

Nursing perceptions of patient safety climate in the Gaza Strip, Palestine

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Aims: This study was undertaken to assess the perception of nurses about patient safety culture and to test whether it is significantly affected by the nurses' position, age, experience and working hours.

Background: Patient safety has sparked the interest of healthcare managers, yet there is limited knowledge about the current patient safety culture among nurses in the Gaza Strip.

Methods: This was a descriptive cross-sectional study, administering the Arabic Safety Attitude Questionnaire (Short Form 2006) to 210 nurses in four public general hospitals.

Results: Job Satisfaction was the most highly perceived factor affecting patient safety, followed by Perception of Management. Safety culture varied across nursing position, age, work experience and working hours. Nurse Managers had more positive attitudes towards patients than frontline clinicians did. The more experience nurses had, the better their attitudes towards patient safety. Nurses who worked the minimum weekly required hours and who were 35 years and older had better attitudes towards all patient safety dimensions except for Stress Recognition. Nurses with a positive attitude had better collaboration with healthcare professionals than those without a positive attitude.

Limitation: Generalization is limited, as nurses who worked in private and specialized hospitals were excluded.

Conclusion: Evaluation of the safety culture is the essential starting point to identify hindrances or drivers for safe patient care. Job Satisfaction, Perception of Management and Teamwork necessitate reinforcement, while Working Conditions, Stress Recognition and Safety Climate require improvement.

Implications for nursing and health policy: Ensuring job satisfaction through adequate staffing levels, providing incentives and maintaining a collegial environment require both strategic planning and institutional policies at the higher administrative level. Creation of a non-punitive and learning environment, promoting open communication and fostering continuous education should be fundamental aspects of hospital management. A policy of mixing experienced nurses with inexperienced nurses should be considered.

Keywords: Cross-Sectional, Gaza Strip, Nurses, Palestine, Patient Safety, Perceptions, Safety Culture

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Conflict of interest

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Introduction

Patient safety is increasingly recognized as a central element of any healthcare system. It is defined as the prevention of medical-related errors and adverse events occurring in the course of healthcare delivery. According to the Agency of Health Research and Quality (AHRQ), a culture of patient safety has the following features: acknowledging an occupation as a high-risk setting, blame-free environment, support and encouragement when addressing solutions to problems and departmental and organizational commitment to patient safety (AHRQ 2010).

In response to the report 'To Err is Human' produced by the Institute of Medicine (IOM), which found that scores of thousands of people lose their lives every year as a result of unsafe care, the safety of patients became a major global concern, and the importance of creating a safety culture received wide attention (Bates 2007).

Because patient safety has multifactorial aspects, healthcare institutions should adopt an approach that incorporates multiple organizational strategies to prevent and reduce suffering to patients. Among these factors are: effective leadership, adequate staffing levels and evidence-based practice (Department of Health and Children 2008). Maintaining a positive safety climate requires understanding the attitudes of health workers towards patient safety-related behaviours. Such information will be a valuable driver for policy makers and managers in improving patient safety (Sorra et al. 2012).

System approaches rely on quality assurance processes, which in turn depend on performance indicators. Adverse events are key quality indicators in hospitals as they may indicate poor quality of care (Lucero et al. 2010). Evidence from eight low-income countries in the Eastern Mediterranean Region showed that the rate of adverse events and long-lasting disability were 8.2% and 40%, respectively (El-Asady 2009). In Jordan, the rate was 28% while in Iran it was 7.3% of which 34.3% were preventable events (Akbari Sari et al. 2015). In Palestine, a study by Najjar et al. (2013) revealed an adverse event rate of 14.3%, ranging from 6% to 24%.

Many initiatives to improve patient safety culture have been implemented, such as the Patient Safety Friendly Hospital Initiative and accreditations (Siddiqi et al. 2012). The Palestinian Ministry of Health joined the World Health Organization's Patient Safety Friendly Hospital Initiative and followed up with two national conferences focused on patient safety. More recently, patient safety became the core of the national health strategy.

Background

Nurses are the key to safety improvement due to the nature of their work, which includes but is not limited to patient monitoring and continuity of care and preventing errors (Kirwan et al.

2013). Further, the report released by the IOM 'Keeping patients safe: Transforming the work environment for nurses' showed a strong link between nurses' work environment and patient safety (Page 2004), and thus, this requirement became one of the main elements in hospital accreditations (Hughes et al. 2009).

