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Reaching the right facility for emergency patients - destinations of patients transported by emergency medical services in Kigali, Rwanda

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Abstract

Background Ensuring that emergency patients reach the right healthcare facility at the right time is a key component of providing quality emergency care. Rwanda's prehospital emergency care system, Service D'Aide Médicale Urgente (SAMU), was established in 2007 to provide prehospital emergency care services, but a formal assessment of the receiving facilities has not been done. We explored the characteristics of patients transported by SAMU to identify factors influencing the choice of destination health facilities.

Methods We retrospectively analyzed SAMU data documenting patients transported in Kigali in 2022. The main dataset included patient sex, age, emergency condition, insurance status, and destination facility. For a subset of patients, additional data were available on clinical variables such as Glasgow Coma Score (GCS), variables to permit derivation of the Triage Early Warning Scores (TEWS), and an assessment of urgency made by the ambulance team. Facilities receiving patients transported by SAMU were categorised into health centers, district hospitals, and tertiary hospitals. Results are described for the main dataset, and associations between facility type and patient characteristics were determined using multinomial logistic regression on the subset of patients with additional clinical variables.

Results Data was available for 7,221 patients. The majority were male (65%), with a mean age of 34 years (SD = 16). The leading three emergency conditions were trauma (66%), gynecological and obstetric conditions (9%), and medical conditions (17%). Most patients were received by district hospitals (47%), followed by health centers (36%), and tertiary hospitals (17%). We also found that patients with urgency classified as "extreme" had a 49%, 37%, and

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14% probability of being transferred to tertiary hospitals, district hospitals, and health centers respectively. Similarly, patients with TEWS of 7 or higher had a 53%, 29%, and 18% chance of being transported to tertiary hospitals, district hospitals, and health centers respectively. Age, sex, and insurance status were not associated with facility type. In the multinomial analysis, patients with trauma had a 44%, 38%, and 18% probability of being transferred to district hospitals, health centers, and tertiary hospitals respectively. Women with obstetrics and gynecology conditions had a 56%, 35%, and 8% probability of being transported to district hospitals, health centers, and tertiary hospitals respectively.

Conclusion We identified that patients' age and urgency of the condition were associated with destination; however, insurance and TEWS scores were found to have less influence.

Keywords Ambulance, Emergency medical services (EMS), Service D'Aide Médicale Urgente (SAMU), Rwanda

Background

Emergency Medical Care Services (EMS) play a crucial role in saving lives and reducing disability by providing immediate assistance to individuals at the scene and transporting patients to the right facility to treat their condition in a timely manner [1, 2]. Delays in seeking and reaching quality healthcare contribute 40% to avoidable mortality after injury, and many patients with time-critical conditions die without ever accessing healthcare [3, 4]. Unfortunately, in many low- and middle-income countries (LMICs), the EMS is fragmented and lacks coordination [5]. These challenges contribute to delays in timely transport to healthcare facilities capable of treating the patient's condition [6].

In 2007, the Rwandan Ministry of Health (MoH) established a prehospital emergency care system known as Service D'Aide Médicale Urgente (SAMU). The service is covered by the Rwandan community-based health insurance [7, 8]. SAMU provides scene-to-facility (primary) and interfacility (secondary) transfers. In 2022, SAMU operated in Kigali with a fleet of over 300 ambulances connected through a central dispatch center and a dedicated emergency service number, "912" [9]. The prehospital care services are administered by ambulance crews consisting of nonphysician anesthetists and registered nurses. In the Rwandan setting, nonphysician anesthetists usually complete three years of college education and are trained to provide anesthetic services, including anesthesia administration, respiratory care, cardiopulmonary resuscitation, and other life-sustaining interventions [10]. Approximately 8,000 patients are transported annually and ambulances are not limited to particular types of emergency conditions. In Kigali, multiple healthcare facilities receive patients from EMS, including three tertiary hospitals, five district hospitals, 38 health centers, and 42 health posts. Ambulance crews select the appropriate facility based on their expertise and multiple phone calls to assess the readiness of each facility to receive patients [11]. There are no formal protocols to guide decision-making for patient destination or field triage; therefore, acuity is assessed based on the judgment of experienced field staff [11].

