

Research

The process of handover in the busy emergency centre: A pre-hospital perspective from Johannesburg, South Africa

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Abstract

Background

Emergency centre handover usually takes place between the pre-hospital emergency care personnel who deliver the handover and the emergency centre personnel who receive the handover. Handover that is not effective may present risks to patient safety. One factor that may affect handover delivery is the process of handover within a busy emergency centre.

Methods

The data reported on in this study formed the qualitative component of a sequential explanatory mixed methods study. It used face-to-face, semi-structured interviews to gather data. Fifteen interviews were conducted with pre-hospital emergency care personnel from a range of qualification and scopes in South Africa. Interviews were transcribed verbatim and imported into Atlas.ti® for coding and analysis using a qualitative descriptive methodology.

Results

Pre-hospital emergency care participants identified a lack of emergency centre staff available to receive handover as a barrier to effective handover and attributed this to emergency centres being overworked and understaffed. This potentiated interruptions to handover and having to deliver multiple handovers for the same patient. Pre-hospital emergency care participants indicated a preference for handing over directly to a doctor.

Conclusion

Several potential process barriers to effective emergency centre handover were identified, including lack of personnel to receive handover, interruptions and the need to perform multiple handovers for the same patient. Generally, these barriers were attributed to the busy understaffed and overworked nature of emergency centres. We would encourage future research in emergency centre handover, specifically from the perspective of the personnel who receive handovers.

Keywords:

emergency centre; handover; prehospital; understaffing; multiple handovers

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Introduction

Handover has been defined within this study setting as ‘a patient-centred process that presents adequate and contextually relevant patient-specific information from one medical professional to another. Handover information is presented in a structured format that facilitates optimal information transfer and recall, as well as establishing a shared understanding of the patient’s condition, to ensure ongoing continuity of care. Handover serves to transfer responsibility and accountability for continuity of care from one medical professional to another. The handover process is complete once the receiving medical professional indicates (verbally or in writing) that they have taken over responsibility for the patient’ (1). Handover in the emergency setting is essential to continuity of care and has been associated with a high risk of adverse events (2). During their journey from first contact to final discharge the patient will likely be handed over many times. The first of these handovers usually takes place in the emergency centre between the pre-hospital emergency care personnel (PECP) who treated the patient and the personnel in the emergency centre who receive the patient from them. PECP act as deliverers of handover and the emergency centre personnel as receivers of the information contained in that handover.

When PECP present to an emergency centre with the patient, the aim is to deliver an appropriate handover to the appropriate person to ensure continuity of care for that patient. Within the resource-constrained emergency centre there are several challenges that have the potential to negatively affect the efficacy of handover. There are critical shortages of both medical and nursing personnel within the South African healthcare system (3,4). The emergency centre is a busy place and the workload has been described as “three times higher than other wards” (5). Understaffing in the emergency centre is commonplace and this is exacerbated by the high workload in these areas (6,7). This understaffing and busyness often result in there being no free staff to take pre-hospital emergency care handovers on their arrival. This is compounded by the critical shortage of qualified PECP (8). These factors have the potential to perpetuate delays in the emergency centre and have been associated with frustration on the part of the pre-hospital emergency care provider who has provided prompt care for their patient and then faced delays in the emergency centre (9). These delays and frustrations have been exacerbated by the COVID-19 pandemic where many facilities have been overwhelmed by patients reporting to emergency centres.

Interruptions to handover can be defined as any event disrupting the handover process (10). Literature suggests that interruptions during handover are commonplace (2,11). Interruptions have the potential to increase discontinuity of handover and in doing so to increase the potential for errors in communication and consequently errors in patient care (10,12). Interruptions can be linked to a need for PECP being required to perform multiple handovers. Multiple handovers refer to when a handover needs to be repeated for the same patient and have been linked to a

loss of patient information, which decreases handover efficacy (13,14).

It is important to identify and address the challenges faced by PECP when trying to deliver effective emergency centre handovers. Identification of the challenges and potential solutions have the potential to improve the efficacy of handovers, and in doing so to potentially decrease the risk of adverse events and possibly improve patient safety. The aim of this study was to examine PECP’s perspectives relating to the process of handover in a busy emergency centre.

