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ORIGINAL RESEARCH

A descriptive analysis of Emergency Department overcrowding in a selected hospital in Kigali, Rwanda



Analyse descriptive de la congestion d'un service d'urgence dans un hôpital sélectionné à Kigali, au Rwanda

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Introduction: Emergency Centre (EC) overcrowding is a global concern. It limits timeous access to emergency care, prolongs patient suffering, compromises quality of clinical care, increases staff frustration and chances of exposing staff to patient violence and is linked to unnecessary preventable fatalities. The literature shows that a better understanding of this phenomenon may contribute significantly in coming up with solutions, hence the need to conduct this study in Rwanda.

Methods: A quantitative descriptive design, guided by the positivist paradigm, was adopted in this study. Self-administered questionnaires were distributed to 40 nurses working in the EC. Only 38 returned questionnaires, thus making the response rate 95%.

Results: The findings revealed that EC overcrowding in Rwanda is characterised by what is considered as reasonable waiting time for a patient to be seen by a physician, full occupancy of beds in the EC, time spent by patients placed in the hallways waiting, and time spent by patients in waiting room before they are attended. Triggers of EC overcrowding were classified into three areas: (a) those associated with community level services; (b) those associated with the emergency centre; (c) those associated with inpatient and emergency centre support services.

Discussion: A number of recommendations were made, including the Ministry of Health in Rwanda adopting a collaborative approach in addressing EC overcrowding with emergency trained nurses and doctors playing an active role in coming up with resolutions to this phenomenon; conducting research that will lead to an African region definition of EC overcrowding and solutions best suited for the African context; and increasing the pool of nurses with emergency care training.

Introduction: La congestion des services d'urgence (SU) est un enjeu mondial. Celle-ci limite l'accès en temps utile aux soins d'urgence, prolonge la souffrance des patients, compromet la qualité des soins cliniques, augmente la frustration du personnel et les risques d'exposition du personnel à la violence des patients, et est associée à des décès évitables. D'après la recherche, une meilleure compréhension de ce phénomène pourrait dans une large mesure contribuer à la détermination de solutions, d'où la nécessité d'entreprendre cette étude au Rwanda.

Méthodes: Une méthode descriptive et quantitative, guidée par le paradigme positiviste, a été adoptée dans cette étude. Des questionnaires auto-administrés ont été distribués à 40 infirmières travaillant au sein du SU. Seuls 38 questionnaires ont été retournés, d'où un taux de réponse de 95%.

Résultats: Les conclusions ont révélé que la congestion des SU au Rwanda se caractérisait par ce qui était considéré comme un temps d'attente raisonnable avant qu'un patient soit examiné par un médecin, un taux d'occupation des lits aux SU de 100 pour cent, le temps passé par les patients qui attendent dans le hall d'entrée et le temps passé par les patients en salle d'attente avant d'être vus. Les causes de la congestion ont été classées selon trois catégories: (a) les motifs associés aux services communautaires; (b) les motifs associés au service d'urgences; et (c) les motifs associés aux services internes et aux services d'appui au services des urgences.

Discussion: Plusieurs recommandations ont été formulées, notamment l'adoption par le ministère de la Santé rwandais d'une approche collaborative à la gestion de la congestion, les infirmières et médecins urgentistes qualifiés jouant un rôle actif dans la détermination de résolutions quant à ce phénomène; la réalisation d'études qui conduiront à une définition par la région africaine de la congestion des SU et des solutions les mieux adaptées au contexte africain; et l'augmentation du réservoir d'infirmières formées aux soins d'urgence.

African relevance

- Emergency centres in Africa are often overcrowded.
- Understanding the characteristics of EC overcrowding may generate practical solutions.
- Policies and guidelines should consider the limited resources in African ECs.

Introduction

Overcrowding¹ in emergency centres is a worldwide concern and represents an international crisis that may affect access

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to health care and the quality of services.² Although the triggers of overcrowding in emergency centres are complex, multi-factorial and beyond the control of the emergency centre,³ the key reason is that emergency centres are normally too small and understaffed for the population they serve.⁴ Understanding the triggers and consequences of overcrowding in an emergency centre is essential to providing the effective leadership that is required to address them.^{3,4} Some authors^{4,5} associate overcrowding in emergency centres with poor outcomes of care and a greater likelihood of the absence of care, especially where there are more patients than resources.