Understanding the characteristics of patients transported using SAMU and the facilities they are transported to is important to plan improvements in the service planning and delivery to ensure patients are transported to appropriate facilities. This study aimed to describe the characteristics and emergency conditions of patients who utilized the SAMU services in Kigali in 2022. The specific objectives were to describe the distribution of patient referrals across health facility types, and understand whether current destination decisions differ depending on patient characteristics and medical conditions.

Methods

Study setting

In 2022, SAMU was operational in Kigali city and its surrounding five districts. The population of Kigali was 1.745 million; 50.9% male and 49.1% female [12]. The top 10 causes of mortality and morbidity in Rwanda, as estimated by the Institute for Health Metrics and Evaluation 2019, were: neonatal disorders, lower respiratory infection, malaria, diarrheal diseases, tuberculosis, HIV/AIDS, congenital defects, road injuries, stroke, and depressive disorders [13].

Data source and study population

We utilized routine data recorded by SAMU. Our main dataset contained information on all patient journeys in Kigali and surrounding districts in 2022; variables included patient demographics (age and sex), conditions necessitating the ambulance call (captured as 31 pre-specified conditions (see Supplementary Table 2), insurance status (captured as Community-based Health Insurance (CBHI), a Rwandaise d'Assurance Maladie (RAMA), and other specified private insurance schemes), and the facility name to which patients are transported. A subset database includes patients with additional clinical information, including classification of urgency made by the EMS ambulance team Glasgow Coma Score (GCS), blood pressure, pulse, and respiratory rate. Data are captured by the SAMU ambulance crews onto paper at the scene of the incident and completed after the incident is declared ended. Most data are transferred to an electronic database by SAMU staff, however, the detailed clinical information contained in the subset is not usually captured in an electronic form. For the sake of data completion, the study team transfered these variables into the electronic data set for a subset of patients when available on paper.

Variable definitions

As the main outcome variable, facility types to which each patient was transferred were categorised into three groups: health centers, district hospitals and tertiary hospitals. Patients treated onsite and in private clinics were categorized under health centers, given the authors' knowledge of the services offered by private clinics. Categorization was based on the existing classification of levels of hospitals in Kigali. (Supplementary Table 1 for all health facilities and their corresponding categorization).

Explanatory variables include patient sex (male or female), age (as a continuous variable) and age group (< 10,10–20,20–30,30–40,40–50,≥60), condition (categorized as trauma, obstetric and gynecology related, and medical and others - see Supplementary Table 2 for categorisations), insurance scheme (as any insurance and no insurance), ambulance staff reported urgency, GCS, and derived TEWS score. The TEWS was derived based on the South African Triage Score (SATS) guideline and available data [14]. GCS scores were converted to the AVPU scale to align with the original guidelines. The process of converting TEWS using GCS is presented in Supplementary Table 3. Temperature and mobility variables were not available, therefore we were not able to include these in the estimation of TEWs. Trauma is defined as an injury or shock to the body caused by an external force [15]. The components added to trauma are shown in Supplementary Table 2.

Data analysis

Patients with missing data on facility destinations were excluded from the analysis. Patient characteristics, sex, age (continuous), age group, emergency condition, insurance status, urgency, GCS score, TEWS score, and facility destinations are described. For categorical variables, counts and percentages are reported. For continuous variables, means, standard deviations or medians, and interquartile ranges are reported when applicable.

Multinomial logistic regression was used to examine associations between the outcome facility types and patient sex, age, emergency condition, insurance scheme, urgency, and TEWS score. We used the health center as a reference group to compare with district hospitals and then district hospitals as a reference group when we compared to tertiary hospitals to provide an intuitive interpretation of facility types. The model did not include GCS, given it was used to derivate TEWs. Assumptions for multinomial logistic regression were examined, including multicollinearity among independent variables using the variance inflation factor (VIF). Independent variables with VIF greater than or equal to 5 were removed [16]. Predictive margins were calculated to provide a more intuitive interpretation of the impact of independent variables on the outcome facility type. Adjusted relative risk ratios (aRRRs) with 95% confidence intervals are reported. Model fit was assessed using a log-likelihood ratio test. McFadden's Pseudo R-squared was used to assess the proportion of variance in the outcome explained by the model. The R statistical data analysis package and Stata V18.0 were used for all analyses [17].

