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Health care-seeking behaviour and diagnostic delays for Human African Trypanosomiasis in the Democratic Republic of the Congo

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Summary

OBJECTIVE About half of the patients with Human African trypanosomiasis (HAT) reported in the Democratic Republic of the Congo (DRC) are currently detected by fixed health facilities and not by mobile teams. Given the recent policy to integrate HAT control into general health services, we studied health seeking behaviour in these spontaneously presenting patients.

METHODS We took a random sample from all patients diagnosed with a first-time HAT episode through passive case finding between 1 October 2008 and 30 September 2009 in the two most endemic provinces of the DRC. Patients were approached at their homes for a structured interview. We documented patient delay (i.e. time between onset of symptoms and contacting a health centre) and health system delay (i.e. time between first contact and correct diagnosis of HAT).

RESULTS Median patient delay was 4 months (IQR 1–10 months, $n = 66$); median health system delay was 3 months (IQR 0.5–11 months). Those first presenting to public health centres had a median systems delay of 7 months (IQR 2–14 months, $n = 23$). On median, patients were diagnosed upon the forth visit to a health facility (IQR 3rd–7th visit).

CONCLUSIONS Substantial patient as well as health system delays are incurred in HAT cases detected passively. Public health centres are performing poorly in the diagnostic work-up for HAT, mainly because HAT is a relatively rare disease with few and non-specific early symptoms. Integration of HAT diagnosis and treatment into general health services requires strong technical support and well-organized supervision and referral mechanisms.

keywords Human African Trypanosomiasis, patients delay, health systems delay

Introduction

Human African trypanosomiasis (HAT) caused by *Trypanosoma brucei gambiense* is a slowly progressive protozoan infection that evolves from a haematolymphatic first stage to a neuro-encephalitic second stage and is fatal if untreated. Checchi *et al.* (2008) estimate the median duration of the first stage at 1½ year. Early detection is paramount both to improve prognosis and to interrupt transmission of the disease. A small study conducted in 2007 among 14 patients with HAT admitted to a hospital in Kinshasa, where HAT is not endemic, revealed major health system delays, with a median of 15 months (W. Van der Veken, personal communication). Odiit *et al.* (2004) and Bukachi *et al.* (2009) report similar problems of diagnostic delays for East African HAT (caused by *T.b.rhodesiense*, with a more acute progression) in Uganda and Kenya.

Although active population screening by mobile teams is the main case finding strategy in the Democratic Republic of the Congo (DRC), currently about 50% of all reported HAT cases are diagnosed upon presenting to health care services at patients' own initiative. More than 85% of those patients are already in the second stage of the disease at time of diagnosis (PNLTHA, Unpublished data). Now that the incidence rate of HAT has decreased after having peaked during the 1990s, active case finding campaigns are being scaled down because the efficiency of such efforts has decreased and funding is no longer adequate (Robays *et al.* 2004). The main alternative being considered by the National Human African Trypanosomiasis Control Program (PNLTHA) and its main donor agency, the

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Belgian Technical Cooperation, is integration of HAT case finding into general primary health care services. For this purpose, a new version of the card agglutination test for trypanosomiasis (CATT) test has recently been developed which does not require a cold chain and comes in 10-dosage vials, rather than the 50-dosage vials of the classical CATT (Hasker *et al.* 2010a). A single-dose format of a rapid diagnostic test is under development (FIND 2010). However, a HAT control strategy based on passive case detection will only work if enough patients with HAT attend primary health care facilities early enough and if the health workers in those centres do recognize potential signs and symptoms of HAT and manage HAT suspects appropriately. Persons infected with *T. b. gambiense* are infectious to tse-tse flies, and the longer the delay between infection and treatment, the higher is the probability that they transmit the infection to other people (Burri & Brun 2009). Also, for obvious clinical reasons, it is important that patients with HAT are diagnosed and treated early, as the longer the patient remains untreated, the more likely he or she is to suffer irreversible neurological damage.

Given the changing disease control policy, we decided to document health-seeking behaviour for HAT within the context of the general health services. We assumed that there could be a potential problem in recognizing and managing HAT suspects at first-line health facilities in DRC and suspected long health system delays. We also studied other potential barriers to early diagnosis such as patient delay and direct and indirect costs incurred by patients before being diagnosed.

Methods

Study design

We took a stratified random sample of parasitologically confirmed passively detected HAT cases from the electronic patient registers of North Bandundu and East Kasai for the period between 1 October 2008 and 30 September 2009. During this period, the two provinces together accounted for roughly 50% of all HAT cases notified in the DRC. We included only those detected 'passively', i.e. after self-presentation at fixed health facilities, and without a prior history of HAT. All patients were still within the 2-year post-treatment follow-up period; their addresses could thus easily be obtained from the routine records. Patients were visited at home, and those consenting to participate were interviewed and had their records reviewed.

