c) Waba musomi, osoma ki ye?
d) Kiki kyo yenda okukola nga omaze emisomo gyo?
e) Waba munamaka, ani okuyambaku kumirimo egyawaka?

3. Ani asasulira obwidhandhabi bwo?
a) Baalo/inhazaala wo/bantu bo?
b) Asasulira buli kyetaago?
c) Iwe owayo ki era kimala?

A2. EBISINDIKIRIZA OKWETABA MUKUGEZESA

1. Wategera otya okugezesa okuli mukitundu kino?

2. Kugezesa ki okundi kwewali owulire ku?

3. Osobola okumpaku ensongadho lwaki wasalawo okwenigira mu kugezesebwa kuno?
a) (Wabanga aidhi okugezesa okundhi) lwaki walondaku okwenigira mu guno ogugezesa entola yaba maama okuva mukyaalo era nebyempuliziganiа ebiriwo?
b) Ngeri ki dh'olowoza nti oganhuirwa mu musomo guno?
c) Okusalawo kwo kwali kutya kukwebeza akawuka kamukenhembya/sirimu emirundu egiswika mu mulala?
d) Wekebeza ku endweire edhindhi?
e) Birungi ki ebiri mukwenigira mu musomo gino/kugezesa kuno?
f) Nsonga ki edhindhi edhakuletera okusalawo okwenigira mu mugezesa kuno?

4. Bigambo ki byewawulira ebigema ku musomo guno nga okaali kugwenigiramu?
a) Wabiwulira kuva wa era kwani?
b) Wabikirizaamu? Lwaki? Oba lwaki bbe?

5. Kyandibeire kyangu oba kizibu okutuka kwiiddwaliro singa tiwegeitha ku kugezesa kuno?
a) (Wekiba kisoboka) kiba kitya nga wakafuna amabunda?

A3. OBULUNGAMU KU LUGUDHO

1. Olowoza ki kukukozesa entambula eno ku bakazi abalikumpi okuzaala?

2. Eriyo engeri edhindhi enungamu mukatambuza ba maama?

A4. EMBERA EDHIRI MU KUKOZESA ENGERI EDHINDI

1. Owulira otya ngabakulonze okukozesa eisimu nga engeri ey'okwetesa entambula ekutwala kwiidwaliro?

A5. OKWEGERESA EBYETAAGO EBYOKUTEGERA OKUGEZESA KUNO

1. Ki kyotya mu kwegeresa aba boda boda ku bigema ku zaala obulungi okumalawo obuzibu mukuzaala (nga baana okufiira munda, okuvaamu omusayi paka okufa, okwabika nabaana nebirala)

2. Misomo ki egindi gyolowoza era gya bantu nga baani?
a) Wali ofunieku ku musomo gwona gwona ogugema ku kunhwa eidagala okuzaala era n'abaibo?
b) Mubiketezo ki bye wetaaga ekweyongera okubangulwa?
c) Ate aboo abakuvuga ng'oja, okunhwa eidagaala, era nimukiibo?

3. Bwobeire nga okaali kwegeita kumusomo guno, obeire okolatya ye, nga engeri eyindhi eyokutambuza ab'amabunda okubatwala mwiidwaliro?
a) Ngeri ki ey'omugwigndu ey'okufunira maama mwiigombolola lino okuja mwiidwaliro?
b) Osobola okukozesa mesegi eye eisimu okwetta owa boda boda okukutwala mwiidwaliro okunhwa eidagala, okuzaala, era nimukiibo?
c) Kiki kyene kyosingo okwenda, kukuba issimu lyene mubuterevu oba kusindika ka mesegi ako era lwaki?

Webaleinho, olinayo ensonga yona yona gyoyenda twogereku?

Ng'okwetabamukwo okwomwigunda mumusomo bwe kuli nti kuweire, nendha kufuna ebidhubo byo ebisembayo ku bintu ebyendawulo by'okozeisa mumusomo.era ndikwenda okukubiriza okwendawulo kwoyinza okubabakwo okwongera mu nzaala era ne mbera eya abaana abewere.

B0. OBUMANIRIVU BWONA BWONA MUKUGEZESEBWA

1. Okuva bwewegeitha ku musomo guno bumaninvu bwofunie mu bwidhuvu?
a) Kikuyambye kitya ye mumirimo gyo egyabulidho?

b) Kizibu ki kyoyageine mukuba mumisomo eyo ebigema ku musomo guno?

2. Bigamboki byowulire ku okuva mukyaalo eyo ebigema ku musomo guno, ogwobwidhandhabi?

a) Oyinza okukoba nti embera ekyaalo gye kibeire kitwalira mu ebigema kumusomo embera eyo ekyisemu? Era etya ye?

3. Ndhawulo ki gyofunie wagati wo n'abo abandi bobeire owulira abogera ku ani ay'eigeita mumusomo guno?

B1. ENKOLAGANA EY'AMAKA MUNGERI ENO

1. Mu bwiduvu, okwetaba mumusomo guno kikyusisa kitya ye obulamu bwo?

a) Kikyusisa kitya emirimo gyo egyabulidho?

b) Kiyambye kitya ye enkolaganayo ni mukagwawo oba nabantu abomumaka?

2. Mukaagwawo n'abantu bo abomumaka bakuyamba batya bwewegetha mumuaomi guno?

a) Embera dhaibwe damala dhakyuka bwe waja mumaiso nomusomo guno? Era dhakyuka ditya ye?

B2. EBIZAAMU AMAANI MU KWETABA MUSOMO

1. Wawulira otya ku musomo guno nga omaze okusoma?

a) Ki ekyatagisa okwongerwamu, wekiba kiriwo?

2. Osobola onkukobera oba ensongadho edhikwetaba mumusomo guno dhitaali dhaami era lwaki?

a) (Wekiba kitegereikeike ku misomo egindhi) lwaki wasalawo okwenhigira muguno ogugema oku kwekebedha ebidhubo era nebiva mu kozesa abavuzi ba pikipiki nga enkola enangu eyambyulensi okusinga ku enkolaedhindhi ediriwo?

b) Ogwanhwirwamu mu kwetaba mumusomo guno era otya ye?

i) Okusalawo okwo kwabeire kusinzira kuki kukutawo enkola enangu eyambyuilence eri ba amaana?

ii) Nsonga ki edhindhi edakuletera okusalawo okwegeitha ku musomo guno?

3. Ebigambo bye wawuliranga muntandikwa ey'okwegeitha ku musomo guno bikaali ebyo nirelo?

a) Era bikaava mu bantu beene abo oba buti bandi inho?

b) Wabikirizamu otya ye era lyaki?

4. Wakozesa ka mesegi oba wakuba isiimu lyene okwetesa owa boda boda alimumusomo guno kwiidwaliro we wali nga olikumpi okuzaala?

a) Kitufu?

b) Wekiba nti bbe osobola okwinhonola lwaki?

