ORIGINAL ARTICLE

Performance of the South African triage score among HIV positive individuals presenting to an emergency department

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ABSTRACT

Introduction: Over a quarter of patients presenting to South African Emergency Centres (EC) have concurrent human immunodeficiency virus (HIV), yet it is unclear how this impacts their presenting complaints, the severity of illness, and overall resource needs in the EC. The primary objective of this study was to compare the performance of the South African Triage Score (SATS) in people living with HIV (PLWH) compared to HIV-negative patients. Secondary objectives included comparing the presentation characteristics and resource utilisation of these populations.
Methods: A prospective cross-sectional observational study was conducted in the Livingstone Hospital EC, Gqeberha, South Africa, to compare triage designation and clinical outcomes in PLWH and HIV-negative patients. In this six-week study, all eligible patients received point-of-care HIV testing and extensive data abstraction, including SATS designation and EC clinical course. Descriptive statistical analysis was completed, and a log-binomial model was used to examine the association between HIV status and clinical outcomes using crude (unadjPR) and adjusted prevalence ratios (adjPR).
Results: During the study period, 755 adult patients who consented to a POC HIV test were enrolled, of which 193 (25.6%) were HIV positive. HIV-positive patients were significantly more likely to be admitted compared to their HIV-negative counterparts when triaged as low acuity (adjPR 1.48, 95% CI 1.14-1.92, (p=0.003)). HIV-positive patients were also significantly more likely to receive laboratory testing when triaged as low acuity (adjPR 1.31, 95% CI 1.08-1.59 (p=0.006)) and as high acuity (adjPR 1.38, 95% CI 1.08-1.59 (p=0.034)) compared to HIV negative patients of the same triage categories.
Conclusion: In our study, PLWH, compared to HIV-negative patients in the same category, were more likely to be admitted and require more EC resources, thus alluding to possible under triage of HIV-positive patients under the current SATS algorithm.

Introduction

Hospital Emergency Centres (ECs) play a key role in healthcare service delivery by providing acute care to patients with varying clinical presentations. Across ECs in South Africa, patients commonly present with Human Immunodeficiency Virus/Acquired Immune Deficiency Syndrome (HIV/AIDS)-related illness, poverty-influenced conditions, non-communicable chronic diseases, and traumatic injuries [1,2]. In 2016, the prevalence of HIV among women and men aged 15-49 in South Africa was 21%, with KwaZulu Natal as the highest burdened province (30%). The Eastern Cape had a 20% HIV prevalence among the same population [3]. With the advent of antiretroviral treatment initiation at HIV diagnosis, improved control of the disease means HIV screening and management can be offered at primary healthcare facilities, as is the case for other chronic diseases [4–6].

However, many new diagnoses of HIV are still made in ECs, where patients frequently present with complications of HIV [7,8,9]. A study conducted in the Eastern Cape showed that over a quarter of patients

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who present to ECs do not know their HIV status and, when tested, almost a third are positive [7]. This has implications for the differential diagnosis and resource needs of these patients in the EC [7]. EC patients have a higher prevalence of both known and unknown HIV but also have lower rates of viral suppression. [7,8,10]. It is unclear if the current triage and treatment algorithms designed for all EC patients meet the needs of PLHIV.

Triage is a key tool to help prioritise care by sorting patients into groups based on the perceived severity of illness [11–13]. The widely used South African Triage Score (SATS) was modified from the Triage Early Warning Score (TEWS) and the Modified Early Warning Score (MEWS) triage systems [12,13]. Using SATS, patients are triaged by their presenting complaint and six health parameters (i.e., blood pressure, heart rate, respiratory rate, temperature, mobility, and level of consciousness) [12]. SATS has been validated for use in both urban and rural healthcare centres [14–18]. Triaged patients are assigned to receive care as emergent, very urgent, urgent, and routine. Under ideal conditions, emergent patients are seen immediately upon arrival (most often requiring resuscitation), very urgent patients are seen within 30 minutes of arrival, urgent patients within the hour, and routine cases thereafter. However, the high number of patients and constrained resources in the EC often cause patients to wait much longer than these ideals, delaying their access to care [19]. SATS was designed to triage all patients presenting for care, both with medical and trauma complaints, and identification of co-morbidities such as HIV is not a component of the triage algorithm. Our study seeks to explore the performance of SATS in PLHIV.

