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*Full Length Research Paper*

# Training of Mothers for Attitude Change to Support Community-Based Referrals for Maternal Outcome in East-Central Uganda

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**ABSTRACT:** In many developing countries, vehicle and motorcycle ambulances have been secured to transport mothers to health centres and the Village Health Teams (VHTs) have been involved in the community referral processes. However, the willingness of mothers to embrace the referral system is still a challenge. The consequences are dire with low health facility-based deliveries and escalating maternal mortality ratio (MMR) and infant mortality rates (IMR) in Uganda. The East-Central study investigated the attitude of mothers towards the use of local motorcycle (boda-boda) transport as a community-based referral means to health centres for a better maternal outcome (deliveries at health centres). A non randomized control trial study design of intervention was conducted in Iganga and Bugiri districts of East-Central Uganda. The study population consisted of 503 mothers (255 in the intervention arm and 248 in the control arm) randomly selected. Self-administered structured questionnaires, in-depth and key informant interviews and focus group discussions were used to collect both quantitative and qualitative data. Quantitative data were analyzed using STATA version 14. Thematic analysis was done using atlas Ti 7 software. Mothers with a positive attitude were 56.962 times more likely to deliver from health centres compared to those with negative attitude and was statistically significant (p=0.000). The average value to determine the change effect on using the difference-in-difference (DID) model was -0.654 and statistically significant (p=0.000). The positive attitude of mothers towards the comfort of boda-boda transport for mothers to health centres to deliver was statistically significant (p=0.011; OR=8.352; CI= 1.620 – 43.048). Massively, mothers are encouraged to contact boda-boda riders for transport services. The quality of boda-boda transport services should be good to enable mothers to change their mindset and positively embrace boda-boda transport for better maternal outcome.

**Keywords:** Attitude, community-based referrals, maternal outcomes, comfort of boda-boda

## INTRODUCTION

According to Kathryn (2016), for a woman to have a baby, there is a reasonably healthy journey she and her baby will have to go through during pregnancy and childbirth. However, the changes in childbirth technology not only minimize risks that might have led to death or disability a century ago, but promise a perfect outcome. Additionally, in many parts of the world today, women can plan their pregnancies and tend to have fewer children than a century ago. This has created a culture where each pregnancy and baby generates intense attention. The health of mothers and newborn babies is therefore crucial in health services management as mothers delivering at home are often affected (Hussein, 2011). Studies by Fisseha (2017) about mothers' perception on the capability of service providers in managing complicated childbirths revealed to the contrary that mothers perceived that service providers at the nearby health centres were capable of managing complicated

childbirth.

A study by Osibogun (2018) on attitude of mothers and the use of health centres in Nigeria identified non-use of health centres by mothers owing to; non-friendly health workers, distance to the health centre, and lack of transport means to the health centre. Chris-Otubor (2015) study to determine the attitude of mothers towards taking children for immunization showed that less than 3% of the women view immunization as bad. 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.

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 and Kurimoto, 2012); though their freedom of movement did not address challenges of maternal referrals from the community. 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. 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 centres (Nnebue, 2014). In this case, boda-boda riders are expected to satisfactorily serve mothers; and this trickles the mindset of mothers and their attitude. This study sought to present an in-depth description of attitude of mothers. The study specifically investigated the mothers' attitude towards community-based referrals for maternal outcomes in the East-Central region, Uganda.

## METHODS AND MATERIALS

### Research design

The study used a 2-arm cluster 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.

### Study area

The study was conducted in East-Central Uganda, in the two districts of Iganga and Bugiri. The 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 motorcycle (boda-boda) transport groups and mama – motorcycle (boda-boda) transport connect communication strategy for mothers to be easily picked and transported to health centres for antenatal care (ANC) and during times of obstetric emergencies. Therefore, four intervention sub counties were purposively selected and four control sub counties randomly selected.

### Study population

The main study population consisted of pregnant mothers who were in their third trimester 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. 503 mothers (255 in the intervention arm and 248 in the control arm) were selected from 14,430 projected populations of expectant mothers in the region (MOH, 2017).

### Sample size of mothers

The outcome was health facility based deliveries because of community-based referrals. In this context, the study explored measures to improve maternal outcome through improving strategies of community referrals to health centres. The sample size calculation for the pregnant mothers was determined by the formula;

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

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 (Osaki, 2013). 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% (Osaki, 2013), 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 (Osaki, 2013).

$$\text{From the formula } n = \frac{2 \times (1.96 + 1.28)^2 \times 0.476\,(1 - 0.524)}{(0.406 - 0.546)^2} = 267$$

Much as the sample size for both arms was 534, only 503 were recruited for the east-central study after consenting.

