Article:
Locke, HN, Randriamarotsiresy, V, Chamberlain, MA et al. (1 more author) (2020) Delays to accessing healthcare and rehabilitation following trauma in Madagascar – a qualitative study. Disability and Rehabilitation. pp. 1-8. ISSN 0963-8288

https://doi.org/10.1080/09638288.2020.1741696

Delays to accessing healthcare and rehabilitation following trauma in Madagascar – a qualitative study

Purpose

To explore the factors affecting access to timely trauma care and rehabilitation in Madagascar.

Materials and Methods

A qualitative study based in the outpatient departments of two large rehabilitation centres. Semi-structured interviews and focus groups were conducted with 12 patients or family members and 11 healthcare professionals. Interviews and focus groups were conducted with a local interpreter and were audio-recorded and transcribed. The data were analysed deductively with thematic content analysis, utilising the Health Care Access Barriers model.

Results

Participants experienced delays in deciding to seek treatment, accessing healthcare facilities and in receiving appropriate treatment. Cognitive barriers included understanding and awareness of healthcare, structural barriers included distance and transportation to health facilities, financial barriers included affordability of healthcare and difficulty accessing funds.

Conclusions

Delays to accessing healthcare may result in increased mortality and disability following trauma, as well as increased financial burden. Addressing the acceptability of services should be a focus for future service development, through training and education schemes. More importantly, improving both physical and financial accessibility of services must be a long-term priority. These findings may help to guide the ongoing development of trauma and rehabilitation pathways in Madagascar.

Keywords: health services accessibility; wounds and injuries; rehabilitation; global health; disability

Introduction

Trauma is recognised as one of the major causes of disability worldwide, with injuries accounting for 10% of the global burden of disease in 2013 [1]. The burden is greatest in low- and middle-income countries, where there are high numbers of injuries resulting from motor vehicle collisions, falls and interpersonal violence. Many survivors of trauma in these countries are unable to access organised trauma care and rehabilitation [1,2]. As mortality from trauma decreases, more survivors are left with permanent disability [3]. The World Health Organisation (WHO) highlights the importance of treating potentially disabling injuries, "so as to minimize functional impairment and to maximize the return to independence and to participation in community life" [2].

Madagascar is a large island off the east coast of Africa. It has a gross national income per capita of $400 and many of its population of 26 million live in poverty [4]. As in many low- and middle-income countries (LMICs), access to healthcare is limited for much of the population [5]. Traumatic injuries are common in Madagascar and were the fourth leading cause of death in Antananarivo, the capital city, between 2008-2012 [6]. A recent study by Halpin et al found that 16% of new patients seen in an outpatient rehabilitation department had traumatic injuries, whilst 12% of inpatient rehabilitation referrals related to trauma [7]. In the same study, they describe the current trauma service and highlight the need for an organised and accessible trauma rehabilitation pathway [7]. The service for post-acute spinal cord injury rehabilitation was only established in 2013 in Antananarivo [8].

During a scoping visit to Madagascar in September 2017, rehabilitation professionals highlighted that many patients do not seek treatment until weeks or

months after their injury. This delay in accessing treatment means that complications such as pain, infection, malunion of fractures and loss of function often arise. This in turn results in higher treatment costs, contributing to the cycle of poverty and ill health particularly for families with already substantial out-of-pocket expenses for healthcare. Such complications can have a major impact on individuals and families, with devastating social and financial consequences.

Disparities in health care access are well documented and various models have been developed to identify the underlying multifactorial causes for this. One such model is the Health Care Access Barriers model (HCAB model) devised by Carrillo et al [9]. This model provides a means of classifying modifiable factors that contribute to health care disparities and hence supports the design of interventions to tackle these factors [9]. It groups factors into three primary categories, namely “cognitive barriers”, “structural barriers” and “financial barriers”. Figure 1 illustrates the three categories with their definition and representative examples.

INSERT FIGURE 1 HERE

The study aims were to explore the barriers to accessing timely trauma care and rehabilitation from the perspective of patients, their family members, and healthcare professionals. We utilise the HCAB model to categorise these barriers, to help identify and target future interventions, and aid planning and development of trauma rehabilitation services in Madagascar.

Methods

Study design

This study used qualitative methodology to allow for in-depth exploration of personal experiences, emotions and attitudes in order to understand the multifactorial reasons for delays in accessing healthcare [10]. Semi-structured interviews were based around an interview guide but allowed participants to expand on topics or raise new issues based on what was most relevant and important to them [11].

Ethical approval was gained from the School of Medicine Research Ethics Committee of the University of Leeds (MREC17-071) and permission was granted from the University of Antananarivo to conduct the study. Participants were aware that their choice to participate or not would have no impact on their treatment or their relative's treatment.

