

Awareness and attitude about patient safety among health professionals in Arar, Saudi Arabia

Patient safety awareness and attitude in Arar

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Abstract

Aim: This study was conducted to assess awareness and culture of health care workers about patient safety in healthcare facilities in Arar city. **Material and Method:** It is a structured questionnaire-based cross-section study. Four hundred and fifty questionnaire copies were randomly distributed to evaluate participants' knowledge and awareness about patient safety. **Results:** Three hundred and eleven participants were enrolled in the study (69.1% response rate). Females represented 62.7% of the responders. Physicians were 46% of the participants. Data showed overall summative scores of awareness of 77.27 %. There was a significant difference among participants according to their past experience of errors, years of work experience and medical specialties in their awareness scores ($p = 0.0042$, 0.0014 and 0.0076 respectively). Regarding culture data, the total composite positive perception of patient safety culture was about $59.04 \pm 3.3\%$. The dimensions of "teamwork within the unit" showed the highest positive composites (83.1%). **Discussion:** More focused programs should be implemented with better training for all staff member, especially for nurses to improve their awareness and culture regarding patient safety.

Keywords

Patient Safety; Health Professionals; World Health Organization; Infection Control; Health Care Related Hazards; Arar

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Introduction

Despite the great advance in healthcare delivery in emerging economies, hazards related to health care are still in focus with international reports showing their dangers [1,2]. Preventable medical errors were reported to cause 44000–99000 deaths annually [3]. In developed countries, up to ten percent of the patients were estimated to suffer from medical errors [4]. In response to this trend, patient safety studies are greatly expanding and attract more attention in the current years especially after the World Health Assembly 'Resolution 55.18' in 2004, which recommended nine issues as 'lifesaving patient safety solutions' to reduce healthcare-related harm worldwide [5,6,7]. These nine Patient Safety policies are focused on healthcare-associated infection, equipment failure, unsafe injection devices, medication errors, failures in patient identification systems and patient transfer, patient catheterization, behavior and communication among healthcare providers, concentrated use of electrolyte solutions and wrong site surgery [8-11].

In the different health care systems, underreporting of the medical errors is a global problem [12-15], which is caused by different factors including miscommunication and bad attitude of the medical practitioners towards the safety issues which is badly affecting their behaviors. Also, Medication errors are a major safety problem. In the Middle East countries, it was reported that lack of knowledge regarding medicines plays a major role in medications errors [16], which are main causes of litigations, especially with increased population awareness.

Proper planning is mandatory to improve patient safety. However, this planning should be based on solid real properly collected data. Unfortunately, there is a shortage of information on knowledge and attitude of health practitioners towards the patients' safety policies, which in term will be inflicted on their implementation. This study aimed to evaluate the awareness, attitude, and practice of the Patient Safety issues among healthcare providers in Arar, Northern Border Province, Saudi Arabia, including nurses, physicians, pharmacists, specialists, and technicians to assess the level of awareness towards patient safety in terms of different variables.

Material and Method

Ethical issues:

The study design was approved by the Northern Border University ethical committee (certificate of approval number 2/39/H06091439).

Study design

A descriptive cross-sectional field survey was conducted among the health care staff in Arar hospitals and medical centers. For this study, a structured questionnaire was distributed randomly among the participants from different health facilities after face to face explanation of the study objectives. Four hundred and fifty questionnaire copies were randomly distributed among healthcare staff in Arar in the different facilities.

A questionnaire consists of three parts. The first part was designed to collect the demographic data regarding age, gender, workplace, position, work experience, and nationality. The second part composed of 13 questions to evaluate participants' a knowledge regarding patient safety issues. These awareness

questions were designed following the previous studies [17-18]. The 3rd part questions were mainly focused on their culture and attitude of the participants regarding patient safety. Questions of this section were extracted from Hospital Survey on Patient Safety Culture designed by Agency for Healthcare Research and Quality (AHRQ) with its 12 dimensions [19]. Arabic translated forms of the questionnaire were available. Questionnaire validity was tested by reviewing via patient safety experts in the Faculty of Medicine, Northern Border University. Incomplete or ineligible surveys which showed the same answers for all questionnaire questions were excluded and the primary data were collected for further statistical analysis

Statistical analysis

Primary data were collected and studied statistically by GraphPad Prism V (GraphPad Software Inc., San Diego, CA). For awareness questions the summative scores, for each participant, were calculated by the percentage of true answers to the total number of questions. The summative score for each profession group and the whole participants were calculated as a mean of the scores of the included participants.

