



Original article

Clinical teams' experiences of crowding in public emergency centres in Cape Town, South Africa

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ABSTRACT

Introduction: Crowding is a significant challenge for emergency centres (ECs) globally. While South Africa is not alone in reckoning with high patient demand and insufficient resources to treat these patients; staff-to-patient ratios are generally lower than in the Global North. The study of crowding and its consequences for patient care is a key research priority for strengthening the quality and efficacy of emergency care in South Africa. The study set out to understand frontline staff's perspectives on crowding in Cape Town public ECs to learn how they cope in such high-pressure working conditions, determine what they see as the factors contributing to crowding, and obtain their recommendations for reform.

Methods: This research is a qualitative study from interviews and observations at five ECs in Cape Town, conducted in June and July 2017. In total 43 staff were interviewed individually or in pairs. The interviews included physicians of varying levels of experience (25), and registered or enrolled nurses (18). Data were analysed with the qualitative text-analysis software NVivo.

Results: Both doctors and nurses saw crowding as a consequence of three factors: 1) limited bed space in the EC, 2) insufficient health professionals to care for admitted patients, and 3) the presence of boarders. Systemic or organizational factors as well as human resource scarcity were determined to be the key reasons for crowding. **Discussion:** With its high patient acuity and volume and its limited human and material resources, South Africa is an important case study for understanding how emergency care providers manage working in crowded conditions. The solutions to crowding recommended by interviewees were to expand the EC workforce and to add discharge lounges and examination tables.

African relevance

- Crowding is a significant challenge for South African emergency centres (ECs);
- The study of crowding and its consequences for patients is a research priority for strengthening the efficacy of emergency care in South Africa;
- This paper fills a gap in understanding general systems and management in emergency care, from five ECs in the Western Cape of South Africa;
- The research examines how EC staff experience crowding, the factors contributing to crowding, and their recommendations for reform;
- Systemic or organizational factors as well as human resource scarcity were determined to be the key reasons for crowding;

- South Africa is an important case study for understanding how emergency care providers manage working in crowded conditions.

Introduction

Crowding is a significant challenge for South African emergency centres (ECs) [1,2]. Contributing factors include high patient acuity affected by national rates of infections, chronic disease, and trauma, especially trauma from traffic collisions and violence [3,4]. Health disparities in accessing emergency care pose an additional challenge: rural areas are largely underserved by emergency care [5], and racial health disparities in accessing emergency care are an enduring challenge [6]. These disparities lead to delays in presentation resulting in higher acuity on presentation for this patient cohort. South Africa is not alone in reckoning with high patient demand and insufficient resources

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to treat these patients; however, staff-to-patient ratios there are generally lower than in the Global North [7,8]. The study of crowding and its consequences for patient care is a central research priority for strengthening the quality and efficacy of emergency care in South Africa [9].

Crowding refers to a full or overloaded EC [10]. Two models are used to explain this problem. One attends to systemic factors linked to workflow [10,11], in three stages: 1) *input* factors - how patient demand for emergency care, levels of patient acuity, and time of patient arrival put pressure on the EC; 2) *throughput* factors - treatment and process delays once patients are admitted to the EC; and 3) *output* factors - the inability of staff to transfer patients from the EC to other departments in the hospital or to another facility [12]. The other model focuses on the intersections among high patient demand for emergency care, patient acuity, and limited human and material resources [12,13]. While definitions of crowding vary, there is consensus among scholars that it is a complex and multifaceted phenomenon that has health care quality and outcome implications [10–11,13].

One of the central objectives in implementation science in medicine is for researchers and planners to attend to the viewpoints of front-line staff as they have an in-depth understanding of their local work contexts [14]. We undertook a qualitative study of frontline staff's perspectives on crowding in Cape Town public ECs to learn how they cope in such high-pressure working conditions [15]. This paper fills a gap in understanding general systems and management in emergency care [9], from the perspective of five ECs in the Western Cape of South Africa, by describing how EC staff experience crowding and what they see as the factors contributing to crowding, and their recommendations for reform.

