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Original article

Exploring healthcare professionals' perceptions of medication errors in an adult oncology department in Saudi Arabia: A qualitative study

Waleed Alharbi [a,b,*], Jennifer Cleland [a], Zoe Morrison [c]

[a] From the Centre for Healthcare Education Research and Innovation, Institute of Education in Medical and Dental Sciences, University of Aberdeen, United Kingdom
[b] The Center for Research, Education & Simulation Enhanced Training (CRESENT), King Fahad Medical City (KFMC), Riyadh, Saudi Arabia
[c] Department of Human Resources & Organisational Behaviour, University of Greenwich, United Kingdom

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ABSTRACT

Objective: Adverse events which result from medication errors are considered to be one of the most frequently encountered patient safety issues in clinical settings. We undertook a qualitative investigation to identify and explore factors relating to medication error in an adult oncology department in Saudi Arabia from the perspective of healthcare professionals.

Methods: This was a qualitative study conducted in an adult oncology department in Saudi Arabia. After obtaining required ethical approvals and written consents from the participants, semi-structured interviews and focus group discussions were carried out for data collection. A stratified purposive sampling strategy was used to recruit medical doctors, pharmacists, and nurses. NVivo Pro version 11 was used for data analyses. Inductive thematic analysis was adopted in the primary coding of data while secondary coding of data was carried out deductively applying the Hospital Survey of Patient Safety Culture (HSOPSC) framework.

Result: The total number of participants were 38. Majority of the participants were nurses (n = 24), females (n = 30), and not of Saudi nationality (n = 31) with an average age of 36 years old. Causes of medication errors were categorized into 6 themes. These causes were related teamwork across units, staffing, handover of medication related information, accepted behavioural norms, frequency of events reported, and non-punitive response to error.

Conclusion: There were numerous causes for medication errors in the adult oncology department. This means substantive improvement in medication safety is likely to require multiple, inter-relating, complex interventions. More research should be conducted to examine context-specific interventions that may have the potential to improve medication safety in this and similar departments.

1. Introduction

Patient safety refers to the prevention of harm to patients in hospitals and other healthcare organisations by preventing, reducing, reporting and investigating adverse events that frequently lead to adverse healthcare outcomes (Mitchell, 2008). Adverse events which are resulted from medication errors are considered to be one of the most frequently encountered patient safety issues in clinical settings (World Health Organization, 2016). Medication error is, in turn, defined as any avoidable misuse of medications that could result in patient harm (Polnariev, 2014).

The existing literature indicates that causes of medication errors differ between countries. For example, a study conducted in an oncology setting in France showed that 91% of errors were related to prescriptions, followed by dispensing errors (8%) and administration errors (1%) (Ranchon et al., 2011). On the other hand, another study conducted in similar setting in the United States showed that administration errors represented 41% of all medication errors, followed by dispensing errors (38%), then writing and transcribing errors (21%) (Ford et al., 2006). Importantly, the causes of medication errors may differ according to clinical

* Corresponding author at: Centre for Healthcare Education Research and Innovation, Institute of Education in Medical and Dental Sciences, University of Aberdeen, Aberdeen, United Kingdom.
E-mail addresses: r01wmaa@abdn.ac.uk (W. Alharbi), jen.cleland@abdn.ac.uk (J. Cleland), z.j.morrison@greenwich.ac.uk (Z. Morrison).

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contexts within the same country, and even in the same hospital. For example, Kane-Gill et al. found that staff inexperience, illegible/unclear handwriting, and distractions were the key factors contributing to medication errors in an Intensive Care Unit (ICU). In contrast, workload, insufficient staffing, and lack of experience contributed to medication errors in the General Care Unit (GCU) of the same hospital (Kane-Gill et al., 2010). This suggests the need to investigate causes of medication errors in specific clinical contexts in different countries to inform delivery of care.

Oncology care is a complex clinical context, treating patients with life-threatening illness utilising toxic therapies. Cancer treatment requires staff to follow complex treatment regimens, such as chemotherapy, that require meticulous coordination of care and expertise (Cheng et al., 2012; Neuss et al., 2013). Patients receive multiple drugs that are administered in repetitive cycles depending on the stage and type of cancer. Indeed, chemotherapy administration is considered one of the most risky and challenging treatments in medicine. 'A range of studies conducted in France, Canada, United States, and Sweden identified missed doses and failure to deliver results on laboratory tests required to start treatment as common chemotherapy administration errors (Ranchon et al., 2011; White et al., 2014; Chera et al., 2015; Fyhr et al., 2017). In the Arab countries context, literature revealed a single study which was conducted in Egypt and identified that undetermined cancer staging in the treatment plan (68%) and dose errors (66%) were the common causes of chemotherapy administration errors (Barakat et al., 2016).