The data regarding the culture questions were entered into Microsoft Excel file and analysis was done in GraphPad Prism V. A "Composite positive response rates" for the various survey items were calculated following the following formula: Composite positive response rate for each dimension = total number of positive responses to its items/total number of responses (positive, neutral, and negative) to these items [23]. One-way ANOVA and t-test was used for comparisons of numerical data, while chi-square and Fisher exact were used for testing of significance of the association between variables. Significance was considered with p-value <0.05.

Results

Three hundred and eleven health care workers had actively participated in the study and returned completed surveys with an estimated response rate of 69.1%. Healthcare staff was involved from both primary care centers and hospitals with different ages, nationalities and variable work experiences. Physicians represented about 46% of the participants who responded to all questionnaire questions. Demographic data of participants were shown in Table [1]. Participants' ages ranged from 23-56 years with average ages of 41 ± 8.9 years. Female represented 62.7% of the responders due to a big number of nurses enrolled in the study, who were all females.

Patients' safety was considered as an important issue by 72% of the participants. Regarding sources of knowledge about patient safety, undergraduate courses were the main source among the non-physicians, while conferences and workshops and postgraduate modules were the main sources among physicians (Figure 1A).

According to the participants' opinion and interest, five topics from the nine WHO topics were selected as the most important issues. Nosocomial infections and medications errors were the most important issues of patient safety as reported by 42.8% and 33.4% of participants respectively. There was a significant difference among the participant choices of the most important safety issues according to their professions (Figure 1B). There

Table 1. Demographic data of the participants

Parameters	Numbers
Totals	311 (100%)
Health service facility:	
Primary healthcare centers	60 (19.3%)
Arar Central Hospital and Cardiology center	101 (32.5%)
Prince Abdul-Aziz Bin Msaad Hospitals	66 (21.2%)
Arar Maternity and Pediatric hospital	84 (27%)
Age:	
20-30	75 (23.2%)
31-40	104 (33.4%)
41-50	89 (28.7%)
>50	43 (13.8%)
Gender:	
Males	116 (37.3%)
Females	195 (62.7%)
Position:	
Physician	146 (46.9%)
Nurse	103 (33.1%)
Laboratory Specialist and technician	32 (10.3%)
Radiology specialist and technician	12 (3.8%)
Pharmacists	18 (5.8%)
Departments:	
Medicine ^a	63 (20.3%)
Surgery ^b	52 (16.2%)
Pediatrics	38 (12.2%)
Obstetrics and gynaecology	37 (11.9%)
Ophtalmology	10 (3.2%)
Family Medicine	30 (9.6%)
Pharmacy	18 (5.85%)
Clinical Pathology	44 (14%)
Radiology	19 (6%)
Nationalities	
Saudi	129 (41.5%)
Non-Saudi (Arabic speakers) ^c	79 (25.4%)
Non-Saudi (Non-Arabic speakers) ^d	43 (21.2%)
Work experience (years)	
<1	66 (21.2%)
1-5	136 (43.7%)
>5	109 (35%)
Past History of Medical errors ^e :	
Physicians	32 (10.3%)
Nurses	24 (7.7%)
Specialists and technicians	18 (5.85%)
Pharmacists	5 (1.6%)

^a Medicine departments includes general medicine, pulmonology, cardiology and neurology
^b Surgery departments include general surgery, orthopedics, urology and neurosurgery
^c Non-Saudi (Arabic speakers) include Egyptian, Sudanese, Jordanians and Syrians
^d Non-Saudi (Non-Arabic speakers) include Pakistanis, Philippines and Indians
^e Reported or non-reported error are considered

was no significant difference between different ages, nationalities and work experience durations regarding the aforementioned opinions.