Methods

Site and participants

The strength of a qualitative methodology is to capture the complexity of medical work by illuminating how clinical teams cope in crowded conditions [16,17]. Our study combined semi-structured interviews with observations conducted over two visits in June and July 2017 at each of five ECs in Cape Town that are linked to high-volume acute hospitals. According to the Western Cape's health plan, these ECs provide a secondary level of care and receive patients referred by the primary health care system. Author 3 (LW) sent emergency physicians from the five selected hospitals emails advertising the study and seeking interested physicians join the study. Each of the physicians responded positively to the email. Thereafter author 1 (CVDR) coordinated with each of the physicians over dates and times to perform the study. Physicians in turn negotiated with nurse managers to gain permission of nurses to volunteer to participate in the study.

The study took place over two days, the first day CVDR observed rounds and followed clinicians throughout their shift. On the second visit, often set approximately a week after the first visit CVDR interviewed EC staff. The research was performed during the day shift and staff were told about the study in advance of the research. CVDR took advantage of nursing huddles and doctors meetings to remind staff about the study on both days of the study. Forty-three staff consented to be interviewed, either individually or in pairs. Given the work pressures placed of EC work staff those who could afford to spare the time to be interviewed consented to the study. Some of the staff, especially nurses and emergency physicians were present during both days of the observation however the rotations of medical officers often precluded continuity over both days. Sampling was done until redundancy was accomplished. The interviewees were specialist emergency physicians and medical officers (25 interviews) and registered and enrolled nurses (18 interviews).

Author 2 and 3 are employed by the Western Cape Department of Health and thus to protect the privacy and confidentiality of the

research participants played no role in the data collection or first round data analysis. Authors 2 and 3 contributed to second round analysis, writing, and dissemination of the article.

Data and analysis

Constructivist grounded theory provided the epistemological basis for this study [18–19] and is used to provide insight and understanding about how patient care is performed under conditions of crowding and resource scarcity. This approach builds on the foundation of grounded theory, an inductive research strategy that uses constant comparative methods to gain understanding of organizational processes. However, constructivist grounded theory introduces greater attention to reflexivity: the ways in which the standpoints and identity of both researcher and participants influence the knowledge produced in the study [19].

CVDR has an insider/outsider status [20] in this research project. As someone who grew up in South African and attended South African undergraduate and graduate institutions, she had an insider status among South African health professionals trained in similar universities. However, as a non-clinician and non-resident CVDR was an outsider.

CVDR's blend of insider and outsider qualities proved to be useful in navigating busy ECs with a racially diverse workforce comprising black, coloured and white staff. As an insider CVDR understood the complex race, gender, and class dynamics that structure social life in South Africa and attempted as sensitively as possible to work with staff from different race and gender backgrounds. As an outsider CVDR emphasized in her interactions with staff how her social science background and non-resident status strengthened the confidentiality of the study as the researcher had limited contact with senior officials in the Western Cape health department. Her training in social science rather than medicine meant she could not make clinical judgements about the quality of work performed in the EC and thus invited staff to speak as freely as they wished about working conditions in the EC.

Semi structured interviews were conducted in private areas of the EC and lasted 15–30 min (see the interview schedule in an Appendix). The researcher actively sought a mix of staff who were experienced and specialist emergency clinicians as well as staff who were generalist, new to emergency medicine, and less qualified and thus lower in the hospital hierarchy in order to seek diverse perspectives on emergency care work. Furthermore, race and gender diversity was sought in the selection of interviews (see Tables 1 and 2) to solicit perspectives from staff about work process than might be influenced by societal gender and race relations.

An interview schedule was used to encourage conversation in order to evince each participant's unique perspective [21]. The schedule was used as a rough guide, initial questions asked staff about a 'typical work' day probing for understanding of both patterned activities and unexpected events. More challenging questions asked at the end of the schedule explored how crowding and work routines posed challenges for safe patient care. CVDR probed for examples of error, types of error, and work situations that presented risks for patients. Interviews were recorded and transcribed. All data were de-identified to protect the confidentiality of participants. Ethical clearance was obtained, and approval was granted by the Western Cape Department of Health.

Two rounds of analysis were undertaken with NVivo 11, a qualitative text-analysis program [22], following inductive analytic techniques

Table 1
Race characteristics of research participants.