Ethical considerations

Ethical approval for the study was sought from and approved by the Rwanda National Research Ethics Committee (No. 99/RNEC/2023).All data accessed were fully anonymised.

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Results

SAMU transported 7,221 patients in 2022, 99.78% (n = 7,205) of patients had data regarding the destination facility. The characteristics of patients included in the analyses in the full and sample dataset are shown in Table 1.

65% of the participants were male, mean age was 34 years (SD: 16 years). The age distribution of participants showed children less than 10 years constituted the least (3.2%) whereas 21–30 (35%) and 31–40 (27%) age groups were the most represented. Whilst females were 100% of the obstetric and gynaecology-related patients, males represented 76.0% of trauma patients and 51.3% of medical patients transported by SAMU (Supplementary Table 4). The distribution of patients transported to district hospitals, health centers, and tertiary hospitals was 47%, 36%, and 17% respectively. Trauma was the most frequently transported condition, accounting for 66% of cases, followed by the category of medical and other conditions at 18.8% and obstetric and gynecology-related issues at 9%. Approximately 55% of the patients had no insurance coverage.

Table 1 Descriptive statistics. Counts and percentages are reported unless stated otherwise

Variables	Overall Population *N* = 7,221	Subset with expanded clinical variables *N* = 1,852
Sex		
Male	4,663 (65%)	1,185 (64%)
Female	2,558 (35%)	667 (36%)
Age, mean (SD)	34 (16)	34 (16)
Age category		
<10	233 (3.2%)	63 (3.4%)
11–20	748 (10%)	175 (9.4%)
21–30	2,527 (35%)	668 (36%)
31–40	1,979 (27%)	509 (27%)
41–50	906 (13%)	223 (12%)
51–60	326 (4.5%)	84 (4.5%)
≥60	502 (7.0%)	130 (7.0%)
Receiving Facility		
Health Centers	2,608 (36%)	689 (37%)
District Hospitals	3,401 (47%)	851 (46.1%)
Tertiary Hospitals	1,194(17%)	306 (16.6%)
Condition		
Trauma	4,730 (66%)	1,258 (68%)
Obs/Gyn related	651 (9.0%)	155 (8.5%)
Medical and others	1,360 (18.8%)	496 (26.8%)
Insurance Status		
No Insurance	3,933 (54.5%)	546 (38%)
Any Insurance	3,288 (45.5%)	891 (62%)
Urgency		
Extreme		35 (2.3%)
Severe		156 (10%)
Moderate		867 (56%)
Minor		485 (31%)
GCS		
3–8		74 (4.5%)
9–12		70 (4.3%)
13–15		1,488 (91%)
Calculated TEWS		
0–3		1,373 (93.2%)
4–6		53 (3.6%)
≥7		47 (3.2%)

The characteristics of patients included in the subset were similar to the full dataset, except for insurance and conditions. Clinical variables measured in the subset indicated that most patients were perceived to be moderately urgent (56%); 91% of patients had a GCS score of 13–15, and TEWs score was 0–3 in 89%. The frequency distributions of conditions included in the three categories are shown in Supplementary Table 2.

Characteristics of patients received by facility type are shown in Table 2

Males represented 67% of patients transported to health centers, 61% to district hospitals, and 69% to tertiary hospitals. Trauma patients comprised 70.2%, 61%, and 67.8% of patients presenting to health centers, district hospitals, and tertiary hospitals. The mean and SD age of patients transported to health centers was 33 (14), 33 (15) to district hospitals, and 38 (19) to tertiary hospitals. The number of missing observations is listed in Supplementary Table 5.

Figure 1 shows the clinical characteristics of patients from the detailed subset dataset by facility. District hospitals received most cases with moderate urgency (80.3%). Health centers received the highest proportion of cases with minor urgency (70.2%). Tertiary hospitals had the highest proportion of patients with severe urgency (33.6%) and extreme urgency (6.9%).