Setting

Data collection was carried out over two sites: the rehabilitation outpatient departments of Joseph Ravoahangy Andrianavalona Hospital (HJRA) in Antananarivo, and the Centre of Motor Rehabilitation of Madagascar (CRMM) in Antsirabe. These sites were chosen as they represent established rehabilitation centres that see high numbers of patients from across Madagascar.

Participants

Opportunistic sampling was used to identify and recruit participants who were attending the rehabilitation outpatient departments. This was felt to be appropriate in this qualitative setting as the aim was not to gain generalisable data, but rather to gain in-

depth information about the individual experience in a particular context [12]. Inclusion criteria were: adults over the age of 16 years who had survived a major traumatic injury or who have a close family member who survived a major traumatic injury. Traumatic injuries included, but were not limited to, major limb injuries, traumatic brain injuries and traumatic spinal cord injuries. Participants were included if their injuries occurred within the last five years. Family members were interviewed in cases where the injured person was under the age of 16 years, or was unable or declined to be interviewed. Participants were identified in collaboration with the clinical leads of the rehabilitation departments. Additionally, purposive sampling was used to identify and recruit a range of healthcare professionals across the multidisciplinary rehabilitation teams. Healthcare professionals were included in the study design to triangulate the data and provide additional contextual information about the health service and care provision.

All participants were provided with a written information sheet (in English, French or Malagasy) and gave written informed consent prior to their participation in the study. An interpreter was present during the consent process and verbal explanations were offered where there was a lack of clarity. The interpreter was from Antananarivo and was a trilingual English language teacher at University level, with experience of interpreting for qualitative research.

Data collection

Data collection was carried out by the first author with the interpreter, who translated between Malagasy/French and English. The interpreter was provided with the interview guide and a debrief carried out prior to the start of research and at regular periods throughout, to ensure there were no issues with translation. For example, an initial question “how did you feel after your injury?” was changed to a more direct “did you

feel sad or depressed following your injury?", which was more easily understood.

A total of 13 semi-structured interviews with patients or family members were conducted, although one interview was later excluded as it emerged during the interview that the injury was more than five years ago. Data saturation was reached at this point with repetition of the major themes. Questions were open-ended and designed to elicit: history and timeline of the traumatic injury; complications or ongoing issues; distance from health facilities; attitudes towards health services/health seeking behaviour; attitudes towards and understanding of illness; cost and funding of treatment.

Two focus groups were carried out with healthcare professionals. Each was purposefully within one discipline, as it was felt that the participants would be more comfortable talking amongst their direct peers. In addition, three professionals who were unavailable for the focus groups took part in individual semi-structured interviews. The focus groups had the benefit of allowing for discussion and debate between professionals, thus sparking different ideas and concepts. Questions were different from those asked of patients or family members and focused on the broad topics of: current trauma and rehabilitation services in the area; the patient pathway; perceived barriers or enablers to service access; and experiences of delivering acute or rehabilitation after trauma.

Data analysis

Interviews and focus groups were audio-recorded and transcribed in English. Data from patients and healthcare professionals were analysed separately and the results considered together as data triangulation. Data were analysed deductively using a thematic analysis approach, based around the HCAB model. Although the HCAB model

is designed to illustrate the barriers to accessing healthcare, this has been modified in our analysis to also include those barriers to receiving timely treatment once at a health facility, as this was felt to be a major area of importance in understanding outcomes following traumatic injuries. All transcripts were read through to gain a broad understanding of the themes. Meaningful data units were classified into codes. These codes were then mapped onto the themes of the HCAB model and grouped into subthemes. These were then validated by returning to the interview transcripts. Representative quotations were then chosen for each theme and subtheme. The computer software programme NVivo 12 Plus was used for data organisation and coding.

Results

Of the nine patients interviewed, seven were female and two were male. Of the three family members, there were two mothers of the injured person and one nephew. Although participants were selected opportunistically, table 1 demonstrates that a wide range of ages and both urban and rural backgrounds are represented within the sample. Interviews were carried out with two physiotherapists and a trauma surgeon who were unavailable to take part in the focus groups. The first focus group consisted of four physiotherapists, whilst the second consisted of five rehabilitation physicians.

INSERT TABLE 1 HERE

Below we describe how the participants' accounts reflect the barriers laid out in the HCAB model, summarised in table 2 with subthemes. The findings from patients

and family members are presented first, and findings from healthcare professionals presented afterwards.

