



ORIGINAL ARTICLE

Health-related reasons patients transfer from a clinic or health post to the Emergency Department in a District Hospital in Botswana

Tebogo T Mamalelala^{a,b,*}, Ditebogo J. Mokone^c, Felix Obeng-Adu^c

^a School of Nursing, University of Botswana, Gaborone, Botswana

^b Rutgers University School of Nursing, New Brunswick, New Jersey, United States

^c Scottish Livingstone Hospital, Molepolole, Botswana



ARTICLE INFO

Keywords:

Emergency centre
Patient transfers
Patient disposition
Diagnosis

ABSTRACT

Introduction: Rural health clinics in low-resource settings worldwide are usually staffed with health care workers with limited knowledge and skills in managing acute emergencies. The Emergency Centre (EC) at the district hospital or primary hospital serves as an entry point for patients with diverse medical needs from health posts and community clinics. The study described the socio-demographic characteristics, primary diagnosis, and disposition of patients transferred from the clinics and health posts to the district hospital in the Kweneng district.

Method: This study is a chart audit of the triage sheets and admitting medical records (Botswana Integrated Patient Management System, IPMS) conducted for the period June through to December 2020. Descriptive statistics were used to analyze the quantitative data. Frequencies, percentages, and measures of central tendency were calculated using the software, SPSS version 27.

Results: A total of 1565 charts were reviewed; 56% ($n = 877$) were females and 43.5% ($n = 681$) were males. Half of the patients presenting to the EC ranged from ages 21 to 50, with a mean age of 36.49. The most frequently reported reason for referral was “trauma,” (23.5%, $n = 368$) whereas the second common reason for referral was abortion-related complications (14.2%, $n = 222$). The highest admissions were from abortion-related complications (20.2%, $n = 169$). Most patients’ transfers were from clinics and health posts outside Molepolole (59.4%, $n = 930$). More than half of the patients (64.2%, $n = 537$) transferred from outside Molepolole were admitted than discharged from the EC.

Discussion: Our study has shown significant transfers to a higher facility for emergency care. The higher number of transfers are trauma-related cases, whereas most patients were admitted for abortion-related complications indicating the need for skill-building in trauma care and management of abortions.

African relevance

- This study describes the burden of disease presenting to an emergency centre in Botswana
- Emergency care epidemiology studies can inform regional referral systems
- Nurses are usually the first contact with patients with the trauma patients and the critically ill
- Nurses in the rural areas are in great need for education in emergency care in Botswana

Introduction

In low-resource settings, emergency care is usually provided by health care providers who have not had specific training in emergency

care [1,2,3]. Acutely ill and critically unstable patients are treated on-site before transfer to the hospital, so the local health care providers must have basic knowledge and skills. The decision to transfer the patient depends on the severity of illness and patients’ preference, capabilities of the transferring facility, clinical evaluation, and other system processes such as transportation, geographic location, and staffing [4,5].

Historically, Botswana relied heavily on foreign doctors until the opening of the first medical school in 2011 [6]. This development led to the expansion of nurses’ roles, who serve as the backbone of the medical system [7]. The country has three referral hospitals at the top of the ladder and provides advanced and specialized services. The Health-care system in Botswana is delivered through a decentralized model, with primary health care being the pillar of the delivery system [8]. The country’s referral system follows a ladder of service delivery with three referral hospitals at the top of the ladder, two general and one psychia-

* Corresponding author.

E-mail address: mamalelalat@ub.ac.bw (T.T. Mamalelala).

<https://doi.org/10.1016/j.afjem.2022.07.014>

Received 27 September 2021; Received in revised form 21 June 2022; Accepted 24 July 2022