Data of the studied questionnaire awareness question are shown in Table 2. The mean (SD) of the overall summative scores of awareness was 77.27 % [3.2] for all participants. Awareness summative scores were 80.2% for physicians, 72% for nurses and 75.5% for the other participants. There was a significant difference among participants according to their past experience of errors, years of work experience and medical specialties in their awareness scores (p= 0.0042, 0.0014 and 0.0076 respectively) (Figure 1).

Participants' composite positive answers regarding the questionnaire culture questions are shown in Table 3. There was a significant difference between the different professions answers for items regarding each dimension in the culture questionnaires questions, while there was no significant difference

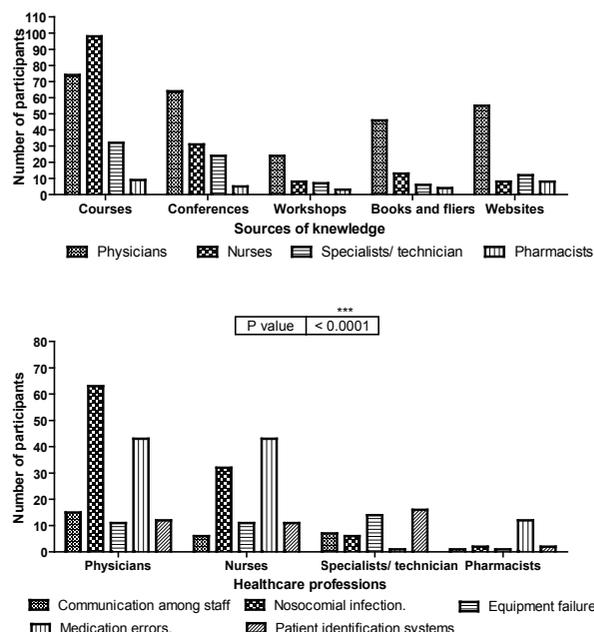


Figure 1. (A) shows the participants' opinions regarding the most important topics related to the patient safety among the World Health Organization recommended nine patient safety solutions, while (B) shows the sources of knowledge about patient safety issues among the participants.

in the composite positive answers in relation to ages, work experience, nationalities and specialties of the participants. The total composite positive perception of patient safety culture in the studied participants was about 59.04 ± 3.3%. The dimensions of "teamwork within the unit," "teamwork across units" and "Organizational Learning-Continuous Improvement" showed the highest positive composites 83.1%, 82.9%, and 64.8%, respectively. The dimensions of "hand-offs" "frequency of events reported" and "non-punitive response to error" had received the least positive responses 41.8%, 41.2%, and 40.8%, respectively.

Data regarding participants grading of the patient safety procedures in their facilities reported an overall Patient Safety Grade was rated as excellent or very good by 58% of respondents, acceptable by 30% and failing or poor by 12%. There was a significant difference between the different professions included in the study (p= 0.0013) (Figure 3).

Regarding reporting, according to the responders, they have reported 420 events in the last 12 months. The mean number of events reported among the study participants were 1.9 ± 1.67, 1.3 ± 2.52, and 1.5 ± 2.09 for physicians, nurses and specialists and technicians staff respectively.

Discussion

This is the first study to systematically assess patient safety awareness and culture in Northern border province hospitals using Hospital Survey on Patient Safety Culture designed by the Agency for Healthcare Research and Quality (AHRQ). The current study was conducted to evaluate awareness of the healthcare staff (physicians, nurses, specialists and technicians) in Arar health care facilities regarding the different topics of patient safety. In addition, their evaluations of the implemented strategies were studied. Patients' safety was considered

Table 2. Participants' response to patient safety awareness questions in relation to their professions.