INSERT TABLE 2 HERE

Patients and family members

Fifty percent of patients or family members (6/12) reported a delay in seeing a qualified doctor of more than one day, with one patient waiting more than 31 days. Furthermore, there was frequently a delay in the patients receiving appropriate definitive treatment (such as surgery, casting of a fracture, or physiotherapy) after initial assessment by a health professional. Complications reported by the patients in this study included loss of function, pain, scarring, swelling and deformity. Participants also reported an impact on daily activities including employment and an increased reliance on others.

(i) Cognitive barriers

Carrillo et al describe cognitive barriers as those factors related to knowledge, understanding and communication around health and healthcare. Patients and their family members were strongly influenced by their culture and people around them.

Understanding of healthcare and illness

A commonly held feeling amongst participants was that hospitals are only for those who are critically unwell or with serious illnesses. Injuries were not seen as significant enough to warrant hospital treatment, or the severity was not appreciated until complications arose or other treatments were unsuccessful.

> When I think of hospitals and doctors it means I'm seriously ill! [Participant 6, patient]

> When I think about hospital I think about disease. So when you come here you must be ill. [P7, family member]

Participants commonly cited fear as a deterrent to seeking hospital treatment. In some cases, this was fear about procedures and interventions, such as injections or surgery. Other participants described fear about the unknown, having had no experience of attending a hospital.

> Some or most Malagasy are frightened of hospitals, that's a very common feeling here. Afraid of needles, afraid of injections. That's very common. [P4, patient]

> We are afraid, we don't know what is happening, we already have pain so we don't want to come. [P10, patient]

Several participants were anxious about talking with doctors, for fear of what might result. Others were anxious about not understanding what was said by the doctors.

> Another barrier is the fear of talking to doctors, talking about what happens to you, trying to hide your disease to the doctors. [P9, patient]

> They are afraid of talking with doctors because sometimes doctors are not understandable. [P8, family member]

Health literacy was variable among participants, with some having a good understanding of illness and others less familiar with disease or treatments.

> I strongly believe that if we didn't bring her here then [the fractured bone] would have turned into cancer, because there was infection inside already. [P7, family member]

Awareness of healthcare

For some patients, there was a delay in seeking treatment because they were unaware of the healthcare facilities or treatments available.

> So we went three times to the traditional healer…but we didn't see any change at all. So it was only then that someone told us to come here, we didn't know about this hospital before. [P7, family member]

Culture and religion

Traditions and religion play a big part in Malagasy culture. Many communities across Madagascar continue to follow cultural traditions, for example following *Fadys* (loosely translating to taboos). Participants identified that cultural beliefs are particularly influential with regards to healthcare and illness.

> Some people would say that such kind of disease is from witchcraft, so we should treat it with witchcraft. [P9, patient]

Of the 12 participants, three chose to visit a Mpanotra (a traditional massage healer) for immediate treatment following their injury.

> Her father also said that we should better go and see a traditional healer, and someone told us that the Mpanotra was a very good one and he could fix everything. [P7, family member]

All later went to a hospital when complications arose. Another was treated at the hospital but chose to see a Mpanotra when she was unhappy with the hospital treatment. As well as tradition, reasons given included the reduced cost and different payment options, as well as ease of access and proximity. However, opinions about the use of traditional healers were mixed. Some participants reflected that they would not want to go to a Mpanotra as they lack access to investigations such as x-rays. It was recognised

that there are different levels of Mpanotra, from those that are very skilled to those with less ability.

> There are skilled Mpanotra, gifted ones who really know what they are doing, but my case was serious so I didn't dare to go there, but if it was something else then I would have. [P5, patient]

Family and friends played a significant role in healthcare decisions. The Malagasy culture is thought of as very caring, with people expected to support each other in times of need. A number of participants reported being influenced or aided by others in their decision making.

> People were very careful and they were so kind to me. There is a Malagasy quotation saying 'your people are like kings or queens', because we care about the person, we take care of him. [P11, patient]

> My first thought was to go to a traditional healer but people said that I had to go to the hospital. [P4, patient]

(ii) Structural barriers

In the HCAB model, structural barriers are those factors either within or external to the health facility that limit access. More than half of the patients lived in rural areas and therefore geographical access and transportation were factors that arose frequently in the interviews. However, even within urban areas, participants were limited by the availability of transport and lack of specialist clinicians or services at their local hospital.

Geographical Access

Geographical access to facilities was cited as a principal factor for many in their choice

of when and where to go for healthcare. Seven of the 12 participants lived in rural areas and had significant distances to travel. For some of the more remote parts of Madagascar, the roads and transport infrastructure are lacking so patients have limited options for travel. One participant travelled 60km to a hospital, walking for the first 40km, after being assaulted at home.