2211-419X/© 2022 The Authors. Published by Elsevier B.V. on behalf of African Federation for Emergency Medicine. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>)

try, equipped to provide advanced and specialized services [9]. Princess Marina is the tertiary hospital where Scottish Livingstone Hospital (SLH) patients are transferred for further management. District hospitals are major hospitals just below the level of referral hospitals, equipped with more beds capable of managing long-term patients. On the other hand, primary hospitals are designed to manage most diseases, trauma, and urgent health conditions. The clinics primarily provide outpatient services within reach of communities, including general consultations, treatment of minor injuries, and severe cases are referred to the hospitals for definitive care. Health posts offer limited services, whereas mobile stops lack a permanent structure and are serviced by clinics and health posts within their catchment area. Health posts and clinics staffed primarily by nurses offer primary health care services. Patients who present to the clinics and health posts to receive primary care services with critical conditions or significant injuries are transferred to tertiary care hospitals for advanced critical care. Some lower-level facilities are very far from those with a medical doctor. Therefore, nurses require skills to stabilize the patient before transfer. As displayed in the Spain study, investment in nurse training can yield good results. Furthermore, experience is a good factor for sustaining knowledge and skills in the nurses, as displayed from those stations in rural areas with minimal support from doctors [10]. In Tanzania, nurses in rural hospitals were more effective at stabilizing patients with emergency care interventions than in district hospitals where doctors were available [11].

Patients must travel long distances in an ambulance before being admitted to a hospital, which creates a barrier to receiving sufficient medical care [12]. Nurses must accompany a patient in the back of an ambulance over a bumpy gravel road because there are no proper roads in some of these places. Due to a shortage of transportation choices, Fraser [13] observed that patients are not usually transferred to the hospital immediately, resulting in delayed care. The emergency centre's (EC) role is to provide initial triage, treatment, and stabilization of patients before admission to their respective inpatient units [14,15]. Patients with various medical requirements from health posts and clinics are transferred to the district hospital's EC. Before being transported to the EC, few patients arriving from lower-level health facilities had been evaluated by a doctor. The study described the socio-demographic, primary diagnosis, and disposition of patients transferred from the clinics and health posts to the district hospital in the Kweneng district.

Methods

Design

This study is a chart audit of all triage sheets and admitting medical records (Botswana Integrated Patient Management System, IPMS) of patients transferred to the district hospital from June to December 2020.

Setting

Botswana has had a public emergency medical service (EMS) since 2012. Unfortunately, the EMS does not operate in the Kweneng district where this study was conducted. Police and private vehicles transport most trauma patients in Kweneng. Nurses at Clinics and health posts provide first-line emergency care in this district. Scottish Livingstone Hospital (SLH) is located in the largest village in the Kweneng district, Molepole. It has a catchment population of approximately 304,349 [16]. The 350-bed public hospital is a secondary care hospital without cardiology, renal/dialysis, computed tomography (CT), and magnetic resonance imaging (MRI). It is a referral hospital for 25 bedded primary hospitals, a military hospital, 23 clinics, and 38 health posts (Figure 1). Self-referrals are accepted. The EC is staffed with six general physicians and 18 nurses serving adults and children.

Table 1
Demographic characteristics and comorbidities of the sample ($n = 1565$).

Gender	<i>n</i>	%
Male	877	56.3
Female	681	43.7
Age		
≤ 20	363	23.2
21-50	792	50.6
51-70	256	16.3
≥ 71	145	9.3

Sample

The study sample includes records/triage sheets of patients transferred from other facilities from June 2020 to December 2020. All the triage sheets of patients transferred to the district EC were extracted.

Data collection and management

On arrival at the EC, the patients register on an electronic system, the Botswana electronic health system (Integrated Patient Management System, IPMS). Nurses and doctors complete individual pages of the triage sheet. The sheets are completed in duplicate, and the patient leaves with the original sheet on admission or discharge, whereas the carbon copy remains in the EC. Scottish Livingstone Hospital (SLH) uses the modified triage form adapted from Princess Marina Hospital. The content and format of the form have been adjusted several times, and it was last updated in August 2014. On disposition, patient care details are recorded in the EC register. The EC register has the following data elements: patients' demographic data, date and time of arrival, triage time, triage code, hospital registration number, referring facility and physical address, time for medical doctor's consult, diagnostic tests, diagnosis, and treatment, doctor and triage nurse's name, time, and final disposition. For this study, data were collected retrospectively, and seven months from June 2020 to December 2020 were selected for analysis. We extracted the following data elements from the triage sheet and EC register: demographic data, triage code, diagnosis, referring facility, triage times and time of consult by a medical doctor, and disposition.