Due to the dearth of the studies conducted in the Arabic context, we undertook a qualitative investigation to identify and explore factors relating to medication error in an adult oncology department in Saudi Arabia as the basis for designing an intervention to reduce medication errors in this complex healthcare setting (Craig et al., 2008). The research was informed by our previous quantitative work to understand staff perceptions of patient safety culture (Alharbi et al., 2018).

2. Methods

2.1. Study setting and design

This study was conducted in the adult oncology department of a public hospital in Saudi Arabia.

As medication errors are likely to be perceived differently by different healthcare professionals, we adopted a social constructivism paradigm (Hays and Singh, 2011). We used face-to-face, semi-structured interviews to gain insight into healthcare professionals' personal views and experiences related to medication errors confidentially. We then conducted focus group discussions to provide insight into participants' shared perceptions of the causes of medication errors (Savin-Baden and Major, 2013). The interview and discussion topic guides were informed by findings of our previous study (Alharbi et al., 2018) and other relevant literature (Khoja et al., 2011; Almutary and Lewis, 2012; Aljadhey et al., 2014).

2.2. Ethical considerations

Ethical approval was obtained from the institutional review board, the medical director of the comprehensive cancer centre, and the chair of the adult oncology department. Prior to starting the interview and focus group discussion, potential participants were provided with an information sheet including information about the voluntary nature of this study and their right to withdraw at any time. Written informed consent was obtained from each participant. All data were professionally transcribed, stored securely and accessed only by the authors to preserve confidentiality and anonymity.

2.3. Sampling and recruitment

After obtaining the required ethics approval, an explanatory email was sent to the medical director and the heads of doctors, pharmacists, and nurses within the adult oncology department, inviting them to take part in the study. A stratified purposive sampling strategy was used to recruit medical doctors, pharmacists, and nurses (Hays and Singh, 2011). These groups are involved in prescription and administration of medication in this department. The first author (WH) approached individuals to request their participation in the study so to ensure participant confidentiality and to facilitate openness. The time and place of interviews were chosen on the basis of participant preference with consideration of the Saudi Arabian culture (e.g. interviewing female participants while doors kept open).

2.4. Data generation

The interview guide included questions about causes of medication errors, causes of non-reporting of medication errors, inter-professional communication related to medication errors, suggestions for improving inter-professional communication, teamwork across units, management support of patient safety, and non-punitive response to error. Before finalising the interview guide, three pilot interviews were conducted (one doctor, one pharmacist, and one nurse). Questions related to the management support of patient safety (e.g., in what ways do management not support a safety culture?) were removed on the basis of feedback from the pilot participants, who believed these questions were too sensitive in general. Both the individual interviews and focus group discussion were conducted in English by the first author (WH) between August and September 2017. Data collection ended when no new themes were identified in the data set (Hays and Singh, 2011). The average length of an interview was approximately 20 min and 45 min for focus group discussions.

2.5. Data coding and analysis

All transcripts were anonymised before entering them into qualitative data analysis software (NVivo Pro version 11) to facilitate the coding and analysing the data. Analysis was led by the first author (WH) who read each transcript several times to become familiar with data set. Coding was done through primary and secondary phases, each involving discussion and review of a sub-set of transcripts by other members of the research team (JC and ZM). Primary codes were inductively extracted based on the keywords of the participants' expressions. Upon completion of primary coding, codes with similar meaning were unified and the codes were organised into sub-themes. Secondary coding was carried out using the finalised codes across the transcripts. Thereafter (deductively), sub-themes were renamed and grouped, applying the Hospital Survey of Patient Safety Culture (HSOPSC) framework (Sorra and Dyer, 2010). All authors approved the final themes and sub-themes generated from the data (Table 1).

3. Results

3.1. Participant characteristics

Forty-one healthcare professionals were consented to take part in this study. Three of the 41 withdrew from the study before interview. Of the 38 remaining participants, 24 were nurses, seven were

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Table 1
An example of the coding process.

Text	Code	Sub-theme	Theme
"When one nurse is working for the six patients, or eight patient, or ten patients, how can we improve the quality, it is not possible. The errors are going to happen" (Medical Doctor1, Focus group 1)	Working for many patients	Workload	Staffing

Table 2
Participant demographics (n = 38).