Despite the empirical evidence that suggests that emergency centre overcrowding is a well-researched area, there is no universally acceptable definition or measurement of emergency centre overcrowding.^{6,7} Fatovich, Nagree and Sprivilis⁸ define overcrowding as a situation where the “emergency department function is impeded, primarily because the number of patients waiting to be seen, undergoing assessment and treatment or waiting for departure exceeds the physical or staffing capacity of the emergency department” [sic](p351). Viccellio, Schneider and Asplin⁹ define emergency centre overcrowding as a crisis situation resulting from the emergency centre serving as a holding area for patients awaiting admission. In the study by Schull and Cookes that targeted the United States of America Emergency Department Directors¹⁰ [sic], emergency overcrowding was characterised by (a) patients waiting for more than 60 min to see a physician; (b) all emergency centre beds being occupied for longer than 6 h a day; (c) patients being placed in corridors for longer than 6 h a day; (d) emergency physicians working consistently for more than six hours without a healthy break, but still failing to cope with the patients load; (e) the emergency centre waiting rooms filled with patients who have to wait for at least six hours before being attended. Overcrowding of emergency centres may lead to a decision of no longer receiving emergency cases, and ambulances being diverted to other hospitals.¹⁰ From the presented definitions of emergency centre overcrowding, one may make an assumption that overcrowding in emergency centres occurs when the capacity of the centre is less than the load of cases seeking emergency care.

Reviewed literature^{11,14-17} reflects that there is no single factor that stands out as to why overcrowding in emergency centres occurs. According to Estey et al.¹¹ emergency centre

overcrowding appears to be a product of several complex internal and external factors, most of which are beyond the control of emergency centre personnel. The literature^{3,12-17} cites a number of possible triggers, as outlined in Table 1.

Empirical literature^{11,18,19} strongly recommend studies aimed at establishing what defines emergency centre overcrowding and understanding factors leading to emergency centre overcrowding, as these are the first steps in finding a solution. This study, therefore, aimed to describe the phenomenon of overcrowding in the emergency centre of one of the referral hospitals in Kigali, Rwanda and to identify triggers of overcrowding.

The hospital where this study was conducted is one of three referral hospitals in Kigali, with 515 inpatient beds. This hospital receives patients from a wide base from both within and outside Rwanda, including the Burundi and the Democratic Republic of Congo. Furthermore, the Rwandan population is growing rapidly. According to the Rwanda National Population and Housing Report,²⁰ Kigali city had 603,049 inhabitants in 2002, increasing to one million in 2008. The emergency centre of this hospital is open 24 h a day and manages medical, surgical and trauma patients. Paediatric, obstetric and gynaecological patients are managed within their appropriate units. At the time of the study, there were a total of 40 nurses (enrolled nurses and professional nurses) and two general doctors employed in the emergency centre. Specialist doctors only come to the emergency centre to do their rounds in the morning and when they are called in as consultants to attend to complicated cases. The emergency centre has five beds reserved for patients who are waiting for an available inpatient bed.

Methods

A quantitative descriptive design was used for this study. The research population comprised of 40 nurses, which included both professional and enrolled nurses working in the emergency centre. Only 38 questionnaires were returned, thus making the response rate 95%. A self-administered questionnaire in both French and English was used to collect data. A Cronbach Alpha test was performed to establish the reliability of the whole instrument and was .837, thus making the instrument reliable. Validity was established by subjecting the questionnaire to the scrutiny of the experts in emergency care and experts in research methodology, and by ensuring that the items in the questionnaire are aligned to the research objectives. Ethical clearance was obtained from the University of KwaZulu-Natal Ethics Committee and the Kigali Hospital Ethics Review Board. Ethics Clearance Number was HSS/0389/08M. Permission to conduct the study was sought from appropriate hospital authorities and respondents signed an informed consent before completing the questionnaire.

