

# Patient safety culture at the unit level of a tertiary hospital in South Africa: a survey study

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## Abstract

**Background.** Patient safety research is scarce in developing countries. Estimates of patient harm due to healthcare processes in resource-poor settings are thought to be greater than those in developed countries. Ideally, errors in healthcare should be seen as opportunities to improve the future quality of care.

**Objective.** This study aimed to investigate patient safety culture within high-risk units of a tertiary hospital in South Africa.

**Methods.** A quantitative, descriptive, cross-sectional methodology, using a survey questionnaire that measured 10 safety dimensions and one outcome measure among clinical and nursing staff, was employed.

**Results.** Two hundred participants completed the survey questionnaire. Areas of strength identified by the participants included organizational learning (91.09%), staff attitudes (88.83%), and perceptions of patient safety (76.65%). Dimensions that have potential for improvement included awareness and training (74.04%), litigation (73.53%), feedback and communication about errors (70.77%), non-punitive response to error reporting (51.01%), size and tertiary level of the hospital (53.76%), and infrastructure and resources (58.07%). The only dimension identified as weak was teamwork and staffing (43.72%). In terms of the patient safety grade, respondents graded their own units highly but graded the hospital as a whole as having a poor patient safety grade.

**Conclusion.** There are still significant gaps in the quality of care provided at this tertiary hospital. The current patient safety culture is perceived as punitive in nature with regard to reporting adverse events. It is advised that targeted patient safety improvements be made, followed by further investigation.

## Introduction

The Institute of Medicine's seminal report *To Err is Human* is a turning point for patient safety globally.<sup>1</sup> However, it has been well documented that there is a scarcity of research on patient safety in developing countries. Currently, estimates of patient harm due to healthcare processes in resource-poor settings vary widely. In 2012, it was estimated that the medical error rate in developing countries was 8.2%.<sup>2</sup> This figure was probably a significant underestimation of the real harm that was caused.<sup>2</sup> Factors that contribute to this underestimation include a lack of resources, poor infrastructure, and considerably low staff-to-patient ratios.<sup>3,4</sup> In addition, South Africa has a considerable burden of both communicable and non-communicable diseases compared with higher-income countries.<sup>4-7</sup>

The patient safety culture of an organization refers to the val-

ues, beliefs, and norms shared by members of the organization with regard to patient safety.<sup>8</sup> Since many aspects of patient safety are intangible and difficult to measure, researchers have resorted to quantifying the patient safety culture of institutions to obtain a clearer picture of patient safety as a starting point for future interventions.<sup>9</sup> The capacity of an institution to prevent harm will only be achieved when it is able to foster a culture of safety among its staff.<sup>10</sup> Assessing an institution's patient safety culture is often a requirement of international accreditation organizations, and as such they help identify the strengths and weaknesses of the institution.<sup>11</sup> With the impending rollout of national health insurance (NHI) in South Africa, all healthcare institutions are required to meet the national core standards (developed and published by the National Department of Health),<sup>12</sup> in order to provide services within the NHI. Compliance with the set standards is a requirement for accessing public funding from the NHI. In the past, provincial Departments of Health in South Africa have faced medical negligence claims of between R875 million and R1.26 billion (US\$54-77 million), and these initiatives should help reduce future claims.<sup>13</sup>

Positive patient safety culture thrives in organizations that encourage collaborative organizational learning, among other factors.<sup>12</sup> Consequently, measuring the patient safety culture of all healthcare institutions as a starting point is imperative. Currently, there is a severe lack of patient safety culture studies in South Africa.<sup>14</sup> This is important due to the high burden of disease in South Africa as well as the ongoing moves to improve the quality of care at public hospitals in South Africa that include initiatives surrounding pharmacovigilance and Pharmacy and Therapeutic Committees.<sup>7,15-17</sup> This study was undertaken to determine the patient safety culture within high-risk units at a tertiary hospital in South Africa. We started with a tertiary institution because if concerns and issues with patient safety are present here, they may be echoed in secondary care and district hospitals.