Methods

Study design

This study used a qualitative design to gather data using semi-structured, face-to-face interviews. A qualitative description approach was used to analyse the data.

Setting

South Africa comprises nine provinces. Gauteng, the province in which the study took place, is the smallest by area but the most populous with an estimated population of 14.3 million (15,16). Participants experienced different settings in their working environment dependent on whether their primary experiences were based in the state-funded or private sector. It is important to be cognisant of the fact that PECP employed by both state-funded and private organisations would handover in both state-funded and private emergency centres. In South Africa there are several pre-hospital qualifications, each of which registers in a scope-dependent category with the Health Professions Council of South Africa (HPCSA) (8). The HPCSA is the regulatory body that governs registration and scope of practice of healthcare providers in South Africa. The Professional Board for Emergency Care specifically governs PECP. Qualification directly relates to registration category and associated scope of practice. A brief description of qualification criteria follows with registration categories depicted in brackets. Basic ambulance assistants (BAA), often categorised as basic life support (BLS), trained for 4 to 6 weeks. Ambulance emergency assistants (ANA), often categorised as intermediate life support, trained for approximately 16 weeks. Critical care assistants, national diplomates, emergency care technicians and emergency care practitioners, usually broadly categorised as advanced life support (ALS). Critical care assistants complete nine months of training and national diplomates study towards a 3-year diploma at a tertiary institution, both registered in the ANT category. Emergency care technicians (ECT) complete a two-year diploma. Emergency care practitioners (ECP) complete either a 3-year national diploma followed by an additional year of study or alternatively, a full-time 4-year degree at an accredited higher education institution (8).

Methods

The data reported on in this manuscript form the qualitative component of a sequential explanatory mixed-methods study (17). The quantitative phase of the study used paper-based

questionnaires that comprised Likert-type, forced-binary and open-ended questions to gather data. Participant responses were used to compile the interview questions for the face-to-face, semi-structured interviews that comprised the qualitative phase. We used a qualitative descriptive approach to the data with the aim of providing the rich, straight descriptions described by Sandelowski (18). The aim was to describe participants' experiences in a language similar to their own and to use this in the development of codes and themes. A purposive sampling strategy was used to identify potential participants who had experience delivering patient handovers in the emergency centre. All levels of qualification and experience levels were included to ensure that there was a broad, information-rich dataset.

Data collection

Potential participants were approached using a purposive convenient recruitment strategy. Face-to-face, semi-structured interviews were conducted in a setting determined by the interviewee's availability and location. All interview venues were deemed to provide adequate privacy and confidentiality. The interview schedule was pilot tested by having a discussion with the first two interviewees after their interviews to determine whether they perceived any ambiguity or lack of clarity with the questions. There were no significant comments raised by the pilot study interviewees. Face-to-face, semi-structured interviews were recorded using two devices to ensure clarity of both interviewer and interviewee.

Credibility was ensured by conducting interviews with a range of qualifications from the pre-hospital environment and that a holistic perspective was captured and portrayed. The inclusion of all data from interviews ensured that the full interviewee perspective was explored. Dependability was ensured by using a code-recode strategy and comparing the results from the two rounds of coding for congruency. A high level of congruence was observed. Authenticity was ensured using a qualitative descriptive approach. This approach generated thick and rich verbatim quotes from participants and demonstrated the emotions and feelings of the participants in their own words.

Analysis

We used a qualitative descriptive approach to analyse the data with the aim of providing the rich, straight descriptions described by Sandelowski (18). Interviews were transcribed verbatim into a Microsoft Word® (Office 2016, Microsoft Corporation, Redmond, WA) document. A final grammar check was done and, where relevant, grammar was changed to accurately reflect medical terminology. The interviews were then imported into Atlas.ti (version 8, ATLAS.ti Scientific Software Development GmbH, Berlin, Germany) for further analysis. The decision to use computer-assisted qualitative data analysis software (CAQDAS) was driven by the perceived advantages that it offered within. The CAQDAS tools have been associated with more rigorous data analysis that is less time-consuming than traditional methods (19,20). There was a total of 147 A4 pages of

transcription available for analysis that were imported into Atlas.ti.