Race	Asian	Black	Coloured	White	Total
Physician	1	1	10	13	25
Nurse		7	10	1	18
Totals	1	8	20	14	

Table 2
Gender characteristics of research participants.

Gender	Man	Woman	Total
Physician	13	12	25
Nurse	4	14	18
	17	26	

influenced by constructivist grounded theory [18,19] and interpretive description [23,24]. The first round involved open coding of the problems clinicians ascribed to crowding in the interviews as well as in CVDR's field notes. Her analysis was supplemented by analytic memo writing that she shared with her coauthors. Emerging out of this first round analysis about relationships between patient crowding, wait times and the quality of patient care, the team saw how systemic factors such as staffing and resource allocations were intertwined with work process. We revisited EC literature from the Global North on crowding and found the scholarship on the characteristics of work process and resource scarcity useful sensitizing concepts in interpreting patterns in our data. The second round of analysis involved theoretical coding [18] of the characteristics of crowding that impacted workflow. Using interpretive description [23,24] we interrogated and the salience of these theoretical categories for public ECs in the Western Cape in order to strengthen understanding of how the quality of patient care was impacted by crowding in unique clinical settings in the Global South.

Member checks [25] were performed to test data credibility by sharing two research memos on the first and second rounds analysis with senior clinicians in Cape Town and garnering their feedback. Additionally, we presented our findings at a policy research workshop health by the Western Cape Department of Health and gained feedback from frontline clinicians and policy researchers in the Western Cape.

Results

Frontline staff indicated that they routinely experienced patient crowding in their ECs. They identified limited bed space available to admit patients, staff shortages, and output blockage in transferring patients out of the EC as the main causes of crowding. The following discussion concerns staff experiences coping in these conditions according to four themes explained in the introduction:

- Input: managing with limited bed space
- Throughput: coping with the volume of admitted patients
- Output: dealing with the subset of patients known as boarders
- Staff shortage

Input factors: managing with limited bed space

Doctors and nurses were preoccupied with the challenges and fallout presented by limited bed space. Input factors are beyond the influence of the EC and the system has struggled to keep up with ever increasing demand. The health system in Cape Town has responded to the chronic space shortage by introducing armchairs, a standard vertical concept, in some areas of the EC. Patients who need to be admitted to the EC when bed occupancy is constrained and who are mobile are seated on chairs or trolleys. The clinicians discussed how the South African Triage Scale [26] aims to sort patients according to the severity of their condition by assigning them an appropriate score by colour. When beds are scarce, doctors decide whether patients coded orange and yellow (very urgent and urgent) should be assigned to a bed or a chair. As one physician explained, deciding who gets assigned a bed as opposed to another surface requires difficult but expedient decisions:

I have to make judgement calls and put the most unstable or the patients who are the most immobile on the beds and then the people who are able to walk or able to sit, I have to put them on the chairs

so that, with what I've got, I can help the most people.

(Physician)

Physicians having to make judgement calls about which unstable or immobile patients to allocate a bed when crowding is an issue is a routine problem solving strategy in both the Global North and South, but the scale of crowding in public hospitals in South Africa means that physicians make these judgement calls as part of their daily practice rather than a response to unusual circumstances.

Although frontline staff see the chairs as preferable to retaining patients in serious condition in the waiting room or placing patients on the floor, they frequently discussed their concerns about caring for patients sitting in chairs. Physicians indicated that the quality of care is compromised, for instance, when performing exams: 'I can't do a decent abdominal exam on a patient in a chair; you just can't. And they could be in that chair for four days, so for four days they go without a decent abdominal exam'. Doctors emphasized that placing patients in chairs instead of in a monitored bed meant that early warning signs may be missed. Nurses were equally concerned about providing care for patients in chairs, as patients get pressure sores more frequently. Nurses also faced the brunt of patients' frustrations at having to wait to be seen, as well as the discomforts they experienced when placed in a chair:

It's not nice to nurse a patient on the wheelchair and other chair, rather than to nurse the patient on a bed or maybe on a stretcher because the person who's sitting there, I already make example of fainting; [a] patient can faint. Other patient can even just collapse, other one they've got bedsores, they are not sitting nicely [comfortably] on the chair, rather than to see the patient on a bed.

