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CLINICAL RESEARCH

Factors associated with delays in seeking treatment for acute bleeding among persons living with haemophilia in Uganda: a cross-sectional mixed methods study

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A study among people with haemophilia presenting at five regional treatment centres across Uganda found transport costs is a major issue impacting treatment seeking for acute bleeds

Introduction: Haemophilia is associated with a high tendency of acute bleeding episodes which can lead to severe morbidity and mortality in the absence of prompt care. Although delay in seeking care can lead to adverse outcomes, many people with haemophilia (PwH) in Uganda do not report to haemophilia treatment centres (HTCs) for treatment in the event of acute bleeding within the two hours recommended by the World Federation of Hemophilia (WFH). Information on factors associated with delays in seeking care is limited. **Aims:** This study aims to determine the extent and factors associated with delays in seeking treatment for acute bleeding among people with haemophilia (PwH) in Uganda to inform appropriate mitigating stratregies and

hence improve health outcomes and quality and life. **Methods:** The study was conducted in five haemophilia treatment centres (HTCs) across Uganda and used a cross-sectional design with mixed methods of data collection. PwH seeking care at the HTCs for acute bleeding episodes were consecutively sampled. A pre-tested questionnaire was used to collect data. Alongside this, qualitative interviews explored health workers' perceptions of factors associated with delays in seeking treatment among patients. Health workers were purposively selected. The quantitative data were analysed using STATA version 16; qualitative data were analysed manually using inductive thematic analysis to generate codes, categories, sub-themes and themes. Multivariate modified Poisson regression analysis was used to determine factors associated with delay to seeking treatment at HTCs. **Results:** 224 male PwH, aged 1 to 67 years (median 11 years) were included in the analysis. The time taken following an acute bleeding symptom to attending the HTC ranged between 1 and 65 hours, with a median of 9 hours. PwH were more likely to delay seeking treatment for acute bleeding episodes if they used public means of transport to the HTC (aPR 1.39; 95% CI 1.22-1.59). PwH who took immediate other actions on recognition of a sign of an acute bleeding episode were less likely to delay seeking treatment at the HTC (aPR 0.75; 95% CI 0.66-0.84). **Conclusion:** Delays in seeking treatment among PwH in Uganda are the result of an interplay between individual and health system factors. Continued information and education programmes are needed to ensure PwH and caregivers understand the benefits of early treatment-seeking, alongside expanding HCP knowledge and capacity building. Mobile clinics and home therapy could reduce travel and waiting times for those needing to access treatment. Addressing these issues could help to provide a level of care for PwH that helps to ensure improved quality of life and better health outcomes.

Keywords: *Haemophilia, Acute bleeding, Time-to-treatment, Developing countries*

Haemophilia is a hereditary condition caused by a deficiency of factor VIII (FVIII; haemophilia A) or factor IX (FIX; haemophilia B) which prevents blood from clotting properly. It is transmitted in the recessive mode linked to the X chromosome and mainly affects males [1], though women can have haemophilia as a result of lyonization, and women who carry the haemophilia gene can also experience symptoms [2,3]. Recent estimates of haemophilia prevalence suggest that there are around 1,125,000 males with haemophilia worldwide, 418,000 of whom are expected to have severe haemophilia [4]. In Africa, estimates suggest only 11.4% of cases are diagnosed [5] with an estimated prevalence of 21 per 100,000 live male births [6]. On this basis, there should be approximately 4,830 cases of haemophilia in Uganda, but data collected by the Haemophilia Foundation of Uganda (HFU) suggests that only 7% of people with haemophilia (PwH) in Uganda are diagnosed (HFU patient data base).

At the time of writing, Uganda has no policy on haemophilia care and management. A resolution on a motion for the developmet of a comprehensive policy for haemophilia management was adopted by the Ugandan parliament in June 2018, and further research was recommended to guide implementation. Current treatment follows World Federation of Hemophilia (WFH) guidelines as far as possible [7]. However, as in most developing countries, access to much that the WFH recommends is limited. Prophylaxis is provided at a low dose for children below 4 years of age or when prescribed by the attending physician, but treatment is mostly episodic or on-demand due to insufficient factor supply. Care is provided at seven haemophilia treatment centres (HTCs) at the regional level. People with a confirmed haemophilia diagnosis are expected to report immediately to the designated treatment centres in the event of acute bleeding.

Although PwH appreciate the benefits of early treatment, anecdotal data from Ugandan HTCs indicate that, at most, 3 in 10 PwH report to hospital for treatment within the WFH recommended time of two hours following the onset of acute bleeding [7]. Possible explanatory factors for delays include insufficient knowledge of haemophilia among PwH and caregivers, lack of transportation, despondency and reluctance to visit health facilities, the inconvenience of needing multiple infusions, inability to understand the benefits of therapy, and denial of disease complications [8].

Over the past 10 years, strides have been made to improve the health-seeking habits of PwH in Uganda, including decentralisation of treatment services, patient education through health camps, and patient outreach [9]. The WFH and other partners have also developed strategies including educational materials and training for effective capacity building among its National Member Organizations (NMOs) [10]. Despite these efforts, this issue persists. Minimal research has been undertaken on the possible factors associated

with these delays. This study aims to determine the extent and factors associated with delays in seeking treatment among PwH with acute bleeding receiving treatment from HTCs in Uganda, in order to inform appropriate mitigating strategies and hence improve their health outcomes and quality of life.

