Healthy Child Uganda Literature Review

Community Emergency Transport

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**Introduction and Overview**

The purpose of this literature review is to explore what documented knowledge and experiences of community emergency transport plans in Uganda, extending through sub-Saharan Africa, and Nepal are currently available as to inform a draft template for VHT-facilitated community emergency transport plans as a part of the Healthy Child Uganda (HCU) model. Delays in reaching health care, transportation difficulties, and challenging geographical access to care are extremely influential factors that contribute to high maternal mortality rates in Uganda so suitable transportation is essential to reducing the delays to reaching care (Ogwang, Najjemba, Tumwesigye & Orach, 2012, p.1; Krasovec, 2004, pp.S14, S15; Njie, 1998, p.14). Therefore, it is significant to look into community emergency transport plans that can help address these issues. Also, a high percentage of maternal emergencies occur in the home rather than at a health facility and so it is necessary to specifically look into emergency transport from the home to the nearest health facility (Krasovec, 2004, p.S20).

I will be examining 14 peer-reviewed and grey literature journal articles that discuss various community emergency transport plans from home to health facility in various sub-Saharan African countries and Nepal. Articles were found using the University of Calgary online library database and the Google search engine by searching combinations of the key words “community,” “emergency,” “maternal,” “transport,” “Uganda,” “Kenya,” “Tanzania,” “Africa” and “Nepal.” This review will be organized as discussions of the articles and findings according to four prominent themes that were evident when examining the articles.

These themes are that of community processes for developing emergency transport plans, non-motorized modes of transport, such as bicycle ambulances, motorized forms of transport, such as boda bodas (motorcycles), and community financial support mechanisms, such as community emergency loan funds. I will conclude with a summary of what gaps were found as well as what applicable implications and recommendations for HCU moving into Rubirizi district were gained from the articles.

**Community Processes for Developing Emergency Transport Plans**

How communities contribute to the development of emergency transport plans were discussed in 4 of the articles. In Tanzania, the Community-Based Reproductive Health Project (CBRHP), a collaboration between CARE-Tanzania and the Tanzanian Ministry of Health and Social Welfare, initiated the development of emergency transport plans as it had been identified by communities as a significant need (Ahluwalia, Robinson, Vallely, Myeya, Ngitoria, & Kitambi, 2012, p.1). Villages developed their transport plans with the assistance of CARE field officers and community development officers care of the Tanzanian district government (Ahluwalia et al., 2012, p.1).

Once the need for a transport plan had been identified, mobilization began with the aid of village health workers or sub-village leaders and in 2007, 6 of the 29 villages that were part of the initiative reportedly had functioning emergency transport plans (Ahluawalia et al., 2012, p.1). Each village developed its own protocol and procedures, which were then overseen by a village transport committee that included village health workers, transport operators, and village chairpersons (Ahluwalia et al., 2012, p.1). Transparency and accountability were noted to be key indicators of sustainable community emergency transport plans with this case example (Ahluwalia et al., 2012, p.1).

The need for a community emergency transport plan was also identified by communities in Makarfi, Nigeria where the Prevention of Maternal Mortality (PMM) team collaborated with the local District Council, comprised of 17 village heads representing 32 villages for a transport plan project (Essien, Ifenne, Sabitu, Musa, Alti-Mu’azu, Adidu, Golji, & Mukaddas, 1997, p.S238). During meetings, difficulties with transport to health facilities and high costs of reaching care were identified as key barriers to maternal deaths and so it was initiated to develop a community emergency loan fund and community transport plan (Essien et al., 1997, p.S239). The village leaders and PMM team members held a village-to-village campaign which involved meetings with various parties including village leaders, health care providers, women’s groups, and transport owners and operators in order to educate them about the community initiatives (Essien et al., 1997, p.S240). In 1995, 3 launches for the emergency loan fund were performed and 3 launches for the transport plan and management committees were then responsible for keeping records of the programs (Essien et al., 1997, p.S240). Ikeh, A., Kuna,

Shehu, Ikeh and Kuna (1997) also describe a case in Nigeria where 14 focus groups were held with community members, health care workers, and traditional heath practitioners to gain qualitative data regarding transportation issues in the area and it was found that the main issues are transportation difficulties and the high cost of reaching care (Shehu et al., 1997, p.S175). As commercial vehicles were deemed the only reliable transportation option, it was decided that a relationship with the union of commercial private road transport workers had to be established (Shehu et al., 1997, p.S176).