**Recruitment process of mothers for training during ANC visits**

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 randomly selected from the ANC register on their visit in the third trimester. 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.

**Training of mothers on 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 community-based referrals and the role played by the boda-boda riders which could hinder them from reaching health centres in time to deliver. Training of pregnant mothers took place for about 1 – 2 hours at the health centres after the routine ANC services. Considering their vulnerability, mothers needed short term training sessions. Mothers in the third trimester were expected to visit health centres 2 – 3 times before delivery. Topics of discussion during the training of mothers were; 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 importance of delivering from health centres and the use of the locally available boda-boda riders. Lists of boda-boda riders' phone numbers were written down and given specifically to pregnant mothers during antenatal care (ANC) at the health centres. This gave the assurance that mothers got the phone numbers. 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 centres in the intervention arm.

**Inclusion criteria for participants**

(a) Pregnant mothers in their 3rd trimester.
(b) Pregnant mothers who must be willing to participate in the community trial.
(c) Mothers with a personal telephone contact (or that of their husbands / next of kin) for easy follow up.

***Exclusion criteria for participants***

(a) Pregnant women who were visibly having signs and symptoms of mental instability and those terminally ill could not be trained and were excluded from participating in the study.

**Study outcome and measurement**

The outcome was assessed by measuring deliveries conducted at health centres. Data extracted from questionnaires was 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.

**Research instruments**

**Questionnaires**

Questionnaires were administered to the consenting respondents (mothers) at the health centres. 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.

**Interview guide**

An interview guide was also used to extract data from the mothers and other key informers during Key Informant Interviews (KII), In-Depth Interviews (IDI) and Focus Group Discussions (FGDs). The interviews were guided by the trained research assistants on scheduling with the respondents.

**Pre-testing the study instruments**

A sample frame was prepared by listing the study target population size of 200 mothers in their 3rd trimester in the pre-test study area from a HCIV in the district of Namutumba. This was done to pre-test the research instruments for both the intervention and control arms. Sampling ratio (sampling fraction) was calculated from target population units (N) divided by the number of study

units (n). Sample fraction was used for selection of the required sample size (200/14=14). These 14 participants were randomly selected from the list of 50 women at Nsinze health centre IV. Corrections were made in the tool where it seemed inappropriate especially in the length of the study tools and repetition of questions.

### Data analysis

Data analysis of descriptive statistics was computed using STATA *version* 14 for the quantitative data. Paired t tests of independence were used to determine the statistical significance of the different variables with *p*-value set at 0.05 and confidence interval at 95 percent. In order for the study to be informative, difference-in-difference (DID) framework or estimator was used. The simplest form of the DID design is a special case in which there are only two groups observed in two time periods. DID was used to determine the change effect based on the average value and its statistical significance. 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. 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.

## RESULTS

### Attitude of mothers towards community based maternal referral

This subsection unfolds the yardstick in the measurement of attitudes of mothers as positive or negative if mothers agreed or disagreed respectively with community-based referral mechanism and its effect on deliveries in health centres as shown in Table 1. The attitude of mothers was positive when they agreed and strongly agreed and it was negative when the disagreed and strongly disagreed.

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. 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. Therefore, mothers' attitude was positive on the role of boda-boda riders in the community after the training. However, it is noted in the pre intervention phase that 67.5% of mothers' attitude was positive in the intervention arm and 38.3% in the control arm. Change effect was noticed because of the intervention as depicted by the average value at -1.028, and was statistically significant (p=0.000) on applying the difference-in-difference (DID) model.

On the use of boda-boda riders when mothers experienced signs and symptoms of pregnancy complications (that is, vaginal bleeding, fever, blurred vision and others), mothers in the pre intervention and post intervention phases had positive and negative attitudes. Only 11.4% of mothers in the intervention arm compared to 10.1% in the control arm had positive attitude. This was associated to mothers not being due for delivery. Most of the mothers were recruited at around 29 weeks of pregnancy (7 months). However, pregnant mothers were able to recognize signs and symptoms and other pregnancy complications after training and were able to contact the boda-boda riders for transport to the health centres. 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 compared to 69.4% of the mothers in control arm. Difference-in-difference model was used to determine the average value and the impact of intervention (change effect after training of mothers) at -2.956, which was 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 1. The average value when the difference-in-difference model was applied to determine the change effect, and was statistically significant (DID= -0.654; p=0.000). The implication was that many mothers had a positive attitude on the comfort of using boda-boda transport after the intervention, and many of them delivered from health centres.

