Bicycle Ambulances in rural Uganda:
Analysis of factors influencing its usage

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Introduction

This paper is concerned with the potential of bicycle ambulances to improve the accessibility to health centres in rural Uganda. The bicycle ambulance is a bicycle with an attached trailer to transport especially seriously sick patients a maximum distance of 15km to the nearest health centre.

Figure 1: Photo of a bicycle ambulance

These bicycle ambulances were distributed to villages or health centres in rural areas of Uganda by the non-governmental organisations FABIO (First African Bicycle Information Office & Workshop) and BSPW (Bicycle Sponsorship Project & Workshop) from Jinja and by the governmental institution Directorate of Health Services (DDHS) of District Kabale. This paper describes the main results of a study carried out in Uganda by the author herself. It aimed to analyse the usage of the bicycle ambulances in selected villages. Furthermore factors that promote or limit its frequency of usage were defined. The results are used to improve the projects of FABIO/BSPW and the DDHS and to provide further recommendations.

The paper is structured as follows: The first section briefly reviews the range of difficulties accessing health centres commonly faced by men, women and children living in rural areas in developing countries as a result of scarce means of transport and limited financial resources.
The second section of the paper focuses on the case study in Uganda with the analysis of the potential of bicycle ambulances to improve the accessibility to health centres for the rural population. Thereby factors related to the bicycle ambulance are examined and presented. Two research areas with different circumstances – the area around Jinja in the central region and the area of District Kabale – are compared with each other.

State of the art:
Access to health centres in Uganda

The authors Thaddeus et al. (1994) constructed a model to categorise barriers for the rural population in developing countries to seek health care. According to this model, barriers or delays to seek

health care can appear on three different levels. Firstly, there is the process to decide that medical treatment is needed. Secondly, there is the means to reach health facilities. Finally, there is the issue of attaining sufficient medical care in the health centre itself. Socio-economic factors, culture, knowledge about facilities, availability and affordability of transport, road infrastructure conditions, opportunity costs and availability of drugs and medical staff are all examples that determine access to health services for patients. Different case studies in developing countries provide different results and factors which mainly influence the rural population in seeking medical treatment. For example, Ensor et al. (2004) focus on the side of the health seekers rather than on the providers. In their study they conclude that an improvement in the quality of health care would not necessarily increase the number of health seekers, because of their burdens to have access to them. Other case studies in developing countries tone down the distance to the health centre (Noorali et al., 1998; Akin et al., 1999) or emphasise the cultural constraints, such as the vulnerability of women or disadvantaged groups (Katahoire et al., 2004; Amooti-Kaguna et al., 2000). Therefore, they arrive at different results referring to the factors influencing the behaviour of patients when seeking health care. However, in almost every study about health-seeking behaviour and its barriers, the aspect of distance to the health facility is a described factor.

The term 'distance' is related to the factors of 'road infrastructure conditions', 'availability' and 'affordability of transport'. In the rural areas of Uganda, where nearly 90 % of the population live, most trips are made by foot. Private motorised transport is mostly not available, and public transport, such as minibuses are rare and for many people not affordable (Barwell et al., 1985; Barwell, 1996; Howe, 2001). In Uganda, animal carts are not common in most regions, yet it is a country with a culture of bicycles. Therefore, the means of transport that is both available and affordable in most villages is the bicycle. With regard to an emergency transport service however, the bicycle cannot be used in all situations. In the hilly areas of southwest Uganda the patients are traditionally carried on stretchers to the health centre. In the central region of Uganda they put a chair on the carrier of the bicycle to enable the patient to sit a little more comfortably and stable.

Figure 2: Stretcher in Kabale District carried by at least four persons

Figure 3: Bicycle with a chair on the carrier to transport patients

Both methods have disadvantages; transportation is slow and exhausting for the people who help to push or carry. Additionally, the poor road infrastructure deteriorates the transport situation. Rural roads are dirt roads, mostly in a fair condition yet riddled with potholes. In the rainy seasons they are often impassable.

Consequently, people in rural areas in Uganda lack access to social institutions and in particular to health centres. Referring to the health sector, the services are mainly centralised in the capital city Kampala, while other smaller cities and especially the remote areas are undersupplied with adequate health facilities and staff. This contributes to a low life expectancy, high mortality rates and a high percentage of self-treatment or visits to traditional healers. According to a study from the Ugandan Bureau of Statistic in 2006, the main reason given for not seeking medical attention from a health provider was that the illness was mild, followed by statements such as the health facility is too costly or is too far. Approximately 20% of the population of Uganda have to travel more than 5km to receive primary health care (UBOS, 2006). Yet even the aspired distance by the government of a maximum 5km for every household is a significant distance for someone ill to travel without appropriate transport.