5. Ngeri ki ye aba piki piki, mukaagwawo, era bantu bo we bakuyambye ku mukazaala okusinga mubisera eby'oluveinhuma?
a) Okeidhukira omusomo guno gwali gugema kuki ye? (Kiki kye bali kugezesa)
b) Ki kye wasinga okwenda ku musomo?
c) Ki kye wasinga obutayenda?

B3. ENKOLA ENUNGI KU LUGUUDO

1. Kubyamu okunsinzira nga omusomo guno gukaali kubaawo, olowozaki kubulungamu obwokukuzesa entabula eno ku kutwala abakazi abali okulumwa mwiidwaliro?

2. Ndowozaki enungi gyolina kukutambuza ba maama obulungi?

B4. EMBERA EDHIGEMA KU KUKOZESA ENGERI EDHINDHI

1. Ngeri ki eyakukolera iwe maama okukugemagania n'owa piki piki oba n'omusawo oba isiimu oba ka mesegi nga ngeri eyokufunamu entambula enangu okukutwala kwiidwaliro era lwaki ye?

B5. OKWEGA EBYATAGISA MUKUTEGERA N'OKUFUNA AMAGEZI KUMUSOMO GUNO

1. Nga tumaliriza, ki kyosinga okutya ku kumusomo abavuzi ba piki piki ku bulungi obwambwilensi dha piki piki okumalawo ebizibu nga (abaana okufiira munda, okuvaamu omusayi paka okufa, okwabika nabana)

2. Musomo ki ogundi gwolowoza nti gwolowoza nti gwetagiza?
a) Misomo ki egindhi egy'ebyobulamu egigema ku kunhwa eidagala, okuzaala, era nikubaibo, gyolowoza nti negyetagisa?
b) Kiketezo ki kye weetaga okweyongera okusoma?

3. Kubyamu ebisera bya lero ne byonga okaali okusoma, wandikoze otya okutwala omukazi owambunda mwiidwaliro?

4. Kyayanguwanga kitya okwgaana abakazi abakwetanga ku isiimu oba ku kamesegi mwiigombolola lino lyokoleramu

5. Buti osobola okukozesa kamesegi okwiramu maama ayenda okumutwala mwiidwaliro okunhwa eidagala, okuzaala oba omwiboo?

Webaleinho, olinayo ensonga yona yona gyoyenda twogereku?

RESEARCH FORM #8 BODA-BODA RIDERS IN THE <u>INTERVENTION & CONTROL ARMS</u>

Site and/Study Number: _____ Date_____

Introduction:

Greetings to you

My name is Muluya Kharim Mwebaza (+256 704 887 896), I would like to thank you for accepting to share your time with me today. I am a PhD student from Kenyatta University. Your thoughts and opinions are very valuable and I appreciate your willingness to help in the efforts to understand women's needs and experiences on effect of training mothers and motorcycle riders (boda-boda) in community-based maternal referrals on maternal outcomes in East – Central region, Uganda. This study is targets mothers in their 3rd trimester during ANC, delivery and post-natal care for improved neonatal and maternal outcomes. It also targets boda-boda riders transporting mothers to health centres to deliver.

As described in the consent process, I would like to meet with you two times over the course of your participation in this community trial. During those interviews, we would like to better understand your experiences taking part in knowledge on maternal community referral research and using alternative transport and communication systems. We are interested in knowing how these experiences might change over time.

As I ask you to describe your opinions and experiences, please keep in mind that there is no right or wrong answers to these questions. People have a lot of different views on these topics. I'm simply interested in your experiences. I am looking forward to learning more about these experiences from you. You are in the role of a teacher today and I am here to learn from you since you are an expert in your own life experiences, opinions, and viewpoints. Thank you for giving me your time. This interview should take around 30 – 45 minutes to complete. If, at any time, you have questions or something I say is not clear, please let me know and I'll try to clarify. Also, if, at any time, you need to take a break, please let me know.

Thank you and do you have any issues you want to raise that we have not discussed?

Interview: (Conducted with boda-boda riders who worked with mothers in the community and transported them to the health facilities)

I'd like to start today by just getting to know you a little. For example, it would be helpful to know more about your home life, who you live with and how you spend your time when you are not involved in clinic visits or trial-related activities.

<u>Community and your workplace experience</u>

1. Could you tell me a little about your work life?

Where is your stage located? (How far away is the furthest customer from your stage to the health centre?)

How long have you worked there?

Who are all the people you work with?

What are the ages ranges of your workmates?
2. What other work or leisure activities do you have, when not involved in study activities?
Have you transported mothers in the past as a boda-boda rider?
Did you have any documentation of the mother when you reach the health facility?
What other recommendations do you have on this particular aspect of community referrals?
3. Who used to pay the fees for the mother for the boda-boda services?
Is the amount adequate?

Attitude & perception of boda-boda riders on the safety for the boda-boda transport

1. How did you address the issues of safety? Your thoughts on the safety of using this mode of transport for women who are about to give birth?
2. Any recommendations on how to better safety for mothers?

Circumstances around use of the Closed caller User Group

How do you feel about being used by these mothers, are you happy to save life?

Training needs and and knowledge of the trial

1. Did you ever worry about the need to train you on maternal better ambulances practices to address maternal outcomes (still birth, over bleeding to death, miscarriage, uterus rupture etc?)
In which areas do you need more training?
1. Have you been having the means to locate a mother within the sub-county where you operate?

Thank you and do you have any issues you want to raise that we have not discussed?

Time points 2: (conducted at the end of the study)

NOTE TO INTERVIEWER: Prior to conducting this 2rd interview visit, please review the transcript from the first interviews. Pay particular attention to how the participant has described her (potentially changing) home life and relationship context, as well as any attitudes and experiences she has described about the community trial and products. (Fill out the interview summary form for the1st interview prior to scheduling 2nd interview and bring the 1st forms with you for reference). Look for opportunities to build on information from the past interviews and to check on contradictions.

Now that your active participation in the study has ended, I would like to get some final thoughts from you about the different products you used in the trial. I would also like to get any recommendations you might have that would improve knowledge on community referral and alternative ambulance services for mother in the 3rd trimester and need to go to the health facility to improve maternal and neonatal outcomes for rural women.

General Trial Experiences

1. Since joining this trial, how would you describe your experiences overall?
What have you liked the most about being in the trial?
What have you found the most difficult about being in the trial?
2. Would you say that community impressions about the trial have changed over time? If so, in what way?

Community and workplace experience

1. Overall, in what ways did your participation in this community trials affect your life?
What about your relationship with your fellow boda-boda riders?
3. How supportive were your fellow riders about your participation in the study?
Did their attitudes towards your participation change over time? In what ways?