METHODS

Study design and setting

This cross-sectional study used quantitative and qualitative elements to determine the extent and factors associated with delay in seeking treatment among PwH attending five HTCs in Uganda: Mulago National Referral Hospital, Mbarara Regional Referral Hospital, Masaka Regional Referral Hospital, Lira Regional Referral Hospital and Mbale Regional Referral Hospital. These sites are the main service providers for PwH and operate under the National and Regional Referral Hospital management system embedded into paediatric and adult haematology wards. Inpatient and outpatient care services are offered in these centres and run throughout the week; the haemophilia clinic offers follow-up services every first and third week of the month. On average, the five HTCs each serve between 10-25 patients with acute bleeds monthly. As the main treatment centre, Mulago attends to more than 30 patients a month on open days and not less than 10 patients on clinic days.

Study population and eligibility criteria

PwH with a confirmed diagnosis of haemophilia A or haemophilia B who presented with acute bleeding episodes at any of the five HTCs between March 2022 and January 2023 were eligible to participate in the quantitative part of the study. Participants below 18 years of age were considered children and their parents/caregivers were asked to respond on their behalf; those above 18 years responded themselves. PwH experiencing very serious bleeding, e.g. intracranial bleeding, were excluded. For the qualitative part of the study, key informant interviews were conducted with health workers, specifically haemophilia nurses and doctors providing care to PwH at participating HTCs. Informed consent was obtained from all study participants or their parents/caregivers.

Sample size and sampling procedure

Quantitative study

Consecutive sampling was used to recruit participants during the study period, and the Kish formula used for calculating sample size from a finite population [11]. The sample size was shared across all the sites proportionate to the number of cases attending the HTC with acute bleeding episodes. Sampling proportionate to size was applied across all the treatment centres. The total number of patients attached to the respective HTCs was generated using the HFU database: Mulago 120 PwH, Lira 65 PwH, Mbabara 54 PwH, Mbale 25 PwH, Masaka 12 PwH. After applying the proportionate sampling formula, the expected numbers of participants per HTC were 97, 53, 44, 20 and 10 respectively. Participants were selected consecutively among those who met the eligibility criteria and consented until the required sample was achieved. This technique was applied so that the sample size would be obtained within the allocated study time.

Qualitative study

We purposively sampled 10 health workers from the five participating HTCs at a ratio of two per health facility (one haemophilia nurse and one physician). The sampling strategy was based on health workers' knowledge and experience in the management of PwH at their respective treatment centres. Apart from Mulago HTC, which has more than one physician, all physicians at the other four study sites were purposively recruited into the study. For physicians at Mulago HTC, a list of the physicians was obtained from the haemophilia focal personnel and a convenience sample selected on the day interviews were conducted. Similarly, four HTCs had only one attending nurse and they were automatically included in the study. For Mulago HTC, a list of all nurses working at the haemophilia clinic was obtained from the haemophilia focal personnel and a convenience sample selected on the day of the interviews.

Study variables

The dependent variable was delay in seeking treatment (DST) among PwH with acute bleeds attending HTCs. DST was reported in hours from the onset of an acute bleeding symptom to the time PwH report to the HTC. Any PwH who experienced an acute bleeding symptom and failed to seek remedy at any HTC within two hours was considered to have delayed. PwH who reported within the recommended time were considered not to have delayed. Independent variables included environmental, population and health behaviour factors.

Data collection

Face-to-face interviews using a questionnaire were conducted with PwH and caregivers by trained research assistants. The questionnaire was translated into five

local languages to ensure accessibility. Interviews were conducted at the HTCs during clinic days and other open days. The questionnaire was specifically developed to determine the extent of delay and factors associated with the delay in seeking treatment. For respondents below 18 years, consent was sought from their parents/caregivers. Researchers used a guide to conduct interviews to collect data from physicians and nurses at the HCTs on their perceptions of health system factors associated with delays in seeking treatment. Face-to-face interviews were conducted in a comfortable, convenient and private setting depending on the interviewee's choice to enable them to share honest and reliable information. The interviews lasted for a maximum of 30 minutes. All interviews were audio-recorded and transcribed verbatim, and notes were also taken during the interview.

Data analysis

Quantitative analysis

Quantitative data were analysed using STATA version 16. The time taken from noticing bleeding symptoms to the time of seeking treatment for acute bleeding was determined by subtracting the time the patient noticed a symptom from the time they sought care. The time was expressed in hours. Descriptive analysis of social demographic characteristics was undertaken using frequency/proportions for categorical variables. Mean/standard deviation (SD) and median/inter-quantile range were used for continuous variables that were normally distributed and not normally distributed, respectively. Binary regression analysis was used to determine environmental and population factors associated with delay in seeking treatment. Depending on the proportion of delay in seeking treatment at the HTC, multivariable modified Poisson regression analysis (Poisson model with robust standard errors) was used to determine independent factors associated with delay in seeking treatment at the HTC.