According to the study in rural Uganda, the most challenging factors affecting the people are availability of transport to the health centres and the necessary money to meet the costs of transport and treatment. It can be assumed that some people, who lack the means to go to the health centres, treat themselves or do not seek any treatment at all. Thus, the introduction of the bicycle ambulance provides an acceptable, alternative form of transport which overcomes the barriers of availability and affordability of transport, and improves the accessibility to health centres.

Analysis of bicycle ambulances in rural Uganda

Background of the study

The first bicycle ambulance was designed and distributed by the non-governmental organisation BSPW in Jinja, Uganda in 1997. Since then, over 400 units have been distributed to different districts. BSPW promotes non-motorised transport, especially the bicycle. Bicycle ambulances are mainly sponsored by international donors. They are distributed to community groups or social institutions in the rural areas to overcome their problems of transport in emergencies. The criteria for the community groups to receive a bicycle ambulance are their relatively high distance to the nearest health centre and the existing poor road and transport infrastructure. Since 1999, the Directorate of Health Services (DDHS) for the Kabale District has taken up the idea of bicycle ambulances and also distributes them.

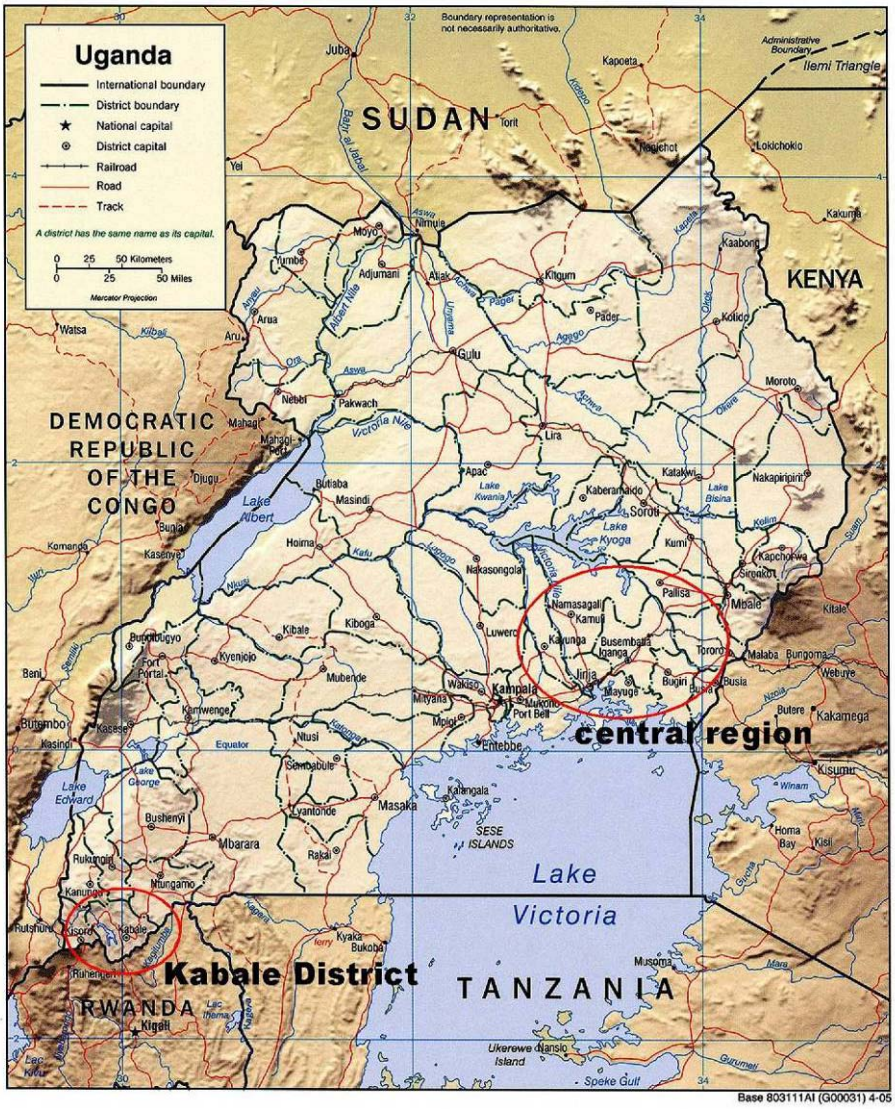

Figure 4: Map of Uganda with the two research areas, www.lib.utexas.edu

Aims and methods

The objective of the study was to explain and understand the usage of bicycle ambulances and their problems. The key questions were as follows:

- Which factors and conditions influence the usage of the bicycle ambulance and;
- Can the bicycle ambulance be described as an appropriate technology in Uganda?