## Materials and Methods

### Ethical considerations

Before data collection, ethical clearance for the study was obtained from Sefako Makgatho University Research Ethics Committee (SMUREC/H/28/2015: PG). Permission was granted by the Clinical Director of the institution to conduct the study in the hospital.

All participants were given a study information leaflet and written informed consent was obtained prior to participation. Any information provided by participants remained confidential. The survey was strictly anonymous, and voluntary and no information that could identify or link participants was included on the data collection instrument.

Questionnaires were handed out in person to participants who were subsequently given the option to complete the questionnaire independently (with a data collector present in the vicinity to provide clarification if needed) or to complete the questionnaire at their own time and place. Complete surveys were collected in a designated box the next day.

### Study setting and sample

This study was conducted at a tertiary hospital in Gauteng Province, South Africa. The hospital consists of 28 clinical departments and provides services to approximately 1.7 million people. The hospital also receives referrals from other provinces, as well as referrals from Southern African Development Community countries, other tertiary academic hospitals, local specialists, and

general practitioners. The hospital has 1650 active beds, 20 approved intensive care unit (ICU) beds, 60 high care beds, and 17 theatres.

The following high-risk units were purposely identified for the study: ICU; neonatal ICU; maternity ward; theatre; accident and emergency; internal medicine. All full-time clinical and nursing staff (medical doctors, physiotherapists, occupational therapists, pharmacists, and nurses) working in these high-risk units were approached for participation in the study. At the time of the study, 3200 clinical and nursing staff were employed at the hospital. Using a confidence interval of 90%, the sample population was calculated to be 250. Only participants who had daily direct clinical interaction with patients were included in the study sample.

### Instrument

A self-administered questionnaire was designed to evaluate clinical and nursing staff's perceptions of patient safety. The Hospital Survey on Patient Safety Culture was adapted for this study.<sup>18</sup> Findings from a qualitative study,<sup>14</sup> conducted before this survey, further informed the adaptation of the questionnaire. 4 field experts comprehensively reviewed and provided input on the questionnaire to ensure content validity. The questionnaire was piloted on 10 pediatric nurses before formal data collection commenced to add robustness to the questionnaire. These 10 nurses were excluded from the study sample. The questionnaire was only available to participants in English which is the official language used in the work environment. Demographic information of participants was recorded. Options for participant age were divided into centiles up to 50 and then above 50. This was done by considering the known age range of employees. Years of experience were also divided into centiles for easier reporting. The questionnaire covered 10 safety dimensions and 1 outcome measure. Most items were measured using a 5-point Likert scale of agreement (1=strongly disagree to 5=strongly agree).<sup>19,20</sup> Participants were asked to grade their unit and the hospital in terms of patient safety (options included: excellent; very good; acceptable; poor; failing). An open-ended question was included for participants to provide any comments on patient safety, errors, or event reporting in the hospital.

### Data collection

Data were collected between September and November 2015 by trained data collectors, who distributed and collected questionnaires and were available to answer any participant queries.

### Statistical analysis

Data were captured onto a Microsoft Excel™ spreadsheet and analyzed in consultation with a statistician using the Statistical Package for Social Scientists (SPSS) version 23. The demographic characteristics of respondents were summarized descriptively. Data on negatively-worded questions were reverse-coded before data analysis commenced. Likert scale responses were categorized into new variables during data analysis. Responses of *strongly agree* and *agree* were combined as positive responses under the general term *agree*, *neither* was categorized as a neutral response and *strongly disagree* and *disagree* were combined as a negative response. In terms of the patient safety grade, scores were also re-categorized for statistical analysis, with responses of *excellent* and *very good* being classified as *good* and responses of *poor* and *failing* being classified as *poor*. The average percentage of positive responses on patient safety culture was computed as a composite score. The dimensions with positive response rates of 75% or above were identified as strengths and those with at least 50% positive response rate were identified as potential for improvement, whereas dimensions with less than 50% were identified as weak-

nesses in line with literature based on the Hospital Survey on Patient Safety Culture.<sup>18,21,22</sup>

## Results

In total, 250 questionnaires were distributed. 200 were completed and returned, giving a response rate of 80%.