Motivations for Trial Participation (CUG & Allowances)

1. How did you feel about this community trial after participating?
A. What should be done better if any?
2. Can you tell me if your reasons for joining this trial still stand and why?
A. Have you benefited from being in the trial and how?
3. Did the mothers use the CUG or physically called you to transport them to the health facility when they were due for delivery?
4. How has your, experiences of supporting link the mother to the riders bettered your outcomes and delivery in this trial as compared to the past?
What did you like best about the study?
What did you like least about it?

Attitude of Boda-boda riders of boda-boda riders on safety of boda-boda Transport

1. Compared to before the study and now what are your thoughts on the safety of using this mode of transport for women who are about to give birth? Or are in labour
2. Any recommendations on how to better safety for mothers?

Circumstances Around Use of the Closed caller User Group

1. Which option worked better for you as you transport mothers to health facility worker either the telephone call or App for mothers to reach health facilities and why?

Training Needs and Knowledge of the Trial

1. At this point of exit, how much do you worry about the need to train you on maternal referral and better ambulances practices to address maternal outcomes (still birth, over bleeding to death, uterus rupture etc).
2. What other training do you think is key?
In which areas do you need more training?
3. Comparing now and before joining this study, what would you have done, if anything, as a way of providing alternative community referral for pregnant women?
4. How easy was it to locate the women who contacted you on the telephone calls or the Apps in terms of reaching a mother within the sub-county where you operate?
5. How able are you now to use the CUG and respond to a mother who needs to be taken to the facility for ANC, delivery and Post Natal Care?

Thank you and do you have any issues you want to raise that we have not discussed?

OKUBUZA ABA BODA-BODA MU INTERVENTION #8 (INTERVENTION & CONTROL ARMS)

Mbalamwisa inho, ameina ninze Muluya Kharim Mwebaza (+256704887896) ndha kuba nga nkola embuliriza eno lero. Ndi musomu ali kwidaala lya Phd mu Kenyatta yunivasite. Nsokera irala okukwebaza okumpa akeire okwogera ku ninze-olunaku luno olwalero. Ebidhubo era nebirowozo byo bya muwendho mungi inho era nkwebaza olwo kwikiriza okutuyamba mukwewayo keife mutetegera ebyetaago ebya abakazi era n'okumanha obulungi obwokuwereza ba maama abamabunda mukyaalo era nentambula enangu ekozesebwa mu mitendera esatu gino, okunhwa idagala (ANC) okuzaala era nga baibo (nakawere) okwongera okutereza obulungi obw'abaana abawere era ni banakawere.

Nga bwekinongoilwa mundikirizagania, twidha kwenda okutyama niiwe emirundu ebiri mulegendo luno olw'okwetaba mukugezesa okwekitundu. Mu kwebuza kuno twidha kuba nga twenda kutegeirera irala obumanirivu bwo mukumanha ekitunda okusinzira ku nonhereza eyo kutola abamabunda mukyaalo ngabakozesa entambula enangu era nebyempulizagania ebiriwo. Tulikwendera irala okutegera embera eno bweyinza okuluka mu bisera eby'omumaiso.

Nga bwenkusaba okwinongola ebidhuubo era n'obumanirivu bwo, tegera nti ezira kwiramu kufu oba kulungi eri ebibuzo bino. Abantu balina ebidhuubo bingi inho ebyendawulo ku musomo guno. Ndi kwendabwenda tugera bumanirivu. Ndikwenda kweyongera kwega okusinzira kumanirivu bwo. Oliwo mwituluba ery'omusomesa olunaku luno olwolwalero era ngandi wano kwega okuva yoli okusinzira nti iwe oli kakensa mu bumanirivu obwobulamu bwo, ebidhuubo era nensonga edha amaani. Nkwebaziza inho olwakeire ko. Embozi eno ejakuwaala edaakika 30 – 45 okuwha.

Bwobanga olina ekibuuzo kyonakyona nga byendikwongera tibirikutegerekeka, mbuza neyongere okutangaza. Era bwobanga mukesera kona kona eyenda yo okuwumulamu nsaba otengeze.

Webale inho, olina yo ensonga yona yona yogenda okuntegeza nga titujogeireku.

Okwebuza okusoka 1: (Kuntandiika)

Nsaba kutandike lero nakukutegera ku kantono, okugeza kiida kuba kyamugaso inho nze okutegera ekisinga mu bulamu bwo obwo mumaka, anni gwoba naye era nibwomala obwiirebwo nga tokyeire kwiidwaliro.

A1. **MUKYALO NE MUBIFU AWAKOLERWA**

1. Osobola okunkuberaku bitono kubigema ku bulamubwo obwomumaka?
a) Sitegi yo eri ruyi wa ye? Eri buwanvu obuliwo okuva ku muntu owamabunda okutuka ku sitegi era paka kwiidwaliro?
b) Okoleire ibanga ki ku sitegi eyo?
c) Abantu bali bameka bokola nabo awo kusitegi eyo?
d) Bakozi beino bali wagati wa myaka emeka egyobukulu?
2. Okola mirimu ki oba mubisera byo ebyeidhembe okola ki, ngatoli mu misomo gyo?
b) Weguba mukozi, ibanga lyomaze ng'okola omulimo guno?
c) Waba musomi, osoma ki ye?
d) Waba munamaka, ani okuyambaku kumirimo egyawaka?
3. Ani akusasula sente olwokukola nga ambuilensi ya piki piki?
a) Omukazi owamabunda mwene, musadhawe, inhazaala we oba mukwano gye?
b) Omuwendho gwebakusasula gumala?

A2. EBIYIZAAMU AMAANI MU KWETABA MUSOMO

1. Wafuna otya amawulire agagema ku musomo guno?
2. Ntegeza kumisomo egindi, lwaki wasalawo okwegeitha ku nkola eno eri okugezesa ebudhubo era nebivaamu mukozesa abavuzi ba piki piki nga ambwilensi okusinga enkola eyindi?
a) Wansinzira kuki okusalawo okuwereza enkola ey'ambwilensi eri ba maama
3. Bumanirivuki bwolina mukuyamba mu mikuzi esatu egya amabunda okubatwala mwiidwaliro?
4. Kiki kyewasinga okunhumirwa guno, ali okola ki, nga engeri eyokufunira bamaama entambula ey'okugya mwiidwaliro?
5. Kiki kyotayendha kumusomo guno?

A3. ENKOLA ENUNGI KU LUGUUDO

1. Kubyamu okunsinzira nga omusomo guno gukaali kubaawo, olowozaki kubulungamu obwokukuzesa entabula eno ku kutwala abakazi abali okulumwa mwiidwaliro?
2. Ndowozaki enungi gyolina kukutambuza ba maama obulungi?