> They had to walk for 40 kilometres. Then after 40 kilometres, the 4x4 took him the 20 kilometres left…maybe the hospital wouldn't be able to move closer, so maybe the road to our village would be finished. [P8, family member]

> [it took us] three hours or more because it was three hours distance from here. [P2, patient]

Time

Some participants felt that appointments took too long, with lengthy waits to register, to be seen by a doctor or other professional and fill in any documentation. This created problems particularly when patients were required to return for several appointments, such as physiotherapy sessions.

> Also the long procedures, the time problem, the queue, all of that. [P5, patient]

In additional, once at a health facility some patients were not able to receive the specialist treatment they required straight away. Individuals from rural areas were more likely to have to wait or travel to a different hospital to receive treatment such as surgery. Two participants initially went to a "dispensaire" (a district referral hospital), which lacked the facilities for the necessary treatments. They were therefore required to wait before being transferred to a regional hospital. This was less common for those from urban backgrounds, who tended to go directly to a regional hospital. Both

hospitals in this study, HJRA in Antananarivo and CRMM in Antsirabe, have orthopaedic and surgical facilities and clinicians, and can provide a wide range of treatments for trauma patients.

> They couldn't do anything because they said that they are not specialist of bones. So we had to wait to stay at the hospital for 19 days and then came a specialist and said that they must do surgery. [P9, patient]

(iii) Financial barriers

Affordability of hospital care

Many participants described the difficulty they faced in paying for healthcare. This was the most commonly stated barrier to accessing timely healthcare. The cost of treatment, transport and accommodation is prohibitively high for many, with few patients having health insurance and a large proportion living below the poverty line.

> As I see it, not just 75% of Malagasy people are in trouble financially, but 100% even. [P9, patient]

As well as the direct costs of treatment, there were also significant indirect costs including loss of earnings and potentially long-term care costs. For some, concerns such as work or childcare were felt to be more of a priority than healthcare.

> Apart from my pain it is a problem in my family because I am the breadwinner and now that I cannot work I cannot earn money and all my children are still in school, so it's a very big problem. [P9, patient]

Difficulty accessing funds

Not all patients paid for their own healthcare. Those who paid with their own money

reported having to borrow from friends or sell animals to raise the funds. Three of the patients had their treatment paid for by their employer, whilst one was paid for by a charitable organisation. Additionally, some found that the process to access funding involved a lot of bureauracy, was complicated and lengthy.

> Normally my work would pay for me but I didn't want to go back and forth so I pay everything at the moment. [P5, patient]

> It was my own money because I had already gathered some money in case something happened to me…They even brought it to the court because they are very cautious, the banks are very cautious because now people are just taking money. So I had to wait from 24th of May to 13th of June. [P3, patient]

Healthcare professionals

The healthcare professionals were asked about their experiences of trauma care and what they understood to be barriers to accessing services and treatments. Many of the barriers they mentioned aligned with those reported by patients and family members. However, they also brought a different perspective of 'within hospital' barriers and provided insight into what they considered barriers to delivering their job effectively.

(i) Cognitive barriers

Understanding of healthcare and illness

The healthcare professionals agreed that many Malagasy people are fearful of hospital and would only seek treatment at hospital if other treatments had failed. They felt that going to a hospital was a last resort for a lot of their patients, who would only present after complications arose.

> For Malagasy people in general they are not likely to go to hospitals, because when you don't really find a solution, that is when you go. [Physiotherapist 1, CRMM]

> Sometimes, when we talk about bones, it is not something that will kill them immediately, so they won't care, they will wait. [Surgeon, CRMM]

Awareness of healthcare

Some healthcare professionals felt that differences in the socioeconomic background of the individual may influence their beliefs and health seeking behaviour. There was a perception that those from lower socioeconomic groups may be less likely to attend a hospital. Participants cited lower educational levels as a key factor and felt that there was a lack of awareness around healthcare.

> It depends on the social group and the educational group. Some people with education would go to see a doctor at the hospital. [Rehabilitation doctor 4, HJRA]

> Educated people would come to a doctor immediately but the rest of the people would go and see a Mpanotra first. [Surgeon, CRMM]

A need for education or *"sensitisation"* (i.e. making people more aware or sensitive to an issue) was cited by many as an issue of crucial importance.

> I think sensitisation is very important. Telling people that once you've got injured you should come directly to the hospital. [Physiotherapist 1, HJRA]

Culture and religion

Healthcare professionals also remarked on the influence of culture and traditions on decisions about where to seek treatment. They felt that many people choose traditional approaches to healthcare that have been passed down between generations, as these are more familiar.

> Malagasy people in general, most of them still keep the traditions from the ancestors. [Physiotherapist 1, CRMM]

> Malagasy people are used to using green leaves to treat, medicinal plants, massage. [Rehabilitation doctor 3, HJRA]

Similarly, religious beliefs were identified as being influential factors in decision making.