Nurses' perception of patient safety is linked to workload demands, in which increased demands were associated with lower safety (Richardson & Storr 2010). Other findings illustrated that managerial commitment, a positive work environment, education level and knowledge transfer among staff are significant factors connected to higher patient safety perception and have an impact on patient outcomes (Aboshaiqah & Baker 2013; Kirwan et al. 2013).

Several studies have been conducted on patient safety culture in the Middle East region (Aboul-Fotouh et al. 2012; El-Jardali et al. 2014; Hamdan 2013; Najjar et al. 2015). However, studies that focused on nurses only were limited (Alayed et al. 2014; Ammouri et al. 2015; Bahrami et al. 2014; Khater et al. 2015), and there were none in the Gaza Strip. Thus, there is limited knowledge about nurses' perception of patient safety culture in this area.

Study aim

This study aimed to assess the perceptions of nurses about patient safety culture on the Safety Attitude Questionnaire (SAQ) dimensions, to identify areas that require improvement and to determine whether perceptions significantly differ with working hours, age, position and work experience.

Methods

Study design and setting

This was a descriptive cross-sectional study carried out in 2014. There are seven public general hospitals distributed in four Gaza governorates: two in the North, one in Gaza, one in the Middle area and three in the South. In order to have a representative sample from the entire Gaza Strip, four hospitals were selected, one from each governorate. Where a governorate had more than one hospital (north and south), randomization was applied. All hospital inpatient wards in the four hospitals were included in the study.

Sample and sampling

Selection criteria for nurses' inclusion were: a formal employee, at least 6 months working experience and willingness to participate in the study. The target population was nurses ($n = 837$) of whom 551 met the inclusion criteria. We used the formula $n = [(Z\alpha/2)^2 p(1-p)/d^2]$ in which p = proportion of persons with positive safety culture [$P = 0.49$ (Najjar et al. 2015)]. The sample size was estimated to be 95 nurses; then, we allowed for a

10% non-response rate and then doubled the resulting number, i.e. $95 + 10 = 105 \times 2 = 210$. Thus, the required sample size was 210 as we were aiming to achieve a minimum of 50% response rate. It was decided to sample proportionally to achieve representativeness of sample.

Subject recruitment was carried out by the researchers visiting the nursing administration in each hospital. First, we explained the research aims and then asked for the exact number of nurses who met the criteria. We calculated the proportion of nurses from the total sample in each hospital and in wards; then, we wrote a list of eligible nurses' names in each ward to select the required number systematically. The K th was equal to 4.

Ethical considerations

This study received approval from the Palestinian Helsinki Ethical Committee (PHRC/HC/01/14). In addition, permission was obtained from the Palestinian Ministry of Health (HRD/231/10/14). The study's purpose was provided to each nurse prior to data collection, and participants were informed that participation was voluntary based and all data would be de-identified and used for research purposes only.

Data collection

We used the SAQ because it demonstrates a strong relation between obtained patient safety score and patient outcomes (Norden-Hagg et al. 2010; Poley et al. 2011). The SAQ is valid and reliable and has been used widely in various countries (France et al. 2010; Norden-Hagg et al. 2010; Raftopoulos & Pavlakis 2013). It covers six dimensions: Teamwork Climate, Safety Climate, Job Satisfaction, Stress Recognition, Perception of Management measured on hospital and unit level and Working Conditions. The questionnaire uses a five-point Likert scale with response choices (1 = strongly disagree to 5 = strongly agree). The Arabic SAQ was slightly modified to adapt to the Palestinian context. Item 36 'Communication breakdowns that lead to delays in delivery of care are common' was not part of the scale but added to the 'Working Conditions' dimension, and Item 29 'The levels of staffing in this clinical area are sufficient to handle the number of patients' was moved to the 'Working Conditions' dimension according to the recommendations of an expert panel. The Arabic SAQ had good content validity. Item content validity index (I-CVI) ranged between 0.77 and 1.00, respectively. The internal consistency was measured by the Cronbach's alpha value and was 77.73 (74.75–82.28). Construct validity was tested by confirmatory and factor analysis and showed satisfactory model of fit.

Six trained nursing students collected data in participants' work places in the morning shift by face-to-face interview. Fifteen minutes were enough to complete the SAQ. Duration of data collection was 10 months, from June 2013 to March 2014.