Profession	Gender		Nationality		Average age
	Male	Female	Saudi	Non-Saudi	
Doctors	7	0	1	6	43
Pharmacists	1	6	6	1	31
Nurses	0	24	0	24	35

doctors, and seven were pharmacists. The majority of participants were female (78.9%). Most participants were not of Saudi nationality (81.4%). The overall average participants' age was 36 years old (Table 2).

3.2. Main themes

Participants' perception on causes of medication errors were categorized in six broad themes (Table 3). These themes are teamwork across units, staffing, handover of medication related information, accepted behavioural norms, frequency of events reported, and non-punitive response to error. The themes and sub-themes are discussed in more details below.

3.2.1. Teamwork across units

The majority of participants indicated that there was miscommunication between healthcare professionals across the different units. This miscommunication seemed to be the result of two factors: underestimation of others' professional roles, and gender discrimination.

3.2.1.1. Underestimation of other professions' roles. Participants' responses indicated that doctors monopolised the clinical decision-making process and did not accept being questioned by other healthcare professionals: *"Doctors usually say do not question us because we are the physicians. That's the problem" (Nurse, Interview 5).* This was reinforced by the belief that the majority of doctors viewed the role of other healthcare professionals as bound to the doctor's plans and orders: *"doctors believe they are over the pharmacists and nurses because of their responsibilities as doctors and you have to just follow their orders. This always happens, so I believe this causes the medication error" (Pharmacist, Interview 3).*

Table 3
Causes of medication errors themes.

Themes	Sub-theme
Teamwork	1. Underestimation of other professions' roles 2. Gender discrimination
Staffing	1. Workload 2. Lack of experience
Handover of medication related information	1. Illegible handwriting 2. Look-alike and sound-alike medication
Accepted behavioural norms	1. Normalizing errors and near misses 2. Fear of shame
Frequency of event reported	1. Consequences of reporting 2. Feedback and communication about error
Non-punitive response to error	–

3.2.1.2. Gender discrimination. Female participants from all three professional groups felt they worked in a culture where males were viewed as superior to females. This was interpreted as gender discrimination that limited their ability to communicate with male team members: *"If you are a female and doctor is a male, he doesn't accept your opinion even if you are a pharmacist. But when our male supervisor calls him and explains the same thing to him, he is thinking about this and he may change his mind" (Pharmacist, Interview 2).*

3.2.2. Staffing

Participants stated that issues related to staffing such as workload and lack of experience increased the potential for medication error occurrence.

3.2.2.1. Workload. The majority of participants claimed that one major contributory factor for adverse events in general, and medication errors in particular, was staff overload from working long hours, resulting fatigue, which in turn increases the risk of adverse events: *"The doctors are working sixty hours per week and sometimes you have an extra duty and sometimes you have an extra work" (Medical Doctor 3, Focus Group 1).* A second contributing factor for staff overload was the imbalance between the number of available healthcare professionals and admitted patients: *"When one nurse is working for six patients, or eight patients, or ten patients, how can we improve the quality of care?" (Medical Doctor 1, Focus Group 1).* Linked to this was the multiple tasks expected of staff. For example: *"...you have to talk to staff from other services, we have to call the social worker, we have to call the pharmacy, we have to call the physician and to call the spiritual services, so it is hard for us. The load is heavy" (Nurse, Interview 13).* The pace of working was also felt to increase the risk of mistakes being made during healthcare delivery: *"sometimes nurses are in a hurry to give the medicine, so they are not checking properly the medication effects like the right drug, the right amount, and the right dosage we give the patient" (Nurse 3, Focus Group 1).*

3.2.2.2. Lack of experience. Medication errors were perceived to occur frequently in the department because it is part of a teaching hospital that enrols trainee doctors who do not have adequate professional supervision: *"Medication errors come from the residents, yeah, residents for sure" (Pharmacist 1, Focus Group 1).* Moreover, due to the lack of effective training on local systems, new staff who are not familiar with the medication management system in this department may increase the risk of medication error

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occurrence: *"new staff, they don't have much experience of this department" (Nurse, Interview 6).*

3.2.3. Handover of medication related information

The majority of participants mentioned that medication errors happen during handing over of medication related information between healthcare professionals due to issues related to handwriting, and look-alike and sound-alike medications.

3.2.3.1. Illegible handwriting. Most nurses mentioned that doctors' illegible handwriting frequently contributes to mistakes occurring during medications and prescriptions, and hinders the flow of staff communication: *"The handwriting of the physician. Sometimes it is not clear, so this one is another cause of the medication error" (Nurse, Interview 5).* Similarly, some participants from the pharmacy department indicated that in cases of encountering unclear prescriptions, even some nursing staff, when contacted, did not have any idea about the prescribed medication: *"the doctor don't write the prescription very clear and the nurse don't has any idea about the medication that the doctor prescribed" (Pharmacist, Interview 2).* In addition, one of the nurses stated that *"we are losing time for the communication because of the doctor's handwriting" (Nurse, Interview 1).* Prescribing and administering processes relied on manual processes as there were no electronic prescribing systems available to the staff. Therefore, unclear handwriting could contribute to delay in the provision of required medication in addition to errors in medication administration.