We extracted data and saved it in a password-protected, encrypted Microsoft Excel file. The data was divided into four categories: admitted, discharged, transferred, and deceased. Primary diagnoses were classified according to the ICD10 codes for each disposition category [17]. In addition, patients transferred from 52 facilities (e.g., clinics and health posts) in the Kweneng area (see Figure 1) were divided into seven categories based on their geographic location: 1) Molepolole (13 facilities), 2) Lentsweletau (9 facilities), 3) Kweneng west (24 facilities), 4) Lobososhale (5 facilities), 5) Thamaga (10 facilities), 6) Police escort, and 7) Other facilities (patients from beyond the Kweneng region). The distance between the facilities and the district hospital varies between five and 252 kilometers.

Results

A total of 1565 charts were reviewed; 56% ($n = 877$) were female and 43.5% ($n = 681$) were male. More than half of patients presenting to the EC ranged from ages 21 to 50 (50.6%, $n = 792$), whereas those over 70 were the least represented group presenting to the EC. The mean age of patients presenting to the EC was 36.49 years (SD = 22.50) (See Table 1). Nurses were the medical transport providers for 96.7% ($n = 1537$) of patient transfers.

On arrival, 39.1% of the 1565 patients transferred to the SLH were classified as "very urgent" or higher. (Refer to Table 2). Daytime transfers accounted for 63% of all transfers. The most common comorbidities were a positive HIV status (19.2%, $n = 300$), hypertension (14.7%,

Table 4
Presenting Diagnosis and Disposition from the ED Crosstabulation.

Presenting Diagnosis	Admissions		Discharges		Total	
	n	%	n	%	n	%
Trauma	86	10.3	245	40.4	368	23.5
Abortion complications	169	20.2	51	8.4	222	14.2
Digestive system	63	7.5	43	7.1	118	7.5
Endocrine	54	6.5	53	8.7	109	7.0
Respiratory system disorders	67	8.0	25	4.1	95	6.1
Mental health	67	8.0	12	2.0	93	5.9
Blood disorders	65	7.8	10	1.6	76	4.9
Nervous system	43	5.1	24	4.0	76	4.9
Certain Infections and parasitic diseases	50	6.0	17	2.8	72	4.6

Table 5
Location and Final Disposition from the Emergency Room Crosstabulation.

Location	Final Disposition				Deceased	Transferred	Total			
	Admitted	Discharged	Deceased	Transferred						
	n	%	n	%	n	%	n	%		
Molepolole	299	35.8	292	48.1	10	30.3	34	41.0	635	40.6
Kweneng West	269	32.2	107	17.6	9	27.3	30	36.1	415	26.5
Lentsweletau	100	12.0	60	9.9	3	9.1	6	7.2	169	10.8
Lobososhale	63	7.5	35	5.8	5	15.2	5	6.0	108	6.9
Police	28	3.3	107	17.6	5	15.2	7	8.4	147	9.4
Thamaga	27	3.2	6	1.0	0	0.0	1	1.2	34	2.2
Other	47	5.6	0	0.0	1	3.0	0	0.0	48	3.1
Total	836	100	607	100	33	100	83	100	1565	100

health posts. In such instances, the level of care required may rapidly exceed the facility's capability where they were initially admitted. Such circumstances necessitate an interfacility transfer to a step-up facility that would be better equipped to render the required level of care.

Nurses escort most patients in the district over vast distances on gravel roads, which could cause delays in receiving care. Due to a shortage of ambulances in the district, most health facilities are allocated one ambulance. As a result, patients are not always transported to the hospital immediately, resulting in delayed care [13]. Nonetheless, because the Botswana referral system follows a hierarchical order in which patients travel through the district hospital before reaching the tertiary hospital, some patients are further transferred to a tertiary hospital, adding to the delay in patient management. A study in Botswana showed that 14.6% of trauma patients died after arriving at the secondary hospital [15]. The findings underscore the necessity for direct transfers to higher-level facilities without following a hierarchical referral system.

Botswana has adequate physical resources for initial trauma management as stipulated by WHO Essential Trauma Care (ETC) guidelines [18,19]; however, emergency care and trauma education for nurses in Botswana is limited [18], whereas the treatment provided in an ambulance during a critical situation depends on the nurses' competency, which is based on training and prior experience [20]. Barriers to high-quality emergency care in low and middle-income countries include a lack of provider education and training, as well as transportation and infrastructure [21,22]. Perhaps trauma care education should be the priority area for skill-building. Botswana is still relying on ambulance drivers and nurses with minimal training in the initial management of patients in remote areas [23].