Interview transcriptions were read repeatedly both vertically and horizontally to ensure better immersion into the data. Coding was carried out vertically and horizontally using a primarily open, inductive and deductive strategy. Vertical coding involved assigning codes within single interviews and horizontal coding involved coding within question responses across the sample (21). A code/recode strategy was employed to evaluate the coding framework for consistency and validity. Codes from the second round of coding were compared to those from the first and a high consistency between the two rounds was observed. The PI performed a code-recode of the data and these coding lists and the interview transcripts were reviewed by one of the co-investigators who had not been involved in the coding process. The co-investigator manually analysed the codes for consistency and determined that there was adequate consistency between the two sets of codes as well as with their own interpretations of the coding tree. Categories were formed by structuring the data using both concept-driven and data-driven strategies.

The requirements described by Fusch and Ness were used to determine data saturation (22). Considerations included the range of interviewee characteristics as well as the depth and richness of the dataset. A total of 15 interviews were conducted, exceeding the proposed number suggested by Guest, Bunce and Johnson (23). In addition, ongoing coding was generating fewer new codes and the decision was made that additional coding was not necessary. These criteria having been satisfied, the determination was made that an acceptable level of data saturation had been reached.

Ethics

Ethical approval was granted by the University of Cape Town Human Research Ethics Committee (Ref: 624/2012) which was renewed annually as required. Approval was sought and granted by the relevant employers where participants were approached at their places of work. Prior to the interview commencing, interviewees were provided an information document to read through that specified the aims of the study as well as their right to withdraw from the study at any point. In addition, interviewees were required to sign informed consent to be interviewed and to be audio-recorded. To ensure confidentiality of interviewees, there were no personal identifiers included in the interviews.

Results

A total of 15 face-to-face, semi-structured interviews were conducted, all of which were used in analysis. The demographics of interviewees are depicted in Table 1.

PECP identified several process barriers to being able to effectively handover in the emergency centre. Primary among these was that the emergency centre was a busy environment and was inherently understaffed. This understaffing was

Table 1. Demographics of interviewees

Interview number and qualification	Interviewee registration category	Years qualified at current qualification (years)	Total pre-hospital experience (years)	Interview length
ECP01 a	ECP	3	23	17 min 39 sec
ECP02 a	ECP	4	10	28 min 15 sec
ECP03 a	ECP	3	7	21 min 29 sec
ECP04 a	ECP	3	15	14 min 38 sec
ECP05 a	ECP	2	9	21min 54 sec
ECP06 a	ECP	5	19	21 min 43 sec
ECP07 a	ECP	2	6	15 min 36 sec
CCA01 b	ANT	25	35	15 min 38 sec
CCA02 b	ANT	7	25	18 min 06 sec
CCA03 b	ANT	2	9	26 min 30 sec
ECT01 c	ECT	5	18	25 min 30 sec
ANA01 d	ANA	11	15	11 min 41 sec
ANA02 d	ANA	26	28	13 min 39 sec
ANA03 d	ANA	1	4	16 min 05 sec
BAA01 e	BAA	5	4	14 min 46 sec

^aemergency care practitioner, ^bcritical care assistant, ^cemergency care technician, ^dambulance emergency assistant, ^ebasic ambulance assistant

identified as the root cause of many of the challenges experienced by PECP when handing over in the emergency centre. A lack of emergency personnel available to receive pre-hospital handovers, interruptions to handover and having to perform multiple handovers were challenges identified by participants to the delivery of emergency centre handovers. Participants identified handing over directly to a doctor as beneficial.