Data collection took place between March and June 2007 and involved qualitative interviews with the distributors and the recipient groups of the bicycle ambulances. A total number of 37 villages were selected, whereby in each village, different community members were interviewed independently. Another method was the distribution of record books to write down details about the usage of the bicycle ambulance in order to provide information and to control the answers in the interviews. In order to

compare the villages, the frequency of the usage of the bicycle ambulance was used as the indicator to get an overview of the group's performance.

Research areas

Two research areas with quite homogenous circumstances and a high quantity of bicycle ambulances were identified:

Research area one included the districts of Jinja, Bugiri and Kamuli in the central region of Uganda. The terrain is flat with scattered settlement structures. The selected villages were a mixture of those with peri-urban or very remote characters and those with good or poor road infrastructure access. Research area two represents District Kabale in the southwest of Uganda. There, the terrain is very hilly with a more concentrated settlement structure than in the flatlands, although road and transport conditions are also often poor. The main differences between the two areas were the community groups and the distributors. In area one, the bicycle ambulances were distributed mainly to women's groups by the non-governmental organisation BSPW. In contrast, the bicycle ambulances in area two were distributed to so-called stretcher/engozi groups, established in almost every village to organise the transport of patients to hospital with a stretcher. The local government of Kabale were the distributor of the bicycle ambulances through the DDHS in this area.

Performance of the groups

Before analysing the factors influencing the usage of the bicycle ambulance, the performance of the groups had to be determined. This was achieved by means of a 'frequency of usage' indicator. The frequency of usage depended on the frequency of sick persons. However, it was assumed that on average, there were more cases of sick persons in a village in comparison to those making use of the bicycle ambulance. As demonstrated in Table 1, only one group (Buwaiswa, Kitayunjwa Sub-county, District Kamuli) out of 37 observed villages made use of the bicycle ambulance on average more than two times per month. Approximately two-thirds of the groups used the bicycle ambulance less than one time or on one occasion per month. Eight did not use it at all.

Table 1: Performance of groups in the observed villages

Performance	*No. of villages (total 37)*	*Village names (central region: total 14, Kabale: total 23)*
1 – More than 2 times per month	1	*Central region:* Buwaiswa
2 – 2 times per month	3	*Central region:* Bwase, Kitengesa *Kabale:* Kyasano
3 – 1 time/month	11	*Central region:* Buwala, Nawaguma, Mafubira *Kabale:* Mpalo 2, Nyakashebeya, Mpungo, Kabere, Nyaruhanga vill, Kagunga, Mugyera, Kicumbi
4 – less than 1 time per month	11	*Central region:* Kalogoyi, Kasuku A, Kigingi, Nsekaseka, Iringa HC *Kabale:* Mpalo 1, Katokye 1, Katokye 2, Nyaruhanga TC, Buranga, Kasheregyenyi
5 – Not used	8	*Central region:* Kasangoile, Nakasita, Namuganza *Kabale:* Kibanda vill, Kibanda TC, Bwindi, Nyamabare, Mwendo
Doubtful answers	3	*Kabale:* Rutegye, Muhanga, Kisaasa

Results: Presenting the factors influencing the usage of the bicycle ambulance

Subsequently, the factors influencing the usage of the bicycle ambulance, as determined through interviews, were categorised into different categories: external factors, describing the situation in the villages, and internal factors, describing the features of the bicycle ambulance, the distributors and the organisation of the groups. The following demonstrates the outcomes:

External factors

The different circumstances in the villages, such as distance to infrastructure, availability and costs of means of transport, did not provide a clear picture of how, and to what extent these factors influence the usage of the bicycle ambulances. Neither the distance to the health centre, nor the distance to the main road and quality of the road itself, significantly influenced the usage of the bicycle ambulance. The only factor that significantly limited the usage of the bicycle ambulance was the availability of motorised transport in the villages. However, motorised transport is scarce and, most likely, not affordable to the rural population in the near future.

Features of the bicycle ambulance

The frequency of the usage of the bicycle ambulances was limited to a few cases in a month or year, and the features and the construction of it were predominantly described as positive by the interviewees. Although some people have negative attitudes towards it, such as 'the patient looks like a dead body lying down in the bicycle ambulance' or that 'the costs of maintenance are too high because repairs are needed too often and spare parts are too expensive', the majority of people in the villages appreciated the bicycle with the trailer in emergencies. The bicycle ambulance construction is easy to maintain, with common spare parts. Additionally, almost every man can ride the bicycle due to the bicycle culture. Furthermore, it is available at any time with little cost, and in comparison to the stretcher, it is more comfortable and less people are needed to transport it. Out of the eight villages that did not use the

ambulance, only three of them reported that it had broken down and could not be repaired. Therefore, non-usage of the bicycle ambulance in the other five villages depended on factors other than repairs.