### Sociodemographic characteristics

The majority of the respondents (87.5%) were female and the mean age was 38.1±12.2 years, with 32.5% aged between 21-30 years. Respondents came from a variety of work areas, with 21.8% working in the general wards. General wards included physiotherapists and pharmacists who are not allocated to a specific ward. Nurses comprised the majority (62.9%) of the clinical respondents who completed the survey. Nearly three-quarters of the respondents (70.5%) had 0-10 years of experience in their profession. All respondents had direct clinical contact with patients.

### Perceptions of patient safety according to survey dimensions

Composite scores of the positive responses per survey dimensions were examined to determine areas of strength, areas necessitating improvement, and areas of weakness. The dimensions with the highest positive scores were organizational learning (91.09%),

staff attitudes (88.83%), and perceptions of patient safety (76.65%). The dimensions requiring improvement were awareness and training (74.04%), litigation (73.53%), feedback and communication about errors (70.77%), infrastructure and resources (58.07%), size and tertiary level of the hospital (53.76%) and non-punitive response to error reporting (51.01%). The lowest scoring dimension, identified as an area of weakness, was teamwork and staffing (43.72%) (Figure 1).

### Variation in the perception of patient safety according to socio-demographic characteristics

To determine whether they are predictors of patient safety culture, factors such as gender, age, primary work area, profession, and years of experience in their profession were tested as independent variables.

#### Gender and age

Female respondents had higher positive responses on all the dimensions compared to their male counterparts, with size and tertiary level of the hospital and infrastructure and resources being the exceptions. Both genders rated teamwork and staffing poorly with only 45.8% of females and 29.6% of males responding positively to this dimension (Table 1). Dimensions that scored highly across all age groups included organizational learning (above 89%) and staff attitudes (above 85%). When compared to respondents below the age of 41, respondents above the age of 41 gener-

**Table 1. Percentage of positive responses to the 10 safety dimensions by gender and age.**

Dimension	Gender			Age				Total n=163
	Female n=175	Male n=25	Total n=200	21-30 n=65	31-40 n=30	41-50 n=35	>50 n=33	
Organizational learning	92.0	85.0	91.1	92.3	92.3	89.2	93.6	92.0
Staff attitudes	89.3	85.8	88.8	85.5	89.4	87.4	92.4	88.9
Perceptions of patient safety	77.3	72.0	76.6	81.3	71.8	77.1	83.9	77.3
Awareness and training	75.3	65.0	74.0	89.3	68.7	66.3	80.7	75.0
Litigation	74.5	66.7	73.5	67.7	71.8	76.7	83.8	74.4
Feedback and communication about errors	72.3	60.0	70.8	78.5	65.4	74.2	74.3	71.5
Infrastructure and resources	58.0	58.6	58.1	62.6	53.8	57.3	63.3	58.2
Size and tertiary level of hospital	52.3	64.0	53.8	52.5	53.9	60.0	41.9	52.1
Non-punitive response to error reporting	52.6	40.0	51.0	51.9	53.7	52.5	47.9	51.8
Teamwork and staffing	45.8	29.6	43.7	48.2	44.1	36.7	44.3	43.6



**Figure 1. Percentage of positive responses per safety dimension (n=200).**

ally had a more positive response to all dimensions, with the exceptions of non-punitive response to error reporting, and size and tertiary level of the hospital, which were identified as areas of weaknesses in this age group.

**Primary work area and profession**

Respondents from the general wards had a more negative impression regarding all dimensions, with only three dimensions scoring as strengths (litigation, organizational learning; and staff attitudes). Dimensions that scored higher than 80% across all work areas included organizational learning and staff attitudes. The dimension with the lowest score across all work areas was teamwork and staffing, with ratings varying between 33.3 and 54.7%. Respondents from the internal medicine and obstetrics and gynecology wards had positive impressions regarding the dimensions, with 6 dimensions scoring higher than 70% (Table 2). Interestingly, nurses scored the same dimensions highly. Pharmacists only scored 2 dimensions as strengths: organizational learning, and staff attitudes.