Awareness questions		Physicians 146(100) n (%)	Nurses 103(100) n (%)	Specialists/ technician/ Pharmacists 62(100) n (%)	p-value	Total correct answers 311(100) N(question summative score)
Competent physician can make medical errors	Yes	126(68.3)	101(98)	59 (95)	0.0021	286 (92)
	No	20(31.5)	2(2)	3(5%)	12.37, 2	
There is a gap between what is expected best health care and what is actually provided	Yes	112(76.7)	82(79.6)	42 (67.7)	0.143	236(75.8)
	No	29(23.3)	21(20.4)	20(32.3)	3.881, 2	
Most errors are inevitable	Yes	14(9.6)	20(18.5)	13(21)	<0.0001	264(84.8)
	No	132 (90.4)	83(80.5)	49 (79)	20.75, 2	
All medical error should be notified to the safety team	Yes	102(69.9)	78(75.7)	38 (61.3)	<0.0001	218(70)
	No	44(30.1)	25(23.3)	24(38.7)	35.86, 2	
If error cause no harm, it is not considered as an error	Yes	22(15.1)	25(23.3)	16(26)	0.0017	248(79.7)
	No	124(84.9)	78(75.7)	46 (74)	12.79, 2	
Medical errors are only caused by the physicians	Yes	22(15.1)	37(16.5)	22(35.5)	<0.0001	250(80.4)
	No	124 (84.9)	86(83.5)	40(64.5)	72.68, 2	
Errors reports should be discussed on the periodic meetings of the departments	Yes	115(78.8)	53(51.5)	40 (64.5)	<0.0001	208(66.9)
	No	65(21.2)	60(48.5)	22(35.5)	33.50, 2	
Culture and sensitivity testing before antibiotics prescription is mandatory	Yes	118 (80.8)	56(54.4)	53(85.5)	<0.0001	227(73)
	No	28(19.2)	47(45.6)	9(14.5)	31.27, 2	
Proper maintenance system for equipment is a patients' safety issue	Yes	111(76%)	55(53.3)	47 (75.8)	0.0001	213(68.5)
	No	35(24)	48(46.7)	15(23.2)	63.96, 2	
Recheck patient full name and file number on all his files and samples is a safety issue	Yes	106(72.6)	48 (46.6)	51(82.5)	<0.0001	225(72.3)
	No	40(17.4)	55(53.4)	11(17.5)	59.42, 2	
Medication errors are only due to prescription?	Yes	25(17.1)	26(25.3)	25(40.3)	<0.0001	235(75.6)
	No	121(82.9)	77 (74.7)	37(59.7)	45.69, 2	
Proper communication among healthcare staff is a safety issue	Yes	24(16.4)	34(33)	12(19.4)	<0.0001	221(71)
	No	122(83.6)	69 (67)	50(80.6)	45.69, 2	
Healthcare hand hygiene is a necessary patients' safety concern.	Yes	137 (93)	99(96)	57 (92)	0.512	293 (94)
	No	9(7)	4(4)	5(8)	1.312, 2	

Table 3. Participants' response to patient safety attitude and culture questions in relation to their professions.

Culture and attitude questions	Items number	Physicians	Nurses	Specialists/ technician/ Pharmacists	p-value	Overall
Teamwork Within Units	4	80.3 (3.2)	89.1(2.8)	92.1(3.5)	<0.0001 ^a	83.2(7.1)
Supervisor/Manager Expectations & Actions Promoting Patient Safety	4	75.4(4.2)	62.7(4.3)	80.7(3.2)	<0.0001 ^a	62.9(9.3)
Organizational Learning-Continuous Improvement	3	71.40 (3.9)	54.33 (2.6)	68.67 (5.8)	<0.0001	64.8(9.2)
Management Support for Patient Safety	3	64.73 (5)	51.00 (4.5)	65.33 (3.2)	<0.0001	58.2 (10.1)
Overall Perceptions of Patient Safety	4	65.73(3.2)	56.33 (6.8)	62.33 (5.9)	<0.0001	58.13(10.5)
Feedback & Communication About Error	3	44.40 (2.9)	56.33(3.8)	52.33 (4.3)	<0.0001	51.02 (6)
Communication Openness	3	61.73 (6.7)	45.67(4.9)	34.67 (4.9)	<0.0001	47.36 (13.6)
Frequency of Events Reported	3	29.73 (2.5)	29.33 (1.7)	44.00 (4.3)	<0.0001	34.35 (8.3)
Teamwork Across Units	4	84.40 (3.4)	83.00 (4)	91.33 (4.9)	<0.0001	82.91 (8.5)
Staffing	4	72.2(4.3)	57.4(2.4)	64(6.5)	<0.0001	193.2 (7.4)
Handoffs & Transitions	4	58.73 (5.2)	41.67 (4.1)	41.00 (3)	<0.0001	47.1 (10)
Non-punitive Response to Errors	3	27.07 (5)	42.67(4)	40.33(2.4)	<0.0001	26.69 (8.4)
Totals	42	61.2 (10.2)	55.7(12.4)	61.4(13.25)	<0.0001	59.5(3.3)