Results

Emergency overcrowding in this study was described in terms of four characteristics. These included what participants regarded as being reasonable in terms of (a) waiting time for a patient to be seen by a physician in an emergency centre; (b) length of time in which all emergency centre beds are occupied; (c) length of time patients are placed in hallways without being attended to; (d) length of time for patients to spend in the

Table 1 Possible triggers of emergency centre overcrowding.

- The use of an emergency centre for non-emergency cases
- High patient volume and insufficient inpatient beds
- Increasing patient complexity and acuity
- Shortage of staff or inappropriate nurse-to-patient staffing ratios
- Gross shortage of emergency physicians on call to manage complicated cases requiring specialised care
- Diagnostic and ancillary services which are inefficient
- Inadequate community resources to effectively handle discharged patients
- Health and human resources shortages
- Lack of alternative health care settings that may provide emergency care
- Delays as a result of waiting for laboratory tests
- Lack of public education regarding appropriate emergency centre usage

emergency centre waiting room before being attended to (Table 2).

The majority ($n = 16$; 42%) of the respondents considered 30–60 min a reasonable time for *waiting to be seen by a physician* in an emergency centre, with 37% ($n = 14$) of respondents viewing waiting for less than 30 min as reasonable. The majority perceived waiting for more than an hour as indicative of an overcrowded emergency centre. *Emergency beds fully occupied* for more than 24 h was perceived by the majority as characteristic of an overcrowded emergency centre. There was a wide range in the responses, however, with some of the participants ($n = 15$; 39%) indicating that up to five hours was a reasonable time for emergency beds to be fully occupied, while others ($n = 7$; 18%) felt that 20–24 h was a reasonable time. Eighty-four percent ($n = 32$) of the respondents regarded *patients placed in the hallways* for more than 24 h as characteristic of an overcrowded emergency centre, with a few respondents ($n = 6$; 6%) viewing waiting for more than four hours unreasonable. Responses regarding what was considered a reasonable time for patients to spend in the *emergency centre waiting room* before being attended to ranged from less than one hour to more than 24 h, but many of the participants ($n = 14$; 37%) perceived waiting between 1 and 4 h in the waiting room as reasonable, but longer than that was a characteristic of an overcrowded emergency centre.

In summary, an overcrowded emergency centre was characterised by a majority of participants as waiting for a physician in an emergency centre for more than an hour, emergency beds being fully occupied for more than 24 h, patients being placed in hallways for more than 24 h and patients having to spend more than four hours in the emergency centre waiting area before being attended to.

Triggers of emergency centre overcrowding were grouped into three areas in this study; (a) those associated with community level services; (b) those associated with the emergency centre; (c) those associated with inpatient and emergency centre support services.

The majority of the respondents highlighted the following as triggers of overcrowded emergency centres which were associated with the under-utilisation or inadequacy of health services at the community level: (a) large volumes of patients

received directly from the community who did not go via a community health centre ($n = 37$; 90%); (b) large volumes of patients who were not emergency cases ($n = 36$; 95%); (c) inappropriate referral of chronic cases ($n = 36$; 95%); (d) non-urgent social cases seen in the emergency centre ($n = 32$; 84%); (e) the increasing complexity and acuity of cases seen in emergency centres ($n = 30$; 79%); (f) lack of specialist physicians providing service at the community level ($n = 20$; 53%); (g) expensive private clinics ($n = 15$; 40%); (h) limited access to primary care services ($n = 10$; 26%) (Fig. 1).

The majority of the participants perceived the following as triggers of emergency overcrowding associated with the emergency centre; (a) insufficient care beds in the emergency centre ($n = 37$; 97%); (b) limited space to cope with the load of patients accessing the emergency centre ($n = 35$; 92%); (c) admitted patients staying in the emergency centre longer than expected ($n = 33$; 87%); (d) stretchers always being occupied because there are not enough to cope with the emergency centre patient load ($n = 28$; 81%); (e) a culture of poor prioritisation of urgent cases in the emergency centre ($n = 20$; 53%); (f) inadequate numbers of emergency centre nurses on duty ($n = 28$; 74%); (g) an excessive number of non-urgent investigations requested ($n = 22$; 58%); (e) doctors taking longer to complete consultations for various reasons ($n = 18$; 48%); (f) a shortage of emergency centre physicians on shifts ($n = 18$; 47%). This study revealed two triggers associated with inpatient services: lack of inpatient beds to cope with the emergency centre demand ($n = 36$; 95%) and poor management of inpatient beds ($n = 22$; 58%) (Fig. 2).

