

## **Training of Motorcycle (*Boda-Boda*) Riders to Improve on Maternal Referrals from the Community in Selected Districts of East – Central Region, Uganda: A Baseline Survey**

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**Abstract:** Uganda has a reproductive health situation characterized with a high maternal mortality ratio (MMR) of 336 per 100,000 live births and neonatal mortality rate (NMR) of 21.4 per 1,000 live births respectively. In East Central Uganda, it is at 346 per 100,000 live births and 27 per 1,000 live births respectively. The MMR and NMR are higher in rural areas, where mothers are poor, less educated and there is difficulty in communication and transport. This leads to failure of the mothers to reach the healthcare centre in time or not going there at all. Studies indicate that training of village health teams, 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. However, commercial motorcycle riders (locally known as boda-boda) who transport majority of rural mothers from community to health facilities have often been excluded in such trainings. Motorcycle riders (boda-boda) therefore lack knowledge on maternal and child health. This study focused on training commercial motorcycle riders to improve maternal referrals from community to health facilities in Iganga and Bugiri districts in East Central Uganda. To ease telephone communication and follow up among the riders, mothers, VHTs and health workers at no cost, a closed caller group was created. 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 pregnant mothers in their third trimester whose sample size of 534 was randomly selected (503 were recruited). Simple random sampling and purposive sampling techniques were employed. Self-administered questionnaires, key informant interviews, focus group discussions, registers/HMIS/DHIS2 and observation checklist was used to collect both quantitative and qualitative data. Findings revealed that training of boda-boda riders and initiating of the closed caller group has the potential to contribute to addressing the challenges associated to community referral needs for pregnant mothers in the 3<sup>rd</sup> trimester. This adds credence to the need for rolling out of training of boda-boda riders as well as the closed caller group initiative to a greater geographical area and to different ethnic groups and other lower resource settings in the sub Saharan Africa.

Key words: Training of boda-boda riders, Community referrals, Closed caller group, Maternal, Uganda

### **1. Introduction**

Pregnant women in low and middle income countries (LMICs) suffer disproportionately from maternal deaths due to complications of pregnancy and childbirth. Neonatal death rates are also high thus, improving access to antenatal care during pregnancy may improve outcomes for women and neonates because antenatal care is positively associated with pregnant women delivering in health facilities and with more babies born normally (WHO, 2013). Interventions in place to improve on antenatal care (ANC) attendance and health facility deliveries are not effective because many pregnant mothers continued to miss out on this level of care due to either knowledge gaps on the early birth warning signs or failure to get means of transport to reach the facility in time (WHO, 2013). Studies indicate that training of village health teams (VHTs), health workers and political leaders, among other stakeholders

on maternal and child health (MCH) have been conducted in the past 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 facilities are excluded from such trainings. Equally pregnant mothers were health educated when they came for ANC at facilities on birth preparations (WHO, 2013). Health workers and village health teams (VHTs) were trained in emergency obstetric care (EmOC) and family linkage to the health facility in the different regions and parts of the world.

Motorcycle/Boda-boda riders are commercial riders with the core value of transporting people (pregnant mothers inclusive) for a financial gain. There was lack of knowledge for this particular stakeholder in the delivery of maternal and child health services especially in enabling a mother reach a health facility to deliver,

yet they were locally at their exposure. Therefore, the study intended to form Mama – Boda-boda Transport Connect (MBTC) groups at different points in the sub counties and train them to get basic information in maternal and child health. However, it was necessary for the health workers and VHTs to be part of the training to share experiences with the motorcycle (boda-boda) riders. This created a defined bondage between the different stakeholders in this study and a defined maternal referral system. The functional referral system was important in backing-up antenatal, labour and delivery, and postnatal services in the primary level of healthcare facilities (Pembe, 2010). The areas of concern in the training included; how to handle maternal and child health emergencies, fleet management, savings done by mothers in order to pay the commercial riders, the use of the communication system in the coordination of the mothers, riders, health workers and other relevant stakeholders in order to increase on the maternal referrals and deliveries in health facilities and signing of agreements/consents were required by the different participants (specifically, boda-boda riders, mothers and health workers).

The health of mothers and their new-born babies is crucial in health services management as it is often affected by mothers delivering at home, and this is attributed to many factors (Hussein, 2011). Timely referral 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). Mothers having information and defined communication systems in place are instrumental in improving some of the maternal health indicators, with substantial evidence on maternal referrals from the community to health centres. The intention is to reduce on the delays to seek quality healthcare services (PATH, 2013). A lot has been left desired as far as the reduction of maternal mortality ratio (MMR) and neonatal mortality rate (NMR) are concerned (Nabudere, 2011). Neither has it been known what information and type of communication systems were effective in enabling mothers reach health centres in time to deliver.