The protean manifestations of HIV could mean PLWH do not conform to the same parameters of ill health used by SATS for the general population [20]. Although there are limitations, proxies for the severity of illness commonly used in triage tool validation studies include resource utilisation and/or disposition (admission, discharge, or death) [14,17,21,22]. This study aims to compare the SATS designation against the disposition of PLWH compared to HIV-negative patients presenting to the EC with medical complaints. The study also aims to describe the clinical and demographic characteristics and resource utilisation by PLWH in the EC. We hypothesise that PLWH who have similar triage scores to HIV-negative patients are more likely to be admitted and require more EC resources.

Methods

Study site

This study is a secondary data analysis of a prospective cross-sectional serological observational study, the Walter-Sisulu Infectious Diseases Screening in the Emergency Department (WISE) study. The original parent study was completed in East London with subsequent patient enrolment and data collection in Mthatha and Gqeberha following identical recruitment, enrolment, consent and data collection procedures described a publication from the Frere study period [7]. The overall premise of the WISE study was to quantify the burden of HIV among EC patients in the Eastern Cape, South Africa. In Gqeberha, South Africa, patients were enrolled over a six-week period from 4 June to 15 July 2018 at Livingstone Hospital. Only data collected from Livingstone Hospital were included in this analysis.

Livingstone Hospital is a tertiary care facility within the Eastern Cape Province of South Africa. It is part of a hospital complex which consists of 2 other hospitals that provide further specialised services that are unavailable at Livingstone Hospital, i.e., Port Elizabeth Provincial Hospital (a regional hospital providing ophthalmology, otolaryngology, urology, cardiothoracic and plastic surgery services) and Dora Nginza Hospital (a regional hospital providing obstetrics and gynaecology). Patients presenting to Livingstone Hospital that required care from these services were transferred from Livingstone Hospital. The hospital provides 24-hour emergency medical and trauma care service seven days a week to

patients within a 200km radius and attends to both walk-in and referred patients. The unit is run by specialist emergency medicine physicians, medical officers, and nurses of varying levels of experience. There are approximately 50 beds, and is staffed by two doctors per shift. Laboratory testing is available 24 hours a day. Approximately 100 patients are seen per day.

Data collection, outcomes, and analysis

The study team collected data on standardised case report forms (CRF) and included the following variables: age, gender, vital signs, time of presentation, mode of transport to the hospital, SATS designation, investigations performed, disposition, and HIV rapid point-of-care (POC) finger prick testing status and results. All information, including SATS allocation, was collected as per the EC hospital records of the attending healthcare provider. CRFs were scanned and entered using intelligent character recognition DataFax software (DataFax©, Clinical DataFax Systems Inc., Hamilton, Ontario, Canada). Independent data technicians double verified the data centrally.

The primary outcome was to compare the SATS allocation to the patients' ultimate disposition and resource needs by HIV status. Patients triaged as emergent ("Red") or very urgent ("Orange") were assigned the designation "High Acuity," while patients triaged as urgent ("Yellow"), or routine ("Green") were assigned the designation "Low Acuity" for data analysis. A similar classification system was used in two other studies assessing triage systems [14,21]. Triage designations were combined for this study due to small numbers across the four triage designations and concern about the possible overlap between urgent and routine, and emergent and very urgent. Thus combining groups to create a binary categorisation will minimise this effect. Further explanation of the SATS triage categories and their interpretation can be found elsewhere [12]. In addition, demographic characteristics, clinical profile, and EC resource utilisation of PLWH were compared to HIV negative patients. Resource utilisation includes laboratory testing and imaging (ultrasound, X-ray, CT, MRI). Laboratory testing included complete blood count and complete metabolic panels and did not include HIV or related testing. For this sub-analysis, patients with trauma complaints were excluded as it was unlikely that the acuity of illness and acute initial management of a trauma patient would be influenced by HIV status.

Descriptive statistical analysis was done using STATA v.15© (StataCorp, LLC, Texas). A log-binomial model was used to examine the association between HIV status and clinical outcomes using crude (unadjPR) and adjusted prevalence ratios (adjPR). In situations where the log-binomial model failed to converge, modified Poisson regression with robust variance were used.