A4. EMBERA EDHIGEMA KU KUKOZESA ENGERI EDHINDHI

1. Owulira otya iwe nga olodembwa okukumba ka isiima oba ka mesegi nga ngeri eyokufunamu entambula okukutwala ba maama kwiidwaliro okuva mu kyaalo?
2. Ngeri ki eyakukolera iwe maama okukugemagania n'owa piki piki oba n'omusawo oba isiimu oba ka mesegi nga ngeri eyokufunamu entambula enangu okukutwala kwiidwaliro era lwaki ye?

A5. OKWEGA EBYATAGISA MUKUTEGERA N'OKUFUNA AMAGEZI KUMUSOMO GUNO

1. Nga tumaliriza, ki kyosinga okutya ku kumusomo abavuzi ba piki piki ku bulungi obwambwilensi dha piki piki okumalawo ebizibu nga (abaana okufiira munda, okuvaamu omusayi paka okufa, okwabika nabana)
2. Musomo ki ogundi gwolowoza nti gwolowoza nti gwetagiza?
a) Kiketezo ki kye weetaga okweyongera okusoma?
3. Ng'okaali kwe yunga ku musomo guno, wali okola ki, nga engeri eyokufunira bamaama entambula ey'okugya mwidwaliro?
4. Wabeiro enkola eyokulondola bamaama mwigombolola lino wo kolera?
a. Osobola okukozesa aka mesegi okwiramu maama gwoba ngoyenze okutwala mwiidwaliro okunhwa eidagala, okuzaala era mukiiboo?

Webaleinho, olinayo ensonga yona yona gyoyenda twogereku?

Ng'okwetabamukwo okwomwigunda mumusomo bwe kuli nti kuweire, nendha kufuna ebidhubo byo ebisembayo ku bintu ebyendawulo by'okozeisa mumusomo.era ndikwenda okukubiriza okwendawulo kwoyinza okubabakwo okwongera mu nzaala era ne mbera eya abaana abewere.

B0. OBUMANIRIVU BWONA BWONA MUKUGEZESEBWA

1. Okuva bwewegeitha ku musomo guno bumaninvu bwofunie mu bwidhuvu?
a) Kikuyambye kitya ye mumirimo gyo egyabulidho?
b) Kizibu ki kyoyageine mukuba mumisomo eyo ebigema ku musomo guno?
2. Ndhawulo ki gyofunie wagati wo n'abo abandi bobeire owulira abogera ku ani ay'eigeita mumusomo guno?

B1. ENKOLAGANA EY'AMAKA MUNGERI ENO

1. Mu bwiduvu, okwetaba mumusomo guno kikyusisa kitya ye obulamu bwo?
a) Kikyusisa kitya emirimo gyo egyabulidho?
b) Ate enkolagana nibamaama bo yambye okutambuza okutoola mukyalo okubatwaala mwidwaliro okunhwa eidagala, okuzaala era nga baibo, n'abantu beibwe abndha?
   i. Abakazi abo ni bakee beibwe, nabantu beibwe bakuyamba batya ye olwokubatwalanga mwiidwaliro?
   ii. Embera dhaibwe damala dhakyuka bwe waja mumaiso nomusomo guno? Era dhakyuka ditya ye?

B2. EBIZAAMU AMAANI MU KWETABA MUSOMO

1. Wawulira otya ku musomo guno nga omaze okusoma?
a) Ki ekyatagisa okwongerwamu, wekiba kiriwo?
2. Osobola onkukobera oba ensongadho edhikwetaba mumusomo guno dhitaali dhaami era lwaki?
a) Ogwanhwirwamu mu kwetaba mumusomo guno era otya ye?

i. Okusalawo okwo kwabeire kusinzira kuki kukutawo enkola enangu eyambyuilence eri ba amaana?

4. Bumanirivu ki bwolina mukutwala ba maama kwiidwaliro nga bali kunhwa eidagala, okuzaala era nga beiboo mubisera ebibisewo?

a) Okeidhukira ebigema kumusomo guno? Ki ekyaali kigesebwa?
b) Kiki kye wasinga okwendaku musomo guno?
c) Kiki kye wasinga butayenda ku musomo guno?

B3. ENKOLA ENUNGI KU LUGUUDO

1. Kubyamu okunsinzira nga omusomo guno gukaali kubaawo, olowozaki kubulungamu obwokukuzesa entabula eno ku kutwala abakazi abali okulumwa mwiidwaliro?
2. Ndowozaki enungi gyolina kukutambuza ba maama obulungi?

B4. EMBERA EDHIGEMA KU KUKOZESA ENGERI EDHINDHI

1. Ngeri ki eyakukolera iwe maama okukugemagania n'owa piki piki oba n'omusawo oba isiimu oba ka mesegi nga ngeri eyokufunamu entambula enangu okukutwala kwiidwaliro era lwaki ye?

B5. OKWEGA EBYATAGISA MUKUTEGERA N'OKUFUNA AMAGEZI KUMUSOMO GUNO

1. Nga tumaliriza, ki kyosinga okutya ku kumusomo abavuzi ba piki piki ku bulungi obwambwilensi dha piki piki okumalawo ebizibu nga (abaana okufiira munda, okuvaamu omusayi paka okufa, okwabika nabana)
2. Musomo ki ogundi gwolowoza nti gwolowoza nti gwetagiza?

a) Kiketezo ki kye weetaga okweyongera okusoma?

3. Kubyamu ebisera bya lero ne byonga okaali okusoma, wandikoze otya okutwala omukazi owambunda mwiidwaliro?
4. Kyayanguwanga kitya okwgaana abakazi abakwetanga ku isiimu oba ku kamesegi mwiigombolola lino lyokoleramu
5. Buti osobola okukozesa kamesegi okwiramu maama ayenda okumutwala mwiidwaliro okunhwa eidagala, okuzaala oba omwiboo?

Webaleinho, olinayo ensonga yona yona gyoyenda twogereku?

Appendix IVB: Research Form #9 Focus Group Discussion Guide

RESEARCH FORM #09 FOR INTERVENTION & CONTROL ARMS

Site: _____ Date: _____

SN		Probe for detailed information
1.	How long have you worked in this place? (Boda-boda riders, midwives, VHTs)	• Less than 6 months • 6 months and above
1.	Why it is important for boda-boda riders and mothers reside in the same location?	
2.	Are deliveries conducted/or not conducted in the nearby health centre? Why?	• State factors contributing to the failure or success.
3.	What has been the contribution of training in community-based maternal referrals in the area?	• Pass on information/knowledge. • Training allowances • Transportation of mothers to health centres in time to deliver. • Increased deliveries in health centres. • Reduced maternal and neonatal mortalities in the area.
4.	What has enabled mothers embrace the local boda-boda riders?	• Rapport • Comfort
5.	What has enabled mothers, boda-boda riders; health workers amongst other stakeholders embrace the Closed caller User Group (CUG)?	• Free calls • Bonus airtime • Savings box for transport fare • Etc
6.	What are the benefits of the Closed caller User Group?	• Timely referral of mothers to health centres. • Others
7.	What challenges have you encountered with this CUG service?	• Network • Phone switched off • Spoilt phones • Etc
8.	How can we better/modify this Mama-Boda-boda Transport Connect services if it has challenges?	
9.	Which conditions would tempt you refer a mother use phone and contact the boda-boda for transport?	• Bleeding from the vagina • Headache with blurred vision • Malaria • Others_____

Thank you for your time.