Globally, approximately 1000 women die from preventable pregnancy and childbirth related causes every day (WHO, 2013). Ninety-nine percent of all maternal deaths occur in developing countries (Patel, 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 and Lawn, 2010).

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 gap especially in the rural areas (Health, 2010). In East Africa, the situation was not different. 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 is measured by the impact of the “three delays” (Orcutt, 2013; UBOS and ICF, 2017). This study found it necessary to address such a gap. In Uganda alone, the maternal mortality ratio is 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 (PATH, 2013). In this case, maternal referrals from community were crucial for expectant mothers to get into the health centres to deliver (Ssebunya & Matovu, 2016).

In the East Central Districts of Uganda, maternal referrals from community especially in the rural areas during emergency, was lacking. An appropriate means of reaching the health facility in time was equally crucial for a mother to deliver in a health setting (Munjanja, 2012). The failure in communication especially for an affordable, comfortable and safe transportation for mothers in labour and other complications to health centres created the need for affordable and comfortable alternatives. Communities, such as those in Iganga and Bugiri were using vehicle/motorcycle ambulances (MOH, 2014). This seemingly eased transportation of expectant mothers to nearby health centres. Iganga and Bugiri districts got one functional government vehicle ambulance each (MOH, 2017). These ambulances hardly picked mothers from their homes or even from the lower health facilities when there was an emergency (MOH, 2014). 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 they were donations made to the local and needy community, they were inadequate. Locally available commercial motorcycle (boda-boda) riders were taken as the other alternative and this study wanted to find out if optimally training them in the basic areas of MCH and management of maternal referrals can yield results.

## 2. Literature Review

### 2.1 Boda-boda riders and their training to support community based referrals

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

The maternal education aimed at enabling health workers and CHEWs transmit information to mothers at the facility and community (Prickett, 2015). However, little was discussed on the maternal referrals from community as a result of training motorcycle riders (Boda-boda).

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 the improvement in the weights of babies at births to reduce neonatal mortality rate. Also the Hunger Project (2017) in Ghana in partnership with the Ghana Health Service (GHS) trained Community Health Nurses (CHN) as midwife assistants in form of workshops, mentorships and coaching for them to have enough information to give mothers, be able to record properly in registers and report to the higher authority in time. Accordingly, some training interventions of community health workers yielded results (Ekirapa-Kiracho, 2017). In eastern Uganda, CHWs' knowledge of MNH improved from 41.3% to 77.4% after training and to 79.9% 1 year post training (Ekirapa-Kiracho, 2017).

## 2.2 The Transport system as a means of referrals

The transport from community to a health centre and between different health facilities at the time of referral is a major concern. Having realised it in Kabarole district, a total of three ambulances were availed to transport needy mothers to health centres during times of emergencies. Two ambulances were provided by the NGO Baylor College of Medicine Children's Foundation – Uganda (referred to as Baylor Uganda), and the third one by Ministry of Health according to Bukuuku 2 and 3 (2015). This worked well for the inter facilities referrals. If a health worker made a decision to refer a mother, will call for the ambulance to pick up the mother and bring her to a higher level facility. Due to the low number of ambulances, this can took a long time for the ambulance riders to respond. Sometimes the ambulances were on its way to another place, or stationed somewhere far away from the concerning health centre. In Kabarole, transport system concentrated on inter-facility referral and not community to health facility referrals of mothers which this study picked interest to instigate.

Research was carried out where six mothers were interviewed in Buhinga after they had been referred and had a caesarean section. 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'* (Interviewed mother Buhinga 6, 2015). 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, the means of transport, by the time she had reached Buhinga the baby had died'* (Interviewed mother Kagote 13, 2015).

## 2.3 Communication Systems in health referral mechanisms

Any thought which is not shared with people or whole world and reserved to you, is no use. It must come out to benefit the people and your primary responsibility is to share your 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.

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 whole day mothers travelling to a health centre, but with the intervention, it reduced to a few hours. Similarly, in Sierra Leone, investments in vehicles and improved referral communication systems where patients and in this case expectant mothers were transported from one level of care to another and led to a doubling of use of emergency obstetric care (EmOC) and a 50% reduction in case fatalities.

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 reduced average transport delays from six hours to three hours (PATH, 2013; Thaddeus, 1994). 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, 2016). It hinders service delivery, especially to the rural population. This is because of the unfavourable environments for the known types of communication systems to be effected.

Surprisingly, all the above studies did not clearly state the solely use of phone for communication in the referral of mothers in rural settings. Mobile phones play different roles when it comes to healthcare (PATH, 2013), but did not talk about the information or message exchange between mothers and commercial motorcycle rider commonly known as Boda-boda.

In Kenya, it was 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).

The ambulances used for maternal referrals in developed countries are motor vehicles which are well equipped with monitoring tools. This type of ambulance best works in urban settings and developed countries. In Uganda, this cannot work well because of the limited numbers of motor vehicle ambulances, hard to access the ambulances drivers and inaccessible roads yet the demand is very high. Therefore, others forms of transport like the motorcycle riders (Boda-boda) locally available, can be tested by this study.