3.2.3.2. Look-alike and sound-alike medication. Medications with similar appearance and names contributed to medication errors: *"LASA medication. LASA means look-alike and sound-alike medication. That's a very big cause for medication error" (Nurse, Interview 11).* Another medical doctor stated that *"We have an issue with LASA especially during verbal orders" (Medical doctor, Interview 1).*

3.2.4. Accepted behavioural norms

Participants mentioned that some accepted behavioural norms, such as normalising errors and near misses, and fear of shame, can play role in the occurrence of medication errors.

3.2.4.1. Normalising errors and near misses. Participants perceived adverse events as a normal part of medical practice. For example, one medical doctor said that: *"Medication errors usually happen during practical medicine because there is a communication between healthcare professionals, so this is normal" (Medical Doctor, Interview 3).* In addition, near misses were less likely to be reported when healthcare professionals believe that if there is no perceivable patient harm, there is no need to report it: *"they didn't report it because it didn't reach and harm the patient, so they just never mind" (Nurse, Interview 14).*

3.2.4.2. Fear of shame. The data suggested that staff – particularly nursing staff - hesitated to ask for clarification of unclear issues related to patient safety as to do so could negatively affect their reputation: *"We are shy to ask sometimes if we didn't understand the order because we think that doctors will say oh! You do not know how to read or understand" (Nurse, Interview 7).* Importantly, this reluctance to check was not limited to nurses: *"most of our physicians don't say I don't know, so they feel a shame that if he can contact or consult with other specialty to correct or just assure that prescribed medication is right" (Medical Doctor, Interview 4).*

3.2.5. Frequency of events reported

The study participants were reluctant to report medication errors for three reasons: adverse personal consequences, burden of reporting, and the lack of feedback after reporting.

3.2.5.1. Consequences of reporting. Participants were fearful that their mistakes would be held against them and alienate colleagues: *"Because it makes enemies, really, so I don't like to report very simple things. No, I don't like it but a big error I will report" (Pharmacist, Interview 2).* Another participant remarked that: *"...it is a reward if I like you, it is a punishment if I am angry with you, and so they forget this is about the patient" (Clinical Pharmacist, Interview 4).* Moreover, some healthcare professionals perceived reporting incidents as an extra task that required a lot of time and effort: *"Because reporting errors takes time, so they don't report any medical or medication error" (Nurse, Interview 12).*

3.2.5.2. Feedback & communication about error. Some participants believed that feedback and communication about errors played a vital role in encouraging healthcare professionals to report adverse events: *"The feedback about errors is important because the error happened and report is done, what is next?" (Medical Doctor 3, Focus Group 1).* However, participants complained about the lack of feedback mechanism after reporting errors: *"We report the medication error but we do not get any feedback" (Pharmacist 1, Focus Group 1).* In addition, some participants indicated that it would be pointless to report incidents if it would not help in informing improvement *"...better to avoid the problem, just keep quiet and sometimes we are accepting that error because if we will report it, they will not take any action" (Nurse 1, Focus Group 2).*

3.2.6. Non-punitive response to error

Participants indicated that there was a culture of uncertainty within the department that made staff hesitant to report errors. Loss of trust between frontline staff and their supervisors was a crucial factor hindering the reporting of errors: *"Another reason for not reporting errors is that nurses are afraid because if they commit mistakes, they are not sure maybe their supervisor will blame them, and at worst they will terminate the nurse" (Nurse, Interview 5).* There was a fear of punishment on discovery of errors: *"Number one, the fear – fear to be discovered that you did this mistake then you will get a lot of consequences" (Nurse 2, Focus Group 1).* Specific consequences mentioned included poor performance evaluation as a result of reporting an error, and potential litigation: *"Sometimes they are taking this issue to the high supervisors and committee, maybe it's going to the court and there is no support from the hospital" (Nurse 2, Focus Group 2).*

4. Discussion

To our knowledge, this is the first qualitative study in Saudi Arabia to explore contributing factors to medication errors in an adult oncology department and one of the first studies to look at this issue from the perspectives of a range of healthcare professionals (doctors, pharmacists, and nurses).