**Years of experience in their profession**

Barring respondents with more than 30 years of experience, all respondents rated teamwork and safety as a weakness (Table 3). Respondents with more than 30 years of experience rated this as an area for improvement. These respondents also held a more nega-

tive outlook regarding the dimension of litigation, whereas all other experience levels rated this dimension as a strength.

**Overall patient safety grade**

Except for the accident and emergency and theatre wards, more than 70% of respondents from all high-risk units rated their work areas as having a good patient safety grade. Only 29.2% of respondents from accident and emergency gave their unit a positive safety rating, while 65.4% of respondents from theatre rated their unit positively (Figure 2).

Regarding the patient safety grade of the hospital as a whole, the percentage of positive responses fell sharply. When comparing the hospital as a whole *versus* the individual units where respondents worked, more respondents graded the hospital as having a poor patient safety grade.

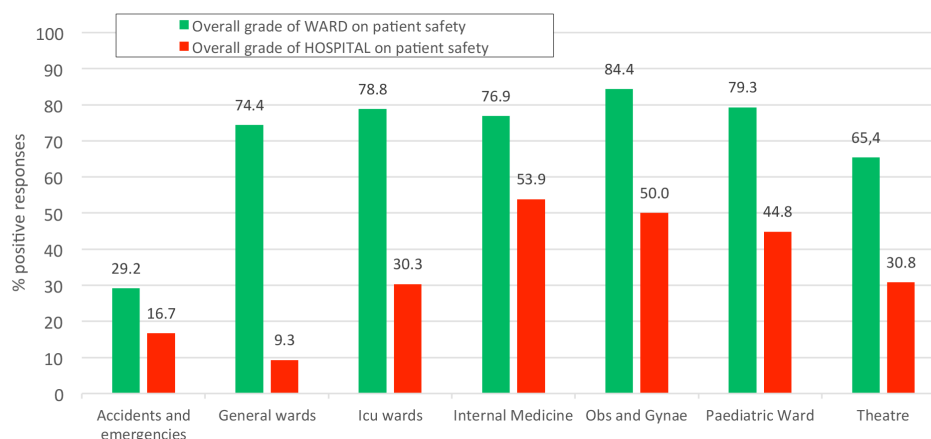
**Discussion**

We believe this is one of the first studies to comprehensively examine patient safety culture in a tertiary hospital in South Africa. Several strength and weakness areas were identified as well as many areas for improvement. Encouragingly, the study revealed that organizational learning is prominent in this institution. The hospital is actively pursuing interventions to improve patient safe-

**Table 2. Positive responses to the 10 safety dimensions by primary work area and profession.**

Dimension	Primary work area							Total n=200	Profession					Total n=200
	A&E n=24	Gen n=43	ICU n=33	Int Med n=13	O&G n=32	Peds n=29	Theatre n=26		MO n=24	Nrs n=129	Phys n=11	OT n=20	Pharm n=16	
Organizational learning	90.6	86.6	90.0	96.2	94.5	93.0	91.4	91.1	86.3	93.4	86.4	88.8	85.9	91.1
Staff attitudes	83.8	91.7	90.2	94.0	85.4	88.1	89.3	88.8	83.8	88.7	90.9	95.6	87.5	88.8
Perceptions of patient safety	78.7	66.6	76.6	76.9	85.2	79.7	77.6	76.6	76.1	80.6	65.9	73.1	57.8	76.6
Awareness and training	71.4	63.1	67.3	90.9	85.5	79.3	75.2	74.0	57.4	80.9	70.5	58.8	65.6	74.0
Litigation	68.1	80.6	77.8	72.2	70.8	66.7	73.1	73.5	66.7	72.1	78.8	91.7	68.8	73.5
Feedback and communication about errors	77.1	56.4	66.2	84.3	83.6	75.9	66.4	70.8	63.5	77.2	63.6	56.3	53.1	70.8
Infrastructure and resources	54.9	55.2	58.5	66.9	61.7	55.7	59.4	58.1	54.6	59.3	62.0	52.3	58.0	58.1
Size and tertiary level of hospital	59.7	51.2	56.6	50.0	49.0	47.1	64.1	53.8	63.9	53.4	54.6	41.7	56.3	53.8
Non-punitive response to error reporting	56.3	51.7	53.4	49.0	45.3	48.7	52.4	51.0	45.7	52.3	61.4	61.3	28.1	51.0
Teamwork and staffing	33.3	47.9	38.4	41.3	54.7	44.1	40.3	43.7	28.6	45.2	43.6	56.0	38.8	43.7