(Nurse)

Throughput factors: coping with the volume of admitted patients

Nurses and physicians stressed how the high patient volume stretched staff capacity to provide comprehensive care. Staffing shortages were common; nurses described working at times when they alone were in charge of ten or more patients:

Firstly, when I came in here on orientation they told me that where I'm working currently, the majors, we are supposed to have thirteen stretchers at a time, but there are days where you would find thirty-nine patients, so it's almost triple and you have only four people working there.

(Nurse)

Doctors were equally concerned about the staff-to-patient ratios: Patient spaces in the EC, it's staffed for twenty but we've got anything up to seventy or eighty patients in there, and so you've got the same number of staff looking after that massive bulk of patients that you should actually [have] for the smaller volume.

(Physician)

Both doctors and nurses stress that the number of staff in the unit is fixed even when the EC has exceeded its capacity. As a result, staff were very concerned about the quality of care they are able to provide when staff-to-patient ratios were so low.

Physicians were mainly concerned that they could not perform complete examinations with so many patients sitting on chairs; a corollary to this problem is that the cramped conditions compromise patient privacy. Additionally, physicians discussed how interruptions increased when the EC was crowded, as there are more family members asking about their relatives, more patients to follow up on, and more incoming messages from nurses and outside departments about multiple patients. North American case studies suggest that increasing size of EC only has a very short term impact, as the patient teams quickly adjust to the new size of the EC space and adjust their processes to fit [27–29].

This experience of trying to manage when there are so many patients and interruptions leads physicians to focus on stabilising patients

and restricting their investigations to what is minimally necessary [30–31]. Physicians worry that, by restricting investigations, the risk increases that other underlying symptoms will be overlooked:

And then also the amount of attention from previous patient that's taken away from our next patient, meaning that I can't pay the amount of attention to them that I want to... and I may overlook things, forget about things because I'm attending to the previous patient.

(Physician)

Nurses worry that the high patient volume threatens their ability to care for patients systematically. When the EC is crowded, medication delays are common, which in turn lengthens the time it takes to stabilise a patient and transfer or discharge that patient from the EC:

We try to manage... The only time you get to spend with a patient if it's a difficult patient so if the patient needs your assistance; that's the only time you get to the patient, so the other patient that's not complaining or anything, that patient doesn't get nursing care because he doesn't complain or he doesn't make nuisance or he isn't crying or he isn't complaining, so you don't get to the patient that's not saying anything, so that patient gets forgotten. So the nursing care is very poor because the only time you get to the patient is when you do your normal rounds, medication, but other than that you don't get to the patient again.

(Nurse)

This nurse is describing similar concerns about interruptions and clinical judgement, in which demanding patients receive more attention because they are being disruptive while the quieter patients who may be seriously ill are overlooked. This is a core problem in emergency medicine. Not only is crowding linked to higher patient acuity and complexity [12,32–33], the negative consequences for both low and high acuity patients leads to delayed care and lengths time of stay in the ED.

Output factors: frustrations in caring for boarders

Staff were concerned about the presence of boarders (patients who had been accepted to other departments but remained in the EC). Globally, research suggests delayed patient discharges contribute significantly to crowding, patient length of stay, morbidity and decreased quality of care for patients [34–35]. Doctors discussed how large numbers of boarders led to bed block and prevented the admission of patients who needed a bed; they were frustrated that they were responsible for patients boarding in the EC, which multiplied their workload and increased the interruptions:

If you refer a patient to a specialty, we would like them to go to that ward that they need to go to and it seldom happens that they stay here for day five because we had patients staying down here for fourteen days. We had psych patients that are down here for quite a while so that is the biggest challenge to me, is then once you've referred a patient on to a certain specialty you would like them to go to that ward so that they can empty the space up, but essentially it's overcrowding and not having enough beds available for patients, so that's the biggest thing.