Mothers further believed that it was necessary to recommend fellow mothers to use the locally available boda-boda transport to health centres. At the baseline,

**Table 1:** Attitudes of Mothers towards Community-Based Referrals.

| Attitude of mothers | Pre | | Post | | DID | P-value |
|---|---|---|---|---|---|---|
| Attitude of mothers | Interv. N= 255(%) | Control N=248(%) | Interv. N=255(%) | Control N=248(%) | | |
| Attitude 1(Positive) | 172 (67.4%) | 95 (38.3%) | 148 (97.2%) | 98 (38.8%) | -1.028 | 0.000 |
| Attitude 2 (Positive) | 29 (11.4%) | 25(10.1%) | 225 (88.2%) | 172 (69.4%) | -2.956 | 0.000 |
| Attitude 3 (Positive) | 179 (70.2%) | 136 (54.9%) | 133 (91.3%) | 123 (49.6%) | -0.654 | 0.000 |
| 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.

**Table 2:** Attitude of mothers and its association with maternal outcomes.

| Predictive variable | Odds ratio (CI 95%) | P-value |
|---|---|---|
| Category | | |
| 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 pre-empt 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 |

mothers interviewed were in agreement with recommending other mothers also to use the locally available transport means (boda-boda) to reach the health centres for medical attention. In the pre intervention phase, 71% of the mothers had a positive attitude towards recommending fellow mothers to use the available boda-boda transport compared to 53.3% of the mothers in the control arm. 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). The implication was that many mothers had a positive attitude to recommend fellow mothers to use boda-boda transport to reach health centres after the intervention, and many of them delivered from health centres.

**Influence of the attitude of mothers towards community-based referrals on maternal outcome**

The influence of attitude of mothers towards community-based referrals on maternal outcome was determined by using the logistic regression model Table 2. According to Table 2, there were variations in responses based on the different attitude variables. Results were illustrated in terms of associations to explain attitudes, which determined or influenced maternal outcome in the selected districts of the east – central region, Uganda.

Generally, attitude of mothers statistically significantly influenced maternal outcome (health facility based deliveries). The odds of pregnant mothers to deliver from health centres were higher among pregnant mothers with positive attitude than those with negative attitude. A mother with a positive attitude towards community based referral was 0.467 times more likely to deliver from a health centre compared to those with a negative attitude (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 changed. Why do I say so? Mothers have seriously contacted us for transport to health centres. Having realized our roles, they positively changed their attitudes towards us."*

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 towards the use of 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). At the beginning of the study, there was minimal use of boda-boda transport by mothers experiencing pregnancy complications. This was attributed to the gestation age at which mothers were recruited for the study (29 weeks of pregnancy/approximately 7 months) when pregnancy complications were low. Therefore, the mothers with positive attitude 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 I don't have any problem with my pregnancy"*... a mother said during an in-depth interview (respondent 2, 2019). On the contrary, during a KII, 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 I have been informed 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 centres. 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). Much as the comfort of boda-boda transport for pregnant mothers was not there even after the intervention, its use to take mothers to health centres to deliver was noticed.

*"…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 coordinators (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 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. Observations here also indicated that attitude of mothers towards recommending fellow mothers to use boda-boda transport to health centres had significant influence on health facility based deliveries, despite the fact that the influence was not strong.

Pregnant mothers with positive attitude to recommend fellow mothers to use boda-boda transport to reach health centres were 0.274 times more likely to deliver from health centres compared to mothers with negative attitude (p=0.006; CI= 0.108, 0.695). The implication here is that positive attitude of mothers towards recommending other mothers to use the boda-boda transport was protective to deliveries at health centres.

*"…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 our ways."*

**Table 3:** Attitude as predictors of maternal outcomes (health facility based deliveries).

| Predictive variable | Odds ratio (CI 95%) | P-value |
|---|---|---|
| Category | | |
| 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 |

**Attitudes of mothers as predictors of maternal outcome (health facility deliveries)**

The study aimed at establishing the predictors of maternal outcome (health facility-based deliveries) in 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 in Table 3. 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). Table 3 indicates further how each of the attitude variables predicts maternal outcome in 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 3). 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).

## DISCUSSION

Attitude refers to a set of emotions, beliefs, and behaviours toward a particular object, person, thing, or event. Attitude is often the result of experience or upbringing, and can have a powerful influence over behaviour (Kendra, 2020). 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 the boda-boda and the recommendation of fellow mothers to use boda-boda riders.

Attitude of mothers on the roles of boda-boda riders was positive, despite the fact that it had no influence on health facility based deliveries (*p>0.05).* Majority of mothers agreed that boda-boda riders play a role in their transportation to the health centres. Majority of the mothers used boda-boda riders for transport to health centres. This was attributed to change of mindset of the mothers to use boda-boda riders for transport to the health centres.