And while not exactly a case example of how a community develops emergency transport plans, Obwang et al. (2012) discuss a case study in Rukungiri district, Western Uganda, which aimed to identify community involvement in maternal emergency management (p.2). It was found that the main support activities undertaken by communities were identifying transportation modes to use and the mobilization of money, such as with community health insurance plans (Obwang et al., 2012, pp.4, 5). These findings support the significance then of the other themes found in this literature review which are that of transport modes and financial support mechanisms.

**Non-Motorized Modes of Transport**

It is found that seven articles look specifically at the usage of non-motorized modes of transport such as oxcarts, tricycles, stretchers, bicycles, and the most heavily emphasized of these grouping, bicycle ambulances.

*Oxcarts and Tricycles*

Schmid, Kanenda, Ahluwalia and Kouletio (2001) found that a village in the Mwanza region of Tanzania, which is marked by poor roads and a lack of vehicles, decided after testing a model tricycle that it was easier to use an oxcart (p.1589). Overall, the tricycle was deemed the most popular choice in this district but locally built tricycle models could not handle the area’s poor roads and paths (Schmid et al., 2001, p.1590). Some of the villages grew impatient waiting for a sturdier model and so they opted to use other transport options instead (Schmid et al., 2001, p.1590). It can be argued then that tricycles could have been a viable option, but only if the models used are capable of handling tougher terrains.

*Stretchers*

An alternative non-motorized transport option involves the manual transport of people on stretchers. In parts of mountainous western Uganda, community emergency transport groups known as Ngozi groups, or ‘helicopters,’ use locally produced stretchers made out of woven fiber attached to poles and carry them at shoulder level to transport people (Njie, 1998, p.14). Ngozi groups are also mentioned by Ogwang et al. (2012) who describe the compulsory membership of each household in a community in Rukungiri district, western Uganda, to contribute funds towards the purchase of a stretcher that is to be kept in the community (p.2). The benefits and drawbacks of the use of a stretcher are not discussed.

Stretchers seem to be used prominently in rural Nepal, where the hilly terrain is similar to that of southwestern Uganda. Stretchers are used in some villages up in the hilly regions of Nepal to carry women down to the roads from their homes as it is felt that the use of stretchers would still be better than nothing (Coleman & Poudyal, 2003, p.9). For example, the International Forum for Rural Transport and Development (IFRTD) placed stretchers in 3 Nepalese districts where they were to be maintained and managed by the communities, namely the Female Community Health Volunteers and the Mothers Group (IFRTD, 2009). The stretchers would be used to carry pregnant women to the nearest road where they would then take a public bus to a health facility (IFRTD, 2009). Also, the Safe Motherhood Innovation Project (SMIP) distributed 5 stretchers in Nepal to be used under the care of Village Development Committees (Taylor, 2007, p.20).

*Bicycles*

Njie (1998) notes that in many ‘developing’ countries such as Uganda, a bicycle would be the preferred and more trusted mode of transport (p.14). However, while bicycles have been widely used in Uganda, a major issue with a bicycle is that it can be very uncomfortable for the woman, especially in hilly regions, and can be inappropriate for women who are late in their pregnancy or are already in labour as they risk falling off (Njie, 1998, p.14). I would also question how effective a bicycle would be in managing the muddy roads during the rainy seasons. Taking into consideration the trust in bicycles but the drawbacks of riding on one, the modification of a bicycle into a bicycle ambulance seems to be the most recommended non-motorized option.