Our findings suggest that teamwork between healthcare professionals is one of the main causes of medication errors in the department. Participants of this study perceived that doctors believe that they are the only decision makers in the department, and that others, particularly females, do not have the right to question them regardless of seniority and experience level. This perceived superiority negatively affected the working relationships and communication between team members, particularly in departments where most staff members were female. Additionally, people did not want to speak up about error or sub-optimal practices, for fear of negative evaluation by colleagues, and/or being "shamed". This meant that poor practices and errors were not reported, gaps in the medication processes were not addressed despite potential risks to patient safety. These issues were exacerbated by the related factors of lack of staff, over-burdened staff and

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trainees working without sufficient supervision/support (Westbrook et al., 2011), as well as practical issues such as poor handwriting and "look alike" medication names.

Although these latter issues were pertinent, and indeed may be possible to address by systems changes, our impression from the data was that the main barriers to achieving a positive patient safety culture were attitudinal and behavioural. Our study revealed that these healthcare professionals work in an environment where they felt they will be punished if their mistakes were disclosed. This supports previous findings that fear of consequences, lack of legal support, and healthcare professionals' perception that their mistakes will be held against them are the main barriers for not reporting errors (Cohen, 2000). This sets up a vicious circle where patient safety events (e.g., errors, near misses) are not reported, which means the department and individual cannot learn from mistakes and avoid similar adverse events in the future (Sarvadikar et al., 2010). Of course, it may be that our participants lacked awareness of good practices, as has been found in other studies (Ridelberg et al., 2014). However, the overwhelming messages from the data were that participants were aware that their practice in relation to medication error and patient safety was less than optimal, but cultural factors imposed certain behaviours and ways of responding (Mobaraki and Söderfeldt, 2010) that did not put patient safety at the forefront of clinical decision making or response to error.

This study has strengths and limitations. In terms of limitations, the study was conducted in one department and thus the findings may not be transferrable to other settings (Guba and Lincoln, 1994). Importantly, however, this study was the first qualitative study to explore the underlying reasons for medication errors in an adult oncology department in Saudi Arabia. We used individual interviews to ensure participant confidentiality, something we had anticipated was of great importance given the findings from our previous questionnaire survey in the same department (Alharbi et al., 2018). We sampled a variety of healthcare professionals directly involved in the delivery of care rather than focusing on one professional group in isolation to reflect the multidisciplinary nature of care in oncology departments.

The findings of this study have a number of implications for future research, policy and practice. In terms of further research, this study revealed multiple different causes of medication errors ranging from system-based gaps to behavioural and attitudinal considerations. These need to be explored in greater detail in order to plan, implement and evaluate any intervention in a complex healthcare setting with multiple stakeholders (Craig et al., 2008). For policy makers and leaders, improving the relationships and expectations between the different healthcare professional groups may be achieved through educational sessions, training courses, and policy development and implementation, to promote cooperation and collaboration among healthcare professionals (Salas and Frush, 2012). In terms of staffing, the healthcare professionals to patient ratio should be reconsidered to ensure the availability of enough healthcare professionals and to reduce staff overload and fatigue. New and junior staff should be subject to orientation programmes in order to familiarise them with the work routine and patient safety related policies (Hartnell et al., 2012). As LASA medications are a contributing factor for medication errors, policy makers should consider the development and implementation of LASA policy to minimise healthcare professionals' confusion and related errors (Ostini et al., 2012). Departmental leadership should encourage a culture of transparency and non-punitive reporting of errors to facilitate open disclosure of healthcare professionals' concerns and queries in order to promote organisational learning (Goh et al., 2013; Sims et al., 2015). Moreover, there is a need to establish a clear and feasible process for feedback after reporting adverse events evidence learning from adverse incidents and promote reporting in this department (Armitage et al., 2010). It is clear from other studies, albeit studies in other cultural contexts, that a multidisciplinary approach, whereby different healthcare professionals cooperatively develop and implement healthcare plans (Atwal and Caldwell, 2006), can led to the provision of higher quality and safer services (e.g. improved medication management and reduction in medication errors) (Makowsky et al., 2009). This may be a goal to work towards in the context of any intervention to reduce medication errors.

In conclusion, there were numerous, intersecting human, cultural and organizational factors contributing to medication errors in adult oncology department. This qualitative study provides insight into the reasons for the attitudes towards error and patient safety identified in our earlier survey of the same department (Alharbi et al., 2018). Our findings indicate that substantive improvement in medication safety is likely to require multiple, inter-relating, complex interventions aimed at changing attitudes and behaviour rather than simple structural changes. More research should be conducted to explore additional, context specific measures that may have the potential to improve medication safety in this and similar departments.

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