Process barriers

PECP participants indicated that a lack of appropriate emergency centre personnel to handover to was commonplace:

"About ninety percent of the time." (CCA02)

"I usually get that most of the time." (BAA01)

And postulated reasons for the lack of available emergency centre personnel:

"... they're just run off their feet, overworked, understaffed..." (ECP01)

"I think first of all, they're just overworked." (ANA01)

"I think the system is understaffed... there's one or two doctors and maybe three RNs, and they are inundated with all the other responsibilities, particularly administrative and patient movement." (ECP02)

"I think it's a shortage of skilled personnel or high quality, high qualified personnel." (CCA03)

PECP participants indicated that a lack of appropriately qualified personnel to hand over to resulted in them having to hand over to lower qualified personnel:

"... they usually send the lowest qualified person to do the triage." (ECP01)

"... so then the lower qualified staff end up taking handovers." (ECP05)

PECP participants indicated a varying incidence of being interrupted while delivering handover in the emergency centre:

"Not a lot. It depends where, which hospital you hand over to." (ANA02)

"I feel like it happens quite often I wouldn't say all of the time but definitely often enough to be memorable." (ECP05)

"It happens all the time." (ECP03)

And postulated reasons for interruptions to their handovers:

"... I think maybe with the doctors who listen to the handover or nurse listen to the handover they just forgot or realised they need to get some other information; they just interrupt and then ask the question." (ECP06)

"... because you're handing over to the lowest qualified person whose doing a triage then you got to walk through and hand over to the nursing staff again and then the doctor inevitably comes and interrupts." (ECP01)

"I think they're just impatient sometimes they just want to get to few points that they want to know and they don't care about the rest." (ECP07)

PECP participants identified several effects that having their handovers interrupted had on them:

"The other thing that I find that's very frustrating is that when you at a crucial point of a handover and then the doctor starts giving instructions, but you haven't finished something so the instructions are premature. I actually had, had two patients die because of that during the

handover phase where the doctor hasn't finished letting me finish handing over, has given an order that's been detrimental to the patient." (ECP02)

"It makes me lose my train of thought so sometimes I have to start again." (ECP05)

Multiple handovers

One of the consequences of insufficient staff and interruptions was that pre-hospital emergency care deliverers of handovers were required to perform multiple handovers on the same patient. Participants indicated that higher qualified emergency centre personnel arriving either during or after handover was the primary reason for the need to repeat handovers. Participants also linked repeated handovers to information loss.

"... so you hand over to the sister then based on that handover the sister realises okay wait we need to get a doctor involved then you hand over to that doctor then perhaps the head of the unit comes in or a consultant comes in and they want to hear a handover from you as well so that's now three handovers that you've done." (ECP07)

"... when I repeat myself sometimes I do find that I am, end up leaving out something between let's say handover A, B and C and then hand, then person A, person B and person C see that they've got a bit of a different fact and it discredits my handover." (ECP02)

"Initially you're eager, you wanna tell them the whole story; you tell the lowest level person in the beginning your handover, your story which will be quite comprehensive. By the time you get to the doctor you're probably only telling him the vitals." (ECP04)

Handing over directly to a doctor

PECP participants indicated that they preferred to handover directly to a doctor for several reasons. These reasons included that the doctor had direct access to the information handed over and that there was less information loss. There was an association of decreased delays in patient management when handing over directly to a doctor.

"I think also to communicate with the doctor, you don't have that gap in between of information that is being lost between handing over to somebody [else] you hand over all the relevant information to them and then they don't hand it over to the doctor. And there could be vital information that's being lost in between." (ECT01)

"It doesn't delay him, the doctor needs to know what's the story, what's the background history what did you find with the patient and it's, and I think it's still appropriate to hand over to the doctor. Ja, as I said because you will get information that's been lost in between, so what you tell the nurse and what the nurse tells the doctor, may not always be the same." (ECT01)

"So things will be done more faster and quicker." (CCA03)

"At the end of the day, the doctor will make the final diagnosis and he will do the treatment regime for this patient and he will need to decide on what is he going

to do for this patient, what's the treatment is the patient going to receive (sic)." (ECT01)

Discussion

Participants in this study were acutely aware that the emergency centres where they were handing over were understaffed and overworked. The South African healthcare system has critical personnel shortages from both medical practitioner and nursing perspectives (3,4,24,25). Understaffing in the emergency centre is not a problem unique to the resource-constrained healthcare environment. The link between understaffing of emergency centres, high patient loads and their resultant busyness has been described in the literature (6,26). The emergency centre has been described as "one of the most overcrowded units in the inpatient service delivery system" (27). Emergency centre overcrowding results when the demand for emergency services exceeds the ability of an emergency centre to provide quality care within appropriate timeframes (28). This often results in 'access block' which can be conceptualised using the input-throughput-output model, where the block is usually as a result of factors outside of the emergency centre (28). Access block is often the cause of patients remaining in the emergency centre longer than necessary, the results are busier staff and increased delays in care. This means that staff who would normally be available to accept handover are often involved in tasks that they would normally not be responsible for. This would explain the common lack of appropriately qualified personnel available to accept pre-hospital emergency care handover identified by participants.