At 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 communication was between the two parties (Flynn, 2010). This study will therefore take humans as sub component of communication system termed as "Physical Information Delivery System" and these will include the health workers, VHTs, mothers and their partners, drivers and riders, and other people, and how they can influence maternal referrals from the community.

#### **2.4 Socio-demographic characteristics and community referral**

There was a cross-sectional, mixed-methods study conducted among 391 women who delivered at four health facilities supplied with motorcycle ambulances in Mbale district, eastern Uganda, between April and May 2014. Quantitative data were collected on socio-demographic and economic characteristics, pregnancy and delivery history, and community and health facility factors associated with utilization of motorcycle ambulances using semi-structured questionnaires. Qualitative data were collected on the knowledge and attitudes towards using motorcycle ambulances by pregnant women through six focus group discussions. 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

( $\geq 35$  years vs.  $\leq 24$  years; adjusted Odds Ratio (OR)=4.3, 95% CI: 2.03, 9.13), sharing a birth plan with the husband (OR=2.5, 95% CI: 1.19, 5.26), husband participating in the decision to use the ambulance (OR =3.22, 95% CI: 1.92, 5.38), and having discussed the use of the ambulance with a traditional birth attendant (TBA) before using it (OR =3.12, 95% CI: 1.88, 5.19). Qualitative findings indicated that community members were aware of what motorcycle ambulances were meant for and appreciated their role in taking pregnant women to health facilities.

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 to domestic needs like food, fees, and general welfare (Namazzi, 2017). This compromises the ability of mothers to deliver in health centres.

According to (Moindi, 2016), the age of the mother and other related factors determines the mother's decision to deliver at a health facility under 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 mother and the partner's old age were associated with higher risk of delivering at home [crude  $P < 0.05$ ] (Moindi, 2016). In the same study by (Moindi, 2016), higher education level of both the mother and the partner were associated with a protective effect on the risk of delivering at home in the univariate regression model (RR  $< 1.0$  and  $P < 0.05$ ) as Mazalale (2015) affirms.

The conducted study by (Namazzi, 2017) in eastern Uganda stated that women who are poor stay in rural villages, and they are hand tied to reach health facilities and they resort to delivering at home. Allegri (2015) also concurs with Moindi (2016) and Namazzi (2017) most of the factors in their studies, apart from marital status. It is stated that in Malawi, unmarried women were significantly more likely [OR=1.88; 95% CI (1.086–3.173)] to deliver outside a facility (Mazalale, 2015). This study looks at finding out if it is the same in East – Central region, Uganda. Religion of mothers is found also to be significantly associated with their delivery in health facilities (Kifle, 2017). This was evident in the study conducted in Ethiopia, where results consistent with institutional delivery services, showed that Muslim religion follower mothers were 89% less likely to seek delivery services and postnatal health care service than the counter parts.

### **3. Methodology**

The study used an open 2 arm cluster non randomized control trial study design; with an intervention and control groups from the selected sub counties where some health centres and communities, as units of non-randomization were selected. Non-randomized trials are interventional study designs that compare a group where an intervention was performed with a group where there

was no intervention (Thiese, 2014). This was a prospective study design performed which was to put forward the relationship between the intervention and the outcome (Schmidt, 2017; Thiese, 2014). In such study design, baseline data was collected such that after the intervention, post interviews were done to determine the impact of intervention.

Four sub counties were selected for the intervention arm and other four for the control arm. The key stakeholders for this study were; the health workers (midwives), boda-boda riders, mothers and the VHTs. Mothers were identified from the Antenatal care (ANC) register and VHTs were selected from the villages as shown in table 1a and 1b.

### **3.1 Setting**

The study was conducted in selected districts and sub counties in East Central region, Uganda. These districts were Iganga and Bugiri; particularly in the sub counties of Nawandala, Nabitende and Nambale in Iganga district and Budaya in Bugiri district for the intervention arm. In this arm, boda-boda riders, VHTs and health workers were trained and mothers comprehensively health educated by the midwives at the health centres during ANC. Prior to this study, there was partial operation of a few motorcycle ambulances in these sub counties. In each sub county, there was only one motorcycle ambulance which was not operational. This prompted the mobilisation and training of the locally available groups of commercial boda-boda riders with the aim of referring mothers for further management at the different levels of health facilities. Sub counties in the control arm included; Nawangingi, Ibulanku and Makuutu in Iganga district and Nabukalu in Bugiri district. Trainings did not take place in the control arm. Only health workers were taken through the study tools to correctly capture data from mothers. Mothers were given the routine ANC services without emphasis on the use of boda-boda riders.