The study undertaken showed that more mothers were happy with the roles of boda-boda riders and if they could manage to keep time to transport them to the health-centres to give birth based on the circumstance and needs. Similarly, boda-boda riders liked their role of transporting mothers. This was due to the incentives that 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. For the few studies like one conducted by Fisseha (2017) about mothers' attitude on the capability of service providers in managing complicated childbirths; revealed to the contrary that mothers perceived that service providers at the nearby health centres were capable of managing complicated childbirth. Mothers trusted the roles of health workers. Similarly, the training of mothers contributed to increased trust of boda-boda riders on their role of transport by the mothers. Mothers' knowledge of the roles of riders was also because of the ANC sessions and other meetings conducted. In other studies, trainings mainly targeted community health workers (Namazzi *et al.,* 2017) and some of the concepts were applied to enrich the East – Central Uganda.

Maternal and child health continues to be a largely overlooked aspect of the health care system leading to major risks associated with pregnancy and childbirth. Similarly, pregnant mothers were required to know the importance of using boda-boda riders as means of transport to health centres. Unfortunately, some mothers had a negative attitude towards the roles of the riders. This was attributed to lack of information on their roles. Delayed transportation of mothers to health centres was associated to lack of information/awareness for the rural mothers (Patel *et al.,* 2016; Lawn, 2010). Therefore, this study was able to address this gap as evidenced by the increased number of mothers knowing the roles of boda-boda riders.

Mothers had negative attitude to use boda-boda riders 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. Unfortunately, it had no significant influence on delivery from health centres ($p>0.05$). Signs and symptoms experienced by pregnant mothers are part of the maternal complications which need urgent attention (Nabudere, 2011). Appropriate and prompt decision making is paramount to reduce on the delay and risk (PATH, 2013). Because of the negative attitude, mothers delayed to make decisions to go to health centres especially in the early pregnancies. Training of boda-boda riders, health education sessions to mothers during ANC 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. This concurred with the WHO (2013) recommendation that mothers are encouraged to visit health centres whenever they experience pregnancy related complications.

The attitude of mothers on the comfort of boda-boda as means of transport to the health centres was statistically significant and influenced health facility based deliveries ($p<0.05$). 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' services were to offer transport, it was not different from health workers who managed complications of child births in health centres (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 had comfort of 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. 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, 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). The three percent of these women were not comfortable with the immunization of their children, unless they attended antenatal and post-natal care for better explanation in maternal child health management sessions. 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. 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 results demonstrated the level of satisfaction and were not different among women of different socio-economic groups ($p> 0.05$). In contrast to the attitude of mothers towards the role of boda-boda riders which was positive, attitude of the health care providers towards the clients was reportedly not good. The health care services have to be good in order to attract mothers to comfortably come to health centres (Nnebue, 2014).

Mothers recommending fellow mothers to utilize boda-boda transport had no significant influence on deliveries in health centres ($p>0.05$). Mothers believed that it was necessary to recommend fellow mothers to use the locally available boda-boda riders for transport to health centres. Mothers had a positive attitude in recommending fellow mothers to use boda-boda riders for transport to health centres to deliver but equally, a big number of mothers had negative attitude. In Egypt, mothers had freedom to decide upon any maternal services (Do and 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 and Kurimoto, 2012). 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 region. Therefore, it was easier for mothers to recommend fellow mothers to use boda-boda riders for transport to health centres in the intervention arm unlike in the control arm. 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. Another study conducted focused on attitude of mothers and the use of health centres in Nigeria. Some of the reasons that were identified for the non-use of health centres 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). Moindi *et al.* (2016), also attributes the failure of mothers to deliver at health centres to non-friendly service providers and distance from the homes of mothers to health centres. This was relevant to this study that focuses on the rural women in East – Central Uganda who has different reasons for their failure to go to health centres to deliver.

## Conclusion

Training of mothers for attitude change on the roles of the different stakeholders and the prevention and basic management of emergencies has improved the community-based maternal referrals in the study area. It has made the process of referral of mothers to health centres better. In the East – Central Uganda, the referral process improved when mothers contacted boda-boda riders for transport and the maternal outcome (deliveries at health centres) also improved.

## Recommendation

This study should be expanded to more sub counties and districts regardless of the inclusion criteria at all levels. This study was carried out in only two districts out of 16 districts in the region. This is based on the study impact which was exhibited in the shortest time of community involvement especially in the area of intervention.

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## Authors' declaration

We declare that this study is an original research by our research team and we agree to publish it in the journal.

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