Ethical Considerations

Ethical approval for the study was received by Johns Hopkins University School of Medicine Institutional Review Board (ref: IRB00105801), the Walter Sisulu University Human Research Ethics Committee (ref: 002/2016), and the University of Cape Town Human Research Ethics Committee (ref: 401/2013). All enrolled participants provided written informed consent to receive a point of care HIV test result and have their clinical data reviewed regarding the presentation and their EC course.

Results

Of the 1783 patients enrolled in the study, 999 patients (56.0%) had non-trauma-related presenting complaints and a documented SATS triage designation and thus were included in the secondary analysis. Among these, 755 (75.6%) patients consented to HIV testing and thus had their HIV status determined and were included in the final analysis. Overall, 193 (25.6%) patients were diagnosed as HIV positive (Figure 1). The majority of the HIV-positive group were between 30-39 years old
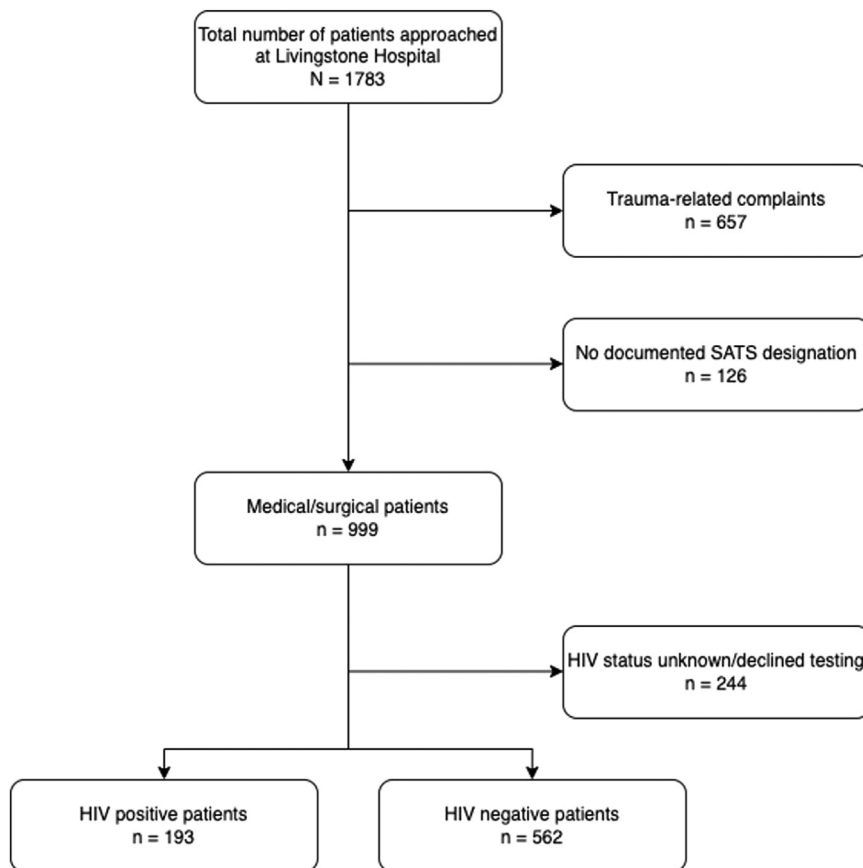
(n=71, 36.8%), compared to the HIV-negative group who were between 20-29 years old (n=162, 28.8%) (Table 1). Most patients from both groups presented after working hours (i.e., after 5 pm and before 8 am the next day), used their own transport to reach the EC, and were self-referrals. More PLWHs used ambulances services as opposed to other modes of transport compared to HIV-negative patients (38.9% vs 28.3%, respectively). There was a significant difference between the presenting complaints across the four groups (PWLH/Low Acuity, PLWH/High Acuity, HIV negative/low Acuity and HIV negative/High acuity). A higher percentage of PLWH who were triaged as low acuity presented with abdominal pain, non-specific body pain, shortness of breath and headache compared to HIV-negative patients in the same category. General weakness was more common in PLWH with high acuity triage scores compared to HIV-negative patients.