### **3.2 Participants**

The participants in the baseline survey were limited to boda-boda riders, mothers, VHTs and health workers from selected villages, sub counties and health facilities in the intervention arm. Similar participants were recruited in the control arm apart from the boda-boda riders.

### **3.3 Recruitment**

A total of 100 boda-boda riders altogether from Budaya, Nawandala, Nabitende and Nambale sub counties were recruited for the training in the intervention arm. There was no recruitment of boda-boda riders in the control arm. 255 mothers, 103 VHTs and 18 health workers were also recruited in the intervention arm. They were trained and reoriented on maternal community referral. 248 mothers, 18 health workers and 90 VHTs were recruited for this study in the control arm.

### **3.4 Implementation**

The purpose of recruiting boda-boda riders was to transport mothers from their respective communities to health facilities in time. Boda-boda riders were also part of the caller user group (CUG) to enable them communicate to mothers and other stakeholders in the group and vice versa at no cost in the intervention arm. This started in October 2018 and ended in March 2019. The health workers helped in the recruitment of eligible mothers for the study in both the control and intervention arms. VHTs helped in following up and reporting about the recruited mothers in community in both arms.

### **3.5 Identification of respondents**

The participants for this intervention were selected from the study population as shown in table: 1a and 1b below.

### **3.6 Data collection methods**

An initial survey was undertaken to benchmark mothers, boda-boda riders, VHTs and health workers who had telephones (mobile phones) and were interested in participating in the study. Dialogue meetings, focus group discussions and key informant interviews were conducted to get views from boda-boda riders, mothers, VHTs and health workers in the intervention arm. In the control arm, only mothers, health workers and some VHTs were interviewed. Quantitative data was collected by use of self-administered questionnaires in all facilities. These were filled by all stakeholders with the exception of boda-boda riders in the control arm. A tracking log was used as an enrolment tool for all eligible mothers across the study health facilities.

### **3.7 Ethical clearances**

Ethical approval to conduct the study was provided by the Institutional Review Board (IRB) at Uganda Martyrs University - Nsambya hospital and 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.

## **4. Results and Discussion**

The main respondents for this study were the pregnant mothers. This research information was obtained from interviews of 503 respondent mothers against 534 from 8 sub counties in both the intervention and control arms; and this contributed to a response rate of 94.2%. However, there were other respondents; that is, Boda-boda riders from the sub counties in the intervention arm (100% of the response rate during training) and the health workers from 10 health facilities in the intervention and control arms (100% of the response rate). Qualitative data was collected from 8 focus group discussions to complement on the quantitative data. Key informant interviews were conducted and also observation tools used to answer a few concerns.

There were 100 boda-boda riders, 18 health workers in health centres and 103 VHTs as participants recruited in the intervention arm of the study, (Table 1a). A total of

488 participants were interviewed separately at baseline in the intervention arm and 375 in the control arm. The control arm also included 18 midwives and only 90 VHTs. This was conducted by midwives and research assistants in all sites/health facilities in the study area.

With the sub intervention of the caller user group, 120 mothers out of the 267 were registered from the 3

intervention sub counties (Nawandala, Nabitende and Nambale). The one remaining sub county (Budaya) in the intervention arm acted as control for the caller user group. See table 1b below. Results were statistically and thematically provided for the baseline survey in both intervention and control arms.

**Table 1a:** Table showing key stakeholders for the intervention and control arms

Categories of respondents	Total number of respondents		Areas of intervention	Areas of control
	Intervention	Control		
Boda-boda riders	100	0	Budaya,	Nawaningi,
Health workers	18	18	Nawandala,	Ibulanku,
Mothers	255	248	Nabitende and	Makuutu and
Village Health Team Members	103	90	Nambale sub	Nabukalu sub
<b>Total</b>	<b>476</b>	<b>356</b>	counties	counties

**Table 1b:** Table showing categories of people in the closed caller group and those not in the closed caller group

Categories of caller group users	Total number of users	Total number of non-users	Area of sub intervention	Area of sub control
Boda-boda riders	75	25	Nawandala,	Budaya sub
Health workers	12	3	Nabitende &	county
Mothers	120	69	Nambale sub	
Village Health Team Members	12	21	counties	
<b>Total</b>	<b>219</b>	<b>117</b>		

#### 4.1 Baseline interventional focus group discussions

After the training of the research assistants, there were pre interventional focus group discussions with the Boda-Boda riders, VHTs and other community members including mothers. The mobilization and coordination was done by the boda-boda stage chairman and the research assistant. This was done in the sub counties of Nawandala, Nabitende and Nambale in Iganga district and Budaya in Bugiri district.

A team comprised of the Principal Investigator (PI) and the research assistants met the LC1 chairpersons, boda-boda chairmen, several community members and boda-boda riders in the designated areas. A total of eight (8) focus group discussions were conducted in the four (4) sub counties of intervention and control.