A&E, accidents and emergencies; Gen, general wards; ICU, intensive care unit; Int Med, internal medicine; O&G, obstetrics and gynecology wards; Peds, pediatrics ward; Theatre, surgical wards; MO, medical officer; Nrs, nurse; Phys, physiotherapist; OT, occupational therapist; Pharm, pharmacist.



**Figure 2. Patient safety grade of the hospital and the ward according to primary work area.**

ty and the general impression of participants is that the hospital and staff actively prevent errors from occurring and are genuinely concerned about patient safety. Similar results were found in studies conducted in China,<sup>23</sup> and Saudi Arabia.<sup>24</sup> For patient safety efforts to thrive, institutions need to learn from past errors and use them to incorporate meaningful and targeted change to improve the quality of care.

The dimension measuring staff attitudes had a similarly positive response. Respondents prioritize patient safety and felt personally responsible stating that being a healthcare professional is their calling and indicating that they put in extra effort for their patients. The final dimension identified as a strength was perceptions of patient safety, and respondents were willing to personally be treated in their respective wards as well as in the hospital in general, which may be seen as a testament to the current patient safety culture of the hospital.

However, based on the findings, there are concerns regarding insufficient patient safety awareness campaigns and training in the hospital, which need to be addressed. Respondents had negative impressions regarding litigation with respondents having lower positive responses to statements such as *patients have the right to take healthcare workers to court*. This could indicate that a culture of *blame and shame* may be perpetuated at this institution despite general positive attitudes towards patient safety culture in hospitals. Litigation associated with poor quality of care can also be seen as an opportunity for learning. As Clinton and Obama have suggested,<sup>25</sup> placing a cap on malpractice costs will not avert hazardous medical practices from occurring or guarantee the provision of fair reparation to patients. The authors suggest that focus should be placed on correctly managing communication and handling any medical malpractice that has occurred. This would involve confidential disclosure of any medical errors to patients as well as negotiated compensation to the patients. Patient trust and satisfaction in the healthcare system would subsequently increase and this would eventually result in reduced administrative and legal costs and fewer malpractice lawsuits.<sup>25</sup> Hopefully improved patient safety cultures within public hospitals in South Africa will bring about similar changes and reductions in the amount spent annually on litigations in South Africa.

Feedback and communication about errors received 70.8% positive responses. Respondents felt they were not well informed about adverse events that have occurred, as well as any subsequent changes that may have been caused. Other authors have found similar findings;<sup>4,26</sup> however, our findings appear somewhat paradoxical since the dimension of organizational learning was scored highly and ideally, these two dimensions should be interlinked and

score similarly. As far as non-punitive response to error reporting is concerned, respondents were hesitant to report errors and held the belief that making a serious error would cause them to lose their jobs or face disciplinary action. This highlights that the culture of reporting errors within this hospital currently has a punitive connotation and consequently despite positive comments about it, the patient safety culture still appears to be one of fear and blame, which also needs to be addressed. This is similar to other studies where non-punitive response to error is a significant contributor to the overall perception of safety in an institution.<sup>4</sup>

One of the lower-scoring dimensions in the survey is related to the size of the hospital. The study site is a tertiary hospital and respondents were questioned whether its relatively large size compromised patient safety. Our findings of low positive scores in this respect are similar to others which have found that smaller hospitals tended to have a higher overall average percentage of positive responses.<sup>11</sup> Larger hospitals are often seen to be more hierarchical with more administrative challenges in implementing quality initiatives. It has also been suggested that the size of the hospital affects employees' attachment to the institution and subsequently their performance.<sup>11</sup> There is little we can do about the size of the hospital; however, the institution should consider such comments when implementing future initiatives.