as an important issue by 72% of the participants involved in the study. Undergraduate course conferences and workshops were the main sources of participants' knowledge about patient safety. According to the opinion and interest of the participants, nosocomial infections and medications errors were the most important issues of patient safety. Regarding awareness summative score there was a significant difference between the different participants' professions groups. The total composite positive perception of patient safety culture of the studied

participants was about $59.5 \pm 3.3\%$ with significant difference among the different professions regarding the different cultural dimensions. Among the implemented safety strategies, infection control programs were the most satisfactory while fluid therapy control was the least satisfactory for the participants. It was clear that the participants' interest regarding the nine topics of safety reported by WHO was mainly affected by their professions and job duties. Doctors and nurses were mainly interested in infection control and medication errors strategies

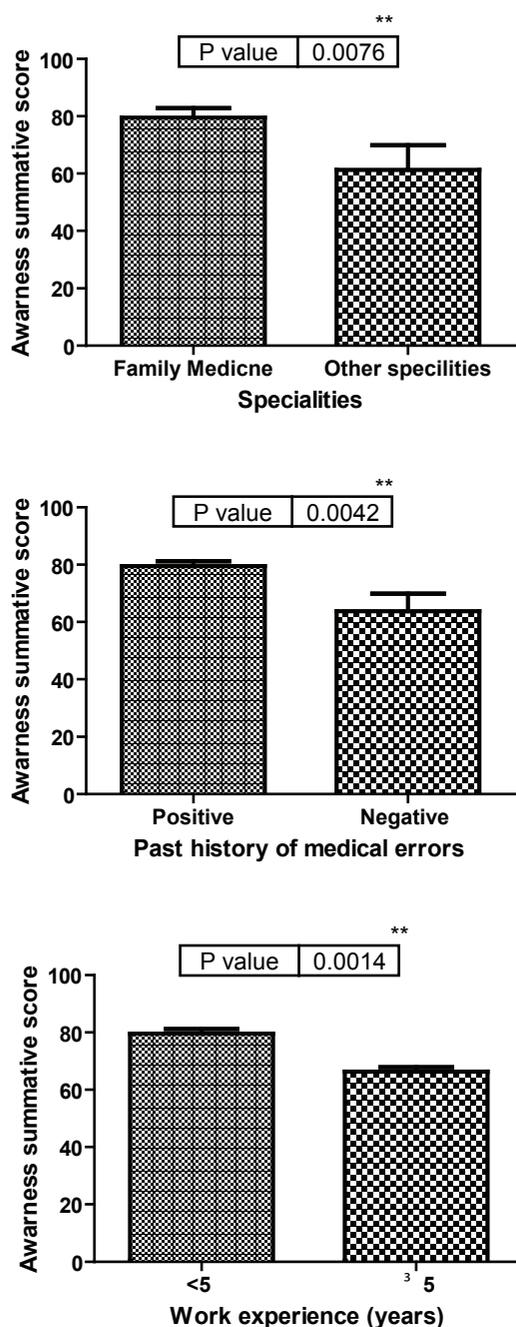


Figure 2. The effect of specialties, past history of medical errors and years of work experience on the awareness summative scores among the participants.