Triage status of patients

A triage status of high acuity was more common in PLWH compared to HIV-negative patients (16.1% and 10.3%, respectively; p = 0.033) (Figure 2). However, most patients across both groups were triaged with low acuity. Figure 2 compares the triage score of both cohorts as per the SATS categories. Emergency and Very Urgent are considered '*High acuity*' and Urgent and Routine as '*Low acuity*' in this study (figure 2).

Resource utilisation and patient disposition

Table 2 shows PLWH in the low acuity category underwent more laboratory testing than HIV negative patients in the same category (55.4% vs 40.6% respectively; p < 0.001). PLWH were also more likely to be admitted (low acuity 12.3%, high acuity 35.5%) compared to HIV negative patients (low acuity 8.3%, high acuity 19.0%) (p<0.001).

SATS performance in PLWH

Comparisons of the prevalence of image utilisation, laboratory testing and admission by a composite variable combining HIV status (positive/negative) and triage designation (HA/LA) are shown in Table 3. This composite variable was created to discern differences in resource utilisation and disposition among people with differing HIV status within the same category. When adjusted for age and sex, the odds of laboratory testing in PLWH triaged as low acuity was 31% higher (p = 0.006) and the odds of admission was 48% higher (p = 0.003) than HIV-negative individuals of the same triage category (Table 3). No significant differences were seen between PLWH and HIV-negative patients triaged as low acuity in terms of imaging utilisation. The odds of laboratory testing in PLWH triaged as high acuity were 38% higher than HIV negative patients triaged as high acuity when adjusting for age and sex (p = 0.034). No significant differences were seen in imaging utilisation or admission rates when comparing PLWH and HIV-negative patients triaged as high acuity.

Discussion

Overall, PLWH presenting to the EC are more likely to require laboratory testing and be admitted to the hospital compared to HIV-negative patients. In the low-acuity triage category, in particular, the likelihood of admission is higher among PLWH, which suggests that PLWH may be at a higher risk of being under-triaged compared to their HIV-negative counterparts. The acute clinical presentation of chronic diseases to ECs usually depends on the stage of illness and initiation and adherence to treatment. However, with HIV, there can be a discordance between acute clinical presentation and disease severity, especially early on after infection with HIV (i.e., where patients appear clinically well despite low CD4 counts) [23]. In clinic-based settings, HIV viral load is recom-

Table 1
Characteristics of included patients by HIV status and triage designation