Qualitative analysis

Transcripts of the interviews with physicians and nurses were thematically analysed. Codes were generated from the texts manually. Data was read word by word to derive codes by first highlighting the exact words in the texts that seemed to capture key thoughts. Codes were sorted into categories based on how different codes were related and linked. A new list of categories and emerging themes was then generated, and repetitions or similar categories and themes were harmonised. The interview recordings were further analysed to ensure that every single word was captured, including pauses and expressions of emotion.

Ethical considerations

Ethical approval for the study was obtained from Makerere University School of Public Health Higher Degrees Research and Ethics Committee and Institutional Review Board. Permission was obtained from the hospital superintendants to authorise health workers to participate in the study. Written informed consent was sought from all adult participants; parents/caregivers consented on behalf of participants under the age of 18. Confidentiality was ensured by avoiding identifiers including names and other forms of identification. Standard operating procedures (SOPs) for COVID-19 were observed during data collection.

RESULTS

Two-hundred-and-twenty-four male PwH, aged 1 to 67 years (median 11 years) were included in the analysis (Table 1). Most (106/224; 47.3%) were aged 5-13 years. The majority (142/224; 63.4%) resided in rural areas and most (135/224; 60.3%) had attained only primary level education. The majority (203/224; 90.6%) lived with their parents/caregivers or families; 21 (9.4%) lived independently. Among those participants who worked, the majority were self-employed, 76 (33.9%); 51 (22.8%) were unemployed and 40 (17.9%) were students.

Fifty-three participants (23.7%) sought treatment from Lira HTC, 10 (4.5%) from Masaka HTC, 20 (8.9%) from Mbale HTC, 44 (19.6%) from Mbarara HTC and 97 (43.3%) from Mulago HTC. In terms of transport, 132 (59%) used taxis, 78 (34.8%) used motorcycles, and 14 (6.2%) used other private means to seek treatment at the HTC.

Thirty-one PwH (13.8%) sought treatment immediately when they had an acute bleeding episode. The time from the onset of a symptom of an acute bleeding episode to treatment at the HTC ranged from 1 to 65 hours. The median time from the onset of acute bleeding symptoms to treatment at the HTC was nine hours. Thirty-one (13.8%) participants attended the HTC within two hours of experiencing symptoms and were identified as not delaying seeking treatment.

Most participants experienced acute bleeding into the joints (208/224; 92.8%), followed by the head, muscle and other bleeds (Figure 1). The majority (216/224; 96.4%) were aware of joint pain as a major sign and symptom of an acute bleed (Figure 2). Around two thirds were not aware that stiffness (137/224; 61.2%) or a headache (143/224; 63.8%) could be an indication

Table 1. Characteristics of people with haemophilia participating in the study (n=224)

CHARACTERISTICS	FREQUENCY (N)	PERCENTAGE (%)
Residence		
Rural	142	63.4
Urban	82	36.6
Education		
None	34	15.2
Primary	135	60.3
Secondary and above	55	24.5
Religion		
Anglican/Protestant	62	27.7
Catholic	92	41.1
Muslim	37	16.5
Pentecostal (Born Again)	23	10.3
Seventh Day Adventist	10	4.5
Age		
1-4 years	36	16.1
5-13 years	106	47.3
14-18 years	38	17.0
19 years and above	44	19.6
Employment		
Child	22	9.8
Student	40	17.9
Formally employed	35	15.6
Self-employed	76	33.9
Unemployed	51	22.8
Average family income per month (UGX)		
500,001 and above	11	4.9
300,001-500,000	13	5.8
200,001-300,000	26	11.6
100,001-200,000	30	13.4
Less than 100,000	144	64.3
Time travelling to HTC		
1 hour	77	34.4
2 hours	60	26.8
3 or more hours	87	38.8
Mode of transportation to HTC		
Motorcycle	78	34.8
Private/Family car	14	6.2
Public means (taxi)	132	58.9
Who do you live with?		
Parents/guardian/ caregiver	203	90.6
Independent	21	9.4

of acute bleeding. Most (213/224; 95.1%) were not aware that a tingling sensation is also a sign of an acute bleed.

Almost all participants knew that infusion with FVIII, FIX and Novo Seven/FEIBA can be used to stop bleeding. Around 30% (68/224) considered ice application and a few (9/244; 4%) considered herbal medicines as a remedy to stop bleeding (Figure 3).

High transport cost was mentioned by 85.3% (191/224) as the most common hindrance to seeking treatment for acute bleeding (Figure 4). About one third of participants considered the availability of medicine as an element hindering treatment seeking for acute bleeding episodes.

Demographic factors associated with delays in seeking treatment for acute bleeding

PwH who had not attained any level of education were more likely to delay seeking treatment for acute bleeding (crude prevalence ratio (cPR) 4.48; prevalence ratio at 95% confidence interval (CI) 1.39-1.44). PwH who were Seventh-Day Adventists were more likely to delay seeking treatment for acute bleeding (cPR 3.96; 95%CI 1.66-9.43) compared to other religions. PwH were more likely to delay seeking treatment for acute bleeding if they were aged ≥45 (cPR 3.45; 95% CI 8.95-1.33) and when they used public means of transport to travel to the HTC (cPR 1.39; 95% CI 1.22-1.59). See Table 2.