The distribution of GCS scores by facility type shows that health centers and district hospitals received most patients with GCS scores of 13–15 (90% and 96%, respectively). Health centers managed a higher proportion of

Table 2 Patient characteristics by facility types. Counts and percentages are reported unless stated otherwise

Variables	Full dataset			Subset		
	Health Centers, N = 2,608	**District Hospitals, N = 2,263**	**Tertiary Hospitals, N = 2,332**	**Health Centers, N = 689**	**District Hospitals, N = 851**	**Tertiary Hospitals, N = 306**
Sex						
M	1,739 (67%)	2,088(61%)	828 (69%)	450(65.0%)	521 (61.0%)	210(69.0%)
F	869 (33%)	1,313 (39%)	366 (31%)	239(35.0%)	330 (39.0%)	96(31.0%)
Age, mean (SD)	33 (14)	33 (15)	38 (19)	33 (14)	33 (16)	38 (20)
Age category						
≤ 10	48 (1.8%)	120 (3.5%)	65 (5.4%)	521(61.0%)	35 (4.1%)	18 (5.9%)
11–20	316 (12%)	345 (10%)	84 (7.0%)	74 (11%)	81 (9.5%)	18 (5.9%)
21–30	1,025 (39%)	1,185 (35%)	311 (26%)	275 (40%)	304 (36%)	87 (28%)
31–40	693 (27%)	968 (28%)	314 (26%)	185 (27%)	242 (28%)	81 (26%)
41–50	296 (11%)	429 (13%)	180 (15%)	91 (13%)	97 (11%)	35 (11%)
51–60	85 (3.3%)	156 (4.6%)	84 (7.0%)	21 (3.0%)	39 (4.6%)	23 (7.5%)
≥ 60	145 (5.6%)	198 (5.8%)	156 (13%)	521(61.0%)	35 (4.1%)	18 (5.9%)
Condition						
Trauma	1,830 (70%)	2,077 (61%)	810 (68%)	503 (73%)	535 (63%)	214 (70%)
Obs/Gyn related	175 (6.7%)	442 (13%)	32 (2.7%)	37 (5.4%)	107 (13%)	11 (3.6%)
Medical and others	603 (23.1%)	882 (39.0%)	352 (15.1)	149 (21.6%)	209 (24.6%)	81 (26.5%)
Insurance scheme						
CBHI	898 (34%)	1,585 (47%)	467 (39%)	228 (42%)	337 (51%)	101 (44%)
Other Insurance	100 (3.8%)	90 (2.6%)	136 (11%)	96 (18%)	73 (11%)	52 (23%)
No Insutance	1,610 (62%)	1,726 (51%)	591 (49%)	217 (40%)	254 (38%)	74 (33%)
Urgency						
Extreme				405 (70%)	69 (9.7%)	8 (3.2%)
Severe				153 (27%)	574 (80%)	139 (56%)
Moderate				8 (1.4%)	65 (9.1%)	83 (34%)
Minor				11 (1.9%)	7 (1.0%)	17 (6.9%)
GCS						
3–8				54 (9.0%)	4 (0.5%)	16 (5.9%)
9–12				4 (0.7%)	28 (3.7%)	38 (14%)
13–15				541 (90%)	726 (96%)	216 (80%)
TEWS						
0–3				518 (98.1%)	642 (92.4%)	203 (85.3%)
4–6				7 (1.%)	26 (3.7%)	18 (7.6%)
≥ 7				3 (0.6%)	27 (3.9%)	17 (7.1%)

cases with GCS scores of 3–8 ($n = 54$, 9%). Tertiary hospitals received more cases with a GCS score of 9–12 ($n = 38$, 14%).

The distribution of TEWS scores by facility type demonstrates that health centers received nearly all patients with a TEWS score of 0–3 (98.1%). District hospitals managed a higher number of cases with a TEWS score of 4–6 (3.7%). Tertiary hospitals received a higher proportion of cases with TEWS scores ≥ 7 (7.1%) and TEWS scores of 4–6 (7.6%) compared to other facility types.

Association between facility type and patient characteristics

In the multinomial regression model using variables from the sub-dataset including age, sex, emergency condition, insurance type, urgency, and TEWS, emergency condition was significantly associated with destination facility with trauma being more likely than medical or obstetric emergencies to be transferred to a tertiary facility. Urgency was also a determinant of destination facility, with patients being assessed as more urgent being transferred to higher level facilities (either district vs. health center or tertiary vs. district). Increasing age was associated with a small, but significant increase in the chance of being seen in a tertiary rather than a district facility (Table 3).