	PLWH (N = 193)		HIV Negative (N = 563)		Total (N = 755)	Chi-squared (p-value)[*]
	Low Acuity (n = 162)	High Acuity (n = 31)	Low Acuity (n = 504)	High Acuity (n = 58)		
Age						
<20	0 (0.0%)	0 (0.0%)	20 (4.0%)	3 (5.2%)	**23 (3.05%)**	<0.001[**]
20-29	30 (18.5%)	3 (9.7%)	147 (29.2%)	15 (25.9%)	**195 (25.8%)**	
30-39	58 (35.8%)	13 (41.9%)	103 (20.4%)	13 (22.4%)	**187 (24.8%)**	
40-49	42 (25.9%)	7 (22.6%)	101 (20.0%)	11 (19.0%)	**161 (21.3%)**	
≥50	32 (19.8%)	8 (25.8%)	133 (26.4%)	16 (27.6%)	**189 (25.0%)**	
Sex						
Female	99 (61.1%)	17 (54.8%)	240 (47.6%)	31 (53.4%)	**387 (51.3%)**	0.026[**]
Male	63 (38.9%)	14 (45.2%)	264 (52.4%)	27 (46.6%)	**368 (48.7%)**	
Time of presentation						
Routine hours	57 (35.2%)	9 (29.0%)	158 (31.3%)	22 (37.9%)	**246 (32.6%)**	0.619
After hours	105 (64.8%)	22 (71.0%)	346 (68.7%)	36 (62.1%)	**509 (67.4%)**	
Day of presentation						
Monday	30 (18.5%)	4 (12.9%)	76 (15.1%)	6 (10.3%)	**116 (15.4%)**	0.152
Tuesday	20 (12.4%)	1 (3.2%)	88 (17.5%)	6 (10.3%)	**115 (15.2%)**	
Wednesday	26 (16.0%)	1 (3.2%)	83 (16.5%)	13 (22.4%)	**123 (16.3%)**	
Thursday	21 (13.0%)	5 (16.1%)	77 (15.3%)	10 (17.2%)	**113 (15.0%)**	
Friday	24 (14.8%)	7 (22.6%)	59 (11.7%)	9 (15.5%)	**99 (13.1%)**	
Saturday	21 (13.0%)	9 (29.0%)	63 (12.5%)	6 (10.3%)	**99 (13.1%)**	
Sunday	20 (12.3%)	4 (12.9%)	58 (11.5%)	8 (13.8%)	**90 (11.9%)**	
Mode of Presentation						
Ambulance	57 (35.2%)	18 (58.1%)	136 (27.0%)	23 (40.0%)	**234 (31.0%)**	0.022[**]
Police	4 (2.5%)	1 (3.2%)	10 (2.0%)	1 (1.7%)	**16 (2.1%)**	
Self-Transport	101 (62.3%)	12 (38.7%)	356 (70.6%)	34 (58.6%)	**503 (66.6%)**	
Unknown	0 (0.0%)	0 (0.0%)	2 (0.4%)	0 (0.0%)	**2 (0.3%)**	
Referral						
New Complaint	123 (75.9%)	27 (87.1%)	420 (83.3%)	45 (77.6%)	**615 (81.5%)**	0.066
Referred	36 (22.2%)	4 (12.9%)	73 (14.5%)	9 (15.5%)	**122 (16.2%)**	
Return Visit	3 (1.9%)	0 (0.0%)	11 (2.2%)	4 (6.9%)	**18 (2.4%)**	
Presenting Complaint						
Abdominal Pain	25 (15.4%)	2 (6.4%)	67 (13.3%)	7 (12.1%)	**101 (13.4%)**	0.008[**]
Non-specific Pain	22 (13.6%)	2 (6.4%)	58 (11.5%)	5 (8.6%)	**87 (11.5%)**	
Shortness of Breath	19 (11.7%)	4 (12.9%)	35 (6.9%)	7 (12.1%)	**65 (8.6%)**	
Headache	13 (8.0%)	2 (6.4%)	29 (5.7%)	1 (1.72%)	**45 (6.0%)**	
Chest Pain	9 (5.6%)	3 (9.7%)	58 (11.5%)	9 (15.5%)	**79 (10.5%)**	
General Weakness	6 (3.7%)	7 (22.6%)	8 (1.59%)	5 (8.6%)	**26 (3.4%)**	

[*] Chi-squared analysis for this table examines the differences between the four groups in this study: PLWH/Low Acuity, PLWH/High Acuity, HIV negative/Low Acuity, and HIV negative/High Acuity

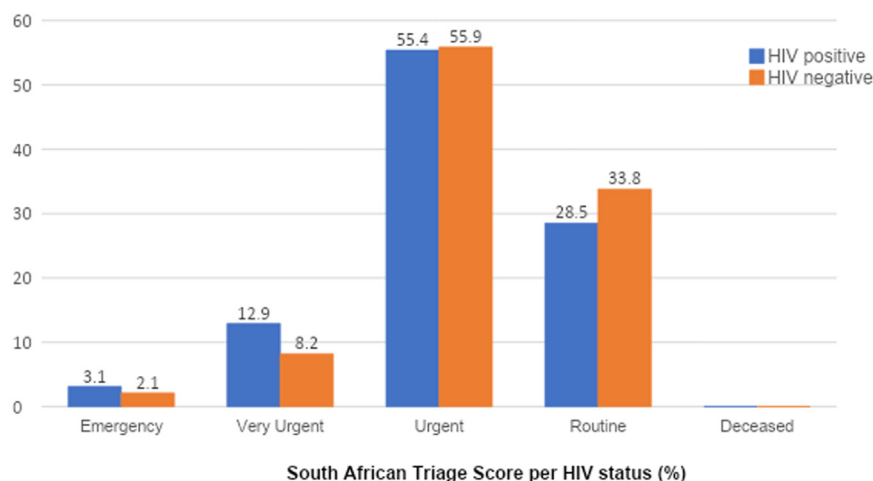[**] Indicates a statistically significant result

Figure 2. South African Triage Score per HIV status (%)

South African Triage Score per HIV status (%)

mended as a marker of disease severity and prognosis [24]. However, in ECs, where blood results are not immediately available, this is not a feasible strategy to augment the triage process. Furthermore, trauma cases may demand more immediate attention in the EC, and since PLWH are more likely to present with medical complaints, this may further delay care for PLWH, enabling progression of acute illness and increasing the likelihood of admission [25]. Lastly, in busy EC settings, delays in care are further compounded by a lack of staff, and less frequent monitoring, which increases the risk of complications while awaiting care [26].