Appendix IVC: Research Form #10 Guide For Community Dialogue Meeting

Study area (district & sub county)	
Venue for the meeting	
Date of meeting	
Time of meeting	
Introductions	• Self introduction of the different participants in the meeting (Investigators and community members)
Meeting objective	• To introduce the project of Mother – Boda-boda Transport System to the stakeholders.
Areas of brief discussions	• Community-based referral systems (community to health facility and facility to facility). • The role of different stakeholders in emergency transport. • Fleet/transport management (possession & ownership of transport). • Plan for training of boda-boda riders and mothers in community-based referrals. • Innovation, communication and technology (CUG & its operation). • Saving plan during ANC (savings box). • Preventing and basic management of emergencies.
Wayforward	• Come up with action points (in the different areas of discussion).

Appendix V: KU Ethical Review Committee Clearance

Kenyatta University
P.O Box 43844-00100
Nairobi-Kenya

REF: KU/ERC/APPROVAL/VOL1/1 Date: 29th November, 2019

Muluya Mwebaza Kharim
P.0 Box 43844-00100

NAIROBI

Dear Mr, Kharim

RE: APPLICATION NUMBER: PKU/2015/I1163 EFFECTS OF TRAINING MOTORCYCLE ON MATERNAL REFERRALS FROM THE COMMUNITY, EAST CENTRAL REGION, UGANDA

This is to inform you that ***KENYATTA UNIVERSITY ETHICS REVIEW COMMITTEE*** has reviewed and approved your above research proposal. Your application approval number is **PKU/2015/I1163.** The approval period is ***29th November, 2019-29th November, 2020.***

This approval is subject to compliance with the following requirements;

i. Only approved documents including (informed consents, study instruments, MTA) will be used
ii. All changes including (amendments, deviations, and violations) are submitted for review and approval by ***KENYATTA UNIVERSITY ETHICS REVIEW COMMITTEE***.
iii. Death and life threatening problems and serious adverse events or unexpected adverse events whether related or unrelated to the study must be reported to ***KENYATTA UNIVERSITY ETHICS REVIEW COMMITTEE*** within 72 hours of notification
iv. Any changes, anticipated or otherwise that may increase the risks or affected safety or welfare of study participants and others or affect the integrity of the research must be reported to ***KENYATTA UNIVERSITY ETHICS REVIEW COMMITTEE*** within 72 hours
v. Clearance for export of biological specimens must be obtained from relevant institutions.
vi. Submission of a request for renewal of approval at least 60 days prior to expiry of the approval period. Attach a comprehensive progress report to support the renewal.
vii. Submission of an executive summary report within 90 days upon completion of the study to ***KENYATTA UNIVERSITY ETHICS REVIEW COMMITTEE***.

Prior to commencing your study, you will be expected to obtain a research license from National Commission for Science, Technology and Innovation (NACOSTI) https://oris.nacosti.go.ke and also obtain other clearances needed.

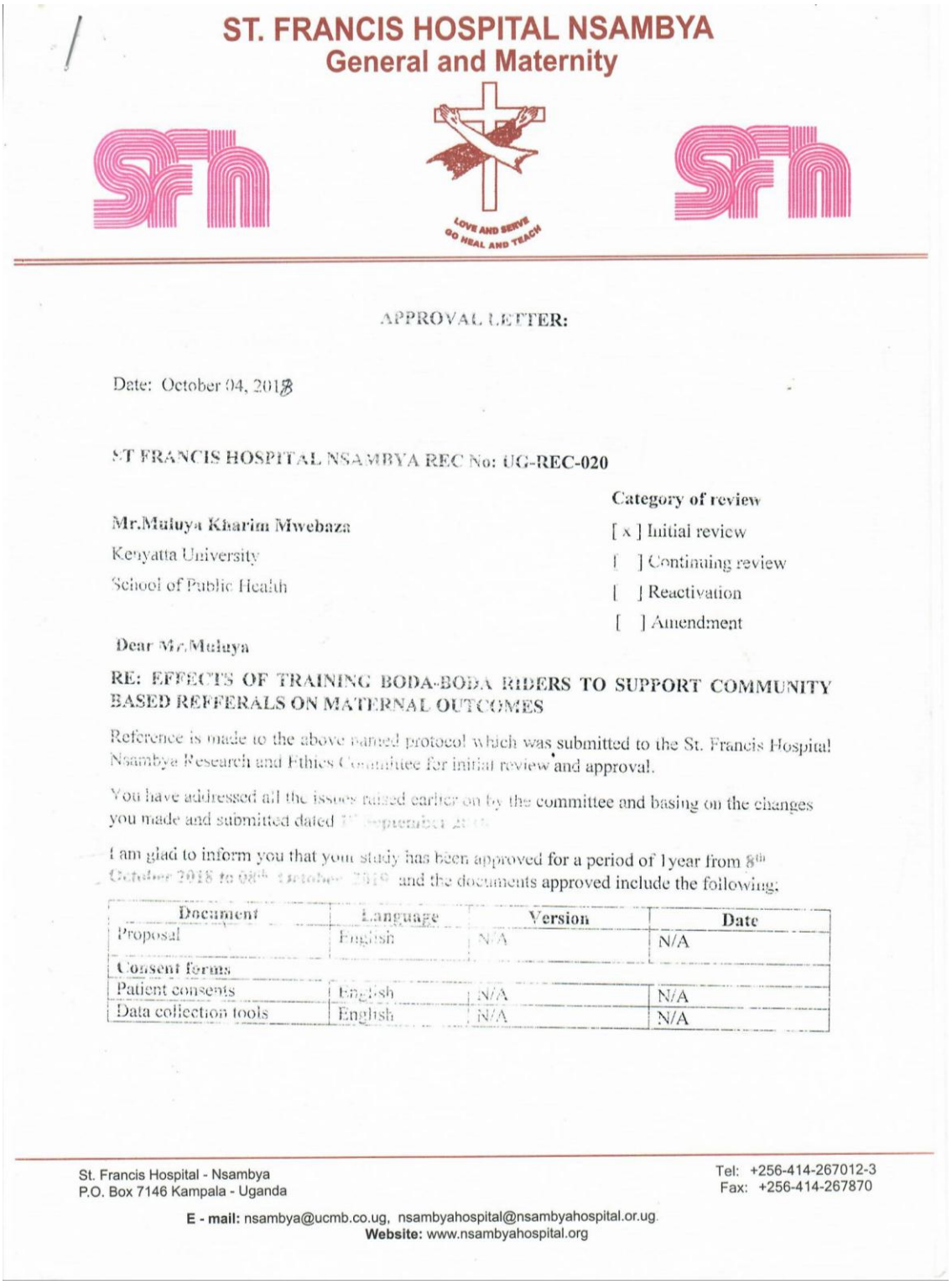
Yours sincerely

KENYATTA UNIVERSITY OFFICE OF THE CHAIRMAN 29 NOV 2019 ETHICS REVIEW COMMITTEE P.O BOX 43844 - 00100 NAIROBI

Prof. Judith Kimiywe

CHAIRPERSON- KENYATTA UNIVERSITY ETHICS REVIEW COMMITTEE.