(Physician)

There were particular problems regarding boarders being transferred to the psychiatry department. Due to space constraints and limited services available to people with mental health problems, the EC becomes the holding area for psychiatry patients; these patients often end up heavily sedated during their stay in the EC, which leads to other complications. Patients diagnosed with mental health patients boarding in the EC is an international phenomenon [36]. Long term boarding in the EC provides suboptimal care for psychiatric patients, increases the costs of EC care, and prolongs the amount of time all patients wait to receive emergency care [37–38]. In addition to bed

block, nurses discussed how managing patients due to delayed transfer to psychiatry distracted them from the urgent needs of newly admitted or physiologically unstable patients. As one nurse explained:

'We've got our psychotic patients that also come in here, so you have to watch them also. So most of the time you run for them, and then you must forget about the older patient that's needing immediate attention'.

Staff recognized, however, that there were no simple solutions to boarders in the EC. They talked about the problem of the revolving door:

Last week the situation was very bad. It was so bad that they had to discharge and discharge, and every time ... I'm talking about medicine now and even surgery, but I know a specific case where the doctor discharged the patient a bit early, but we had to discharge more and the patient deteriorated at home and came back.

(Nurse)

Discharging patients before they are ready in order to free up beds drives up readmission rates; doctors described this process as a negative loop of a systemic nature, where high patient demand and fixed human and material resources present structural barriers to solving the problem of crowding. In addition to the lack of outpatient resources for care, the issues of inpatient bed and length of stay management are essential and complex that go beyond the scope of this article. For clinicians' resource scarcity in the public sector is pivotal:

I think the disparity between private and public is huge. I think at some stage there needs to be something in terms of a national health insurance that comes in, but at the moment it is almost criminal how little we have to work with, with such a high burden of disease.

(Physician)

Staff frequently discussed the differences between the private and public health systems. Physicians frequently discussed how in the private sector patients do not have to sit on chairs instead of a bed. Likewise, working conditions in ECs in private hospitals were seen to be easier as ECs were seldom crowded and the patient-doctor ratios are higher.

Staff shortages

Staff frequently emphasized that crowded conditions in the EC were compounded by staff shortages. Both nurses and doctors agreed that nurse shortages were the more critical problem:

We don't have a ratio, like in the wards they've got thirty patients and they've got, for example, eight nurses, so they've got maybe five patients per nurse or four, whereas here we don't have that system. We've got three sisters or four and maybe two staff nurses and four nurse aides, and you've got a hundred patients, for example, so it's not per patient, per nurse.

(Nurse)

Inequalities in staffing levels between the wards and EC was discussed by both nurses and physicians. While this is a common cause for nursing turnover, the high nurse-to-patient ratios were seen by staff as detrimental to patient care, as one physician attested: '*not enough eyes on patients*'. Nurses and doctors were concerned that there were no staff available to relieve nurses when they took lunch or tea, creating even greater vulnerabilities in the EC because a single sister would be responsible for the entire area. Furthermore, nurses discussed the challenges they faced caring for patients when they were so stretched:

Turning the patients that cannot turn themselves, but if you're alone, how can you turn a patient on your own? You can't. Who's going to help you that you can, but if you can't, you end up not changing the patient, not all of them maybe. You're going to change some but not all of them.

(Nurse)

Physicians also discussed how shortages in their ranks posed a problem for patient care:

If you think they're on a shift, not even just talking about the front, which might be a hundred and ten, so that means that you see a hundred and twenty patients per night. The number of doctors in the [EC] team is going to be five. Which means that one is in the critical area, one in all the other spaces, so if you have one doctor to see all of those [patients] then you're getting about one [doctor] to twenty-five [patients] and that's in hospital, that's not even talking about outside. So it's quite a lot for doctors to try and see and to try and keep ahead of.

(Physician)

Observational research on nurse staffing levels and patient outcomes in the Global North [39–40] finds similar links between nursing shortages and patient outcomes including longer length of stay in the EC, delays in being seen and patient satisfaction.

Discussion

Doctors and the nurses attributed the crowding in Cape Town ECs to both systemic workflow obstacles and to material and human resource scarcity.