*Bicycle Ambulances*

The mode of non-motorized transport most widely discussed in the articles is that of bicycle ambulances. Njie (1998) points to bicycle ambulances used in Uganda, such as those sponsored by the Ministry of Health, WHO and UNICEF, that are designed for various terrains and are essentially bicycles attached with specially designed trailers (p.14). With such bicycle ambulances, the trailer can be detached from the bicycle so that it can be manually pulled along rugged paths or difficult hilly areas and maintenance and usage costs are considered reasonably affordable (Njie, 1998, p.14). Krasovec (2004) also discusses the value of bicycle ambulances as, while some people reached care by walking, bicycle ambulances were found to be the most common form of transportation in multiple districts in Uganda (p.S17). Additionally, a project in Uganda found that the transport of pregnant women using bicycle ambulances accounted for 52 percent of all medical reasons for transport (Forster, Simfukwe & Barber, 2010, p.13).

Forster et al. (2010) also discuss the usage of bicycle ambulances but in eastern Zambia, where Transaid produced 40 bicycle ambulances to be distributed to community-based volunteers in 2008 (p.13). It was found that over a four month period, the ambulances were used 82 times and care for pregnancy comprised 17% of this number (Forster et al., 2010, p.13). Riding in such ambulances are considered to be safer and more comfortable than for patients to sit on a bicycle as the ambulance canopy provides privacy and shelter from the elements and the detachable stretcher makes it easier to take paths by foot when a bicycle cannot pass (Forster et al., 2010, p.14). Also, Forster et al. (2010) found that the bicycle ambulances were more suitable for challenging road conditions and all different weathers and were preferred over bicycles by both riders and patients (p.14). While the articles overall support the use of bicycle ambulances especially, Krasovec (2004) does note that in Malawi, the use of oxcarts and bicycle ambulances proved to be problematic during the rainy season in addition to the occasional lack of necessary spare parts (p.S17).

Use of bicycle ambulances has also been documented in Nepal. In Makrahar, Practical Action collaborated with community members to implement a bicycle ambulance project, which would be maintained by small contributions from community members each week (Practical Action). A ‘bed’ section is padded to make it more comfortable for the patient and a ‘seat’ section allows for an accompanying family member or other attendant, and a canopy made durable and waterproof with treated cotton is attached (Practical Action). It is unclear if Coleman and Poudyal (2003) are discussing the precise same project, but also in Makrahar, it was found that bicycle ambulances were used only once and then abandoned because the community felt that the length of the trailer did not suffice to be comfortable for the patient (p.8).

**Motorized Modes of Transport**

Besides non-motorized modes of transport, various motorized options are also explored. Overall, four articles discuss the use of motorized modes of transport such as motorized tricycle rickshaws, 4-wheel drive vehicles, ambulances, boda bodas ambulances, and boda bodas.

*Motorized Tricycle Rickshaws*

The UNFPA Uganda Country Office initiated the use of motorized tricycle rickshaws, essentially a three-wheeled scooter, called ‘Rescuers’ as part of the Rural Extended Services and Care for Ultimate Emergency Relief (RESCUER) project (Krasovec, 2004, p.S16; Njie, 1998, p.14). The Rescuers are kept at the local health centers and have a reclining seat for the mother, a side seat available for an escort, and a traditional birth attendant’s kit (Krasovec, 2004, p.S16; Njie, 1998, p.14). Each rescuer also has a two-way radio system for enabling efficient communication (Njie, 1998, p.14). Benefits of these tricycles would be relatively increased comfort for the mother and the ability to also transport an accompanying family member or other attendant. No weaknesses are implied and it is not evident from the articles how the tricycles are maintained as well as if, and how, service payment is involved.