The finding that laboratory testing was higher among PLWH is consistent with the literature and demonstrated across high and low-income settings as well as setting with a both high and low prevalence of HIV. [8,27,28]. A study from South Africa showed that HIV-positive were twice as like to receive abdominal ultrasounds and blood cultures [28].

Table 2

Resource Utilisation and Disposition of patients by HIV status and triage designation[†,**]

	PLWH (N = 193)		HIV Negative (N = 563)		Total (N = 755)	Chi-squared (p-value)
	Low Acuity (n = 162)	High Acuity (n = 31)	Low Acuity (n = 504)	High Acuity (n = 58)		
Imaging Completed						
Yes	107 (66.0%)	25 (80.7%)	333 (66.1%)	46 (79.3%)	**511 (67.7%)**	0.080
No	55 (34.0%)	6 (19.3%)	171 (33.9%)	12 (20.7%)	**244 (32.3%)**	
Laboratory Testing						
Yes	83 (51.2%)	24 (77.4%)	195 (38.7%)	33 (56.9%)	**335 (44.4%)**	<0.001[*]
No	79 (48.8%)	7 (22.6%)	309 (61.3%)	25 (43.1%)	**420 (55.6%)**	
Disposition						
Death	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	**0 (0.0%)**	<0.001[*]
Admission	60 (37.0%)	16 (51.6%)	126 (25.0%)	20 (34.5%)	**222 (29.4%)**	
Discharge	90 (55.6%)	14 (45.2%)	333 (66.1%)	37 (63.8%)	**474 (62.8%)**	
Absconded	9 (5.6%)	1 (3.2%)	44 (8.7%)	0 (0.0%)	**54 (7.1%)**	
Unassigned	3 (1.8%)	0 (0.0%)	1 (0.2%)	1 (1.7%)	**5 (0.7%)**	

[*] Indicates a statistically significant result

[**] Urgent and Routine Triage patients were deemed "Low Acuity;" Very Urgent and Emergent Triage patients were deemed as "High Acuity."

[†] Complete Blood Count, Complete Metabolic Panel, HIV

Table 3

Prevalence ratio (PR) of outcomes of low acuity and high acuity patients by HIV status[†,‡]

	Low Acuity						High Acuity					
	Unadjusted			Adjusted[*]			Unadjusted			Adjusted[*]		
	PR	95% CI	p-value	PR	95% CI	p-value	PR	95% CI	p-value	PR	95% CI	p-value
Imaging Utilisation												
HIV negative	1.00	Ref	Ref	1.00	Ref	Ref	1.00	Ref	Ref	1.00	Ref	Ref
HIV positive	1.00	0.88-1.13	0.996	0.99	0.87-1.13	0.916	1.02	0.82-1.26	0.881	1.00	0.81-1.24	0.996
Laboratory Testing												
HIV negative	1.00	Ref	Ref	1.00	Ref	Ref	1.00	Ref	Ref	1.00	Ref	Ref
HIV positive	1.32	1.10-1.60	0.003**	1.31	1.08-1.59	0.006**	1.36	1.01-1.83	0.041**	1.38	1.03-1.87	0.034**
Admission												
HIV negative	1.00	Ref	Ref	1.00	Ref	Ref	1.00	Ref	Ref	1.00	Ref	Ref
HIV positive	1.48	1.15-1.90	0.002**	1.48	1.14-1.92	0.003**	1.50	0.91-2.45	0.110	1.32	0.83-2.10	0.238

[*] Adjusted for age and sex

[**] Designates a statistically significant result

[†] Complete Blood Count, Complete Metabolic Panel

[‡] admission is defined as a disposition of "admission" or "transfer."

This could be explained by the varying and subtle presenting symptoms and signs in both early and advanced HIV infection. In addition, increased resource utilisation, particularly of laboratory investigations, results in a longer length of stay in the EC, which has been independently shown to increase the likelihood of acute complications prior to and while accessing care in busy EC settings [7,12,13].