We used two sets of questionnaires, one for patient interviews and another one for review of patient records. Both were pretested before the start of the study. Reviews of patient records were made by the provincial HAT coordinators (CL and FM). Patient interviews were conducted by a team of trained field workers under supervision of these provincial HAT coordinators. From the records, we collected data on mode of case detection; diagnostic criteria; whether or not the village of the patient had been screened by a mobile unit; and whether or not the patient had participated in this screening exercise. In the interviews, patients were asked about presenting symptoms; date of onset of these symptoms; which health care providers they consulted and when; where and when they were eventually diagnosed with HAT; and what costs they had incurred in the process.

Case definitions

Our definition of a HAT case is the standard definition used by the PNLTHA, i.e. a person in whom HAT has been parasitologically confirmed. Patient delay was defined as 'The duration in days, weeks or months from the onset of symptoms to the first health-care seeking action at a health facility'; health system delay was defined as 'The duration in days, weeks or months between the first health care seeking action taken by the patient and the date of diagnosis of HAT'. Total diagnostic delay was defined as the sum of patient delay and health system delay.

Sample size

Our sample size calculation was based on the assumption that at least 50% of passively detected patients have either visited several health facilities before being recognized as a HAT suspect or health system delays of several months. To estimate a factor present in 50% of cases arising from a total population of 1500 with a precision of ±10% and an α-error of 0.05 requires a sample size of 90. To account for the fact that some patients may be absent or may not agree to cooperate, we increased our target sample size to 100 cases. Taking into account the differences in reported incidence between the two provinces, we sampled 40 patients from East Kasai and 60 from North Bandundu.

Ethical aspects

We obtained ethical clearance from the ethics committee of the PNLTHA in the DRC and from the ethics committee of the University of Antwerp in Belgium. The study subjects were interviewed and had their medical records reviewed; no samples were collected, no therapeutic intervention was done or withheld. All patients were still within the 2-year post-treatment follow-up period and thus were still under care of the PNLTHA. To avoid the

possibility of stigmatization when visited in their homes, patients were first approached by general health workers.

Data management

Questionnaire forms were checked for completeness and presence of inconsistencies, after which they were handed over to data entry clerks. Data were entered into an MS Access database using a double data entry procedure. Data files were compared to identify typing errors.

Data analysis

For data analysis, we used STATA/IC V10.1 (Stata Corp., College Station, TX, USA). We calculated proportions and medians with interquartile ranges as required. To assess statistical significance of observed differences in medians, we used the rank sum test.

Results

A total of 2868 HAT cases were detected in the two provinces between 1 October 2008 and 30 September 2009; of those, 1325 (46.2%) were detected by passive case finding. Of 100 patients sampled from this group of 1325 passively detected patients, we were able to interview 67. One of the 67 interviews had to be interrupted when the husband of the patient arrived and did not agree for his wife to participate in the study. Of the remaining 33 cases not interviewed, 12 had incorrect addresses, seven were temporarily absent, six had permanently moved, three had died, four turned out to be previously treated cases, and one lived in a village that was inaccessible during the rainy season. Of the 66 patients enrolled, 27 (41%) were from East Kasai and 39 (59%) were from Bandundu. Overall, 35 patients enrolled were women (53%). In Bandundu, women made up 59% of the sample and in East Kasai, 44%. Ages of patients interviewed ranged from 3 to 79 years, with a median of 26 years (interquartile range (IQR) 20–40 years); there were no major differences in age structure of patients between the two provinces. Information on stage of disease at time of diagnosis was available for 65 patients: 19 (29%) were in stage 1 and 46 (71%) were in stage 2; patients in Kasai were more often in stage 2 than patients in Bandundu (85% *vs.* 61%, $P = 0.03$). Information on whether or not their villages had been visited by a mobile screening unit prior to the date they were diagnosed was available for 59 patients enrolled. Of those, 47 (80%) lived in villages where screening by mobile teams had taken place; however, only four of these 47 (9%) had actually participated in such screening (Table 1).

Table 1 General characteristics of study population ($n = 66$)

	Study population Kasai (%)	Study population Bandundu (%)	Total (%)
Age			
0–14	6 (22)	5 (13)	11 (17)
15–24	4 (15)	12 (31)	16 (25)
25–34	8 (30)	10 (24)	17 (26)
35–44	5 (18)	3 (8)	8 (12)
45–54	4 (15)	6 (16)	10 (15)
55+	0	3 (8)	3 (5)
Sex			
Male	15 (56)	16 (41)	31 (47)
Female	12 (44)	23 (59)	35 (53)
Disease stage at time of diagnosis ($n = 65$)			
Stage 1	4 (15)	15 (39)	19 (29)
Stage 2	23 (85)	23 (61)	46 (71)
Village visited by mobile screening unit ($n = 59$)			
Yes	22 (81)	25 (78)	47 (80)
No	5 (19)	7 (22)	12 (20)
Participated in screening by mobile unit ($n = 47$)			
Yes	1 (5)	3 (12)	4 (9)
No	21 (95)	22 (88)	43 (91)

The most common presenting symptoms were headaches, reported by 71% of patients interviewed; fever, reported by 68%; weight loss, reported by 52%; itching, reported by 44%; pain in other body parts reported by 33%; psychological problems, reported by 30%; and swollen glands, reported by 27%. Of the women interviewed, 26% reported amenorrhoea; impotence was reported by 32% of the men.