Other variables were not significantly associated with facility destination.

Figure 2 below shows the predicted probabilities of destination facilities across different levels of each of

Fig. 1 Clinical characteristics of patients

Table 3 Multinomial logistic regression

Variables	**Destination facility**			
	District hospitals Vs. Health Centers(ref.)		**Tertiary hospitals vs. District hospitals(ref)**	
	aRRR	**95% CI**	**aRRR**	**95% CI**
Sex				
Female	Ref.	Ref.	Ref.	Ref.
Male	1.09	0.72,1.64	1.46	0.88,2.4
Age	1.00	0.99,1.01	1.02	1.01,1.03
Condition				
Trauma	Ref.	Ref.	Ref.	Ref.
Obs/Gyn related	0.66	0.33,1.32	0.31	0.11,0.85
Medical and others	0.90	0.54,1.48	0.45	0.32,1.00
Insurance Scheme				
Any Insurance	Ref.	Ref.	Ref.	Ref.
No Insurance	1.20	0.812,1.74	0.71	0.46,1.11
Urgency				
Minor	Ref.	Ref.	Ref.	Ref.
Moderate	23.4	15.7,34.9	3.30	1.0,11.1
Severe	36.4	13.2,100.5	25.80	7.2,92.5
Extreme	19.7	2.0,190.8	28.27	4.89,163.5
TEWS				
0–3	Ref.	Ref.	Ref.	Ref.
4–6	2.10	0.58,7.6	0.41	0.13,1.3
≥7	2.17	0.46,10.2	1.14	0.38, 3.40

aRRR: adjusted relative risk ratio

The VIF showed minimal multicollinearity among the predictor variables, and McFadden's Pseudo R-squared value was 0.398, indicating a moderate model fit