Appendix VI: IRB Clearance



ST. FRANCIS HOSPITAL NSAMBYA
General and Maternity

LOVE AND SERVE
GO HEAL AND TEACH

APPROVAL LETTER:

Date: October 04, 2018

ST FRANCIS HOSPITAL NSAMBYA REC No: UG-REC-020

Mr.Muluya Kharim Mwebaza
Kenyatta University
School of Public Health

Category of review
[x] Initial review
[ ] Continuing review
[ ] Reactivation
[ ] Amendment

Dear Mr.Muluya

RE: EFFECTS OF TRAINING BODA-BODA RIDERS TO SUPPORT COMMUNITY BASED REFFERALS ON MATERNAL OUTCOMES

Reference is made to the above named protocol which was submitted to the St. Francis Hospital Nsambya Research and Ethics Committee for initial review and approval.

You have addressed all the issues raised earlier on by the committee and basing on the changes you made and submitted dated [illegible]

I am glad to inform you that your study has been approved for a period of 1year from 8th October 2018 to 08th October 2019 and the documents approved include the following:

Document	Language	Version	Date
Proposal	English	N/A	N/A
Consent forms			
Patient consents	English	N/A	N/A
Data collection tools	English	N/A	N/A

St. Francis Hospital - Nsambya
P.O. Box 7146 Kampala - Uganda

Tel: +256-414-267012-3
Fax: +256-414-267870

E - mail: nsambya@ucmb.co.ug, nsambyahospital@nsambyahospital.or.ug
Website: www.nsambyahospital.org

Any problems of serious nature as a result of this study to the participants should be reported to the St. Francis Hospital Nsambya-REC and the Uganda National Council for Science and Technology (UNCST) immediately.

Please note that you are required to submit copies of the stamped documents to the Uganda National Council for Science and Technology (UNCST) before the study can commence. We would like to congratulate you and wish you a successful conduct of the study.

Prof Ignatius Kakande

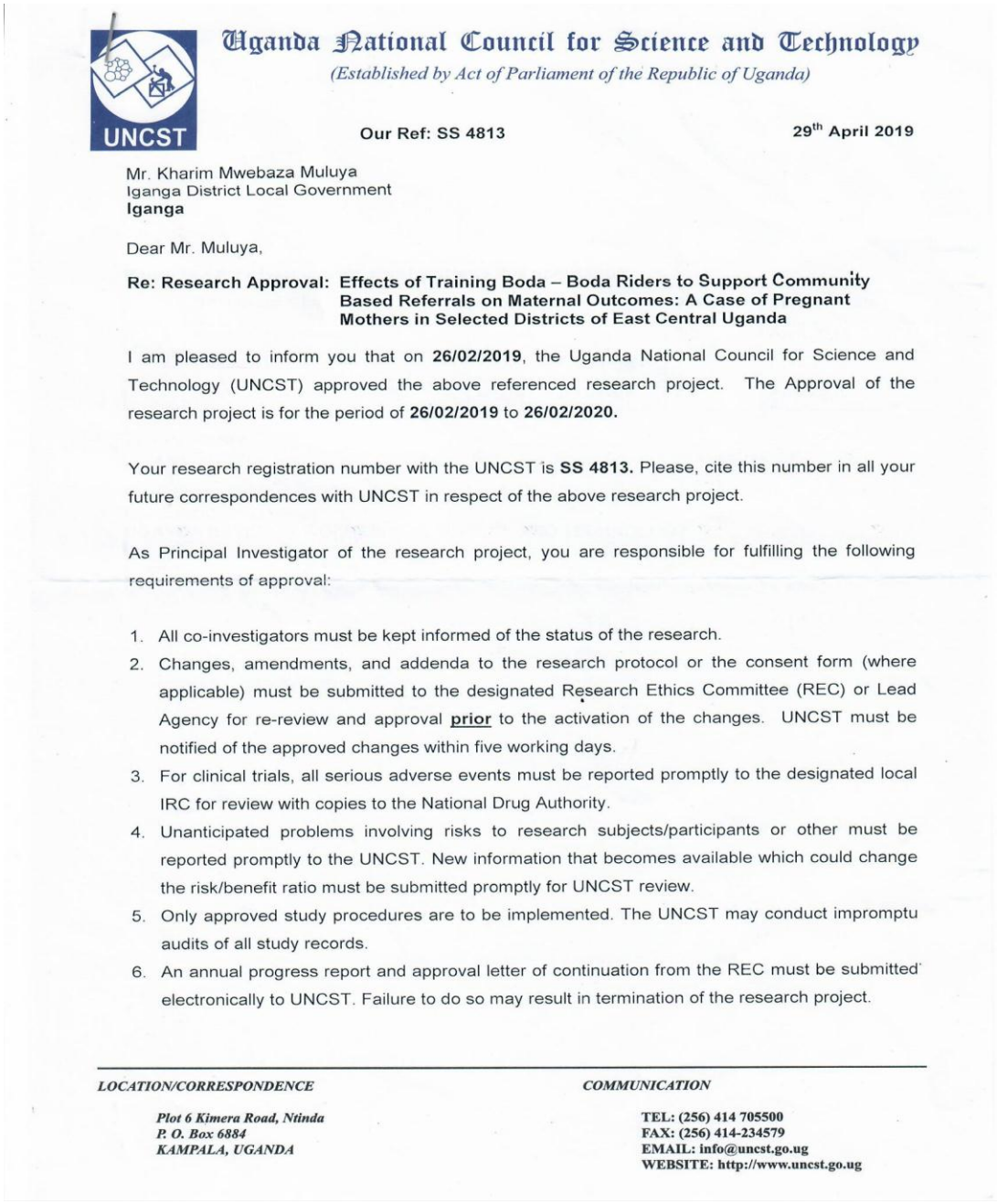
REC-Chairperson

APPROVED
APPROVED DATE 08 OCT 2018
EXPIRY DATE 08 OCT 2019
ST. FRANCIS HOSPITAL NSAMBYA REC
P. O. BOX 7146, KAMPALA (U)

8/10/18

Date

Appendix VII: 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 4813

29th April 2019

Mr. Kharim Mwebaza Muluya
Iganga District Local Government
Iganga

Dear Mr. Muluya,

Re: Research Approval: Effects of Training Boda – Boda Riders to Support Community Based Referrals on Maternal Outcomes: A Case of Pregnant Mothers in Selected Districts of East Central Uganda

I am pleased to inform you that on **26/02/2019**, 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 **26/02/2019** to **26/02/2020.**

Your research registration number with the UNCST is **SS 4813.** 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 Research Ethics Committee (REC) 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. An annual progress report and approval letter of continuation from the REC must be submitted electronically to UNCST. Failure to do so may result in termination of the research project.