Statistical analysis

Data were analysed using the SPSS software version 22 IBM Corp, Armonk, NY, USA. Data were checked for errors and outliers during the data entry phase, and the proportion of missing values was calculated. To create a dimension score in the range of 0–100, the score was converted to 0–100 point scale and responses for the items in the same domain were summed and then divided by the number of items in that domain. Additionally, the negatively worded questions were reverse coded, which means the higher the score, the more the positive responses and vice versa. Answers were collapsed to three options: disagree strongly/disagree, neutral and agree/agree strongly. Positive scores were calculated (>75 of 100).

Descriptive measures were used to describe and summarize the quantitative variables. The mean score of each dimension was compared with participants' demographic characteristics (nursing position, age, gender and weekly work load) using the Chi-square test. One-way ANOVA was conducted to study the significant differences between the means obtained in each dimension with years of experience of nurses (≤ 5 , 6–11, ≥ 12 years).

We used the generalized estimating equation to estimate the possible unknown correlation between outcomes (Zeger et al. 1988). We aimed to identify the association between the respondents' safety attitudes for the Arabic SAQ dimensions and the three safety-related behaviour questions in which disagree = 0 and agree = 1 using the Wald chi-square test. The level of statistical significance was determined at $P < 0.05$.

Results

Participants

An overall 91.9% response rate was achieved. The mean age of nurses was 33.7 years, and the majority were below 35 years old (62.3%). Male nurses constituted more than half of the sample (54.4%), and more than half held a bachelor degree (63.2%), while 28% had a 3-year diploma. Two-thirds were clinical nurses (68.9%), and the remainder were administrators (head nurses and supervisors). Half worked in the largest and biggest hospital in the Gaza Strip (52.3%; Table 1).

Perception of safety culture

The mean score of SAQ and the six domains distributed by demographic characteristics are presented in Table 2. This study showed variations between nurse managers and clinical nurses in all dimensions of the SAQ. The differences in mean scores were observed for nurse managers. Positive attitudes towards Stress Recognition were more evident in the clinical nurses than in the nurse managers, but the difference in mean score was not statistically significant. Nurses who worked 35 h weekly, which is the

Table 1 Demographic characteristics of participants

Variables	Mean (SD)	Range	N	N%
Gender				
Male	–	–	105	54.4
Female	–	–	88	45.6
Age	33.72 (9.62)	20–57	191	–
≤35 years	27.84 (6.52)	20–35	119	62.3
>35 years	46.23 (6.49)	37–57	72	37.7
Years of experience	10.39 (8.34)	1–35	190	–
≤5 years	2.94 (1.82)	1–5	70	36.8
6–11 years	7.98 (2.13)	6–11	63	33.2
≥12 years	21.60 (8.03)	12–35	57	30
Position				
Head nurse	–	–	37	19.2
Nurse supervisor	–	–	21	10.9
Staff nurse	–	–	133	68.9
Working load				
35 h	–	–	107	55.4
>35 h	–	–	86	44.6
Place of living				
North	–	–	29	15.3
Gaza	–	–	53	27.5
Middle area			57	29.5
South			54	28.0
Hospital				
Kamal Odwan			19	9.8
Shifa			101	52.3
Aqsa Martyrs			20	10.4
Nasser			53	27.5
Department				
Surgical			55	28.5
Internal medicine			73	37.8
Obst/Gyn			39	20.2
ICU			26	13.5
Education level				
Diploma			54	28.0
Bachelor degree			122	63.2
Master degree			16	8.3

minimum required hours of work, were more positive towards all safety culture dimensions except for Stress Recognition, compared with those who worked >35 h weekly. Nurses with >12 years' experience were more positive towards all safety culture dimensions except for Stress Recognition. Nurses who were >35 years old scored higher than those under 35 years old for all patient safety culture dimensions except for Stress Recognition, and differences were only significant with Perception of Management (in both unit and hospital management $P < 0.01$). The difference in patient safety score between male and female was not wide, but showed statistical significant for males ($P < 0.05$).

Descriptive analysis of positive responses for the Arabic SAQ dimensions showed that Job Satisfaction had the highest positive responses (63.2%), followed by Perception of Management, then Teamwork Climate (44.2%), Safety Climate (40.5%), Stress Recognition (39.3%) and lastly Working Conditions (16.2%; Table S1).