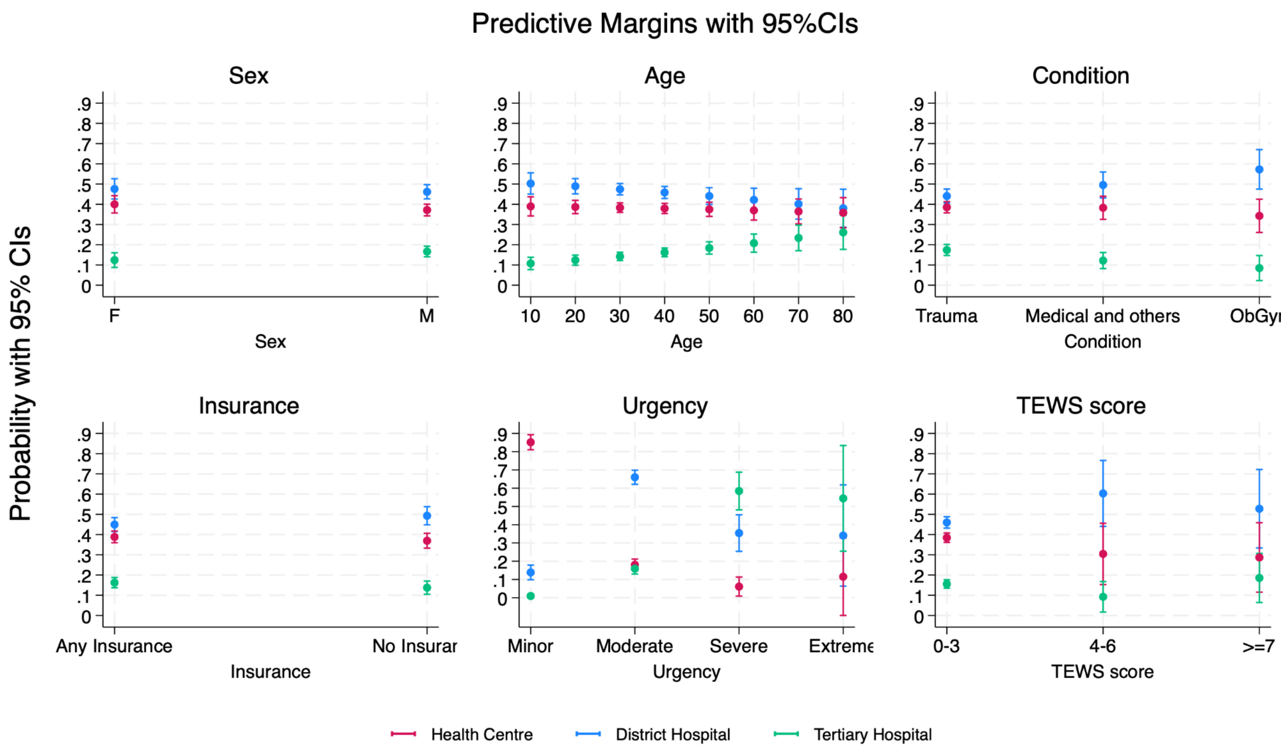

Fig. 2 Predictive probabilities

the explanatory variables (sex, age, condition, insurance, urgency, and TEWS) holding all other covariates at their mean values. As the urgency of conditions and TEWS increases, the likelihood of being transferred to tertiary hospitals compared to lower-level facilities increases.

The corresponding data used for the graphical representation of predictive probabilities in Fig. 2 is also presented in tabular format in Supplementary Table.

Discussion

We investigated the factors influencing selection of facilities by SAMU, with the primary objective of providing insights into the current decision-making processes and pave the way for a standardised decision process that can be used to inform future destination decisions for all emergency patients in Rwanda.

A distinct pattern of sex differences in SAMU utilization emerged, with a predominant use of services by male patients. This is likely because males are more likely to be injured [18] and injuries form the majority of cases transported by SAMU. This aligns with findings from previous studies conducted in Kigali, Rwanda, where 76.5% of the study population and 77.7% of the transported trauma patients were male [9, 19]. This highlights two potential issues. The first is community awareness of the availability of SAMU services for other conditions. Whilst there are no data from Rwanda to understand the relative prevalence of other medical emergencies that require hospital care, it is known that non-communicable diseases are increasing in the community and associated emergency conditions are also likely on the rise [20]. In addition to better data collection on the prevalence of such conditions, there likely needs to be more messages about the urgency of these conditions to the public and the availability of SAMU services to transport patients with these emergencies to hospitals. The second issue is around the potential gendered use of ambulance services, even after accounting for the burden of disease. We have shown that males make up three-quarters of trauma patients. Given the lack of data on emergency medical conditions in Rwanda, whether this proportion is reflective of the sex balance of patients suffering from emergency conditions is not known. More research needs to be done to understand the impact of sex and condition on the utilisation of SAMU services to ensure that interventions are developed to facilitate use of SAMU services by all people who require them. Learning from other specialties suggests sex-based disparities in care access are connected to gender norms, where females have less autonomy, decision-making power, and other socio-cultural determinants [21, 22] and these factors may have a role in the utilisation of SAMU.

When controlling for other variables, we have found that most patients are transported to district hospitals, regardless of their age, sex, condition, insurance status, or TEWs score. The only variable consistently and significantly associated with transfer to tertiary vs. other facilities was urgency, where higher perceived urgency patients were transported to tertiary facilities more often than those at lower levels of urgency. However, there are some nuances. We found that as age increases, patients are more likely to be transferred to tertiary hospitals. This finding is similar to what has been shown in other settings [23–25] and may be because the urgency of the conditions increases as older patients present with multiple chronic conditions and comorbidities that require specialized diagnostic and therapeutic interventions available in higher levels of facilities [26]. However, our findings show that this age-related effect persists after controlling for perceived urgency and more objective measures of acuity (for example, TEWS). This might indicate other reasons or perceptions that our study did not elucidate.