Thirty-three patients (50%) had first reported to a public health facility, either a health centre (24 patients), a hospital (six patients) or a specialized HAT centre (four patients). Of the remaining 33 patients, 10 had first reported to a qualified private practitioner and 23 to an unqualified private practitioner; their first point of contact with the public health system was a health centre for 23, a general hospital for five and a specialized HAT facility for the remaining five. Thus, 46 of 66 patients (70%) entered into the public health system through a health centre.

Reported patient delay ranged from 1 day to more than 5 years, with a median of 4 months (IQR 1–10 months), and was slightly but not significantly shorter in Bandundu (median 3.5 months) than in East Kasai (median 4.5 months, $P = 0.35$). Among the 33 patients with a patient delay above the median, 16 (48%) mentioned financial constraints as the reason for not presenting

earlier; 10 (30%) thought the symptoms would go away by themselves, eight (24%) thought nothing could be done about the symptoms, and seven (21%) had no means of transport to go to a health service.

The median delay within the official health system reported by patients was 2 months (IQR 0.5–11 months, $n = 29$). There were differences, though, between types of public facilities. Whereas public hospitals did reasonably well with a median delay of 1 month (IQR 0–3 months), public health centres did much worse with a median system delay of 7 months and 25% of their patients even reporting delays of more than 1 year (IQR 2–14 months, $P = 0.07$).

The total diagnostic delay ranged from 6 days to more than 3 years with a median of 10 months (IQR 6–21 months).Details on all diagnostic delays (patient, health system and total) by type of facility first visited are presented in Table 2.

Seven patients indicated having been diagnosed upon their first consultation; among those were the four who had directly presented to a specialized HAT facility and three more who had first presented to a district hospital. For all patients combined, the median number of facilities visited prior to the visit of diagnosis was 3, with an IQR from 2 to 6 and a maximum of 12.

Of all patients interviewed, 57 were able to provide information on expenses incurred in the process of being diagnosed with HAT. The median reported expenditure was 40 900 Congolese Franc (CDF) (936 CDF = 1 USD), with an IQR of 23 500–63 600 and a maximum of 130 800 CDF. Most money was spent on feeding while hospitalized (Median 15 000 CDF; IQR 8000–24 500 CDF), buying drugs (Median 7000 CDF; IQR 1000–16 500 CDF) and hospitalization fees (Median 3000 CDF; IQR 1000–5000 CDF).

Discussion

In our sample of 66 passively detected patients with HAT, we observed major diagnostic delays, both patient and health services related. Financial constraints were most often mentioned as a reason for delaying health care seeking. The median reported expenditure up to the moment of diagnosis, equivalent to 44 US$, is considerable among a rural population in a country where 79.6% live on <2 US$ a day (World Bank 2006). Health service delay was short in specialized HAT facilities and in hospitals but much longer in health centres. For 46 of 66 patients enrolled, health centres were the first point of contact with the health services. Although 80% of our patients lived in villages that had been visited by mobile screening teams, only 9% had actually participated in such screening. Lack of participation rather than lack of coverage or lack of quality of the screening programme appears to be the main constraint. Overall participation rates are certainly higher because our sampling frame excluded patients detected through the screening programme, yet our findings appear to confirm the observations of Robays *et al.* (2007) that participation in the screening drops once the prevalence of HAT diminishes. The coverage of the screening programme is also likely to drop over the coming years as funding is expected to be reduced. There is thus an urgent need to reinforce passive case finding.

Since HAT is a disease that mostly affects impoverished rural communities, reducing patient delay should certainly be attempted but may be hard to achieve. There is however also a substantial system delay occurring within the public health system; addressing this delay needs to be a priority because raising HAT awareness among the population will only be beneficial if the health system is ready to properly manage HAT suspects. This study was performed in the two most HAT endemic provinces of the DRC; even there the median diagnostic delay incurred after presenting to public first-line health care facilities was 7 months; for 25% of patients, this delay was more than 1 year. Health system delay is likely to be even worse in provinces where HAT is less commonly diagnosed. From the fact that prior to being diagnosed with HAT, half of the patients had already consulted a health facility three times or more, we may assume that in all probability, many HAT cases remain undiagnosed.