Clinical and health system factors associated with delays in seeking treatment for acute bleeding a

People with haemophilia B were more likely to delay seeking treatment for acute bleeding compared to those with haemophilia A (cPR 1.15; 95% CI 0.75-0.47). PwH whose families were less supportive were more likely to delay seeking treatment for acute bleeding (cPR 4.56; 95% CI 1.62-12.79). Furthermore, patients who experienced acute bleeding episodes three or more times in a month were more likely to delay seeking treatment than those who had less frequent bleeding episodes (cPR 2.38; 95% CI 1.16-4.91).

Delay in seeking treatment for acute bleeding was significantly more common when bleeding occurred at night, between 7 pm-5 am, than when it occurred during the daytime (cPR 7.71; 95% CI 4.00-1.48). Those who took immediate other actions after recognising symptoms and signs of acute bleeding (e.g. contacted a physician, used RICE, used tranexamic acid) were less likely to delay seeking treatment (cPR 0.10; 95% CI 0.03-0.28). Those whose previous waiting time for treatment at the HTC was two hours were more likely

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Figure 1. Types of acute bleeding for which people with haemophilia in Uganda attended a haemophilia treatment centre (n=224)

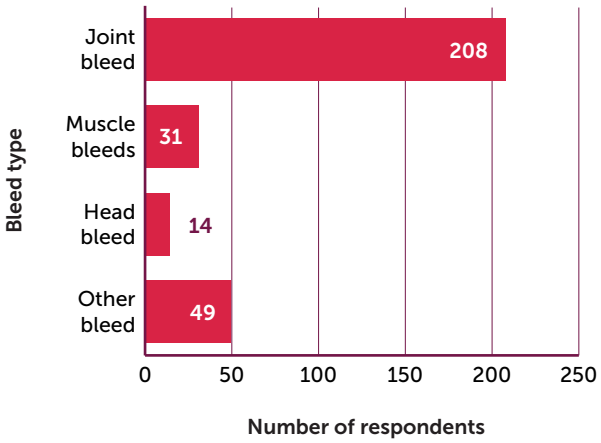


Figure 2. Awareness among people with haemophilia in Uganda of signs and symptoms of acute bleeding (n=224)

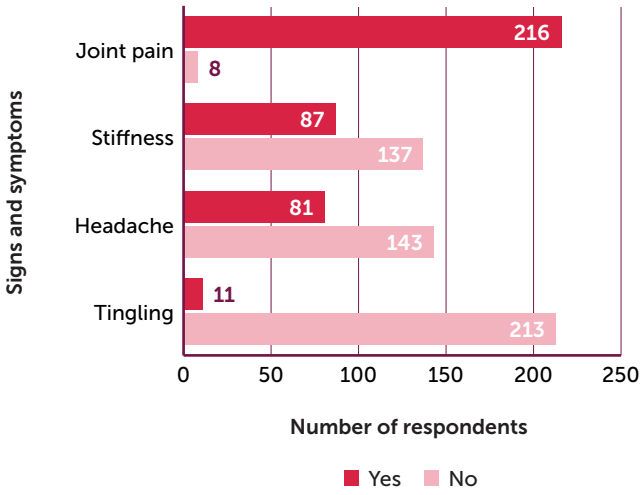


Figure 3. Knowledge and beliefs among people with haemophilia in Uganda on what treatments can be used to stop bleeding (n=224)

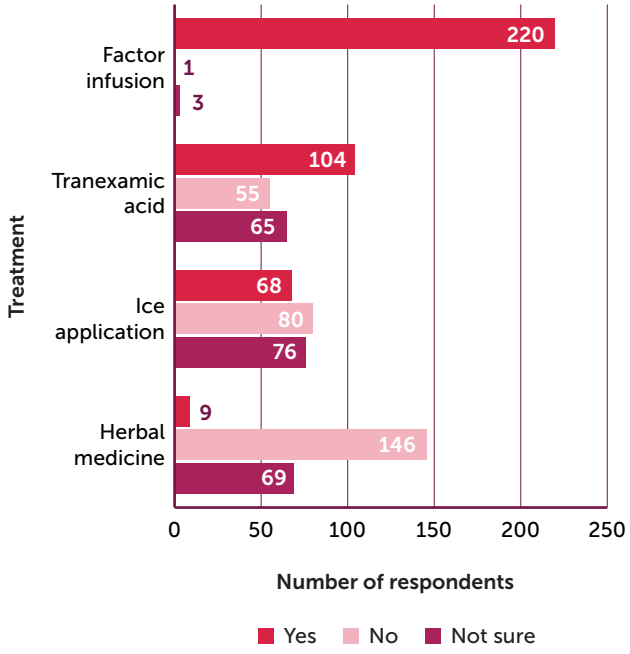
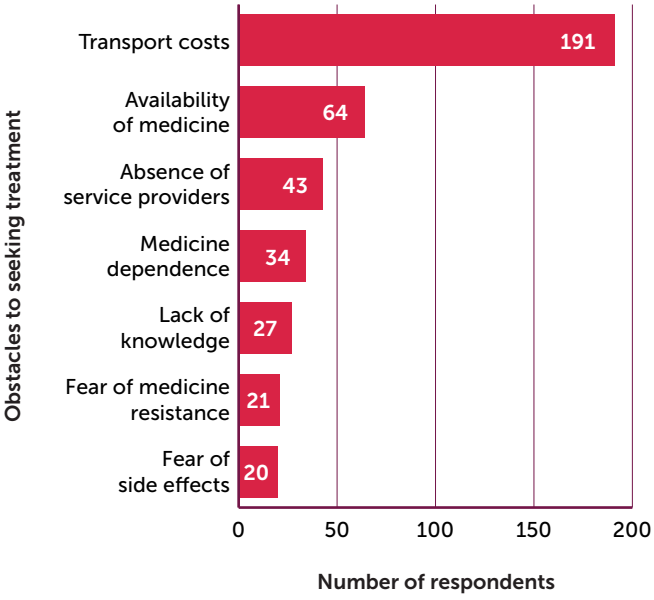