The dimension of infrastructure and resources considered the cleanliness of the facility, infrastructure, financial resources, and security available at the hospital. Respondents indicated that clean linen is often not available, the hospital is not kept sufficiently clean, structural inadequacies abound and physical security is not at its peak. This is important going forward as an East African study demonstrated that the material context of the work environment affected the staff's ability to provide safe care.<sup>27</sup> Since their study was conducted in a similar context, the issues surrounding patient safety are similar to ours: structural inadequacies of both studies included inappropriate building design, over-crowdedness, and poor water and electricity supply. Lack of materials and resources was another factor in both studies. A multicenter study investigating how the physical environment affects hospital outcomes in 9 different countries also showed that a poor work environment is associated with negative staff outcomes and poor quality of care.<sup>28</sup> This also needs to be addressed going forward.

The main dimension identified as a weakness in this study population was teamwork and staffing. Respondents were under the impression that staff are overworked in their unit and that there were not enough staff to carry the workload. It has been shown that the ratio of healthcare workers to patients in developing countries is significantly lower than in developed nations. For every 10,000

**Table 3. Percentage of positive responses to the 10 safety dimensions by years of experience.**

Dimension	Years of experience				Total n=192
	0-10 n=141	11-20 n=28	21-30 n=18	31-40 n=5	
Organizational learning	90.7	89.7	97.0	85.0	91.0
Staff attitudes	90.0	86.0	90.1	80.0	89.1
Perceptions of patient safety	75.4	75.7	82.4	82.5	76.3
Awareness and training	70.5	82.7	87.5	82.5	74.2
Litigation	73.9	75.3	80.4	53.3	74.1
Feedback and communication about errors	69.0	72.6	83.8	70.0	70.9
Infrastructure and resources	57.9	58.0	61.0	52.7	58.0
Size and tertiary level of hospital	56.2	37.0	62.8	73.3	54.4
Non-punitive response to error reporting	50.5	47.7	57.4	55.0	50.8
Teamwork and staffing	42.0	44.8	45.9	52.0	43.0

members of the population, there are typically only 2 doctors and 11 nurses/midwifery personnel available in sub-Saharan Africa compared to the 19 doctors and 49 nurses/midwifery personnel in America and 32 doctors and 78 nurses/midwifery personnel in Europe.<sup>29</sup> This results in increased workload and work hours for staff which leads to staff being overworked, and suffering from burnout and stress which in turn negatively impact their work performance.<sup>8</sup> Our findings are similar to those of Nie *et al.*,<sup>23</sup> who had staffing as the lowest scoring dimension, as well as those of Aveling *et al.*<sup>27</sup> These results highlight that adequate staff numbers are imperative for patient safety, and that it is one of the major challenges facing patient safety. This also needs to be actively considered going forward to reduce patient harm.

### Overall patient safety grade

Respondents rated wards in which they worked with high patient safety scores, with 4 of the 7 wards giving their wards a positive patient safety rating. However, when rating the hospital as a whole, the percentage of positive responses appreciably dropped, with ratings dropping between 12.5 and 64.8%. Consequently, while respondents held positive views regarding the patient safety culture of their respective wards, they held more negative perceptions of the patient safety grade of the hospital as a whole. This discrepancy in the perception of the hospital's patient safety rating is in line with a study conducted in Norway which reported that patient safety culture scores significantly varied at the ward level.<sup>30</sup> Thus it is imperative for patient safety interventions to be aimed at the unit level, where patient care is primarily focused.