The purpose of the focus group discussions was to have an entry point into the community. Secondly, to brainstorm on how mothers could be easily and timely transported to health centres from the community to deliver under skilled personnel. The discussions were led by principal investigator of the study. The PI requested for feedback from the rest of the members on the ideas of (1) Boda-boda riders' serious participation in the study and see how they can help mothers reach health facilities in time, (2) the registration of participants and use of the closed caller user group (CUG).

#### 4.2 What was raised during the FGD?

It included challenged faced by the different stakeholders. These were stated by the respondents in the intervention arm where most of the boda-boda riders believe that the mothers have no money and after the project they will not be able to pay for transport fare, a respondent clearly stated, *"this existing practice can only stand the time we remain with caller groups as a practice"*.

Their perceptions, is that using boda-boda riders is a quick way of addressing the risks associated with delayed child birth and if well thought through it can improve maternal and neonatal health. But today very little is being done in this regard.

Much as the training for the boda-boda riders was not done in the control arm, FGDs at end of the study was done. During this time, participants (boda-boda riders) fronted their views. One of the participants in the control arm lamented how nothing had been achieved over the past years. *"For safety we allow God direct our footsteps. Otherwise the boda-boda riders in this place are a menace"*.

External influences are another challenge especially for boda-boda riders, these range from riding a motor cycle which is hired, the rider has regulations when to pick and park where the motorcycle sleeps amongst others. These are serious challenges when implementing such intervention.

### 4.3 Socio-demographic characteristics

The main study population for this study was pregnant mothers who responded to the questionnaires. However, KII were conducted for other key stakeholders.

In terms of age majority of the mother were drawn from age groups (25 – 34, and 15 – 24), and these contributed to an independent percentage of 34.6% leading to a total of 69.2%. For the case of educational status of the respondents, the majority of them had schooled up to primary level of education 45.2%. Basing on the above,

it can be argued that the majority of respondents did not move to higher rungs of educational ladder, and thus, are semi illiterates. Majority of the mothers were staying in rural area and their level of income was low. This was for both the intervention and control arms as seen in table 1c below. Most of the mothers were carrying their 3 – 4 pregnancies in both the intervention and control arms and the distance between their homes and health centre was said to be 2 – 4 kilometres. These mothers were a mix of religions (Catholics, Protestants, Moslems and others). Majority of these mothers were married.

**Table 1c:** Table showing the socio-demographic characteristics of mothers in both the intervention and control arms

Variable	Intervention		Control	
	n	%	n	%
<b>Age</b>				
<14 yrs	0	0	1	0.4
15 – 24	88	34.6	99	40.2
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
<b>Educational Level</b>				
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
<b>Level of income</b>				
Low	165	64.6	147	59.4
Middle	80	31.3	84	33.8
High	10	4.1	17	6.8
<b>Marital status</b>				
Not married	0	0	0	0
Married	249	97.6	245	98.8
Divorced	6	2.4	3	1.2
Widowed	0	0	0	0
<b>Religion</b>				
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
<b>Number of pregnancies</b>				
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
<b>Average distance to the HC</b>				
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
<b>Residential place</b>				
Rural	231	90.6	212	85.3
Urban	24	9.4	36	14.7
	<b>N = 255</b>		<b>N = 248</b>	

Source: Primary Data



At baseline survey, the following key parameters were focused on; where it was found out whether mothers experienced signs and symptoms (vaginal bleeding, fever, headache/blurred vision) during pregnancy or not, distance to the nearest health centre, time taken for the boda-boda rider to arrive when contacted, among others. Questions on closed caller group were asked. These included whether mothers have ever heard and used the

caller user group (CUG), have ever used their own airtime, who is the owner of the phone, what is the relationship with the owner of the phone, who pays for transport to the health facility, challenges experienced amongst others. During the baseline for the intervention and control arms few mothers had the signs and symptoms of vaginal bleeding, blurred vision and fever amongst others as shown in table 2 below.

**Table 2:** Showing the number of mothers who experienced the pregnancy related symptoms in the pre intervention

<i>Experience of pregnancy related symptoms</i>	<i>Frequency</i>		<i>Percent</i>	
	<i>Intervention</i>	<i>Control</i>	<i>Intervention</i>	<i>Control</i>
<i>Yes</i>	126	109	11.2	9.9
<i>No</i>	129	139	88.8	90.1
<b><i>Total</i></b>	<b>255</b>	<b>248</b>	<b>100.0</b>	<b>100.0</b>

According to the findings of the baseline survey in the intervention arm, few mothers had experienced signs and symptoms during pregnancy which included vaginal bleeding, fever, headache/blurred vision

(11.2%) as compared to 9.9% in the control arm. Some of the mothers who were interviewed associated this with not being due for delivery. Most of the mothers were recruited at 29 weeks of pregnancy (7 months).