Figure 4. Obstacles to seeking treatment for an acute bleeding episode at a haemophilia treatment centre among people with haemophilia in Uganda (n=224)



Note: In some cases, more that one obstacle to treatment seeking was relevant to an individual participant

to delay seeking treatment for acute bleeding than those who had previously waited for a shorter time (cPR 2.26; 95% CI 1.06-4.79). Likewise, the prevalence of delay among PwH who described the attitude of health care practitioners' (HCPs) towards their haemophilia status as fairly good and very good was 26% lower (cPR=0.26, 95% CI 0.11-0.59) and 23% lower (cPR=0.23, 95% CI 0.97-0.57) respectively compared to those who described HCPs' attitude as not good. See Table 3.

Multivariate analysis of factors associated with delays in seeking treatment for acute bleeding

At multivariate analysis, significant factors associated with delay in seeking treatment following an acute bleeding episode were the mode of transportation used by patients to access treatment at HTC and the urgency of taking other actions by the patient on recognising symptoms of acute bleeding. The prevalence of delay among PwH who used public means of transport was 1.39 (95% CI 1.22-1.59) times more than when patients

used a motorcycle as means of transport. The prevalence of delay among those who took immediate action to seek treatment on recognising signs of acute bleeding was 75% (cPR=0.75 95% CI 0.66-0.84) lower compared to when no immediate action was taken (Table 4).

HCP perceptions of factors associated with delays in seeking treatment for acute bleeding

The final sample size of HCP respondents was as estimated. Although interviews were conducted with 10 HCPs, no HCPs at Mbale HTC were interviewed and four HCPS at Mulago HTC were interviewed. Time constraints among the expected participants at Mbale HTC meant that it was not possible to interview them, and as saturation had not been reached a decision was made to interview two additional key informants at Mulago as it is the main HTC in Uganda and has a high inflow of patients with acute bleeds.

Most of the HCPs interviewed indicated that there is inadequate information regarding haemophilia to guide HCPs. This ultimately affects the care seeking behaviours of PwH, who delay seeking treatment because they are not sure that they will receive the best care.

> *"Sometimes patients go to nearby health facilities where healthworkers have inadequate or completely no information about haemophilia and its management and care, hence misdiagnose and treated for other things, and others give wrong doses because they have never received training about haemophilia care. But also at our HTC, some healthworkers are ignorant about haemophilia care. One time I saw one of my colleagues infusing a factor VIII patient FIX instead because she thought it would work the same —it happens."* – KII-MBRHTC-001

> *"The majority of the healthworkers are not interested in learning management of acute bleeds, we still think it is very rare and the symptoms are overlooked. Many of the colleagues are not involved... [...] we don't know how to treat and we don't want to risk patient lives.... I wish we train more health workers, this will get them on board and patients will never wait for that particular doctor or nurse who is always there to offer services. Imagine, a patient queuing for over 3 hours..."* – KII-LRRHHTC-00C

Some participants referred to bad attitudes among HCPs toward patients as a factor that demotivates PwH from attending the HTC when they have acute bleeding episodes; for example, when a child comes to the treatment centre and is spoken to rudely by a nurse or the nurse is not willing to offer medical information to guide the patient or caregiver. One HCP candidly commented:

> *"Yes, the quality of care patients receive matters. Sometimes colleagues fail to answer patients' health concerns, or even don't respond when they are asked about their treatment plans and why they are changed from different treatment regimens. In addition, sometimes, parents are inquisitive to know the causes of haemophilia and how they can deal with it with their partners who think it's a burden. So, if a healthworker has a bad attitude, she/he will not help the parent and the patient by offering counselling to leave positively. In addition, sometimes there is no privacy, especially when adult patients are treated from the children's ward where they are trained personnel."* – KII-MLGHTC-002

Most (9/10) HCPs interviewed mentioned that FVIII and FIX stockout also affects patients' care seeking habits. This occurs in all treatment centres: they rely on WFH humanitarian aid for their supply of coagulation factors and the number of PwH keeps multiplying as diagnostic efforts improve.

> *"We don't provide them with replacement therapy, we only provide the on-demand type of treatment. The challenge is with the supply of factors VIII and IX. For example, we normally have more FVIII than FIX and we have to wait for months since the clearance process also takes some bit of time. Alternatively, contact blood bank to supply fresh frozen plasma or cryoprecipitate."* – KII-MLGHTC-001

All 10 HCPs interviewed spoke of other factors associated with delays in seeking treatment alongside quality of care and lack of awareness. Factors mentioned by all participants included distance from home to HTC, lack of transport, lack of information about where services are offered to patients, and young PwH hiding bleeding episodes from their parents/caregivers.