Sixty-eight percent (68.2%) of road traffic-related deaths in Botswana are preventable; limited knowledge was a contributing factor [24]. Basic emergency skills set for transport providers would perhaps facilitate the timely delivery of life-saving interventions. Most developed countries have courses specific for nurses working in emergency care areas, such as the Advanced Trauma Nursing Course (ATNC) or the Trauma Nursing Core Course (TNCC), which have predominantly focused on pre-hospital and EC nurses. As a result, there is a need to develop a context-specific emergency nursing course for Botswana.

Although trauma was the most common reason for referral, abortion-related complications accounted for most hospital admissions in the study setting. Contrary to our study, analyses of 1506 response calls by the Ministry of Health and Wellness emergency medical services in Gaborone, Botswana, indicated that the most frequent calls were for obstetric and gynaecologic emergencies (25%) and trauma (18%) [25]. Abortion is not legal in Botswana; however, post-abortion complications are the third leading cause of maternal death [25]. A significant obstacle to accessing safe abortion worldwide is a lack of trained providers [26]. Therefore, training of health care providers in managing complications of abortions should be a priority, mainly focusing on timely referrals since most clinics and health posts cannot provide comprehensive abortion care, including uterine evacuations.

The district hospital triage system was adapted from the Princess Marina Hospital triage system, which was validated in Princess Marina Hospital and Mahalapye district hospital in Botswana [27,28]. Validation of the triage system in the study context is necessary [27]. There was a disproportion in the triage score and disposition in the study setting. One would have assumed that since a higher triage category indicates the severity or urgency of the disease, this should correlate with the number of inpatient admissions. The higher number of inpatient admissions despite a lower triage category may indicate the under-triaging of patients. In a study conducted in a district hospital in Botswana [29], the most under-triaged patient category by the nurses was the very urgent category. There is a variance in the triaging of patients by nurses because nurses are assigned to the EC without prior training. In most hospitals in Botswana, nurses rotate between units after at least two years on the same unit, and the incoming team usually learns about the triage process from the nurses who stay on the same unit during rotations. However, there is usually no formal training for the incoming team, contributing to the under or over-triaging of patients.

The average length of stay in the EC is four and half hours, and this is quite a long time considering that it is a district hospital, even though the median length of stay in a referral hospital was 9.6 hours. The increased length of stay in the EC is primarily due to other factors such as the laboratory results and radiological imaging turnaround times [27]. Similarly, in a Botswana tertiary hospital, organizational variables

such as multiple referrals and investigations were the leading causes of a lengthy stay in the EC [15].

Conclusion

The higher number of transfers are trauma-related cases, indicating the need for skill-building in trauma care. Standards or guidelines for emergency patient care during patient transport are also vital. Botswana has no specific training for nurses who provide care during transport, leading to variation in the care of emergency patients by providers during transport. Future research is needed to explore the providers' knowledge, skills, and interventions during the interfacility transfer of emergency patients.

Limitations: Duplicate triage forms were used for data collection in the retrospective study. The carbon papers are used to duplicate the notes and are used several times, some of the notes were not visible, and some doctors could not turn the sheets properly, so they wrote their notes on top of the nurses' notes. Due to system downtimes, some patients were not registered electronically, and their data could not be retrieved from the IPMS.

Some patients had multiple diagnoses as primary, and the initial diagnoses were taken as the primary diagnoses. The subjective determination of the primary diagnosis might have introduced subjective biases to the study.

Dissemination of results

The results from this study will be presented to the hospital authorities and have been shared informally with the clinical staff at the data collection site.

Authors contribution

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: TTM contributed 60%; WH contributed 20%; and DJM and FOA contributed 10% each. All authors approved the version for publication and agree to be accountable for all aspects of the work. TTM contributed 60%; DJM and FOA contributed 10%, each. TTM, DJM, and FOA were responsible for data collection, and TTM was responsible for formal analysis and writing the original draft. WH contributed 20%, approved the version to be published, and all authors agreed to be accountable for all aspects of the work.