Perspective of distributors

The system of bicycle ambulance distribution differed in the two research areas. In research area one, as access to the villages is difficult and distances are far, BSPW worked with partner-organisations in the areas of work, these organisations having local knowledge of the area and direct contact to the villages. Before the distribution of the bicycle ambulance took place, BSPW carried out 'capacity building' workshops in the villages to facilitate knowledge of management and maintenance of the bicycle ambulance to the community and group members. BSPW saw it as their responsibility to monitor and control the performance of their distributed bicycle ambulances, but funds were limited. Access to the areas is difficult and visits were rare due to financial and time constraints. The direct monitoring process was therefore carried out by the partner-organisations who forwarded the information to BSPW. In Kabale, research area two, the DDHS played a more passive role. They neither carried out specific monitoring of the groups, nor provided specific 'capacity building' workshops. However, their passive role did not influence the usage negatively. Whether 'capacity building' and/or continuous and frequent monitoring influenced the usage can only be assumed, but could not be observed in the villages.

Organisation of the groups

Bicycle ambulances in both areas were always distributed to community groups or social institutions that were responsible for the management and maintenance.

In almost every community in area two, there exists a stretcher/engozi group that is responsible in the community for the transport of patients to health centres on a stretcher and to give additional support in funeral functions. They groups are long-established and at least one person from each household is a member of the group. The bicycle ambulance provided an additional activity. Maintenance of the group is financed through membership fees. Every household is therefore aware of the activities of the group and the bicycle ambulance and makes a contribution towards its maintenance. As a consequence, each member has a strong feeling of ownership and responsibility to the bicycle ambulance.

In area one, most of the groups that received bicycle ambulances were recently established women's groups working across several villages. Since the members are spread over different villages, the organisation and activities of the group depend a lot on the motivation and efforts of the leader. In other villages, specific bicycle ambulance committees were founded to manage the ambulance. However, neither the women's groups nor the committees were as integrated into community life as the stretcher/engozi groups in Kabale, due to the fact that only a few members live in the same village and/or the fact that the groups were only recently established. Consequently, only a few community members were involved with the management and maintenance of the bicycle ambulance and had knowledge about it.

Another important point to consider is the necessity of the bicycle ambulance. Vulnerable people have a proportionally higher need for an affordable means of transport, such as the bicycle ambulance, than other community members. Additionally, they may not have the self-esteem to ask for the facility. Therefore, targeting and informing these vulnerable people is essential in the community and an important task for the group. Consequently, this has a positive influence on the usage of the bicycle ambulance. For example, the children's home in Buwaiswa, District Kamuli, has direct contact to vulnerable people in the neighbouring villages and, at the same time, the most frequent usage of the bicycle ambulance of all observed villages.

Nevertheless, each location and region has its particular difficulties when transporting the bicycle ambulances. In Kabale, steep climbs make usage difficult, and in the central region, area one, the scattered settlement structures make access difficult. Therefore, the attitudes of people either supporting or hindering its usage are essential for the decision to use it.

Conclusion

This paper presents results from the study in Uganda about the usage of bicycle ambulances. The study was based on a qualitative research analysis involving guided interviews with distributors and beneficiaries of the bicycle ambulance. External and internal factors influencing the usage of the bicycle ambulances were defined.

As listed in Table 1, the bicycle ambulance was only used more than two times in a month in one out of 37 selected villages. In eight villages the facility was not used at all. The reasons for using the bicycle ambulance or not are based on different factors. On the one hand, the technology itself may be in/appropriate to the local conditions and on the other hand, the attitudes of the people may either promote the technology or refuse it.

With regard to the bicycle ambulance's technology, it is appropriate to the circumstances in the rural areas of Uganda when compared to the available and affordable alternatives such as motorised transport, stretchers and bicycles.

As a consequence, usage or non-usage of the bicycle ambulance depends on factors other than the technology:

- Firstly, the situation of the villages and location has little or no influence on the usage.

- Secondly, the influence of the distributor – BSPW or DDHS – can be assumed, but could not be observed.

- Thirdly, the organisation of a group determines the usage of a bicycle ambulance significantly. Awareness of the group and their activities from within the community, as well as the group's integration into the village community itself positively influence the usage of the bicycle ambulance.

The principal problems encountered in usage of the bicycle ambulance in the observed villages were the awareness of the bicycle ambulance and the support of the community members to make use of it. Possible solutions to these problems would be changes in the organisational

structure of the groups and the distributors.

In the author's opinion, the situation of the majority of rural people in developing countries will not improve significantly in the near future in terms of income and transport opportunities. Therefore, intermediate means of transport like the bicycle are important facilities in order to access social and economic institutions. The bicycle ambulance is an example of an appropriate mode of transport in emergencies in order to improve access to health centres.

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