Our study indicates that HIV-positive patients are potentially more vulnerable to under triage. As such further study into incorporating HIV status into triage tools, especially in areas of high HIV prevalence, is needed. Some success has been shown in identifying clinical signs of ill-health beyond SATS through an alternative screening tool for PLWH. A study based at two hospitals in Johannesburg and Cape Town in South Africa created a screening protocol tool with more detailed questions about the presenting symptoms of PLWH to determine disease severity, and the level of care needed [29]. Its success relies on adequate training of EC medical staff to discern clinical discriminators of ill-health from vital signs to avoid the under-triage of patients. Evaluation of the tool found that patients often had multiple complaints (16% had five or more physical complaints) and sometimes poorly self-described their symptoms (40%), impacting the performance of the tool [29]. While training healthcare workers to perform more detailed triage and educating patients about the importance of providing as much detail as possible into their presenting complaint is feasible, these strategies are also challenged by resource-constrained and understaffed settings with high patient numbers presenting to the emergency department [27,30]. Haukoos et al. explored the use of a clinical triage instrument which

required less in-depth details but included a breadth of other symptoms (fever, sweating, ataxia, dizziness, cough, and aphasia) for HIV-infected patients, but was found to have inadequate performance for clinical use [20]. These studies acknowledge the importance of tailored triage of PWLH and highlight the challenges associated with their evaluation and the development of such tools.

While antiretroviral treatment initiation on diagnosis has shifted the focus on HIV from an acute life-threatening illness to a chronic disease, differences remain in how PLWH present with acute complaints to the EC compared to people without HIV. The data provided in this study is important to advance the understanding of those differences and the performance of SATS in this population. Further studies should investigate how the inclusion of HIV status in the triage score may enable more timely management of these patients and whether more detailed HIV symptomatology screening would be beneficial for these patients to access prioritised care.

Limitations

This study is a secondary analysis of an existing dataset which was intended to collect HIV incidence and prevalence data in an EC. This means that outcome measures for this study were based on the available data from the parent study. Direct causation between triage score and disposition in the EC cannot be determined, given the cross-sectional nature of the study. Correlation between the two is made using surrogate markers to assess SATS performance- which is less than ideal, but other

types of studies are unlikely to be appropriate to validate SATS for this population in an EC setting.

Disposition data used for this study was based on EC records, and case report forms were completed by researchers rather than clinicians. As a result, there may be inconsistency in differentiating between final diagnoses and presenting complaints with the terminology used for a patient's presenting complaint being used as the final made disposition data difficult to interpret. Follow-up of patients who were admitted to the hospital to determine the patients' final outcomes would also be useful to understand the patient's acuity of illness in the EC. The classification used in this study (high acuity vs low acuity), although similar to that seen in the broader literature, may have overlooked the differences within triage score groups, but this approach was taken due to the small sample size. Furthermore, the high refusal of HIV testing and absconding rates could have influenced the results described. The study site being a single tertiary centre limits generalisability and requires validation of findings by further prospective data collection and analysis at multiple sites.

Conclusion

PLWH have higher rates of resource utilisation and hospital admission following presentation to the EC compared to HIV-negative patients. This is particularly significant for PLWH who were triaged at lower acuity levels (i.e., routine or urgent categories). Further consideration needs to be given to the use of SATS and other such triage tools in settings where HIV prevalence is high. It is also likely that incorporating HIV status determination or including clinical discriminators specifically for HIV-associated illness will improve the accuracy of the triage process and thus enable more timely access to care for HIV-positive patients who present to the EC.

Declaration

None.

Dissemination of results

The results of this study were shared with the staff and senior management of Livingstone Tertiary Hospital.

Author contributions

Authors contributed as follows to the conception or design of the work; the acquisition, analysis, or interpretation of data for the work; and drafting the work or revising it critically for important intellectual content: RM and LJ contributed 60% together; EH contributed 25%, and BH 10%; TQ, AR, SR, and JB contributed 5% together. All authors approved the version to be published and agreed to be accountable for all aspects of the work.

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Declaration of Competing Interest

The authors declare no conflicts of interest.

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