> There are some religious people who do not reach hospitals, they would just pray instead. [Physiotherapist 2, HJRA]

Communication

One physiotherapist commented that patients may be "afraid of being scolded" by healthcare professionals, stemming from previous experience or that of friends or relatives. This was echoed by other clinicians who felt that communication from healthcare professionals could be improved.

> …the way the professional healthcare would welcome and receive the patient, because at the traditional healer the patients are well welcomed, they are considered and maybe we should also improve that. [Surgeon, CRMM]

A further potential source of mistrust was raised by two of the healthcare professionals, who commented that in some cases staff in healthcare institutions may expect extra payment in return for better care.

> I don't know if you have to know someone there to be well received or you have to pay money, I don't know. [Physiotherapist 1, CRMM]

> Some people will just look at the patients without actually doing anything unless you pay something. [Physiotherapist 3, CRMM]

(ii) Structural barriers

Infrastructure

One clinician noted that administrative procedures within the hospital may cause confusion and fear among patients.

> Especially people coming from the rural area, the remote area, they are afraid of the administrations within the hospital. [Surgeon, CRMM]

A lack of facilities and materials was mentioned by the physiotherapists, who felt that it made it more difficult to deliver their interventions. They also agreed that some patients are moved between facilities to get the treatment that they need, and that this can result in delays.

> We have some problems here at the service because we lack room, so the patients have to queue and we also lack materials, which is a problem. [Physiotherapist 2, HJRA]

> There are some hospitals the way they receive the patients is very bad because they do not really take care of the patients directly, the patients would have to do a back and forth. [Physiotherapist 1, CRMM]

Training

Some clinicians felt that they would benefit from more training on diagnosis and management of musculoskeletal complications after trauma, which would improve their confidence and that of their patients.

> If professional healthcares become more skilled, people will be more confident to see them. [Surgeon, CRMM]

(iii) Financial barriers

Affordability of hospital care

Again, the most commonly cited barrier to accessing healthcare were the direct and indirect costs of treatment.

> If a person from the countryside come here…and he works, so the field will be neglected. [Physiotherapist 1, HJRA]

> One of the biggest barriers is affordability. People can't afford to get to the hospital. Maybe you need surgery, which you will spend a big amount of money. So money I think is the biggest problem. [Physiotherapist 3, CRMM]

Healthcare professionals also identified that transportation to hospital can be a financial burden. Although there is an ambulance service based at the larger hospitals, few knew about this and clinicians reported that the cost was prohibitive for most patients.

> Ambulances are very expensive. People prefer to get a taxi here. [Physiotherapist 1, HJRA]

Unclear payment pathways

Additionally, there appeared to be a lack of clarity over the payment system, with clinicians and patients unsure of the entitlements for funding. Healthcare professionals mentioned that some patients' treatments are paid for by charities or religious congregations.

> There is a system called social case. If the major or the doctors see that the person can't really afford it they would make all the treatment free for the person. [Physiotherapist 2, HJRA]

> It depends on the patients, for example patients who have been brought here by NGOs [Non-Governmental Organisations] then it is the NGOs that take care of the

> patient, but some patients they come here by themselves so the family takes them in charge. [Physiotherapist 3, CRMM]

Discussion

The findings here map onto the three categories of the HCAB model, demonstrating clear cognitive, structural and financial barriers. Accounts from patients and families were triangulated with the data from healthcare professionals, whose input also highlighted additional barriers to effective healthcare delivery. A strength of the HCAB model is that it allows for grouping of modifiable barriers in such a way that allows identification and targeting of appropriate interventions to improve healthcare access. However, Carrillo et al's original model does not account for "within hospital" factors that lead to delays in receiving treatment once at a health facility. For the purpose of this analysis, the HCAB model has therefore been adapted to also reflect these barriers.

Key cognitive barriers included fear, distrust and lack of awareness around healthcare. In addition, a lack of appreciation of the severity of injuries led many to delay seeking treatment. These were all noted to be influential factors in Grimes et al.'s "Systematic Review of Barriers to Surgical Care in Low-Income and Middle-Income Countries" [13].

One approach to tackling these barriers may be to improve health awareness through education programmes at a community level. Several professionals interviewed were already using their contact time with patients to improve awareness. The influence of family and social networks is important in Malagasy culture; by utilising each patient contact for education, a cascade effect can be achieved to spread the message to others in the community. Collaborating with community health workers and traditional healers

to provide training on health education has been effective in other settings [14,15]. Traditional healers in Madagascar often occupy an influential position within their communities, particularly in the more rural setting, and are potentially an excellent resource if collaboration and training are done sensitively.