LOCATION/CORRESPONDENCE

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

COMMUNICATION

TEL: (256) 414 705500
FAX: (256) 414-234579
EMAIL: info@uncst.go.ug
WEBSITE: http://www.uncst.go.ug

Uganda National Council for Science and Technology
(Established by Act of Parliament of the Republic of Uganda)

Below is a list of documents approved with this application:

	Document Title	Language	Version	Version Date
1.	Research proposal	English	2.0	April 2018
2.	Consent form	English and Lusoga	2.0	April 2018
3.	Data collection instruments	English and Lusoga	2.0	April 2018

Yours sincerely,

Isaac Makhuwa
For: Executive Secretary
UGANDA NATIONAL COUNCIL FOR SCIENCE AND TECHNOLOGY

Copied to: Chair, St. Francis Hospital Nsambya, Research Ethics Committee

LOCATION/CORRESPONDENCE

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

COMMUNICATION

TEL: (256) 414 705500
FAX: (256) 414-234579
EMAIL: info@uncst.go.ug
WEBSITE: http://www.uncst.go.ug

Appendix VIII: Authorisation Letters to Lower Local Government

Iganga District Local Government

THE REPUBLIC OF UGANDA

Office of the
District Health Officer,
Iganga District
P. O. Box 358,
IGANGA.

Tel: 043-242147
Fax: 043-232245

email:ddhsiganga@yahoo.com

Our Ref: 05/1/1
Your Ref:

Date: 16th August, 2018

The District Health Officer,
.....District

The Chairperson LC III,
NKWANKYA..... Sub-county

The Senior Assistant Secretary,
..... Sub-county

OFFICE OF CHAIRMAN LC III 22 AUG 2018 NAWANDALA SUB-COUNTY

Highly recommended
Received

RE: REQUEST FOR PERMISSION TO CONDUCT A NON RANDOMISED COMMUNITY TRIAL STUDY IN BUGWERI, IGANGA AND BUGIRI DISTRICTS

I kindly ask for permission to conduct a study in your sub-county/district health facilities. This study is under the School of Public Health of Kenyatta University. It is a doctoral project titled **"Effect of training motorcycle (Bodaboda) riders on maternal referrals from the community in East-Central region, Uganda**, that seeks to contribute to knowledge on creating an enabling environment for scaling up the deliveries in health facilities to reduce maternal and neonatal mortalities.

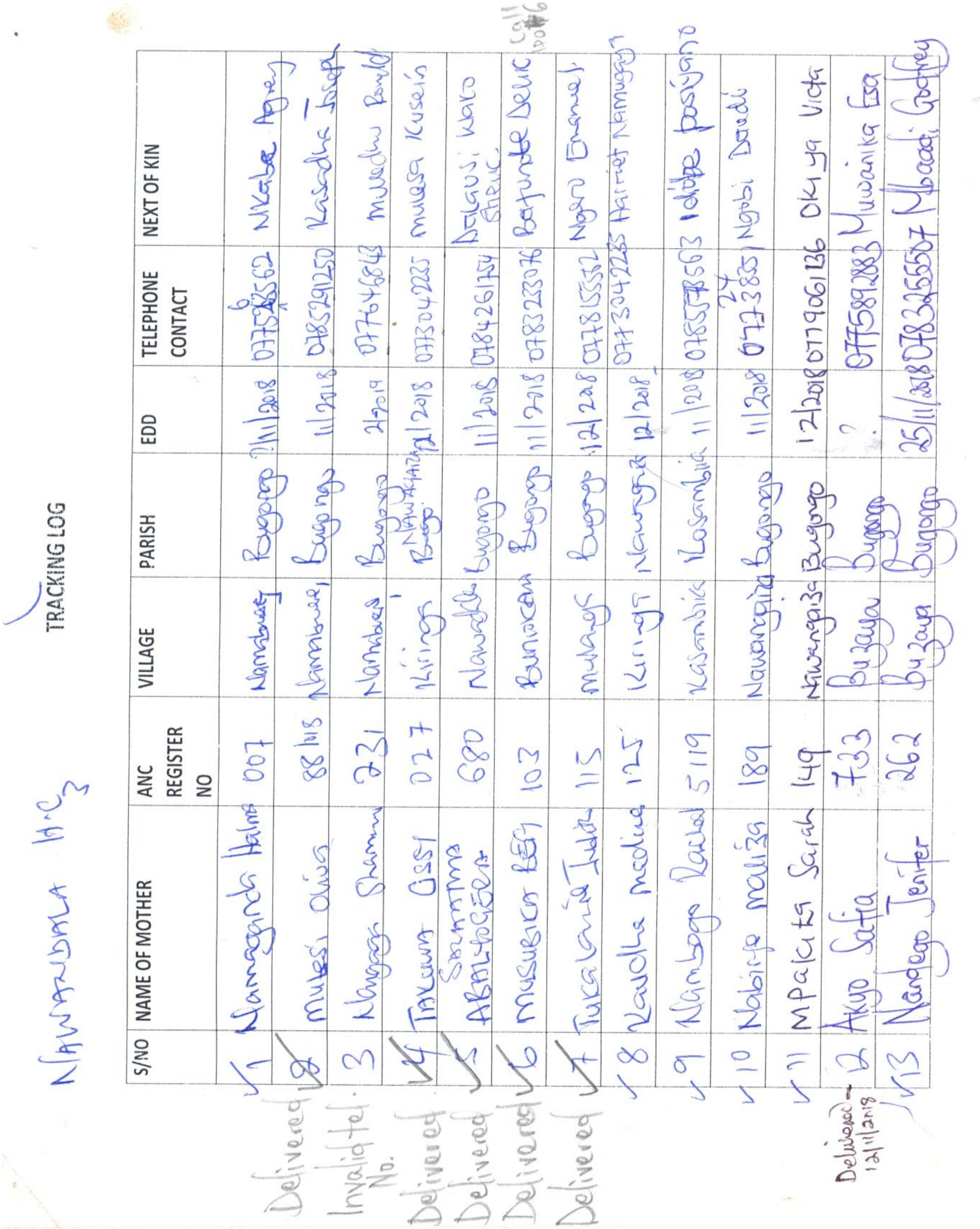
During the study, I plan to train boda-boda riders, health workers and Village Health Teams in their respective sub-counties, review records of health facilities on maternal care, hold conversations with health workers from Health Centre IIIs and IVs. In addition, I plan to make in-depth interviews with mothers in the district and other actors engaged in service delivery, monitoring and implementation. I also plan to make observations in health facilities and communities. The study is expected to last between 3 to 6 months.