### Limitations

This study measured the patient safety culture in a single institution, the results obtained cannot be generalized to other institutions. The fact that our study sample included only high-risk units also limits any conclusions. We are also aware that the questionnaire used in this study has not been formally validated. Consequently, we recommend that future research be undertaken using this instrument. Lastly, with 20% of questionnaires not returned by respondents, the possibility of non-responses bias should also be taken into account when interpreting the results of this study. However, despite these limitations, we believe these findings are robust given the comprehensive methodology we used and do provide direction for the future.

### Conclusions

We believe this is the first comprehensive survey of patient safety culture conducted in a tertiary public hospital in South Africa. The study site has been slowly improving its compliance with the national core standards since the study was conducted, but there is still much work to be done to improve patient safety and culture within this context. Gaps in the awareness and implementation of patient safety efforts amongst current clinical and nursing staff prompted us to recommend more emphasis be placed on patient safety within the undergraduate curriculum of medical and allied health students so that future healthcare practitioners are in a better position to deal with patient safety issues. In addition, professionals in the healthcare system need continuous support and training on patient safety issues especially with the implementation of the NHI which obliges healthcare institutions to comply with the national core standards, of which patient safety is a priority standard. Based on the study results, potential areas for quality improvement include improving staff perceptions around error reporting and decreasing staff workload by increasing staff

appointments. Interventions such as these will improve the quality of care provided. In a high-hazard industry such as healthcare, those dimensions not scoring as strengths should be seen as weaknesses of the system and efforts should be put into place to strengthen them.

### References

1. Institute of Medicine. To err is human: building a safer health system. Washington DC, USA: National Academies Press; 2000. Available from: [https://www.ncbi.nlm.nih.gov/books/NBK225182/pdf/Bookshelf\\_NBK225182.pdf](https://www.ncbi.nlm.nih.gov/books/NBK225182/pdf/Bookshelf_NBK225182.pdf).
2. Wilson RM, Michel P, Olsen S, et al. Patient safety in developing countries: retrospective estimation of scale and nature of harm to patients in hospital. *BMJ* 2012;344:e832.
3. Jha AK. Summary of the evidence on patient safety: implications for research. Geneva, Switzerland: World Health Organization; 2008. Available from: [https://apps.who.int/iris/bitstream/handle/10665/43874/9789241596541\\_eng.pdf?sequence=1&isAllowed=y](https://apps.who.int/iris/bitstream/handle/10665/43874/9789241596541_eng.pdf?sequence=1&isAllowed=y).
4. Mayeng LM, Wolvaardt JE. Patient safety culture in a district hospital in south africa: an issue of quality. *Curationis* 2015;38:1518.
5. Skosana PP, Schellack N, Godman B, et al. A point prevalence survey of antimicrobial utilisation patterns and quality indices amongst hospitals in south africa; findings and implications. *Expert Rev Anti Infect Ther* 2021;19:1353-66.
6. Kyu HH, Maddison ER, Henry NJ, et al. Global, regional, and national burden of tuberculosis, 1990–2016: results from the global burden of diseases, injuries, and risk factors 2016 study. *Lancet Infect Dis* 2018;18:1329-49.
7. Mashaba TP, Matlala M, Godman B, Meyer JC. Implementation and monitoring of decisions by pharmacy and therapeutics committees in south african public sector hospitals. *Expert Rev Clin Pharmacol* 2019;12:159-68.
8. Liu C, Liu W, Wang Y, et al. Patient safety culture in china: a case study in an outpatient setting in beijing. *BMJ Qual Saf* 2014;23:556-64.
9. Colla JB, Bracken AC, Kinney LM, Weeks WB. Measuring patient safety climate: a review of surveys. *Qual Saf Health Care* 2005;14:364-6.
10. Nieva VF, Sorra J. Safety culture assessment: a tool for improving patient safety in healthcare organizations. *Qual Saf Health Care* 2003;12:ii17-23.
11. El-Jardali F, Dimassi H, Jamal D, et al. Predictors and outcomes of patient safety culture in hospitals. *BMC Health Serv Res* 2011;11:45.
12. National Department of Health. National core standards for health establishments in south africa; 2011. Available from: [https://static.pmg.org.za/docs/120215abridge\\_0.pdf](https://static.pmg.org.za/docs/120215abridge_0.pdf). Accessed: 24 June 2021.
13. Cape Times. Effective hospital monitoring system essential - cohsasa; 2015. Available from: <https://www.iol.co.za/capetimes/arts-portal/lifestyle/effective-hospital-monitoring-system-essential-cohsasa-1849286>. Accessed: 18 June 2021.
14. Abraham V, Meyer JC, Godman B, Helberg E. Perceptions of managerial staff on the patient safety culture at a tertiary hospital in south africa. *Int J Qual Stud Health Well-Being* 2022;17:2066252.
15. Matlala M, Gous AGS, Meyer JC, Godman B. Formulary management activities and practice implications among public sector hospital pharmaceutical and therapeutics committees in a south african province. *Front Pharmacol* 2020;11:1267.