Additionally, providing training on clinical skills and effective communication for healthcare professionals may help to improve their confidence and that of their patients, as suggested by the clinicians and physiotherapists themselves. Effective training for healthcare professionals may be achieved through global health partnerships, as advocated by Crisp in his 2007 report [16]. Such schemes have previously been successful in Madagascar, exemplified by a training partnership with rehabilitation professionals from the UK from 2011-2013 [17]. However, the need for ongoing training remains. This could be in the form of an accredited and sustainable Continuing Professional Development (CPD) programme, following a curriculum based on local needs.

Structural barriers frequently led to delays in reaching a healthcare facility. Approximately 67% of the population live in rural areas and 60-70% have access to primary health services [18], while 29% can reach a surgical unit within two hours [19]. Eliminating transportation costs can increase the numbers accessing healthcare in low-resource settings [20]. However, improving pre-hospital trauma care must also be a priority; the WHO identify this as a key factor in improving trauma outcomes [21]. Given that many patients rely on taxis and public transport to travel to hospital, training lay people, such as taxi drivers, in emergency first aid can be effective in this context. Studies in Madagascar and Ghana have shown that such schemes are feasible and can

improve mortality, although the effect on long-term disability is unclear [22,23]. Any plans must be considered in the context of the existing health system, road and transportation infrastructure.

With an estimated 3 physicians per 10,000 population [24], the lack of trained staff also led to delays in receiving appropriate treatment for some patients. Additionally, rehabilitation services lack full multidisciplinary teams. For example, no team includes an occupational therapist, of which there are currently only eight in the country. Alternative ways to build capacity in resource-poor health systems have been suggested elsewhere and may include task-shifting between different members of the multidisciplinary team [17].

One of the most significant barriers to receiving timely treatment was cost. Financial difficulties were almost universal amongst the study participants. Madagascar is one of the poorest countries in the world with an estimated 78% living on less than US$1.90 per day [25]. Despite Madagascar's natural resources, the political instability since the coup d'etat in 2009 has diminished economic growth. Total expenditure per capita on health was $44 in 2014 and although the government is striving towards universal coverage in line with the WHO World Health Report, there is some way to go to achieving this [26]. Bureauracy and confusion over payment methods add to the problem. Community health insurance schemes and equity funds are available, however few subscribe to these and it is unclear whether they protect the poor from financial risk [27,28].

Madagascar has a nascent rehabilitation network comprising of multidisciplinary services in government hospitals across six cities. However, none of these services yet provide specialist post-trauma rehabilitation. Building new facilities and improving staffing and equipment within the limited health budget will be challenging. However, the WHO "Guidelines for Essential Trauma Care" suggest that administrative and organisational delays can be improved with better service planning, which in turn can improve health outcomes [2]. The Malagasy government has recognised this with the recent National Strategic Plan for Physical Rehabilitation (PNSRP) 2017-2021 [29], aiming to deliver a co-ordinated approach from all national and international stakeholders. There are also a number of non-governmental organisations (NGOs) working towards improving healthcare and rehabilitation in Madagascar [17,30-33].

This was a small-scale qualitative study and was limited by including only patients and their families attending the outpatient rehabilitation departments and therefore may not be fully representative. However, the findings were corroborated by the doctors and physiotherapists interviewed. It would be beneficial to explore the opinions of those choosing not to attend hospital at all, from different geographical areas and the different ethnic and cultural groups across Madagascar. Cross-language research also provides a number of challenges [34,35]. This study employed a single interpreter for the interviews and focus groups and the translations were not validated by a second bilingual individual, as suggested in Squire's methodological recommendations for cross-language research [36]. This introduces an uncertainty about conceptual equivalence in the translations and is a potential source of bias, however this was lessened in part by regular debriefs between the researcher and interpreter. Only

one researcher conducted the interviews and the analysis, however the interview guide and the final analysis template were discussed and agreed with the whole research team.

This study highlights the key factors leading to delays in treatment following trauma in Madagascar. Understanding the reasons behind these is vital, as delays may result in poorer outcomes and greater healthcare costs. This in turn may increase the burden on the health system and contribute to the cycle of poverty and ill health in a resource-limited setting. To our knowledge, this is the first study looking at delays in trauma care and rehabilitation in this country. This study highlights the importance of considering both service accessibility and cognitive barriers when developing co-ordinated trauma care and rehabilitation pathways in Madagascar. Financial barriers, in particular, should be recognised as a priority. However, improving awareness and patient perceptions of healthcare through training and education schemes is also paramount.