Your support in this regard will be highly appreciated.

Thank you.

Muluya Kharim Mwebaza
ASSISTANT DISTRICT HEALTH OFFICER (ENV. HEALTH)
IGANGA DISTRICT.

Appendix IX: Sample of Filled Tracking Log



NAWANDALA H.C 3 — TRACKING LOG

	S/NO	NAME OF MOTHER	ANC REGISTER NO	VILLAGE	PARISH	EDD	TELEPHONE CONTACT	NEXT OF KIN	
Delivered	1	Namaganda Halima	007	Namabuga	Bugongo	7/11/2018	0775385626	Nkabe Agnes	
Invalid tel. No.	2	Mulesi Olivia	88/18	Nanabwe	Bugongo	11/2018	0785291250	Kasadha Joseph	
	3	Nangoga Shamim	231	Nanabwe	Bugongo	2/2019	0776468643	Muledhu Ronald	
Delivered	4	Takuwa Gssy	027	Kiringa	Nawangaiza Bugongo	12/2018	0773042225	Mulesa Kuseis	
Delivered	5	Samantha Abalyogera	680	Nawandala	Bugongo	11/2018	0784261754	Dalaus; Waiswa Steve	
Delivered	6	Musubika Betty	103	Buniokana	Bugongo	11/2018	0783233076	Batunde Deric	call no #6
Delivered	7	Tukalaine Idah	115	Mulagi	Bugongo	12/2018	0778155332	Ngoro Emanuel	
	8	Kavulha Medina	125	Kiringa	Nawangaiza	12/2018	0773042235	Harriet Namugaya	
	9	Nambogo Rachael	5119	Kasambira	Kasambira	11/2018	0785578563	Idibe Posiyano	
	10	Nabirye Maliza	189	Nawangaiza	Bugongo	11/2018	0773835 (24)	Ngobi David	
	11	Mpaka Sarah	149	Nawangaiza	Bugongo	12/2018	0779061136	Okiya Victo	
Delivered – 12/11/2018	12	Akyo Safia	733	Buzaya	Bugongo	?	0775892883	Muwanika Esa	
	13	Nandego Jenifer	262	Buzaya	Bugongo	25/11/2018	0783255507	Mbaadi Godfrey	

Appendix X: Registration Form for Participants During Training

Government of Uganda - IGANGA DISTRICT LOCAL GOVERNMENT

DATE 24/08/2018

LOCATION NAWANDALA S/C.

ATTENDANCE LIST

	Name	Title	Place of work	Telephone Number	Signature
1	KIBWIIKO BENIDA	Bodo	KIWANYI S.	0787018873	[illegible]
2	LUBAALE KELEMENTI	V.H.T	BUSAKAILE	0773371986	[illegible]
3	MUZANI SAMUEL	V.H.T	DUGONGO -A	0775360840	[illegible]
4	BASAMBULA JULIUS	VHT	NAWANDALA	0781526329	[illegible]
5	BIROLI WILSON	VHT	BUNIOKANO	0773625405	[illegible]
6	NAIRUBA ANNET	V.H.T	NAWANGAIZA II	0779660119	[illegible]
7	NAIGAGA ANNET ✓	V.H.T	BUYUNGA	0782806827	[illegible]
8	NAKAYIMA CISSY	VHT	KIRINGA - B	0774773928	[illegible]
9	MUGONDO RUTH	VHT	KIRINGA - A.	0753011291	[illegible]
10	ISABIRYE ALI ✓	VHT	BUZIKAYA	0786070429	[illegible]
11	MULONGO MWAMAD.	Boda	NAWANDALA	0775736314	[illegible]
12	NAMUSUUBO SARAH MUGWANO	V.H.T	BUGONGO B	0770530642	[illegible]
13	ISABIRYE SILVE	V.H.T	NAWANDALA	0786994781	[illegible]
14	SALIM SALEH	C/P BODABODA	KIWANYI	0773971579	Salim
15	KALULU SAMONI	BODBO	KIWANYI	0781805353	[illegible]
16	MUSOBYA BRIAN	BODA	KIWANYI	0772353697	[illegible]
17	BINOGA SHALIF	BODA	KIWANYI	0777808821	[illegible]
18	ZIJJAIKO BAKALI	BODA	NAUSISI	0783 269299	[illegible]
19	Mugeere Elifazi	BODA	NAUSISI	0777634545	[illegible]
20	Bamwange Edison	V.H.T	Namukunya	0781526323	[illegible]
21	MULONDO AKIIMU	BODA	NAWANDALA	0774361619	[illegible]
22	WAISWA BENARD	BODA	NAWANDALA	0787868493	[illegible]
23	N Tuwe SOEL	BODA	NAWANDALA	0784986756	[illegible]
24	AWALI Kateule	BODA	KIRINGA	0783298169	[illegible]
25	Basalirwa Christopher	BODA	Kiringa B	0771228472	Basalirwa
26	MUBIRU EMMANUEL	G/sec BODA	Kiringa B	0783927363	[illegible]
27	Waiswa Ayubu	Boda Boda	Kiwanyi	0704483003	[illegible]

Appendix XI: Monthly Allowances (Incentive) to Health Workers

MAMA-BODA CONNECT
OCTOBER MOTIVATION ALLOWANCES

IGANGA DISTRICT LOCAL GOVERNMENT

ACCOUNTABILITY FORM
DATE 12th. November. 2018

	NO.	NAME	TITLE	CONTACT	AMOUNT	SIGNATURE
NAMBALE HCIII	1.	ACHENG MARITHA	ECN	0778906436	100,000=	[illegible]
KASAMBIIKA HCIII	2	MAMUKOSE AGNES	E/M	0750044239	100,000=	[illegible]
NAMUSIISI HCIII	3	KAMPI MARIAM	E/M	0780548396	100,000=	[illegible]
NAWANDALA HCIII	4.	KISAKYE NAUME	E/N	0788063685	100.000=	[illegible]
BUGONO HCIV	5	NANKYA BUDESTA	E/m	0756734720	100,000=	[illegible]

Appendix XII: Photos Taken During Boda-Boda Training

Appendix XIII: Map of East Central Uganda