16. Terblanche A, Meyer JC, Godman B, Summers RS. Impact of a pharmacist-driven pharmacovigilance system in a secondary hospital in the Gauteng province of South Africa. *Hosp Pract* 2018;46:221-8.
17. Meyer JC, Schellack N, Stokes J, et al. Ongoing initiatives to improve the quality and efficiency of medicine use within the public healthcare system in South Africa; a preliminary study. *Front Pharmacol* 2017;8:751.
18. Agency for Healthcare Research and Quality. Hospital survey on patient safety culture. Available from: <http://www.ahrq.gov/sops/surveys/hospital/index.html>. Accessed: 4 November 2021.
19. Altwaijry N, Ibrahim A, Binsuwaidan R, et al. Distance education during COVID-19 pandemic: a college of pharmacy experience. *Risk Manag Healthc Policy* 2021;14:2099-110.
20. Tomczyk S, Taylor A, Brown A, et al. Impact of the COVID-19 pandemic on the surveillance, prevention and control of antimicrobial resistance: a global survey. *J Antimicrob Chemother* 2021;76:3045-58.
21. Reis CT, Paiva SG, Sousa P. The patient safety culture: a systematic review by characteristics of hospital survey on patient safety culture dimensions. *Int J Qual Health Care* 2018;30:660-77.
22. Okuyama JHH, Galvao TF, Silva MT. Healthcare professional's perception of patient safety measured by the hospital survey on patient safety culture: a systematic review and meta-analysis. *ScientificWorldJournal* 2018;2018:9156301.
23. Nie Y, Mao X, Cui H, et al. Hospital survey on patient safety culture in China. *BMC Health Serv Res* 2013;13:228.
24. Alahmadi HA. Assessment of patient safety culture in Saudi Arabian hospitals. *Qual Saf Health Care* 2010;19:e17.
25. Clinton HR, Obama B. Making patient safety the centerpiece of medical liability reform. *N Engl J Med* 2006;354:2205-8.
26. Nordin A, Theander K, Wilde-Larsson B, Nordström G. Health care staffs' perception of patient safety culture in hospital settings and factors of importance for this. *Open J Nurs* 2013;3:28-40.
27. Aveling EL, Kayonga Y, Nega A, Dixon-Woods M. Why is patient safety so hard in low-income countries? A qualitative study of healthcare workers' views in two African hospitals. *Glob Health* 2015;11:6.
28. Aiken LH, Sloane DM, Clarke S, et al. Importance of work environments on hospital outcomes in nine countries. *Int J Qual Health Care* 2011;23:357-64.
29. Naicker S, Eastwood JB, Plange-Rhule J, Tutt RC. Shortage of healthcare workers in sub-Saharan Africa: a nephrological perspective. *Clin Nephrol* 2010;74:S129-33.
30. Deilkås E, Hofoss D. Patient safety culture lives in departments and wards: multilevel partitioning of variance in patient safety culture. *BMC Health Serv Res* 2010;10:85.