Word count: Abstract 192, Main text 5320

Acknowledgements

The authors would like to thank the interpreter Sedera Onja, all the healthcare professionals who helped with the study, in particular Dr Renaud Rakotonirainy and Dr Sonia Andrianabela for their support and advice, and the patients and families that contributed to this project. We acknowledge and thank the British Society of Rehabilitation Medicine for their funding and support. RJOC's research is supported by the National Institute for Health Research (NIHR) infrastructure at Leeds and Sheffield. The views expressed are those of the authors and not necessarily those of the NHS, the NIHR or the Department of Health.

Declaration of Interest

The authors report no conflicts of interest.

Funding statement

This research was supported by the inaugural award of the Professor Bipin Bhakta Memorial Postgraduate Research Travelling Scholarship from the British Society of Rehabilitation Medicine, which was awarded to the author HNL.

References

1. Haagsma JA, Graetz N, Bolliger I, et al. The global burden of injury: incidence, mortality, disability-adjusted life years and time trends from the Global Burden of Disease study 2013. Inj Prev. 2016;22:3–18.
2. Mock C, Lormand JD, Goosen J, et al. Guidelines for essential trauma care. Report, World Health Organization, Geneva, 2004.
3. Gosselin R, Charles A, Joshipura M, et al. Surgery and trauma care. In: Debas HT, Donkor P, Gawande A, et al (eds) Essential Surgery: Disease Control Priorities. 3rd ed (Volume 1). Washington (DC): The International Bank for Reconstruction and Development / The World Bank; 2015, p. 41-60.
4. The World Bank, Data [Internet]. Madagascar: 2018 [cited 2018 Mar 20]. Available from: https://data.worldbank.org/country/madagascar
5. Peters DH, Garg A, Bloom G, et al. Poverty and access to health care in developing countries. Ann N Y Acad Sci. 2008;1136:161–171.
6. Masquelier B, Waltisperger D, Ralijaona O, et al. The epidemiological transition in Antananarivo, Madagascar: An assessment based on death registers (1900-2012). Glob Health Action. 2014;7:23237.
7. Halpin SJ, Rakotonirainy R, Chamberlain MA, et al. Trauma rehabilitation in a teaching hospital in Antananarivo, Madagascar: current provision and patients' perspectives. Disabil Rehabil. 2019; DOI: 10.1080/09638288.2018.1540667.
8. Renaud R, Locke HN, Hariharan R, et al. Developing a spinal cord injury rehabilitation service in Madagascar. J Rehabil Med. 2018;50(5):402-405.
9. Carrillo JE, Carrillo VA, Perez HR, et al. Defining and targeting health care access barriers. J Health Care Poor Underserved. 2011;22(2):562-575.
10. Dew K. A health researcher's guide to qualitative methodologies. Aust N Z J Public Health. 2007;31(5):433–437.
11. Jamshed S. Qualitative research method – interviewing and observation. J Basic Clin Pharmacol. 2014;5(4):87.
12. Marshall, MN. Sampling for qualitative research. Fam Pract. 1996;13:522-525.
13. Grimes CE, Bowman KG, Dodgion CM, et al. Systematic review of barriers to surgical care in low-income and middle-income countries. World J Surg. 2011;35(5):941–950.

14. Poudyal AK, Jimba M, Murakami I, et al. A traditional healers' training model in rural Nepal: Strengthening their roles in community health. Trop Med Int Heal. 2003;8(10):956–960.
15. Mbeh GN, Edwards R, Ngufor G, et al. Traditional healers and diabetes: results from a pilot project to train traditional healers to provide health education and appropriate health care practices for diabetes patients in Cameroon. Glob Health Promot. 2010;17(2):17-26.
16. Crisp N. Global Health Partnerships: The UK contribution to health in developing countries. UK: COI; 2007.
17. Locke HN, Doctors S, Randrianampianina I, Chamberlain MA, O'Connor RJ. Evaluating a global health partnership rehabilitation training programme in Madagascar. J Rehabil Med. 2020;52. DOI: 10.2340/16501977-2621.
18. Marks F, Rabehanta N, Baker S, et al. A Way Forward for Healthcare in Madagascar? Clin Infect Dis. 2016;62(1):76–79.
19. Bruno E, White MC, Baxter LS, et al. An Evaluation of Preparedness, Delivery and Impact of Surgical and Anesthesia Care in Madagascar: A Framework for a National Surgical Plan. World J Surg. 2017;41(5):1218–1224.
20. Shrime MG, Hamer M, Mukhopadhyay S, et al. Effect of removing the barrier of transportation costs on surgical utilisation in Guinea, Madagascar and the Republic of Congo. BMJ Glob Heal. 2017;2:e000434.
21. Sasser S, Varghese M, Kellermann A, et al. Prehospital trauma care systems. Geneva: World Health Organization; 2005.
22. Geduld H, Wallis L. Taxi driver training in Madagascar: The first step in developing a functioning prehospital emergency care system. Emerg Med J. 2011;28(9):794–796.
23. Tiska MA, Adu-Ampofo M, Boakye G, et al. A model of prehospital trauma training for laypersons devised in Africa. Emerg Med J. 2004;21:237-239.
24. Madagascar: Primary Health Care in Action [Internet]. WHO; 2013 [cited 2018 Aug 7]. Available from: http://www.who.int/whr/2008/media_centre/country_profiles/en/index7.html
25. Madagascar Country Profile [Internet]. World Bank Group; 2018 [cited 2018 Aug 8]. Available from: http://databank.worldbank.org/data/views/reports/reportwidget.aspx?Report_Na