Responses by items

Teamwork Climate was well shaped and coordinated between nurses and physicians as stated by 73.1%. Three-quarters affirmed that their suggestions and views regarding patient care were well received by other professionals. As regards Safety Climate, 35.3% agreed that the work environment was not helpful for learning as it was still difficult to discuss errors. Some 29.1% affirmed that the culture of the work place was not conducive to learning from errors. Most nurses liked their job (78.2%) and were proud to work in their hospital (71.5%), and 64.7% 'would feel safe being treated in their hospital as patients'. As regards Stress Recognition, half (52.4%) affirmed that 'fatigue impaired their performance during emergency situations', and the performance of 65.2% was impaired when their workload became excessive. Most professional nurses were in favour of unit management. Over half (58.5%) considered that it 'supported their daily efforts', and 70.5% affirmed that unit management provided nurses with 'adequate and timely information about events that might affect their work'. Working Conditions were perceived as the lowest influencing dimension of safety culture among study subjects. 64.8% of nurses disagreed that 'Staffing levels are sufficient to handle the number of patients'. Over half affirmed that 'the hospital does a good job of training new personnel', and trainees were well supervised (Table S2).

Relationship with safety-related behaviours

The participants were divided into two groups: positive attitude group (≥ 75) and negative attitude group (< 75). Then, we compared them with the three safety behaviour questions. The findings showed that nurses with a positive attitude expressed a collaborative approach towards their nursing, pharmacist and physician colleagues. Results were presented by determining the odds ratio and minimum and maximum values. All Wald chi-square tests were significant at $P < 0.05$ except for Stress Recognition (Table 3).

Discussion

This study provides the most complete information available on the patient safety culture status quo among nurses working in Palestinian public hospitals in the Gaza Strip. The included hospitals were public and general and have no quality accreditation

Table 2 Scores of SAQ and its domains distributed by gender, positions, workload and years of experience and age of professional nurses (Gaza Strip, 2014)

		SAQ Dimensions										
		Teamwork climate (M) SD	Safety climate (M) SD	Job satisfaction (M) SD	Stress recognition (M) SD	Perception of unit management (M) SD	Perception of hospital management (M) SD	Working conditions (M) SD	SAQ (Short Form 2006) (M) SD	Cohen's d (effect size)		
Gender												
	Male	75.53 (3.65)	74.07 (4.75)	79.74 (4.33)	71.17 (3.69)	77.40 (4.23)	70.56 (4.92)	63.48 (4.05)	73.82 (18.22)		0.055	
	Female	76.12 (2.93)	74.64 (3.71)	80.26 (3.45)	68.51 (3.44)	75.61 (3.59)	73.62 (3.83)	63.15 (3.06)	73.20 (14.04)			
	P value	0.042*	0.086	0.072	0.725	0.701	0.018**	0.013**	0.047*			
Position												
	Administrative nurse	78.74 (2.76)	76.41 (3.87)	82.47 (3.48)	67.70 (3.74)	80.64 (2.96)	78.23 (3.10)	66.17 (3.15)	76.21 (13.12)		0.361	
	Clinical nurse	77.93 (3.51)	73.43 (4.46)	78.98 (4.13)	70.91 (3.53)	75.05 (4.28)	69.44 (4.82)	62.28 (3.78)	72.53 (17.57)			
	P value	0.088	0.251	0.063	0.520	0.004**	0.000**	0.125	0.016**			
Workload												
	≤35 h/week	78.42 (3.09)	76.67 (3.73)	82.32 (3.69)	69.90 (3.77)	79.05 (3.66)	75.69 (4.11)	65.42 (3.28)	75.60 (15.06)		0.469	
	>35 h/week	72.61 (3.38)	71.38 (4.74)	77.01 (4.15)	70.13 (3.34)	73.64 (4.19)	67.68 (4.66)	60.64 (3.92)	70.90 (17.31)			
	P value	0.170	0.074	0.235	0.349	0.112	0.210	0.092	0.101			
Age												
	≤35 years	73.93 (3.42)	72.47 (4.47)	77.71 (4.12)	71.34 (3.60)	74.71 (4.29)	69.24 (4.84)	62.30 (3.79)	72.02 (17.28)		-0.429	
	>35 years	79.74 (2.87)	77.36 (3.80)	84.48 (3.40)	67.62 (3.60)	80.10 (3.03)	77.23 (3.33)	64.92 (3.35)	76.33 (13.85)			
	P value	0.084	0.232	0.234	0.997	0.005**	0.002**	0.083	0.064			
Years of experience												
	≤5 years	66.83 (3.70)	72.40 (4.51)	77.86 (4.13)	71.50 (3.46)	76.05 (3.75)	72.31 (4.52)	62.24 (3.78)	71.56 (18.28)		(F = 2.12)	
	6–11 years	76.56 (3.38)	46.14 (4.48)	78.65 (3.98)	70.13 (3.72)	73.40 (5.13)	67.45 (5.50)	63.09 (4.02)	73.68 (17.64)		($\partial\eta^2 = 0.028$)	
	≥12 years	78.52 (2.78)	76.42 (3.98)	84.47 (3.34)	66.61 (3.79)	80.37 (2.91)	77.18 (3.12)	64.91 (3.32)	75.65 (13.27)			
	P value	0.054*	0.257	0.043*	0.348	0.081	0.016**	0.594	0.128			