> *"Majority of the patients come from hard-to-reach places and the means of transport are not user-friendly to the patients, especially when*

they are experiencing acute bleeding episodes. For example, if some are expected to receive treatment from Lira and have to trek from Otuke, that would take him more than three hours on the road and yet he is experiencing pain." – KII-MBRHTC-001

Most (80%; 8/10) emphasised that on top of the long distance, patients often do not have their own transport and find it difficult to meet transport costs.

"Patients delay seeking treatment because they lack transport to cover the travel bills so they have to think twice about how to split the little money they have to transport their children for treatment and how to balance with their family needs. For example, if one family had more than one haemophilic child and they fall sick at the same time, they will choose to keep because they cannot afford the transport expenses amidst other needs." – KII-MLGHTC-001

DISCUSSION

Although the WFH recommends that treatment for acute bleeding episodes is sought within two hours of onset, our study found delays in seeking treatment of up to nine hours, indicating a high magnitude of delay. A study among clinicians in Europe, the USA, Africa, Australia, and Central and South America indicated that 64.6% of bleeds were treated within one to two hours following the onset of an acute bleeding episode [12]. This discrepancy can be explained by the availability of resources and the use of home treatment as one of the main means of care in developed countries, in comparison to developing countries, including Uganda, where treatment is mainly administered through the HTC. HCPs who participated in our study also saw the availability of medicine as an element hindering timely treatment-seeking for acute bleeding episodes. When bleeding episodes are treated early, this is associated with better health outcomes and a need for fewer doses of factor concentrates [13]. The introduction of home treatment, under the guidance and close monitoring of the area nurse, has the potential to improve outcomes for PwH in Uganda [14,15]. This would be very much dependent on ensuring a sustainable and accessible supply of factor concentrates across all regions. Ghosh and Ghosh indicate that in developing country settings consideration must be given to the minimum amount of factor needed to ensure that the number of PwH can be relatively bleed-free [16]. Being able to extend low-dose prophylaxis more widely to PwH in Uganda would also be beneficial [17].

In our study, mode of transportation was found to be statistically associated with delays in seeking treatment, particularly public transport. Transport is a challenge for PwH in hard-to-reach areas in cases of acute bleeding. Patients can spend many hours travelling, during which time bleeds may worsen; there may even be a risk of death if treatment is not provided on time. The infrastructure in most regions of Uganda is poor and does not allow for a comfortable drive, especially for those experiencing pain and who have a physical disability. In this respect, our findings are similar other studies highlighting that mode of transportation to the HTC is a significant challenge in managing haemophilia in developing countries [16].

Distance travelled to the HTC had no significant impact on the time taken to seek treatment following an acute bleeding episode. This contrasts with findings from the Hemophilia Utilization Group Study conducted in the US, which showed that distance was the most cited barrier to the early seeking of treatment at any HTC where the average distance from home to HTC was 45.2 $\pm$ 63.6 miles (72.74 km $\pm$ 102.35 km) [18]. Until recently, PwH in Uganda (which has an area of around 150,000 square miles/241,000 km^2) had to trek long distances to access services in Mulago, where the regional hospital was the only location able to provide haemophilia treatment. This presented many problems, including incurring lodging expenses, high transportation charges, and absenteeism from school and the workplace. The creation of satellite HTCs in various regions of Uganda may have helped to reduce the challenges associated with distance [9].

Our study also found that a delay in taking other actions immediately following symptoms of acute bleeding was associated with a delay in seeking treatment. Failure to take immediate action often meant that PwH waited for days to seek treatment, thereby delaying resolution of acute bleeding and pain relief, and increasing the cost of product use. Initiating early treatment, however, is not always straightforward. PwH who have experienced many bleeds in the same joint may develop joint damage, which itself causes pain. They may become used to living with their pain and find it difficult to tell the difference between the pain caused by their joint damage and the pain caused by acute bleeding [19], and therefore not take immediate action to seek treatment. Similarly, PwH who have not experienced many bleeds may not recognise the

onset of bleeding or appreciate the need for rapid treatment [12]. There is a need to ensure that PwH and carers understand the dangers of not taking immediate action to seek treatment upon realisation of signs and symptoms of acute bleeds.

HCPs in our study cited many reasons that influence the delay in seeking care at HTCs, including lack of awareness about haemophilia, quality of care at the HTC, distance from home to HTC, lack of transport, factor stock-outs, and lack of information about where services are offered. They also reported lack of access to information on how how HCPs should treat PwH as an issue. Other studies in Africa have also reported lack of knowledge and experience among HCPs on how to treat PwH as a key factor in causing delayed treatment [5,20]. However, this issue is not limited to countries with less developed health care systems and less capacity to manage and treat haemophilia. A study in the US and Germany to evaluate barriers to fast treatment for acute bleeding found that, respectively, only 26% and 28% of HCPs had access to treatment guidelines [21].