#### 4.4 The distance from home to the nearest health facility

At baseline, the distances between the homes and health facilities were categories in six distance bands (less than 2 km, 2 – 4 km, 4 – 6 km, 6 – 8 km, 8 – 10 km and 10+ km). The research findings especially during the FGDs and KII established challenges that the boda-boda riders in the intervention were to encounter especially with

those mothers from a distant band of 10 km and above. They expressed the fear over the safety of their motorcycles. This was a major concern raised by many riders in the different sub counties of Budaya, Nawandala, Nabitende and Nambale.

**Table 3:** Table showing the distance bands from the mothers' homes to the nearest health centres

<i>Expected distance to nearby health Centre from home in km</i>	<i>Frequency</i>		<i>Percent</i>	
	<i>Intervention</i>	<i>Control</i>	<i>Intervention</i>	<i>Control</i>
<i>&lt; 2</i>	39	35	15.4	14.1
<i>2 – 4</i>	71	77	27.8	30.0
<i>4 – 6</i>	69	64	27.1	26.8
<i>6 – 8</i>	46	49	18.0	17.5
<i>8 – 10</i>	21	19	8.2	8.0
<i>10 and above</i>	9	4	3.5	3.6
<b><i>Total</i></b>	<b>255</b>	<b>248</b>	<b>100.0</b>	<b>100.0</b>

According to the table above majority of respondents lived in the distance band of 2 – 4 km and 4 – 6 km respectively. The average distance between a household and the health facility in Uganda is 5 km (UBOS and ICF, 2017). Like in Gambia, Ugandan population specifically 87 percent can access health services within the reach of 5km radius (UBOS and ICF, 2017). The transport means to health centres by mothers with maternal challenges is also limited, if not unavailable. Much health education is conducted at the time of ANC

visit, to increase on their knowledge on the importance of using boda-boda riders.

Still, the 5 km is not a walk-able distance by a mother especially when in labour. . In the FGDs conducted, “*the distance between the health centres and householders is not walk-able*”, one of the mothers said. At that same boda-boda stage of Kiwanyi, one of the riders said.... “*There is a long distance between Kiwanyi village and Nawandala HCIII, a mother cannot walk that distance, and more so when in labour*”.



**Table 4:** The number of women who expected to use boda-boda riders to take them to health centres

<i>Number of women who were to use boda-boda riders to go to the health centre</i>	<i>Frequency</i>		<i>Percent</i>	
	<i>Intervention</i>	<i>Control</i>	<i>Intervention</i>	<i>Control</i>
<i>Yes</i>	136	121	53.4	48.9
<i>No</i>	119	127	46.6	51.1
<b><i>Total</i></b>	<b>255</b>	<b>248</b>	<b>100.0</b>	<b>100</b>

The number of mothers who registered to use boda-boda riders to take them to health centres in the intervention arm was more (53.4%) than that of registered mothers in the control arm (48.9%). The difference was attributed to the sensitisation of mothers during the entry meetings and FGDs in the community as well as health education during ANC in the intervention arm.

The willingness to use the boda-boda riders depended on their availability and response when contacted. 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). For other researchers, it worked well for the inter facilities referrals. If a health worker made a decision to refer a mother, could call for the ambulance to pick up the mother and bring her to a higher level facility. Due to the low number of ambulances, this took a long time. It caused serious delay and worst of all, death. ‘*She was referred when the baby was still alive. But due to the distance, the means of transport, by the time she had reached Buhinga the baby had died*’ (Interview mother Kagote 13, 2015).

**Table 5:** Mothers who were to use phone calls to contact boda-boda riders to transport them to the health facility

<i>Mothers who were to use phone calls to contact boda-boda riders</i>	<i>Frequency</i>		<i>Percent</i>	
	<i>Intervention</i>	<i>Control</i>	<i>Intervention</i>	<i>Control</i>
<i>Yes</i>	172	88	67.6	35.4
<i>No</i>	83	160	32.4	64.6
<b><i>Total</i></b>	<b>255</b>	<b>248</b>	<b>100.0</b>	<b>100.0</b>

In the intervention the number of women who were to use their phones or somebody next to them to contact the boda-boda riders were 172 mothers (67.6%), whereas in the control, only 88 mothers (35.4%) accepted to use their phone or any other person to contact the boda-boda riders. Mothers in the intervention arm had already been mobilised and sensitised even before the interviews began, unlike in the control arm. This intervention worked well in Malawi when radio-telephones in health centres were used. 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).

However, to call the boda-boda riders, mothers were supposed to load their phones with airtime. Only 51% accepted to load airtime in the intervention arm compared to 38 percent in the control arm. This is because mothers in the intervention had prior knowledge on the importance of calling boda-boda riders to take them to the health facilities. This is evidenced in the table below. It was different when the FGD was conducted in Nabitende. “*Many times women and their families can’t afford to pay for airtime and transport, even after taking them to the health facility. Families don’t adequately prepare for the communication expenses and boda-boda transport during labour*”, another Boda-boda rider added.