Table 2 Delay by type of health facility first consulted

Type of health facility first consulted	*n*	Median patient delay in months (IQR)	Median system delay in months* (IQR)	Median total delay in months (IQR)
Public hospital	6	9 (2–17)	1 (0–3)	16 (6–17)
Public health center (general)	23	1 (0.5–9)	7 (2–14)	10 (5–20)
Specialized HAT center	4	4 (2–7)	0 (0–0)	4 (2–7)
Private practitioner (qualified)	10	1 (0–5)		9 (6–33)
Private practitioner (unqualified)	23	7 (4–20)		15 (7–23)

*Within the official public health system.

Improving management of HAT suspects within the general health care system poses many challenges. Some of these challenges are related to the disease but could be mitigated through a well-organized health care system, incorporating general and specialized health workers (Simarro *et al.* 2008). Presenting symptoms of HAT in the early stages are fairly non-specific and may mimic many other conditions. Because HAT control has always been an entirely vertical programme and because HAT is a relatively rare disease, general health workers are often not aware of when to suspect HAT and how to manage HAT suspects. Although leprosy has more distinct clinical signs and symptoms, the fact that the disease is also relatively rare poses similar challenges. Leprosy control programmes have solved these by maintaining a referral possibility at district level and through regular supervision of general health facilities by a specialized health worker (WHO 2006). Depending on the prevalence of leprosy, peripheral health workers are either expected to just suspect and refer or to diagnose and initiate treatment in diagnostically uncomplicated cases. All cases are eventually certified, registered and reported by a specialized health worker. Such a health worker can be responsible for more than one disease; leprosy and tuberculosis are often dealt with by the same supervisor.

In case of HAT, the system would need to include hospitals that can provide full diagnostic and treatment services with involvement of peripheral health centres according to their possibilities. The diagnostic options for health centres could be (i) to simply suspect and refer; (ii) to suspect, perform a CATT test and refer if positive; or (iii) to suspect, perform a CATT test and if positive, perform confirmatory tests. Confirmatory tests could range from just a thick film in any centre that is able to perform microscopy for malaria to the more sensitive tests such as mini anion exchange centrifugation technique or capillary tube centrifugation (Chappuis *et al.* 2005). If any of those tests is positive and the centre is able to also perform a lumbar puncture, the diagnostic process can be completed within the facility; in all other cases, a patient with a positive CATT test would need to be referred to a higher level. This strategy will only apply to new patients, without a history of previous HAT diagnosis or treatment. All those with a history of HAT who again have complaints need to be assessed by a specialized health worker. Apart from the level of HAT endemicity, the utilization rate of the health facility should be another important criterion to decide where to make available permanent HAT diagnostic facilities. Attendance rates of health centres in the DRC are typically low, <0.15 visits per inhabitant per year (Wembonyama *et al.* 2007).

The process of referral for all patients could be made easier if, as is practiced in tuberculosis and leprosy control programmes, a visiting supervisor attends each health facility at fixed dates. The health worker can then ask the patient to come back that day; another conceivable option would be for the health worker to collect capillary blood samples on filter paper and have them examined by the supervisor on the day of his (her) visit (Hasker *et al.* 2010b). A supervisor needs to have adequate knowledge of diagnosis and treatment of HAT, but given the constraints in availability of human resources can deal with more than one disease. Most of all supervision needs to be a well-planned regular process (WHO 2005).

This study has limitations: we were unable to contact 29 of 100 cases included in the sample, and four more cases had to be excluded because of having a history of previous HAT treatment. However, among the remaining 67 patients contacted, only one did not agree to participate. Of those we were not able to contact, the vast majority (25) had incorrect addresses, were temporarily absent or had moved; there seems to be no reason to assume that their profile differed systematically from those interviewed. Three of the remaining four cases not interviewed had died, and one could not be visited because his village was inaccessible; in all probability, not including these patients did not cause us to overestimate delay.

A factor that did almost certainly cause us to underestimate delay is the fact that we could enrol only those who were actually diagnosed with HAT. Among this group, one in two has a diagnostic delay of 10 months or more. This means that in all probability, a substantial proportion of HAT patients die without ever being diagnosed.

Conclusion

Patients detected passively currently make up about 50% of all patients with HAT in the DRC. With active case finding likely to be scaled down further in the near future, passive case detection will become even more important. We found significant patient and health system delays; the latter being a major problem in public health centres. Because public health centres are the first point of contact with the health system, there is an urgent need to improve their performance. HAT is a relatively rare disease with few or aspecific early signs and symptoms; raising the awareness and skills of general health services staff is necessary but will not be sufficient. In addition, a strong referral system and regular supervision are essential. Just as is the case for leprosy and tuberculosis, integration of HAT into general health care services will not obviate the need to maintain a well-organized technical support component.

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