Participants identified the lack of adequate staff to receive handovers with inappropriate persons being allocated to receive handovers. This receiving of handover by inappropriately qualified personnel was linked to interruptions to handovers being delivered. Interruptions of handover have been demonstrated to increase discontinuity, incidence of error and consequently negatively affect patient care (10,12,29). de Lange et al observed similar interruptive behaviour in a single facility study in an environment not overly dissimilar to those of this study (30). The study by de Lange et al was performed in a private-funded facility which would generally be better funded, better staffed and better equipped than a state-funded facility.

Interruptions to handover delivery were identified by PECP participants as occurring commonly and were a source of frustration. Interruptions during delivery of handover seem to be commonplace, occurring up to 49% of the time during verbal handovers (12). Interruptions were attributed to either requests for additional information, the issuing of instruction by the receiver or a higher qualified person taking over responsibility for the patient. Interruptions related to information requests or patient care issues have been described in the literature (12). Interruptions were linked with feelings of frustration, loss of thought train and incomplete handovers that were detrimental to patient care. It is important that the deliverer of handover is given the opportunity to complete their handover without interruption

to ensure maximum efficacy. One of the risks of commonplace behaviour, such as that of interruptions to handover, is that they may become accepted practice and constitute a greater risk for human error (31). In emergency centre environments such as the ones described by participants, personnel tend to become task-orientated in an effort to manage the chronic staff shortages and the constant patient stream (30). This focus on tasks as opposed to handover has potentially negative consequences for patient care.

The primary reason postulated by participants for multiple handovers was that initial handover was delivered to inappropriately qualified personnel and that there was then an escalation of care. Multiple handovers have been linked to a loss of information (14,32). Participants indicated that they were prone to omitting information with handovers that were delivered after the initial handover. This was sometimes simply because of unintentional omission but could be attributed to the frustration attributed to having to handover multiple times. The loss of information, sometimes referred to as 'information dilution', has been described by Owen et al where information is lost each time a new person becomes involved in the information transfer process (13). Ensuring that the initial handover is delivered to the appropriate person may decrease the need for multiple handovers by PECP and in doing so decrease the perceived risk of information loss. It is important to consider that multiple handovers may be deemed helpful from the perspective of the emergency centre personnel and this should be investigated in future studies.

Participants indicated that they would prefer to handover directly to a doctor. This was potentially linked to their experiences of multiple handovers due to initial handover being delivered to a lower qualified person. Participants acknowledged that handing over directly to a doctor would lower the risk of information loss. Another perceived benefit was that the doctor receiving the handover would be able to act without the need for further referral and delay related to patient management. The implication was that handing over to a person who was lower qualified delayed triage, resulted in interruptions, multiple handovers and unnecessary delays in initiating appropriate patient management. This may be perceptual on the part of the deliverer of the handover and not fully understanding the inner workings of the emergency centre in which they are delivering the handover. Given the resource-constrained environment in which this study took place, it is unlikely that a doctor would be available to consistently receive handovers.

Limitations

Limitations of the study include those commonly linked to qualitative studies. The use of a semi-structured interview protocol to guide the interview may have limited the completeness of the data. The limited geographical coverage and sample size potentially limit the generalisability of the results. The rich data collected mitigated this somewhat and allowed the participants' voices to be heard. The subjective

nature of the data interpretation may be seen as a limitation, but the use of a qualitative descriptive methodology and a code-recode strategy limits this somewhat. The volume of data may have resulted in coding fatigue, but this was mitigated by using the code-recode strategy.