Three triggers were perceived to be associated with emergency support services. These included delays as a result of poor prioritisation of emergency cases ($n = 20$; 53%), laboratory delays (39%; $n = 15$) and radiological delays (42%; $n = 16$).

Discussion

In this study, it was perceived that patients in the emergency centre should not have to wait for the physician for more than an hour, emergency centre beds should not be occupied for more than 11–24 h, patients should not be placed in hallways

Table 2 Reasonable waiting times to characterise overcrowding.

<i>Waiting to be seen by a physician in an emergency centre</i>								
Minutes	> 30	30–60	61–90	91–120	121–150	151–180	< 181	Total
Frequency	14	16	0	3	2	2	1	38
(%)	(37)	(42)	(0)	(8)	(5)	(5)	(3)	(100)
<i>Emergency beds fully occupied</i>								
Hours	0–5	6–10	11–15	16–20	20–24	< 24	Total	
Frequency	15	1	0	0	7	15	38	
(%)	(39.5)	(3)	(0)	(0)	(18)	(39.5)	(100)	
<i>Patients placed in the hallway without being attended to</i>								
Hours	1–4	4–9	10–14	15–19	20–24	< 24	Total	
Frequency	3	0	0	0	3	32	38	
(%)	(8)	(0)	(0)	(0)	(8)	(8)	(100)	
<i>Patients waiting in the emergency centre waiting room before being attended to</i>								
Hours	> 1	1–4	5–9	10–14	15–19	20–24	< 24	Total
Frequency	8	14	1	2	0	5	8	38
(%)	(21)	(37)	(3)	(5)	(0)	(13)	(21)	(100)

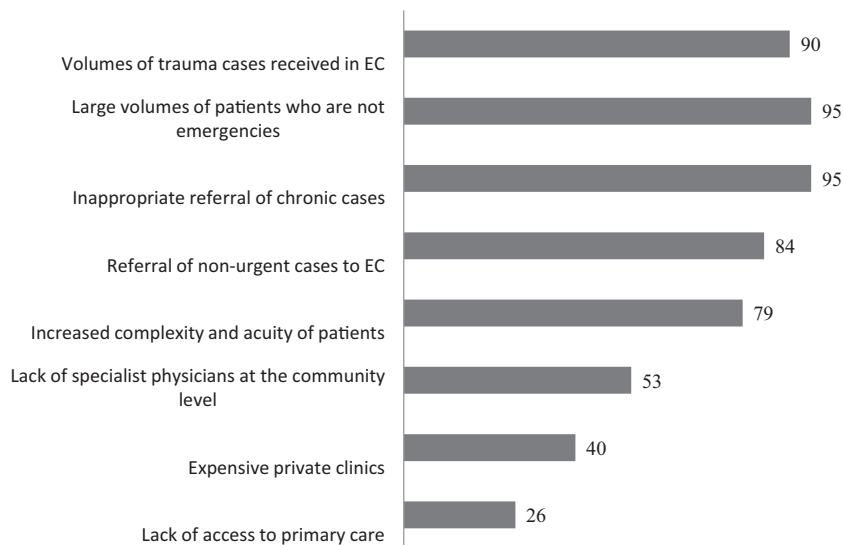


Figure 1 Triggers of EC overcrowding associated with community level services.