Work organization

Clinicians frequently used the term *manage* to describe how they went about their work when the EC was crowded. Clinical education in South Africa does not include training in operations and patient flow, globally this is an essential skillset. As previous studies have found, tensions between quality and efficiency in the EC were evident in how clinical teams responded to their workloads [15]. The most pressing preoccupation for physicians was to free up beds in order to admit new patients. Physicians described having to make decisions about which patients most needed a monitored bed. Staff in general discussed the challenges of caring for patients sitting in chairs, which disabled doctors from conducting a thorough investigation and elevated the risk of pressure sores that nurses had to tend to. Bed management and decision-making practices blur the boundaries between clinical judgement and organizational priorities to ensure continued workflow through the EC [15].

South African health professionals' experience of crowding aligns with international research on this problem that identifies the multiple causes of crowding [10]. In keeping with international research, staff saw the linkages between exit block and bed occupancy constraints leading to long wait times [38], and staff were concerned about how early discharges from the hospital led to a revolving door where patients became unstable again at home and were readmitted to the EC [41,42].

Material and human resource scarcity

Staff interviewed for this study were not complacent about crowding, and they railed against the dysfunction [43] it created. Many drew comparisons to the inequities between the private and public sectors in South Africa. The asymmetries in South Africa's health care system highlight the importance of understanding “local care settings, their processes, habits, and traditions” [44], as this directly influences the characteristics of the problem. These social conditions may differ from organization to organization, and thus standardizing across organizations is not possible [45]. The South African context including high patient demand for emergency care, and a fixed supply of clinical services [6] creates routine crowding in ECs. Staff feel they are stretched beyond their capacity.

As a result of both systemic factors and human resource scarcity, crowding compromises physicians' and nurses' ability to comply with

clinical guidelines [15,46]. Both doctors and nurses described how they felt their clinical judgement was undermined by the frequency of interruptions they experienced and by the impossibility of spending enough time with patients to analyse their condition properly. To cope, they must discharge patients or transfer them to medical specialties or move patients to chairs. Staff were anxious about not providing the care they know a patient needs because they don't have the time to give to it. They wrestled with the dilemma of not being able to provide the quality of care set by the standards of their profession. They make rapid clinical decisions with limited information and worry about missing aspects of the patient's condition.

Solutions

Physicians and nurses recommended both systemic and human resource solutions to improve crowding. Systematically, the EC staff recommended the introduction of a discharge lounge for patients already evaluated and treated. Also, placement of an examination table in the EC to allow for thorough examinations of patients consigned to chairs, would improve quality and throughput. However, the biggest challenge frontline staff identified is the scarcity of human resources. Expanding the workforce would go a long way to improving the quality of patient care in South African ECs and to improving working conditions for clinical staff: this must be a policy priority.

Limitations

Staffing shortages among nurses posed challenges for recruiting nurses into the study and as a result fewer nurses were recruited into this study than physicians. Research on nurses' roles in promoting safe patient care has been identified as a research priority [9]. Future studies should consider ways to secure protected time for nurses to improve their participation in the quality improvement research.

The emphasis on local context brings to the fore a geographic limitation to this study. The five case study hospitals are based in Cape Town, which has a relatively well-developed health infrastructure and a large workforce in comparison with other parts of the country [47]. The national picture for South Africa is marked by inadequate services [48] and chronic staff shortages; thus, one would expect that the problems relating to crowding in the EC are likely to be magnified elsewhere in the country.

In conclusion this study examined the perceptions of frontline EC staff about the complex relations among crowding and rising admission thresholds, delayed discharges, and staff shortages. Systemic or organizational factors as well as human resource scarcity were identified as the reasons for crowding. Solutions recommended by staff include expanding the EC workforce and adding features such as discharge lounges and examining tables to improve the quality of patient care.

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Dissemination of results

The authors shared two research memos on the first and second rounds analysis with senior clinicians in Cape Town and garnered their feedback. Additionally, we presented our findings at a policy research workshop health by the Western Cape Department of Health and gained

feedback from frontline clinicians and policy researchers in the Western Cape.

Authors' contribution

Authors contributed as follow 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: *CVDR contributed 50%; LW 45%; and SL contributed 5%.*

All authors approved the version to be published and agreed to be accountable for all aspects of the work.

Declaration of competing interest

The authors declared no conflicts of interest.

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