me=CountryProfile&Id=b450fd57&tbar=y&dd=y&inf=n&zm=n&country=MDG

26. World Health Organization. The World Health Report: health systems financing: the path to universal coverage. Geneva: World Health Organization; 2010.
27. UNICEF. Madagascar Public Expenditure Review 2014: Health Sector Background Paper. UK: UNICEF; 2015.
28. Honda A, Hanson K. Do equity funds protect the poor? Case studies from north-western Madagascar. Health Policy Plan. 2013;28(1):75–89.
29. Plan National Stratégique du Développement de la Réadaptation Physique 2017-2021. Madagascar: Ministere de la Sante Publique; 2017.
30. Humanity and Inclusion - Madagascar [Internet]. Humanity and Inclusion; 2018 [cited 2018 Aug 7]. Available from: http://www.hi-us.org/madagascar
31. CBM – Madagascar [Internet]. CBM; 2018 [cited 2018 Aug 7]. Available from: https://www.cbm.org/Madagascar-265535.php
32. Education Development Trust. A study on children with disabilities and their right to education: Madagascar. UK: Education Development Trust and Unicef; 2016.
33. Ramahenina H, O'Connor RJ, Chamberlain MA. Problems encountered by parents of infants with clubfoot treated by the Ponseti method in Madagascar: A study to inform better practice. J Rehabil Med. 2016;48(5):481–483.
34. Squires A. Language barriers and qualitative nursing research: methodological considerations. Int Nurs Rev. 2008;55(3):265–273.
35. Lee SK, Sulaiman-Hill CR, Thompson SC. Overcoming language barriers in community-based research with refugee and migrant populations: options for using bilingual workers. BMC Int Health Hum Rights. 2014;14:11.
36. Squires A. Methodological Challenges in Cross-Language Qualitative Research: A Research Review. Int J Nurs Stud. 2009;46(2):277–287.

Figure 1. Carrillo et al's Health Care Access Barrier model with definitions and representative examples [9]

CATEGORY	DEFINITION	EXAMPLES
Cognitive barriers	Knowledge and communication barriers	Awareness of health care Knowledge about illness Communication difficulties
Structural barriers	Institutional and organisational barriers	Proximity of health facilities Transportation Availability of childcare
Financial barriers	Cost of care and health insurance status barriers	Lack of health insurance

Table 1. Demographics and characteristics of trauma survivors

	Gender (M/F)	Age (years)	Place of living (Rural/ Urban)	Injury	Cause of injury	Interviewee
1	F	50	Rural	# humerus	Fall in field	Patient
2	F	52	Rural	# ribs and c-spine	RTA (passenger in taxi)	Patient
3	F	71	Urban	#NOF	Fall from low wall	Patient
4	M	59	Rural	Shoulder injury	Assault in street	Patient
5	F	30	Urban	Knee meniscus injury	Fall down stairs	Patient
6	F	32	Rural	Open # left wrist	Fall down stairs	Patient
7	F	10	Urban	# humerus	Fall down stairs	Mother
8	M	64	Rural	Head wound, # arm	Assault in home	Nephew
9	M	45	Rural	# left ankle	Injury at work	Patient
10	F	61	Urban	# elbow	Fall in road	Patient
11	F	DNA	Rural	# right ankle in 2 places	RTA (passenger on motorbike)	Patient
12	M	12	Urban	Knee injury	Playing football	Mother

*DNA = did not answer, # = fracture, NOF = neck of femur, RTA = road traffic accident

Table 2. Findings mapped onto the HCAB model by participant group with subthemes

Participant Group	Themes	Subthemes
Patients and family members	• Cognitive barriers	• Understanding of healthcare and illness • Culture and religion • Awareness of healthcare
	• Structural barriers	• Geographical access • Time
	• Financial barriers	• Affordability of hospital care • Difficulty accessing funds
Healthcare professionals	• Cognitive barriers	• Understanding of healthcare and illness • Awareness of healthcare • Culture and religion • Communication
	• Structural barriers	• Infrastructure • Training
	• Financial barriers	• Affordability of hospital care • Unclear payment pathways