**Table 6:** The women who were to load airtime in advance to contact the boda-boda riders

<i>Mothers who were to load airtime to contact boda-boda riders</i>	<i>Frequency</i>		<i>Percent</i>	
	<i>Intervention</i>	<i>Control</i>	<i>Intervention</i>	<i>Control</i>
<i>Yes</i>	130	94	51.0	38
<i>No</i>	125	154	49.0	62
<b><i>Total</i></b>	<b>255</b>	<b>248</b>	<b>100.0</b>	<b>100.0</b>

Out of the data analysed, it was clearly noted that the other people’s phones to be used included the spouses (husbands), relatives (who included siblings, parents and in laws), friends and even the VHTs as reflected in

the table below. It is clear that majority of the mothers possessed their own phones both in the intervention and control arms. This is contradicts with certain

interventions, where phones instead were left to health workers at the facilities (PATH, 2013).

**Table 7:** The relationships the mothers had with the owner of the phone used

<i>Relationship with the owner of the phone</i>	<i>Frequency</i>		<i>Percent</i>	
	<i>Intervention</i>	<i>Control</i>	<i>Intervention</i>	<i>Control</i>
<i>Mothers (Mine)</i>	185	190	72.5	76.6
<i>Husband</i>	37	34	14.5	13.7
<i>Friend/VHT</i>	9	11	3.5	4.4
<i>Relative</i>	24	13	9.5	5.3
<b>Total</b>	<b>255</b>	<b>248</b>	<b>100.0</b>	<b>100.0</b>

The study was to find out the ways in which mothers will 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 both arms, mothers thought they can make a phone call (60%).

Possible challenges in communication were suggested as follows; 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 amongst others. This was evidenced in the focus group discussions where majority of people said the problem in calling for transport was the network and perhaps boda-boda riders not picking calls especially at night.

Another member said from Nambale community that... *“Mothers/families don’t have phones/numbers to*

*contact the Boda-boda riders. Sometimes in such situations a neighbour or friend will call the boda-boda and they rider will go to their house first to be directed to the mother, increasing the delay. At times, riders will arrive when mothers have already gotten Boda-boda riders that pass by them on the road”.*

This was not quite in agreement with existing literature that notes that other reasons for the delay according to Programme for Appropriate Technology in Health (2013) include difficult geographical terrain, cost of transport, lack of phones and vehicles, suboptimal distribution and location of health facilities, and poor decision-making of health professionals. However, in the intervention arm there was a sub study on the caller user group (CUG), where mothers were registered with other stakeholders most importantly the boda-boda riders to ease communication among themselves and at no cost. As reflected in table 8 below, 82.2% of the mothers in the caller group expected to call the boda-boda riders for transport to the health centres.

**Table 8:** Number of women who were to use the closed caller group to have boda-boda rider drop them to health centre

<i>Women in closed caller group to have boda-boda riders drop them to health centre</i>	<i>Frequency</i>	<i>Percent</i>
<i>Yes</i>	99	82.2
<i>No</i>	21	17.8
<b>Total</b>	<b>120</b>	<b>100.0</b>

Mothers thought they would use the boda-boda riders for the pregnancy they were carrying. Indeed they had also the previous history of using boda-boda riders with the past pregnancy. About 48% of the mothers in the intervention arm and 53% in the control arm as highlighted in table 9 below agreed to use boda-boda

riders for that particular pregnancy. Much as there was no training of boda-boda riders in the control arm, the boda-boda riders were used to transporting mothers from the community to the health centres to deliver and even those who had complications according to the interviews conducted.

**Table 9:** Women who were to use boda-boda during this pregnancy or used for the previous pregnancies

<i>Use of boda-boda during that pregnancy to the health centre</i>	<i>Frequency</i>		<i>Percent</i>	
	<i>Intervention</i>	<i>Control</i>	<i>Intervention</i>	<i>Control</i>
<i>Yes</i>	122	131	48	53
<i>No</i>	133	117	52	47
<b>Total</b>	<b>255</b>	<b>248</b>	<b>100.0</b>	<b>100.0</b>

Most of the mothers assumed that it was to take 31 – 60 minutes for a boda-boda rider to arrive when called for transport to the health facility. This was for both the intervention and control arms (54.9% and 53.2% respectively). However, a big number of mothers also believed that a boda-boda rider would arrive between 21

to 30 minutes (31.4% for the intervention and 37.1% for the control). This proved better compared to other studies. In Mali, it reduced to a few hour and there was an improvement in some of the indicators. Same in Malawi where the time take for transportation reduced from 6 hours to 3 hours (PATH, 2013).