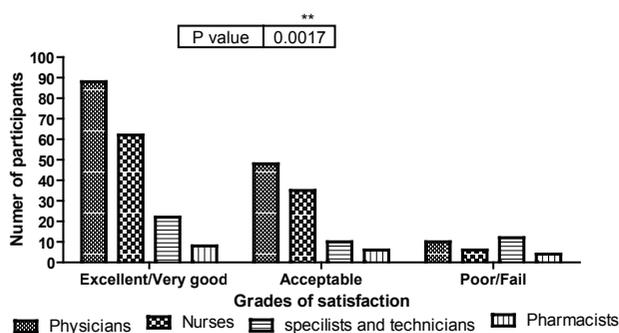


Figure 3. Grades of satisfaction among the participants regarding the implemented patient safety plans.

while specialists and technicians were mainly interested in the equipment failure and communication problems with the other health care workers in the wards and clinics while samples identification was in focus of laboratory staff and medication errors were in focus of pharmacists.

Regarding sources of knowledge about patient safety, an undergraduate course was the main source among the non-physicians. As all employed nurses, specialists, technician, and pharmacists had been graduated from Saudi University and high schools where patient safety module is compulsory within their undergraduate programs.

Results showed that participants with a past history of medical errors showed higher awareness about patient safety. This indicates that self-interest is often only triggered after a problem occurs. This is in accordance with the previous literature that showed that most efforts to improve safety in healthcare facilities are reactive and not proactive efforts [20].

Participants with lower ages and lower work experience showed more awareness than elderly colleagues. This was also reported by Al-Mandhari et al. (2016) [17]. This may be due to the recent addition of patient safety as a module in their undergraduate studies. In addition, they are more motivated to participate in conferences and workshop to build up better records to make them more competitive for better opportunities. Furthermore, the young generations are less resistant to change management than elderly [21].

Family medicine staff showed the higher summative score, this may be due to the fact that they have less workload which gives them more opportunities to read about patient safety and attend conferences and workshops related to it. In addition, patient safety is considered within the core of their postgraduate studies.

The overall summative score of awareness revealed that the highest scores were among physicians. This higher score among physician is expected due to their responsibilities for the workflow in their departments which raise their attention toward the safety issues. While the lower scores among nurses is a threat for any future plans as the nurses are mainly involved in all invasive procedures, infection control policies, and administration of medication in the daily work in wards and clinics. This necessitates urgent education and training programs to be implemented all over the province facilities.

The overall patient safety culture score in this study was 59%, which is slightly lower than the scores previously reported in Palestine (63.5%) [22], Saudi Arabia (60%) [17] and China (63%) [23]. The current scores are lower than reported in Lebanese hospitals (72.5%) [24]. However, Arar hospitals score is higher than the score reported in Beni-Suef University hospitals in Egypt [25] and one in the Indian university hospital staff [26]. A possible explanation for these different scores is mainly due to the different training and educational programs and improvement strategies.

The highest dimension positive score in the current study was for the teamwork within the units. This was associated with lower scores for the teamwork across the unit. This is in accordance with other studies [26, 27]. However, the reverse was reported in other published data [28]. The increased negative score of the teamwork across the unit is the expected image

for the lower scores of communication and patients transition items of the questionnaire. This problem necessitates higher contribution from the higher administration for better communication between different units in the hospitals and different facilities within the province.

Overall patient safety grade was rated as excellent or very good by 58% of respondents, acceptable by 30% and failing or poor by 12%; these scores are similar to the data reported by Alahmadi (2010) [21] from 13 general hospitals in Riyadh city. Also these scores reflected high grade than scores reported by Ekram et al. (2017) from Beni-Suef University hospitals [25].