Study limitations

This study relied on self-reports by patients to explain their health-seeking practices, which may be subject to bias: patients may over-report and caregivers may not be able to recall the events and how long it took them to seek care. However, the use of self-report to measure delays in seeking care has been validated elsewhere [18]. Confidentiality and privacy were offered during data collection to facilitate openness. The participants were also assured that their names were not noted.

The qualitative approach used in the study is likely to have some degree of subjectivity during analysis which may affect the transferability of the findings to the general population.

The study findings may not be generaliseable to other HTCs. Nevertheless, the findings resonate with the literature in terms of the general reasons for delayed treatment and this could be considered beyond the study settings.

CONCLUSION

This study provides new evidence on the time taken to seek treatment for acute bleeding and factors associated with delay among PwH receiving treatment from five HTCs in Uganda. Delays in seeking treatment are the result of an interplay between individual and health system factors, and may result in serious consequences for PwH. The findings demonstrate a need to continue to enhance information and education programmes in Uganda, targeting parents and young people with haemophilia to overcome stigma. Both PwH and caregivers need to understand the benefits of early treatment-seeking. HTCs should consider working with school nurses to overcome unnecessary delays in case of a bleeding episode while at school. Further research in the different treatment centres could help to provide more information on the different context-specific factors associated with delays in seeking treatment and the perspectives of parents and caregivers.

The absence of access to treatment guidelines and lack of knowledge about haemophilia management among HCPs impacts patient treatment-seeking habits. Patient support organisations can advocate for the development and implementation of national guidelines on principles of haemophilia care to harmonise practice and close the gap in diagnosis, care and treatment. However, there is also a need to integrate haemophilia care into routine care and build capacity for health workers through continued medical training (CME). Enabling HCPs to widen their knowledge base regarding haemophilia care and management should occur alongside the organisation sensitisation programmes targeting patients, parents and caregivers to increase their knowledge to easily detect signs and symptoms of an acute bleeding episode.

Allocation of resources is a key issue and there must be close monitoring of the stock of factor concentrates and other treatments at the different HTCs to avoid stock-outs. There is a need for the Ugandan government to purchase treatment products rather than depending on donations which are not sustainable. Government support of mobile clinics and home therapy could help in reducing long hours of travel and waiting times at HTCs, and the reimbursement of transport costs for needy patients should be considered. Together with improved HCP education, this approach could help to provide a level of care for PwH that helps to ensure improved quality of life and better health outcomes.

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Author contributions

All authors participated in the conceptualisation of the study and interpretation of the findings. All authors read and approved this manuscript.

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Data availability

Data and materials will be made available by the authors. Requests should be forwarded to *The Journal of Haemophilia Practice*.

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Table 2. Bivariate analysis of sociodemographic characteristics associated with delay in seeking of treatment for acute bleeding at a haemophilia treatment centre among people with haemophilia in Uganda (n=193)

CHARACTERISTIC	DELAYED (N=193) N (%)	CRUDE PR (95%CI)	P-VALUE	ADJUSTED PR (95%CI)	P-VALUE
Place of residence					
Rural	121 (85.2)	(ref)		—	—
Urban	72 (87.8)	0.82 (0.40-1.66)	0.591	—	—
Level of education					
Tertiary	31 (91.2)	(ref)		—	—
Primary	111 (82.2)	2.01 (0.64- 6.31)	0.22	—	—
Secondary	31 (88.6)	1.29 (0.31-5.37)	0.72	—	—
None	20 (100.0)	4.48 (1.39-1.44)	0.000*	—	—
Religion					
Anglican/Protestant	53 (85.5)	(ref)		—	—
Catholic	78 (84.8)	1.04 (0.48-2.27)	0.905	—	—
Muslim	32 (86.5)	0.9 (0.33-2.57)	0.89	—	—
Pentecostal (Born Again)	20 (87.0)	0.89 (0.26-3.03)	0.86	—	—
Seventh Day Adventist	10 (100.0)	3.96 (1.66-9.43)	0.000*	—	—
Age					
1-4 years	30 (83.3)	(ref)		—	—
5-13 years	93 (87.7)	0.73 (0.30-1.79)	0.50	—	—
14-18 years	29 (76.3)	1.42 (0.56-3.59)	0.45	—	—
19 & above	41 (93.2)	0.41 (0.11-1.53)	0.18	—	—
Employment status					
Child	20 (10.36)	(ref)		—	—
Formally employed	29 (15.03)	1.88 (0.41-8.55)	0.41	—	—
Self-employed	70 (36.27)	0.86 (0.18-4.01)	0.85	—	—
Student	31 (16.06)	2.47 (0.58-10.49)	0.21	—	—
Unemployed	43 (22.28)	1.72 (0.64-1.10)	0.46	—	—
Average family income per month (UGX)					
500,001 and more	23 (76.7)	(ref)		—	—
300,001-500,000	25 (96.1)	0.28 (0.03-2.35)	0.24	—	—
200,001-300,000	12 (92.3)	0.14 (0.01-1.21)	0.07	—	—
100,001-200,000	8 (72.7)	0.85 (0.26-2.74)	0.79	—	—
Less than 100,000	125 (86.8)	0.48 (0.16-1.38)	0.17	—	—
Mode of transportation to HTC					
Motor cycle	54 (68.3)	(ref)		(ref)	
Private/Family car	10 (76.9)	0.56 (0.15-2.06)	0.390	1.17 (0.85- 1.58)	0.331
Public means	129 (97.7)	0.70 (0.02-0.22)	<0.001*	1.39 (1.22 -1.59)	<0.001
Who do you live with?					
Parent/Guardian	173 (85.2)	(ref)		—	—
Independent	20 (95.2)	0.32 (0.04-2.25)	0.25	—	—