*4-Wheel Drive Vehicles and Ambulances*

Some of the discussed Rescuer tricycles were later upgraded to 4-wheel drive vehicles due to community concerns about poor roads, but fuel costs may be cancelling out any benefits (Krasovec, 2004, p.S16). Transport options that require a lot of fuel, and are therefore high cost, such as 4-wheel drive vehicles and ambulances, may be a preferred mode of transport especially in terms of comfort, but at the same time, may not be affordable for many communities. Krasovec (2004) argues that overall, motorized transport, such as Malawi’s use of ambulances, is probably the most effective as well as acceptable transport option (p.S17). However, Krasovec (2004) also notes the finding in Uganda that ambulance usage is not very effective due to high fuel costs and fuel shortages (p.S16). Therefore, even if such a mode of transport may be preferred, it cannot be successfully implemented as an emergency transport plan if community members cannot afford to use it.

*Boda Bodas and Boda Boda Ambulances*

A motorized transport option that would require less fuel than larger vehicles would be boda bodas. Boda bodas are a good option as Pariyo, Mayora, Okui, Ssengooba, Peters, Serwadda, Lucas, Bloom, Rahman and Ekirapa-Kiracho (2011) found in their study that mothers tended to prefer the use of boda bodas over bicycles because they are more comfortable and could go further distances (p.9). However, in this study, the women did not have to pay for whichever transport mode they chose so it is questionable if the women would still have opted for the boda bodas over bicycles if they had to pay the higher fees (Pariyo et al., 2011, p.9).

According to Miesen (2013), boda bodas with sidecars attached to the left side, known as ‘BodAmbulances’, are most suitable for hilly terrains and relatively poor conditions. However, the BodAmbulances discussed by Miesen (2013) and used in Mbale, Manafwa and Bududa districts of Uganda free of charge to clients were purchased by Partnership Overseas Networking Trust (PONT) and maintained with funding by Rotary International-UK ad Kissito Healthcare International-Uganda. Dependent on external funding, the use of these BodAmbulances is not a very sustainable initiative. In order for a community to viably implement a plan utilizing such boda boda ‘ambulances’, it would need to be able to at the very least sustain the costs of upkeep and fueling of the boda bodas. Overall, Njie (1998) points out that in general, while motorized transport options may be used or preferred, such travel can be far too expensive for many Ugandans (p.14)

**Community Financial Support Mechanisms**

The final prominent theme found amongst the articles is that of the use of various community financial support mechanisms. Such initiatives include the use of transport vouchers, pre-negotiated arrangements with various transport providers such as bus unions, and community emergency loan funds. Four of the articles discuss these community initiatives.

*Transport Vouchers*

Pariyo et al. (2011) discuss a 2009 to 2010 study in Kamuli district, eastern Uganda, that involved distributing transport vouchers at antenatal care clinics which allowed women to access locally available transport to reach maternal health services for free (pp.3-4). After transporting the client, the transport provider would receive a voucher that they could then redeem for cash from the study coordinator with an initial flat rate of 2,000 shillings for a bicycle or 5,000 shillings for a boda boda (Pariyo et al., 2011, p.4). Overall, transport providers felt positively about the project and pregnant women benefitted from having free transport and easier accessibility to transport (Pariyo et al., 2011, pp.5, 9). However, clear challenges include the cost and capacity of running such a program (Pariyo et al., 2011, p.5). Also, I would interpret that such a program is completely dependent on external funding and is hence not a self-reliant and sustainable option. Therefore, it is imperative that if such a program were to be implemented, that the communities would have to be responsible for funding it such as with an emergency loan fund.