*P value < 0.05; **P value < 0.01.

M, Mean score on scale 100; SD, standard deviation.

by International Organization for Standardization or similar accreditation institutions.

Previous studies on nurses' perceptions had response rates ranging from 17.2% to 92.3% (Ausserhofe et al. 2012; Houser 2012; Rigobello et al. 2012), and the response rate of our study was 91.9%. The high response rate can be attributed to the data collection method.

Job Satisfaction was ranked the highest safety attitude area among study subjects despite the participants' recognition of difficult working conditions. This finding is supported by previous studies (France et al. 2010; Raftopoulos & Pavlakis 2013). Work satisfaction is thus an important driver for making health care safer. Institutions whose nurses are dissatisfied due to nursing shortages and excess workloads are prone to errors leading to an increase in the incidence of adverse events and medication errors (Kunaviktikul et al. 2015). Nursing supervisors and administrators who are satisfied in their work influence improving patient safety because they influence specific behaviours and values that need to be strengthened and reinforced.

Interestingly, Perception of Management received the second highest scores among nursing professionals. In contrast, studies from Denmark, Brazil and Australia showed that Perception of Management was the lowest positive attitude (Chaboyer et al. 2013; Kristensen et al. 2015; Rigobello et al. 2012). However, our finding is supported by a study conducted in Taiwan (Lee et al. 2010).

Perception of Management is a key element to guarantee patient safety. This is because certain management actions to promote patient safety, such as providing ongoing professional development and creating a reasonable work environment characterized by free discussion about errors, are necessary to reinforce and support safe practices.

Unexpectedly, Working Conditions had the lowest positive response among study participants. This is an interesting finding because many studies conducted in developing and developed countries showed that Working Conditions were among the top perceived positive safety attitude (Alayed et al. 2014; Kristensen et al. 2015). Our finding, however, is supported by a study conducted by Lee et al. (2010). The differences could be explained by organizational and cultural variations related to patient safety. The unfavourable and low score provided to Working Conditions implies that most respondents were not satisfied with logistic support and quality of work setting. Working Conditions including staffing, overtime, wages and promotions are shown to have association with patient safety outcomes including but not limited to healthcare-associated infections and 30-day mortality (Stone et al. 2007) and job satisfaction (Bacha et al. 2015). The nurses in the Gaza Strip work in a hard situation; they receive less than half of their salaries, work under

Table 3 Relationship between safety behaviours questions with SAQ dimensions (Gaza Strip, 2014)

	TM	SC	JS	SR	PM	WC	SAQ
	Wald Chi square (min-max)						
I experience good collaboration with							
Nurses	8.47 (2.84-24.77)	9.36 (2.76-31.73)	6.24 (2.80-13.86)	1.50 (0.69-3.26)	7.40 (3.06-17.89)	8.51 (1.12-64.63)	19.22 (2.56-144.03)
P value	<0.001***	<0.001***	<0.001***	0.297	<0.001***	0.038*	0.004**
Physicians	9.37 (3.76-23.33)	9.11 (3.42-24.26)	7.16 (3.54-14.49)	1.34 (0.68-3.61)	5.97 (2.92-12.22)	4.09 (1.18-14.13)	15.54 (3.63-66.48)
P value	<0.001***	<0.001***	<0.001***	0.389	<0.001***	0.026*	<0.001***
Pharmacists	7.62 (3.36-17.30)	10.80 (4.06-28.68)	8.22 (4.10-16.49)	1.29 (0.67-2.47)	5.14 (2.61-10.10)	4.71 (1.36-16.20)	8.18 (2.79-23.94)
P value	<0.001***	<0.001***	<0.001***	0.436	<0.001***	0.014**	<0.001***

*P value < 0.05; **P value < 0.01; ***P value < 0.001.