Declaration of Competing Interest

The authors declared no conflicts of interest.

References

- Broccoli MC, Cunningham C, Twomey M, Wallis LA. Community-based perceptions of emergency care in Zambian communities lacking formalized emergency medicine systems. *Emerg Med J* 2016;33(12):870–5. doi:10.1136/emmermed-2015-205054.
- Burke TF, Hines R, Ahn R, Walters M, Young D, Anderson RE, Tom SM, Clark R, Obita W, Nelson BD. Emergency and urgent care capacity in a resource-limited setting: an assessment of health facilities in western Kenya. *BMJ open* 2014;4(9):e006132. doi:10.1136/bmjopen-2014-006132.
- Stanley L, Min TH, Than HH, Stolbrink M, McGregor K, Chu C, Nosten FH, McGready R. A tool to improve competence in the management of emergency patients by rural clinic health workers: a pilot assessment on the Thai-Myanmar border. *Confl Health* 2015;9(1):1–9. doi:10.1186/s13031-015-0041-x.
- Feazel L, Schlichting AB, Bell GR, Shane DM, Ahmed A, Faine B, Nugent A, Mohr NM. Achieving regionalization through rural interhospital transfer. *Amer J Emerg Med*. 2015;33(9):1288–96. https://doi.org/10.1016/j.ajem.2015.05.032
- McNaughton CD, Bonnet K, Schlundt D, Mohr NM, Chung S, Kaboli PJ, Ward MJ. Rural interfacility emergency department transfers: framework and qualitative analysis. *Western J Emerg Med* 2020;21(4):858. doi:10.5811/westjem.2020.3.46059.
- Caruso N, Chandra A, Kestler A. Development of emergency medicine in Botswana. *Afr J Emerg Med* 2011;1(3):108–12. doi:10.1016/j.ajem.2011.08.002.
- Gala P, Moshokgo V, Seth B, Ramasuana K, Kazadi E, M'buse R, Pharithi S, Gobotsamang K, Szymanowski P, Kerobale RO, Balekile K. Medication errors and blood pressure control among patients managed for hypertension in public ambulatory care clinics in Botswana. *J Am Heart Assoc* 2020;9(2):e013766. doi:10.1161/JAHA.119.013766.
- Tapela NM, Tshisimogo G, Shatera BP, Letsatsi V, Gaborone M, Madidimalo T, Ovberedjo M, Jibril HB, Tsimba B, Nkomazana O, Dryden-Peterson S. Integrating noncommunicable disease services into primary health care, Botswana. *Bull World Health Organ* 2019;97(2):142. https://doi:10.2471/BLT.18.221424.
- Seitio-Kgokgwe O, Gauld RD, Hill PC, Barnett P. Assessing performance of Botswana's public hospital system: the use of the World Health Organization Health System Performance Assessment Framework. *Int J Health Policy Manag* 2014;3(4):179. doi:10.15171/ijhpm.2014.85.
- Martínez JA, Delgado RC, Álvarez TC, González PA. Primary health care nurses' self-perception of theoretical knowledge and practical skills in life-threatening emergencies: a cross-sectional study. *Prehospital Disaster Med* 2019;34(4):376–84. doi:10.1017/S1049023X19004461.
- Lucumay NJ, Save HR, Mohamed A, Sylvanus E, George U, Mfinanga JA, Weber EJ. Pre-referral stabilization and compliance with WHO guidelines for trauma care among adult patients referred to an urban emergency department of a tertiary referral hospital in Tanzania. *BMC Emerg Med* 2019;19(1):1–6. doi:10.1186/s12873-019-0237-2.
- World Health Organization. Health worker roles in providing safe abortion care and post-abortion contraception, 81; 2015. Available at https://www.who.int/reproductivehealth/publications/unsafe_abortion/abortion-task-shifting/en/.
- Fraser A, Le Vay JN, Byass P, Tollman S, Kahn K, D'Ambruoso L, Davies JJ. Time-critical conditions: assessment of burden and access to care using verbal autopsy in Agincourt, South Africa. *BMJ Glob Health* 2020;5(4):e002289. doi:10.1136/bmjgh-2020-002289.