*Pre-Negotiated Arrangements with Drivers or Unions*

An arguably more sustainable option than the transport vouchers discussed by Pariyo et al. (2011) is that of pre-negotiated arrangements with drivers or unions. Through focus groups with members of the community and health care workers in Kebbi state of northwestern Nigeria, Shehu et al. (1997) found that, while motorcycles, bicycles and private commercial vehicles were all used as transport, commercial vehicles were considered the only reliable and sustainable option (p.S174, S176). The initiative was then taken to approach the local union of commercial private road transport workers to provide cost-efficient transport to the community and participants were issued a certificate and identification sticker for their vehicle after a post-test (Shehu et al., 1997, p.S176-S177). This transport plan was designed to be complementary to the market day schedule as most of the commercial vehicles would be transporting people and goods to the various community markets on predetermined days (Shehu et al., 1997, p.S177). It would then be easily known where to find the drivers in case of need.

Shehu et al. (1997) found that the overall response to this plan was very positive as wait times for transport were reduced significantly and fees were considered to be reasonable (p.S178). Also in Kebbi, Nigeria, Pariyo et al. (2011) mention the arrangement for a local bus driver’s union to provide transport for women in obstetrical emergencies who afterwards receive reimbursement for fuel through a community fund is mentioned by (p.2). It was reported that use of transport through this arrangement was relatively cheaper than ambulances, which is an important benefit (Pariyo et al., 2011, p.2).

Pre-negotiated arrangements are also discussed by Essien, Ifenne, Sabitu, Musa, Alti-Mu’azu, Adidu, Golji, and Mukaddas (1997) as they examine a 1995 project in the Makarfi district of northern Nigeria in (p.S238). Transport owners were mobilized to form an affordable community transport service, a management committee was created, and volunteer transport owners that registered with the service had to agree to being available around the clock and charge reasonable fares (Essien et al., 1997, p.S240). The names and locations of all the registered transport operators were provided to pregnant women and/or their husbands who registered with the committee (Essien et al., 1997, p.S240). Trends of the utilization of the services were not yet determined but over the course of three program launches, volunteers increased from 3 to 40 who agreed to participate in a 6 month rotation and 23 were to be permanent volunteers (Essien et al., 1997, p.S242).

*Community Emergency Loan Funds*

The project in Nigeria discussed by Essien et al. (1997) was actually a joint program that integrated arranged community transport with the establishment of a community emergency loan (p.S239). It was thought that such a loan fund would encourage the sustainability of the overall program. Sustainability of such a program is also heavily dependent on those in management roles and how dutifully they are adhering to their responsibilities, such as ensuring loan repayments, maintaining current records, and in respect to the community transport service arrangement, keeping in close contact with the transport owners (Essien et al., 199, p.S243).

Krasovec (2004) finds that, especially in West Africa, community-based loan funds for emergency transport are increasingly common for sharing costs (Krasovec, 2004, p.19). For example, in a project implemented by the US Centers for Disease Control and Prevention and CARE in Mwanza, Tanzania, 5 villages utilized emergency funds and 19 out of the 50 villages collected community funds for the use of both motorized and non-motorized modes of transport (Krasovec, 2004, p.S17). Prepayment and the pooling of resources in a community are considered advantageous over individual users having to pay service fees at the time of requiring transport (Krasovec, 2004, p.S19). Voluntary community health insurance schemes were also found in western Uganda (Ogwang et al., 2012, p.5).

And in Nepal, the SMIP project initiated Community Managed Birth Emergency Funds (CMBEF) in various districts that were to be used for maternal emergencies (Taylor, 2007, p.20). These CMBEFs proved to be successful as in other areas, village development committees initiated their own funds and in still others, pregnant women began their own funds (Taylor, 2007, p.20). It is noted that once a fund gets to sizeable amount, committees that are responsible for the funds would benefit from some practical financial management training (Taylor, 2007, p.20).