The mean numbers of events reported among the study participants were 3.90 ± 1.67 , 1.9 ± 1.67 , 1.3 ± 2.52 , and 1.5 ± 2.09 for physicians, nurses and specialists and technicians staff for physicians, nurses and specialists, technicians and pharmacists respectively, which is lower than other Saudi study records which revealed reporting averages of 3.0 ± 1 , 3.7 ± 1 , 3.2 ± 0.9 for physicians, Para-medical and non-medical staff respectively in 13 Riyadh hospitals [21]. This difference is expected mainly due to the difference in workload and the number of population between Riyadh, the capital city, and Arar in the Northern border. The participant's awareness and culture regarding reporting of the medical errors remain a major challenging problem. Most of the participants stated that they do not report errors if no harm occurs and sometimes errors were not reported even when harm occurs. This finding was highlighted in other publications [39-30]. This is mainly due to fear of shame and punishment especially with less open climate and employee coming from different cultures and nationalities [31]. Also, unfamiliarity of the foreigner with the reporting system can play a role in this issue.

The study has few limitations. First, the data collected from different facilities which were merged together while these facilities are different in size, staffing, and types of services and workload. Secondly, it is clear that the answers of the participants are affected by their interest and their work duties. Mostly participants are trying to clear their sides and blame the others for the safety problems. Thirdly, the potential for bias in the sampling frame among the different facilities should be considered due to the lack of random selection as only persons who respond and complete their forms are considered for data collection and further analysis. Fourthly, some staff was asked about some issues in patient safety which may not be in focus of their work. For example, laboratory and radiology specialist are not aware of medication errors prevention strategies of the hospitals and electrolytes prescription programs and how intubation and catheterization are going on inside the wards and different departments.

Despite these limitations and due to the lack of research in this area, the study provides important information and sheds light on several critical patient safety issues in Saudi Arabian hospitals. Hence, the generalization of this study should be reviewed within the context of limitations inherent in a study; suggestive of social desirability bias and the fact that attitude does not always translate into practice.

Scientific Responsibility Statement

The authors declare that they are responsible for the article's

scientific content including study design, data collection, analysis and interpretation, writing, some of the main line, or all of the preparation and scientific review of the contents and approval of the final version of the article.

Animal and human rights statement

All procedures performed in this study were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. No animal or human studies were carried out by the authors for this article.

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Conflict of interest

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References

- Balkhair A, Al-Farsi YM, Al-Muharrmi Z, Al-Rashdi R, Al-Jabri M, Neilson F, et al. Epidemiology of multi-drug resistant organisms in a teaching hospital in Oman: a one-year hospital-based study. *ScientificWorldJournal*. 2014; 2014. DOI: 10.1155/2014/157102.
- Madea B, Musshoff F, Preuss J. Medical negligence in drug associated deaths. *Forensic Sci Int*. 2009; 190: 67-73.
- Das BP, Rauniar GP, Bhattacharya S K. Medical errors challenges for the health professionals: Need of pharmacovigilance to prevent. *JNMA J Nepal Med Assoc*. 2006; 45: 273-8.
- Kohn LT, Corrigan JM, Donaldson MS. *To Err Is Human: Building a Safer Health System*. Washington, DC: National Academy Press; 2000.
- Khani-Jazani R, Molavi-Taleghani Y, Seyedin H, Vafaei Najar A, Ebrahimipour H, Pourtale A. Risk Assessment of Drug Management Process in Women Surgery Department of Qaem Educational Hospital (QEH) Using HFMEA Method (2013). *Iran J Pharm Res*. 2015; 14 (2): 495-504.
- Stelfox HT, Palmisani S, Scurlock C, Orav EJ, Bates DW. The "To Err Is Human" report and the patient safety literature. *Quality and Safety in Healthcare*. 2006; 15(3): 174-8.
- Andermann A, Ginsburg L, Norton P, Arora N, Bates D, Wu A, et al. Core competencies for patient safety research: a cornerstone for global capacity strengthening. *BMJ Quality and Safety*. 2011; 20(1): 96-101.
- O'Leary DS. Patient safety: the search for global solutions. *World Hosp Health Serv*. 2008; 44(1): 19-21.
- Donaldson LJ, Fletcher MG. The WHO World Alliance for Patient Safety: towards the years of living less dangerously. *Med J Aust*. 2006; 184(Suppl.10): S69-72.
- Pittet D, Donaldson L. Challenging the world: patient safety and health care-associated infection. *Int J Qual Health Care*. 2006; 18(1): 4-8.
- Arias CA, Murray BE. Antibiotic-resistant bugs in the 21st century—a clinical super-challenge. *N Engl J Med*. 2009; 360(5): 439-43.
- Al-Muharrmi Z, Rafay A, Balkhair A, Jabri AA. Antibiotic combination as empirical therapy for extended spectrum Beta-lactamase. *Oman Med J*. 2008; 23(2): 78-81.
- Allan EL, Barker KN. Fundamentals of medication error research. *Am J Hosp Pharm*. 1990; 47: 555-71.
- Antonow JA, Smith AB, Silver MP. Medication error reporting: A survey of nursing staff. *J Nurs Care Qual*. 2000; 15: 42-8.
- Crawford SY, Cohen MR, Tafesse E. Systems factors in the reporting of serious medication errors in hospitals. *J Med Syst*. 2003; 27: 543-51.
- Uribe CL, Schweikhart SB, Pathak DS, Dow M, Marsh GB. Perceived barriers to medical-error reporting: An exploratory investigation. *J Healthc Manag*. 2002; 47: 263-79.
- Al-Mandhari A, Al-Zakwani I, Al-Adawi S, Al-Barwani S, Jeyaseelan L. Awareness and implementation of nine World Health Organization's patient safety solutions among three groups of healthcare workers in Oman. *BMC health services research*. 2016; 16(1): 533.
- Nabilou B, Feizi A, Seyedin H. Patient safety in medical education: students' perceptions, knowledge and attitudes. *PLoS One*. 2015; 10(8). DOI: 10.1371/journal.pone.0135610.
- Alahmadi HA. Assessment of patient safety culture in Saudi Arabian hospitals. *Qual Saf Health Care*. 2010; 19(5). DOI: 10.1136/qshc.2009.033258. Tyler TR, Schuller RA. Aging and Attitude Change. *J Pers Soc Psychol*. 1991; 61(5): 689-97.
- Hamdan M, Saleem A. Assessment of patient safety culture in Palestinian public hospitals. *Int J Qual Health Care*. 2013; (25) 2: 167-75.