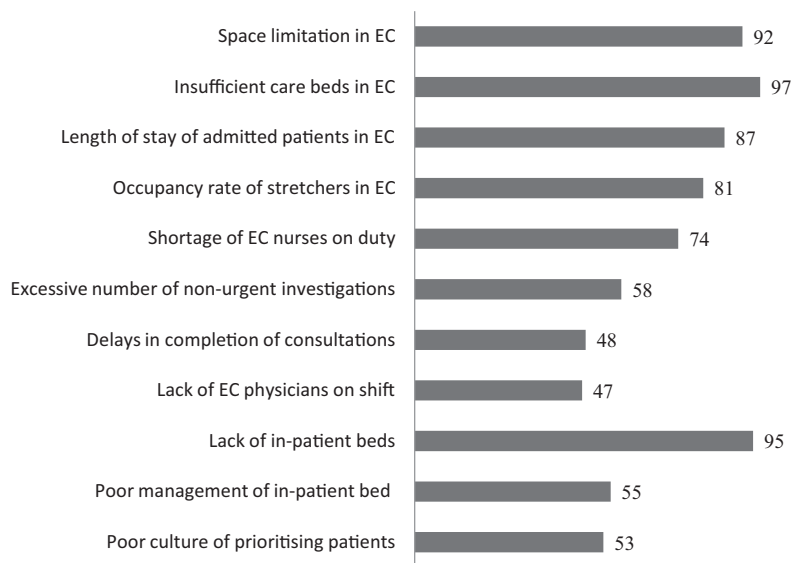


Figure 2 Triggers of EC overcrowding associated with EC and inpatient factors.

for more than 24 h and patients need not have to spend more than four hours in the emergency centre waiting area before being attended to. Participants felt that it was acceptable that patients had to wait a minimum of 60 min for a specialist physician because they were not part of the emergency centre's staff, only coming to the emergency centre for morning rounds or if there is a need for a consultant. This seems to be in line with the recommended time by the California Emergency Department and US Emergency Department directors [*sic*], which is one hour.^{12,21} In Birkhahn et al.'s study, however, the average waiting time for a specialist physician was about 90 min.¹⁹ Findings of this study revealed that participants perceived that it was acceptable that all beds in the emergency centre were occupied for a period ranging from 11 to 24 h. This was slightly contradictory to the study findings by Richards et al.¹² where the time in which all beds were occupied in Canadian emergency centres should not exceed 6 h. The findings in

this study where the placement of patients in the corridors for more than 24 h is perceived as a sign of overcrowding was slightly different from the findings of the study by Derlet⁴ where patients placed in corridors for more than six hours a day was a sign of overcrowding. Embedded in the understanding of emergency centre overcrowding in this study is the similar perception shared by the Canadian Physician Hospital Care Committee,²² where emergency centre overcrowding is viewed as an inability to cope with the load because the demand exceeds the capacity of an emergency centre to provide quality care within acceptable time frames. This may be as a result of contextual factors in the country, hence the variations in the definitions.

Occupancy of the emergency centre by non-urgent cases, who come directly from the community level without following any referral system, came up as one of the triggers of emergency centre overcrowding (66%). This is in line with

the findings by Nsereko²³ in 2007, where about 81.4% of trauma cases admitted to emergency centres in Rwanda had minor injuries which could have been attended to at the community level. Non-urgent cases in emergency centres may be attributed to: the increasing acuity and complexity of cases in an era where patients present with multiple diseases (e.g., hypertension, diabetes, TB and HIV) and require management by a specialist; lack of specialist physicians at the community level; expensive private clinics; as well as limited access to primary care services.³ The Rwanda Health Sector Policy²⁴ reflects this as a broader systemic issue because of a referral system that requires further clarification of responsibilities of the central-level national referral hospitals, taking into consideration the limited number of district hospitals, especially in urban areas. As a result of a poor referral system, national hospitals are inundated by patients that should be managed by district hospitals.²⁴ Overcrowding of emergency centres by non-urgent cases in Rwanda may also be associated with the consequences post 1994, in which the country and its health system were left in ruin, with their infrastructure destroyed.²⁵ The situation of non-urgent cases overcrowding emergency centres is not unique to Rwanda. A systematic review conducted by Hoot et al.,² reflected similar findings and Shactman⁵ raised the same concern in an emergency centre survey in the New York City where it was found that 43% were non-emergency cases.