**Table 10:** Time taken by motorcycle (boda-boda) rider, to pick mother from home

<i>How soon is the boda-boda rider to arrive</i>	<i>Frequency</i>		<i>Percent</i>	
	<i>Intervention</i>	<i>Control</i>	<i>Intervention</i>	<i>Control</i>
5 – 20	11	18	4.3	7.3
21 – 30	80	92	31.4	37.1
31 – 60	140	132	54.9	53.2
60+	24	6	9.4	2.4
<b>Total</b>	<b>255</b>	<b>248</b>	<b>100</b>	<b>100</b>

**Table 11:** Perceptions of mothers on the role and time the boda-boda riders took to arrive when contacted

<i>Perception of mothers on the role and time boda-boda take</i>	<i>Frequency</i>		<i>Percent</i>	
	<i>Intervention</i>	<i>Control</i>	<i>Intervention</i>	<i>Control</i>
Yes	172	146	67.5	58.9
No	83	102	32.5	41.1
<b>Total</b>	<b>255</b>	<b>248</b>	<b>100.0</b>	<b>100</b>

The survey undertaken showed that more mothers were happy with the roles of boda-boda riders more so when riders can manage to keep time to transport them to the health facility for delivery based on the circumstance and needs. At least 67.5% said yes in the intervention arm while 32.5% said no. In the control arm 58.9% said yes and 41.1% said no.

A study was conducted on the perceptions and factors affecting the utilization of motorcycle ambulances in Eastern Uganda. These ambulances were stationed near the periphery health units and mothers could easily access them. To the contrary, their role in improving maternal and child health have not been realised by the mothers. The perception of mothers towards their utilization has not been positively taken (Ssebunya & Matovu, 2016; Gabrysch, 2011).

According to the respondents (mothers), 70.3% of them were comfortable with the locally available means of transport since that is what was at their exposure, whereas 29.7% were not comfortable with the boda-boda riders. This was in the intervention arm. This was not different from the control arm, where 54.8% of the mothers said they were comfortable with the boda-boda riders while 45.2% said they were not comfortable. One study focused on attitude of mothers and the use of transport means available to the health facility 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 (Onwuhafua, 2005). However, this study mothers were comfortable with the boda-boda riders (70.3% in the intervention arm).

**Table 12:** Comfort of motorcycle (boda-boda) transport for mothers

<i>Comfort of mothers with locally available Boda-Boda</i>	<i>Frequency</i>		<i>Percent</i>	
	<i>Intervention</i>	<i>Control</i>	<i>Intervention</i>	<i>Control</i>
Yes	179	112	70.3	54.8
No	76	136	29.7	45.2
<b>Total</b>	<b>255</b>	<b>248</b>	<b>100</b>	<b>100</b>

It was realised that mothers who were interviewed agreed to recommend other mothers also to use the locally available transport means (boda-boda) to reach the health facility for medical attention. In the

intervention arm, 71.1% of the mothers said yes, while 28.9% said no. In the control arm, 52.7% said yes and 47.3% said no.

**Table 13:** Would you recommend another pregnant woman to utilize service

Recommendation of another mother	Frequency		Percent	
	Intervention	Control	Intervention	Control
Yes	181	131	71.1	52.7
No	74	117	28.9	47.3
<b>Total</b>	<b>255</b>	<b>248</b>	<b>100.0</b>	<b>100</b>

## 5. Conclusions and Recommendations

### 5.1 Conclusions

This study involved “training of boda-boda” riders and initiation of the “closed caller group” which has demonstrated that it has the potential to contribute to addressing the challenges associated to community referral needs especially for pregnant mothers in the 3<sup>rd</sup> trimester. Training of the stakeholders in this case the boda-boda riders, VHTs and health workers (midwives), makes the process of referral and transportation of pregnant mothers better since the VHTs are able to prepare the health workers at the facility in terms of the condition the mother is in at point of referral in the community. This means that in case of complications

### 5.2 Recommendations

The following recommendations stand out from this study:

1. This study should be expanded to more sub counties and districts because of the impacted exhibited in the shortest time of community involvement.
2. Massively, boda-boda riders should be encouraged to form associations at their

then the midwife is fore aware and can prepare to save the mother and baby in an event that there is a complication. The caller group has the potential to address the communication gap and transport linkages gaps in the maternal health structure of the health system for low resource settings like Uganda. Small incentives are required to motivate mothers use their phones to contact boda-boda riders and others stakeholders. Mothers got a bonus of 10,000 UGX shillings worth of airtime to call across other networks or Boda-boda riders who are not in the caller group.

Therefore this training of boda-boda riders and closed caller group initiative needs to be rolled out to a greater geographical area and to different ethnic groups and other lower resource settings in the sub Saharan Africa.

different stages with the intention of helping mothers reach health facilities in time to deliver.

3. Let Implementing partners be brought on board to help in branding the interested boda-boda riders for easy identification. T-shirts, aprons, helmets, identity cards amongst others may be used for identification.
4. Quarterly review meetings of boda-boda riders with the district team and other interested partners are necessary.

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