21. Nie Y, Mao X, Cui H, He S, Li J, Zhang M. Hospital survey on patient safety culture in China. *BMC Health Services Research*. 2013; 13: 228.
22. El-Jardali F, Jaafar M, Dimassi H, Jamal D, Hamdan R. The current state of patient safety culture in Lebanese hospitals: a study at baseline. *Int J Qual Health Care*. 2010; (22): 5: 386–95. DOI:10.1093/intqhc/mzq047
23. El-Shabrawy Ekram M, Anwar Manal M, Zahra'a Mohammed Mostafa. Assessment of Patient Safety Culture among Health Care Workers in Beni-Suef University Hospital, Egypt. *EJCM*. 2017; (35)3: 11-19
24. Rao MV, Thota D, Srinivas P. A study to assess patient safety culture amongst a category of hospital staff of teaching hospital. *ISOR J Dent Med Sci*. 2014; 13: 16–22.
25. Rajalatchumi A, Ravikumar TS, Muruganandham K, Thulasingham M, Selvaraj K, Reddy MM, et al. Perception of patient safety culture among health-care providers in a Tertiary Care Hospital, South India. *J Nat Sci Biol Med*. 2018; 9(1): 14.
26. Nie Y, Mao X, Cui H, He S, Li J, Zhang M. Hospital survey on patient safety culture in China. *BMC Health Serv Res*. 2013; 13: 228.
27. Poorolajal J, Rezaie S, Aghighi N. Barriers to medical error reporting. *Int J Prev Med*. 2015; 6: 97. DOI:10.4103/2008-7802.166680
28. Morrison M, Cope V, Murray M. The underreporting of medication errors: A retrospective and comparative root cause analysis in an acute mental health unit over a 3-year period. *Int J Ment Health Nurs*. 2018; 27(6):1719-1728
29. Edmondson AC. Learning from mistakes is easier said than done: group and organizational influences on the detection and correction of human error. *J Appl Behav Sci*. 1996; 32(1): 5-28.

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