We also show that patients with higher TEWS were more likely to be transported to a district hospital vs. a health centre. Higher TEWS scores typically indicate a higher mortality risk and need for immediate care at a well-equipped facility [27, 28]. Patients with trauma were more likely to be transported to district hospitals vs. other facilities. These findings, taken together, may reflect that there are a greater number of district hospitals in Kigali than tertiary hospitals and that ambulance teams prefer to take higher acuity emergency patients to district hospitals than to travel a potentially further distance to tertiary facilities. Unfortunately, we do not have data on the location of the incident to undertake this analysis. However, this hypothesis is challenged by our finding that ambulance crews' decisions to transfer to a tertiary vs. a district hospital are significantly guided by perceptions of urgency. That perceptions of urgency seem to predominate over objective measures of physiological urgency in selecting levels of facilities to transport patients to is troubling, however, and suggests that there may need to be more training around objective assessments and a need to implement a standardised field triage process. A 2022 scoping review of published literature on prehospital triage tools reported that the available literature primarily originates from high-income countries and focuses on adult stroke and trauma cases. No universally accepted standard tool for prehospital triage of undifferentiated patients exists [29]. However, SATS is a widely used and reliable tool implemented in low- and middle-income countries that can be recommended in the context of Rwanda [14, 30–32]. The lack of clear EMS dispatch protocols requires urgent attention because it contributes to delays in reaching appropriate care, consistent with the Three Delays Model [33]. Patients requiring specialized care at tertiary hospitals are sometimes mistakenly directed to district hospitals. This misdirection compromises their chances of receiving timely, life-saving care. As with other conditions, most patients with obstetric and gynecological conditions were taken to district hospitals, with a large proportion managed at health centers. This is reflective of the result of the drive for women to deliver in health centers in Rwanda [34] and also indicative of the mandate for district hospitals to provide comprehensive emergency obstetric and newborn care (CEmONC). This remit was highlighted in the 2021 national needs assessment conducted by the Rwanda Biomedical Center, which reported that all district hospitals in Rwanda should be capable of providing the seven essential life-saving signal functions required for CEmONC [35, 36].

Our study has several limitations. Specifically, temperature and mobility variables were not included in the final TEWs score due to data unavailability, therefore the derived TEWs scores are conservative estimates and don't enable accurate representation of where patients who have truly high TEWs values. Nevertheless, our TEWs scores can be considered relative, and our findings of where patients with higher relative to lower TEWs scores are sent is valid. Conditions were recorded by ambulance teams and may not accurately reflect the ultimate patient diagnosis. Unfortunately, it is impossible to link patient records from pre-hospital EMS to facility discharge to understand their final diagnosis. The variable "type of insurance" which showed fewer than 50% of patients had insurance coverage recorded is contrary to the reported national insurance coverage of over 90% [7, 37]. However, this variable might represent the number of patients transported who were not carrying their health insurance or other identity cards during transport. The current decision process for patient transfer by EMS in Rwanda is strongly influenced by the experience of dispatchers and ambulance crews. There is a recognition of the urgent need to standardise destination decision making [38]. It is encouraging to have available data to study baseline decision making factors [39–40].

Conclusion

Our study provides a nuanced examination of prehospital EMS utilization in Rwanda, shedding light on demographic patterns and clinical factors influencing facility selection. Our findings contribute valuable insights to the literature on prehospital EMSs, emphasizing the need for tailored strategies and standardised and objectively informed decision processes in field triage. These insights have implications for the optimization of prehospital emergency care, improved resource utilization in the healthcare and ultimately leading to improved patient outcomes.

Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s12245-025-00853-z.

Supplementary Material 1

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Author contributions

JCB and JD conceived the study. EDS, OM, AN, BA, AB, JCB, and JD were involved in the study design. OM, EDS, AN, DH, FH, JC, and JCB were involved in data acquisition. EDS, LQ, and OM analyzed the data. EDS, BA, OM, NA, AN, JN, JMU, JNS, IB, DH, FH, CFI, JCS, GR, AI, LD, PM, SJ, EAN, LQ, AB, JCB and JD were involved in the data interpretation. EDS wrote the first draft. All the authors have read and approved the final manuscript. EDS takes responsibility for the overall content as the corresponding author.

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Data availability

Data are available upon reasonable request.

Declarations

Ethics approval and consent to participate

Ethical approval was granted by the Rwanda National Ethics Committee (No. 99/RNEC/2023) and the Ethics Committee of the Kigali University Teaching Hospital (EC/CHUK/036/2023). The study involved the analysis of secondary data collected for emergency medical care provision hence, consent to participate in the study was not applicable.

Consent for publication

Not Applicable.

Competing interests

The authors declare no competing interests.

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