Conclusion

This study identified perceived process barriers to effective and safe emergency centre handover from the perspectives of PECP in Johannesburg, South Africa. These barriers were attributed to the inherently busy, understaffed and overworked emergency centre. A lack of perceived appropriate persons to receive handover, interruptions and the need to perform multiple handovers for the same patient were identified as perceived barriers to effective emergency centre handover. The results of this study may be generalisable to other emergency centres from both resource-constrained and resource-rich environments where process flow hampers handover efficacy. Further research is needed to better understand the pre-hospital use of mnemonics within emergency centre handover. Future research should include the perspectives of emergency centre personnel to ensure a more holistic view of what is essentially a bidirectional process. This study was limited in that data were gathered from a single geographical area and only from PECP which may negatively affect the generalisability of the results.

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Competing interests

The authors declare no competing interests. Each author of this paper has completed the ICMJE conflict of interest statement.

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References

1. Makkink AW, Stein COA, Bruijns SR, Gottschalk S. The variables perceived to be important during patient handover by South African prehospital care providers. *Afr J Emerg Med* 2019;9:87-90. <https://doi.org/10.1016/j.afjem.2019.01.014>
2. Sujan M, Spurgeon P, Cooke M. The role of dynamic trade-offs in creating safety - a qualitative study of handover across care boundaries in emergency care. *Reliab Eng Syst Saf* 2015;141:54-62. <https://doi.org/10.1016/j.res.2015.03.006>
3. Econex. Identifying the determinants of and solutions to the shortage of doctors in South Africa: is there a role for