**Gaps in Knowledge**

Amongst the fourteen articles, three discussed emergency transport plans in Tanzania, two in Nigeria, one in Malawi, four in Nepal, four in Uganda as a whole, and only two specifically in western Uganda. Taking into consideration the particular climate, the mountainous geography and their associated challenges in southwestern Uganda, it would have been beneficial to find more articles that focused on western Uganda or any articles that looked specifically at the southwestern region. For example, the rainy seasons in combination with the isolated locations of some of the villages up in the hills that can only be reached via narrow dirt paths in the southwest create a context that may be very different from others found around sub-Saharan Africa and even in other regions of Uganda. In order to compensate for this gap, literature documenting emergency transport plans in the hilly regions of Nepal, which has a similar terrain to southwestern Uganda, were used. However, it would still be preferable to have more southwestern Ugandan case examples. This needs to be taken into account when proposing a mode of transport and so it is questionable how applicable some of the findings from this article are to Rubirizi district. There is therefore a real need for further research into viable community emergency transport plans that are specific to southwestern Uganda.

It would also have been beneficial to obtain more information on both the clear strengths and weaknesses of the various modes of transport discussed, as well as the community financial support initiatives. Some strengths and weaknesses are discussed and some can be assumed, such as for stretchers that it would be cost-effective but it also would not be the most time-efficient. But it would have been valuable for the articles to discuss more explicitly, or at all, any founded assets and limitations as to provide a better idea of which modes of transport would be most appropriate and worthwhile to pursue. It would also have been useful to find literature that draws comparisons between various modes of transport.

Additionally, there is a lack of detailed documentation on how communities develop their own emergency transport plans as most of the literature looks more at how emergency transport plans are implemented by external actors, such as various organizations. Even when the community process of developing such plans is documented, it is not explicitly discussed what the entire process involved. It would therefore have been very useful to find more literature on how communities actually develop their own transport plans as to inform how it would be best for HCU to approach the development of community emergency transport plans.

**Implications and Recommendations**

In summary, two main overarching implications and recommendations gathered from the articles are that there is the need to empower communities to take initiative in implementing an emergency transport plan and that the chosen mode of transport is appropriate to the context and the needs of the communities. With the motivation to implement any community emergency transport plan, the emphasis needs to be on empowering the community members, rather than for example health workers, to take the steps needed in order to improve all community members’ access to health services (Ogwang et al., 2012, p.9). For example, Schmid et al. (2001) found that in Mwanza, Tanzania, no communities in the region had emergency transport plans in place and the majority of people felt that it should be sole responsibility of the mothers or the families themselves to arrange emergency transport (p.1589). There is therefore a need to ensure that a community is both ready and motivated to take the initiative in implementing a community emergency transport plan before moving forward.

Looking specifically at modes of transport to be utilized, Krasovec (2004) argues that whatever mode of transport is to be used, it is essential that it significantly reduce delays in reaching care (p.S17). One aspect of this is that there needs to be technology that is both appropriate for the environment and geography, as well as available, such as with the need for sturdier models of bicycles (Schmid et al., 2001, p.1590). Other points to keep in mind may include that the proposed mode of transport takes into consideration concerns about privacy, the possibility of accommodating accompanying family members, and especially cost seeing as transport that is of minimal cost is often more inclined to be used (Krasovec, 2004, pp.S17, S18). Adding to this, Coleman and Poudyal (2003) heed that it is key that the mode of transport is the right fit for the terrain as, for example in Nepal, very few ambulances work in the hilly regions and are thus restricted to hard-surfaced roads (pp.4, 5).

Integrating both recommendations, Schmid et al. (2001) warn that there is the danger that if appropriate transport plan options are not readily available when a community feels that it is ready to take action, then the community may lose both its commitment to act as well as its enthusiasm (p.1590). Therefore, it needs to be stressed that appropriate transport plans that are suited for both the local environment and the amount of resources that a community has access to will facilitate earlier acceptance and implementation of the proposed plans (Schmid et al., 2001, p.1590). In summary, a community emergency transport plan that is to be sustainable and effective is dependent on the interest and initiative of community members as well as how well it takes into consideration the overall context that it is to be implemented in.

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