- Kang H, Nembhard HB, Rafferty C, DeFlitch CJ. Patient flow in the emergency department: a classification and analysis of admission process policies. *Ann Emerg Med* 2014;64(4):335–42. doi:10.1016/j.annemergmed.2014.04.011.
- Siamisang K, Tlhakanelo JT, Mhaladi BB. Emergency department waiting times and determinants of prolonged length of stay in a Botswana referral hospital. *Open J Emerg Med* 2020;8(3):59–70. doi:10.4236/ojem.2020.83007.
16. 2022 New ICD-10-CM Codes. Available at: <https://www.icd10data.com>
- Demography of Botswana 2015. Statistics Botswana. Available at: <http://botswana.opendataforafrica.org/DEOB2015/demography-ofbotswana-2015>. Accessed April, 2021.
- Mwandri MB, Hardcastle TC. Evaluation of resources necessary for provision of trauma care in Botswana: an initiative for a local system. *World J Surg* 2018;42(6):1629–38. doi:10.1007/s00268-017-4381-0.
- Hanche-Olsen TP, Alemu L, Viste A, Wisborg T, Hansen KS. Trauma care in Africa: a status report from Botswana, guided by the World Health Organization's "Guidelines for Essential Trauma Care". *World J Surg* 2012;36(10):2371–83.
- Sjölin H, Lindström V, Vicente V, Hult H, Ringsted C, Kurland L. Prehospital emergency nurses' experiences of care in critical incidents. *Int Emerg Nurs* 2020;51:100890.
- Kironji AG, Hodkinson P, De Ramirez SS, Anest T, Wallis L, Razzak J, Jensen A, Hansoti B. Identifying barriers for out of hospital emergency care in low and low-middle income countries: a systematic review. *BMC Health Serv Res* 2018;18(1):1–20. doi:10.1186/s12913-018-3091-0.
- Broccoli MC, Calvello EJ, Skog AP, Wachira B, Wallis LA. Perceptions of emergency care in Kenyan communities lacking access to formalized emergency medical systems: a qualitative study. *BMJ Open* 2015;5(11):e009208. doi:10.1136/bmjopen-2015-009208.
- Motsumi MJ, Ayane G, Kwati M, Panzirah-Mabaka K, Walsh M. Preventable deaths following road traffic collisions in Botswana: a retrospective review. *Injury* 2021. doi:10.1016/j.injury.2021.04.020.
- Glomb NW, Kosoko AA, Doughty CB, Rus MC, Shah MI, Cox M, Galapi C, Parkes PS, Kumar S, Laba B. Needs assessment for simulation training for prehospital providers in Botswana. *Prehospital Disaster Med* 2018;33(6):621–6. doi:10.1017/S1049023X18001024.
- Melese T, Habte D, Tsimba BM, Mogobe KD, Nassali MN. Management of post abortion complications in Botswana-the need for a standardized approach. *PLoS One* 2018;13(2):e0192438. doi:10.1371/journal.pone.0192438.
- Van Wyk S, Heyns T, Coetzee I. The value of the pre-hospital learning environment as part of the emergency nursing programme. *Health Gesondheid*. 2015;20(1):91–9. doi:10.4102/hsag.v20i1.924
- Tshitenge ST, Mbuka DO, Ogunbanjo GA. The effectiveness of the South African Triage Toll use in Mahalapye District Hospital-Emergency Department, Botswana. *Afr J Prim Health Care Fam Med* 2016;8(1):1–5. doi:10.4102/phcfm.v8i1.1030.
- Twomey M, Mullan PC, Torrey SB, Kestler A. The Princess Marina Hospital accident and emergency triage scale provides highly reliable triage acuity ratings. *Emerg Med J* 2012;29(8):650–3 doi: 10.1136/emmermed-2011-200503. Epub 2011 Aug 29. PMID: 21856994.
- Meaney PA, Joyce CL, Sethlare S, Smith HE, Mensinger JL, Zhang B, Kalenga K, Kloeck D, Kgosisiele T, Jibril H, Mazhani L. Knowledge acquisition and retention following Saving Children's Lives course for healthcare providers in Botswana: a longitudinal cohort study. *BMJ Open* 2019;9(8):e029575. doi:10.1136/bmjopen-2019-029575.