- the private sector in medical education? 2015. Available at: <https://hasa.co.za/wp-content/uploads/2019/02/identifying-the-determinants-of-and-solutions-to-the-shortage-of-doctors-in-South-Africa-Is-there-a-role-for-the-private-sector-in-medical-education.pdf>
4. Uys LR, Klopper HC. What is the ideal ratio of categories of nurses for the South African public health system? *S Afr J Sci* 2013;109:4-7. <https://doi.org/10.1590/sajs.2013/a0015>
 5. Jamshidi H, Jazani RK, Alibabaei A, Alamdari S, Kalyani MN. Challenges of cooperation between the pre-hospital and in-hospital emergency services in the handover of victims of road traffic accidents: a qualitative study. *Investig y Educ En Enferm* 2019;37. <https://doi.org/10.17533/udea.iee.v37n1e08>
 6. Stafford RE, Morrison CA, Godfrey G, Mahalu W. Challenges to the provision of emergency services and critical care in resource-constrained settings. *Glob Heart* 2014;9:319-23. <https://doi.org/10.1016/j.ghheart.2014.08.005>
 7. Lim SY, Jarvenpaa SL, Lanham HJ. Barriers to interorganizational knowledge transfer in post-hospital care transitions: review and directions for information systems research. *J Manag Inf Syst* 2015;32:48-74. <https://doi.org/10.1080/07421222.2015.1095013>
 8. South African Government. National emergency care education and training policy. Pretoria, South Africa: National Department of Health; 2017.
 9. Meisel ZF, Shea JA, Peacock NJ, et al. Optimizing the patient handoff between emergency medical services and the emergency department. *Ann Emerg Med* 2015;65:310-7.e1. <https://doi.org/10.1016/j.annemergmed.2014.07.003>
 10. Habicht R, Block L, Silva KN, et al. Assessing intern handover processes. *Clin Teach* 2016;13:187-91. <https://doi.org/10.1111/tct.12404>
 11. Redley B, Botti M, Wood B, Bucknall T. Interprofessional communication supporting clinical handover in emergency departments: an observation study. *Australas Emerg Nurs J* 2017;20:122-30. <https://doi.org/10.1016/j.aenj.2017.05.003>
 12. Venkatesh AK, Curley D, Chang Y, Liu SW. Communication of vital signs at emergency department handoff: opportunities for improvement. *Ann Emerg Med* 2015;66:125-30. <https://doi.org/10.1016/j.annemergmed.2015.02.025>
 13. Owen C, Hemmings L, Brown T. Lost in translation: maximizing handover effectiveness between paramedics and receiving staff in the emergency department. *Emerg Med Australas* 2009;21:102-7. <https://doi.org/10.1111/j.1742-6723.2009.01168.x>
 14. Iedema R, Ball C, Daly B, et al. Design and trial of a new ambulance-to-emergency department handover protocol: "IMIST-AMBO". *BMJ Qual Saf* 2012;21:627-33.
 15. Office of the Premier. About Gauteng n.d. Available at: www.gautengonline.gov.za/Business/Pages/AboutGauteng.aspx [Accessed 20 June 2017].
 16. StatsSA. Mid-year population estimates 2017. P0302, Pretoria: 2017.
 17. Creswell JW, Clark VLP. The nature of mixed methods research. In: *Designing and Conducting Mixed Methods Research*. Sage Publications, Inc. 2011; p. 1-18.
 18. Sandelowski M. Focus on research methods whatever happened to qualitative description? *Res Nurs Health* 2000;23:334-40.
 19. Rambaree K. Bringing rigour in qualitative social research: the use of a CAQDAS. *Univ Mauritius Res J* 2007;13A:1-16.
 20. Rambaree K, Faxelid E. Considering abductive thematic network analysis with ATLAS-ti 6.2. In: Sappleton N, editor. *Adv Res Methods with New Technol*. Hershey, PA: Information Science Reference; 2013, p. 170-86.
 21. Silver C, Lewins A. Qualitative coding in software: principles and processes. *Using software in qualitative research: a step-by-step guide*. SAGE Publications Ltd; 2017, p. 158-85. <https://doi.org/10.4135/9781473906907.n8>
 22. Fusch PI, Ness LR. Are we there yet? Data saturation in qualitative research. *Qual Rep* 2015;20:1408-16.
 23. Guest G, Bunce A, Johnson L. How many interviews are enough? An experiment with data saturation and variability. *Field Methods* 2006;18:59-82. <https://doi.org/10.1177/1525822X05279903>
 24. Econex. Updated GP and specialist numbers for SA. Health Reform Note 7 2010:3-8. Available at: https://econex.co.za/wp-content/uploads/2015/04/econex_health-reform-note_7.pdf
 25. Rispel LC. Transforming nursing, policy practice and management in South Africa. *Glob Health Action* 2015;8:28005. <https://doi.org/10.3402/gha.v8.28005>
 26. Pun JKH, Chan EA, Murray KA, Slade D, Matthiessen CMIM. Complexities of emergency communication: clinicians' perceptions of communication challenges in a trilingual emergency department. *J Clin Nurs* 2017;26:3396-407. <https://doi.org/10.1111/jocn.13699>
 27. Erenler AK, Akbulut S, Guzel M, et al. Reasons for overcrowding in the emergency department: experiences and suggestions of an education and research hospital. *Turkiye Acil Tip Derg* 2014;14:59-63. <https://doi.org/10.5505/1304.7361.2014.48802>
 28. Affleck A, Parks P, Drummond A, Rowe BH, Ovens HJ. Emergency department overcrowding and access block. *Can J Emerg Med* 2013;15:359-70. <https://doi.org/10.2310/8000.CAEPPS>
 29. Borowitz S, Waggoner-Fountain L, Bass E, Sledd R. Adequacy of information transferred at resident sign-out (in-hospital handover of care): a prospective survey. *Qual Saf Health Care* 2008;17:6-10.
 30. de Lange S, van Eeden I, Heyns T. Patient handover in the emergency department: 'how' is as important as 'what.' *Int Emerg Nurs* 2018;36:46-50. <https://doi.org/10.1016/j.ienj.2017.09.009>
 31. Spooner AJ, Corley A, Chaboyer W, Hammond NE, Fraser JF. Measurement of the frequency and source of interruptions occurring during bedside nursing handover in the intensive care unit: an observational study. *Aust Crit Care* 2015;28:19-23. <https://doi.org/10.1016/j.aucc.2014.04.002>
 32. Bost N, Crilly J, Patterson E, Chaboyer W. Clinical handover of patients arriving by ambulance to a hospital emergency department: a qualitative study. *Int Emerg Nurs* 2012;20:133-41. <https://doi.org/10.1016/j.ienj.2011.10.002>