* Significant at p<0.2

Table 3. Clinical and health system factors associated with delay in seeking treatment for acute bleeding at a haemophilia treatment centre among people with haemophilia in Uganda (n=193)

CHARACTERISTICS	PARTICIPANTS N(%)	DELAY CRUDE PR†	P VALUE	ADJUSTED PR†	P VALUE
Haemophilia type					
Haemophilia A	166 (86.5)	(ref)	—	—	—
Haemophilia B	27 (84.4)	1.15 (0.75-0.47)	0.75	—	—
Haemophilia severity					
Mild	10 (83.3)	(ref)		—	—
Moderate	60 (81.1)	1.13 (0.29-4.39)	0.85	—	—
Severe	123 (89.1)	0.65 (0.16-2.52)	0.53	—	—
Time since haemophilia diagnosis					
1 year or less	36 (75.0)	(ref)		—	—
2-5 years	64 (88.9)	2.25 (0.99-5.10)	0.05*	—	—
>5 years	93 (89.4)	0.95 (0.40-2.25)	0.91	—	—
No. of siblings with haemophilia					
One	90 (85.7)	(ref)		—	—
Two-three	69 (88.5)	0.80 (0.37-1.75)	0.58	—	—
Four/more	34 (82.9)	1.19 (0.52-2.72)	0.67	—	—
Siblings lost due to haemophilia					
Yes	133 (85.8)	(ref)		—	—
No	60 (87.0)	1.01 (0.88-1.17)	0.85	—	—
Family support					
Less supportive	69 (94.5)	(ref)		—	—
Highly supportive	67 (89.3)	1.94 (0.61-6.20)	0.260	—	—
Less supportive	57 (75.0)	4.56 (1.62-12.79)	0.004*	—	—
Number of times you experience acute bleeds in a month					
0-1 times	68 (85.0)	(ref)		—	—
2-3 times	111 (93.3)	0.45 (0.18-1.10)	0.082*	—	—
More than 3 times	14 (56.0)	2.38 (1.16-4.91)	0.018*	—	—
Time of realising an acute bleeding episode					
Morning (6am-12pm)	137 (84.6)	(ref)		—	—
Evening (1pm-6pm)	39 (86.7)	0.99 (0.43-2.27)	0.991	—	—
Night (7pm-5am)	17 (100.0)	7.71 (4.00-1.48)	<0.001*	—	—
Did you take immediate action on realisation of a sign of an acute bleed to seek treatment?					
Yes	64 (97.0)	(ref)		(ref)	
No	129 (70.3)	0.10 (0.03-0.28)	<0.001*	0.75 (0.66-0.84)	<0.001*
Opinion of services provided at HTC					
Fair	83 (84.7)	(ref)		—	—
Good	87 (86.1)	1.11 (0.16-7.39)	0.912	—	—
Very good	23 (92.0)	1.10 (0.16-7.42)	0.915	—	—
Previous waiting time for treatment at HTC					
1 hour	136 (90.1)	(ref)		—	—
2 hours	31 (77.5)	2.26 (1.06-4.79)	0.033*	—	—
3 or more hours	26 (78.8)	2.13 (0.94-4.82)	0.068*	—	—
Attitude of HCPs about care for acute bleeds at HTC					
Not good	107 (87.0)	(ref)		—	—
Fairly good	4 (50.0)	0.26 (0.11-0.59)	0.002*	—	—
Very good	82 (88.2)	0.23 (0.10-0.57)	0.001*	—	—

CHARACTERISTICS	PARTICIPANTS N(%)	DELAY CRUDE PR†	P VALUE	ADJUSTED PR†	P VALUE
Do you think haemophilia is curable?					
No	181 (86.6)	(ref)		—	—
Yes	12 (80.0)	1.49 (0.51-4.35)	0.464	—	—

† 95% CI * Significant at p<0.2

Table 4. Multivariable analysis of factors associated with delay in seeking treatment for acute bleeding among people with haemophilia attending haemophilia treatment centres in Uganda

CHARACTERISTICS	DELAY	NO DELAY	CRUDE PR†	APR†	P- VALUE
Mode of transportation to HTC					
Motorcycle	54 (68.3)	25 (31.7)	(ref)	(ref)	
Private/Family car	10 (76.9)	3 (23.1)	1.13 (0.75-1.69)	1.17 (0.85- 1.58)	0.331
Public means	129(97.7)	3 (2.3)	1.43 (1.00-2.04)	1.39 (1.22 -1.59)	<0.001
Did you take immediate action on the realisation of a sign of an acute bleed to seek treatment?					
No	129(97.0)	4 (3.0)	(ref)	(ref)	
Yes	64 (70.3)	27 (29.7)	0.73 (0.56-0.94)	0.75 (0.66-0.84)	<0.001*

† 95% CI * Significant at p<0.05