Sixty three percent of respondents in this study perceived increasing complexity and acuity of cases as a cause of overcrowding. This is certainly an issue because acuity and complex cases need more time to be managed. Similar results were reported by Cowan and Trzeciak²⁶ who suggested that the most important determinants of emergency centre overcrowding in US emergency centres were an increasing volume of high-acuity patients. A survey by Rowe et al.¹⁴ from the Canadian Emergency Department/Directorates [*sic*] also identified increased complexity and acuity of patients' symptoms as a major cause of emergency centre overcrowding. Furthermore, increased volume and acuity of disease among the general patient population were also noted in the United States of America as a cause of emergency centre overcrowding.²⁷

The results in this study also revealed insufficient emergency centre beds ($n = 37$; 97%) as well as limited space ($n = 35$; 92%) as triggers of overcrowding in the emergency centre. According to the Canadian Association of Emergency Physicians,³ proper functioning of the emergency centre depends on having appropriate space and suitably qualified staff that match the volume and nature of emergency patients. Han, Zhou and France²⁸ however, caution that although a hospital may attempt to address these by expanding the emergency centre and increasing the number of emergency beds, this is an insufficient solution if other bottlenecks in the hospital and the health care system are not addressed. A comprehensive approach may be the best approach as it will also consider the needs of the rapidly growing population, as experienced in Rwanda, where the population in the Kigali city grew rapidly,²⁰ adding pressure to the emergency centre.

Various factors were identified by participants as compounding the overcrowding problem in the emergency centre. These included the length of stay of patients admitted to the emergency centre ($n = 33$; 87%); excessive non-urgent investigations ordered ($n = 22$; 58%); delays in completion of consultation ($n = 18$; 48%), poor inpatient

bed management ($n = 22$; 58%); a poor culture of prioritising patients in emergency centres ($n = 20$; 53%). Inefficiencies related to the ordering of unnecessary tests and slow processing of patients are associated with inexperienced medical practitioners and medical students.¹⁷ A study by Askenasi, Lheureux, and Gillet²⁹ revealed that X-ray investigations can add an extra 40 min to emergency centre turnaround time.

This study revealed an inadequate referral system, with patients from the community directly accessing a referral hospital as a first line of contact. This contributes to overcrowded emergency centres. Developing guidelines to streamline management of emergency care patients from the community level to the hospital and back may be of value in addressing the emergency centre overcrowding challenge in Kigali, and Rwanda in general.

It is also recommended that hospital authorities open more opportunities for nurses to undergo training in emergency care because the scope of practice for emergency care nurses is broader than that of a generalist nurse. Some of the activities (i.e., reading blood results, electrocardiograms and drawing the attention of the doctor for those who need urgent attention) may be performed by this specialist nurse (depending on the scope of practice). This may cut down on the waiting time and contribute significantly in reducing overcrowding in the emergency centre. This recommendation is in line with Schriver et al.'s²⁷ suggestion that the current complexity of emergency nursing practice has fostered new and more comprehensive educational preparation. The broader educational preparation of emergency care nurses is critical in an era where patients seeking emergency care present with multiple health problems, which require specialised management.

A time series research study that will analyse time spent by patients in emergency centres, from the time of entry to the time of exit, is recommended. Such a study may assist in identifying bottlenecks in the system used to manage patients in emergency centres. This research may conclude by estimating average times, guided by the nature of the emergency case, investigations conducted, as well as patient management in the emergency centre. This may improve efficiency of the emergency centre and turnaround time for emergency centre cases. Such a study has the potential to influence decision making regarding allocation of both staff and material resources.

Conclusion

Overcrowding in emergency centres is a problem that cannot be ignored. It poses a challenge to a number of health care systems globally. It is a complex phenomenon, with a range of triggers and multiple adverse outcomes if not addressed.⁴ In an era where quality health outcomes are critical, this challenge of emergency centre overcrowding should be addressed as it is associated with increased patient suffering, deteriorating levels of service, preventable complications and even loss of life. A comprehensive approach to manage emergency centre overcrowding is recommended as there may be some hidden factors that may have unintentionally been excluded, which are, however, significant in emergency centre overcrowding. The Ministry of Health may collaborate with emergency care experts and other critical stakeholders in coming up with solutions.

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