TW, teamwork climate; SC, safety climate; JS, job satisfaction; SR, stress recognition; PM, perceived management; WC, working condition. Comparing positive attitudes with negative attitude to SAQ dimensions (agree = 1, disagree = 0).

intolerable pressure and complain of nursing shortages, but are satisfied and proud with their professions. This could reflect the belonging and loyalty of nurses to their profession.

A significant variation was observed with regard to nursing position, working hours, nurses' age and years of experience, similar to Rigobello et al. (2012). Nurses with managerial positions were more positive towards all domains except for Stress Recognition. This is similar to findings from Denmark (Kristensen et al. 2015). Differences between nurses in management positions (head nurses and nursing supervisors) and clinical nurses were only significant in the management domain. As regards Safety Climate, nurses in managerial positions had higher scores than frontline nurses, which is in line with Rigobello et al. (2012). A possible explanation could be that managers usually were involved in and/or aware of quality improvement and patient safety due to frequent workshops and meetings. Our findings highlight the prominence of the nurse manager's role towards patient safety, where care is provided by establishing a non-punitive learning environment, promoting continuous professional training and improving teamwork and staff motivation.

In this study, working experience was a predictor for patient safety; it was found that nurses who had >12 years' experience at work had better perception for all safety culture except for Stress Recognition, which is similar to findings of Rigobello et al. (2012). Experienced nurses have a higher score than those less experienced, indicating that experienced nurses familiar with their job are also more likely to have better safety attitudes. Thus, a policy of mixing experienced nurses (>12 years) with new employees would contribute to a reduction in the rate of errors and to ensuring patient safety. In contrast, Nabhan & Ahmed-Tawfik (2007) found that safety culture was greater among nurses having <1-year experience in comparison with nurses who had been working for longer time.

Findings showed a sturdy link between safety culture and health workers' safety behaviours. Nurses with a positive attitude compared to those without a positive attitude expressed a collaborative approach with their clinical colleagues. This is similar to findings obtained from Lee et al. (2010).

The shortage of nurses in the Gaza Strip is an old issue, and in most hospitals, officially employed nurses account for two-thirds of the wards' nursing staff, while the remaining are volunteers. Therefore, at least one nurse has to work with a volunteer nurse on evening and night shift duty together (17 consecutive hours). We found nurses who worked 35 h weekly were more positive towards safety culture than those worked >35 h. A study conducted by Wu et al. (2013) found that longer working hours were associated with low patient safety grade, and Rogers et al. (2004) reported a 3.29 times increased chance of making an error among nurses who worked for a

longer duration (>12.5 h shift in 24-h period). In contrast, an increasing number of reporting errors could be a sign of positive patient safety culture when staff work in an organization characterized by a blame-free environment and feel free to speak up and report errors. Further studies are necessary to analyse the relationship between working hours and patient safety culture scores.

Variation in the patient safety culture was also found in relation to nurses' age. Nurses >35 years old showed more positive attitudes than those <35 years old. A possible explanation could be that older nurses are more mature and professionally responsible and put more emphasis on patient safety than younger nurses during the course of patient care. Nurses in their 40s and 50s are more aware of their responsibilities and roles towards patient safety and can better understand the complication and consequences associated with negligence and poor care. Therefore, they can act as role models and mentors for new employees.

Methodological considerations and limitations

This study was strengthened by including nurses from different units of work and the high response rate (>91%). Results may readily transfer to other hospitals within the Gaza Strip, but they may not be generalizable to other hospitals within the country. The likelihood of selection bias was minimized by the selection process.

Conclusions

Nurses perceived Job Satisfaction, Management and Teamwork as the leading factors influencing patient safety. Therefore, strenuous efforts are required by hospital management to increase nurses' job satisfaction including but not limited to the provision of learning and financial incentives such as recognition, promotions, decreased workload and making the work environment supportive. We also found perceptions varied according to nursing position, years of experience, working hours and age. The perceived gap in the patient safety culture is important to consider, and healthcare organizations have to share this responsibility. We found nurses with positive attitude are more prone to collaborate with their colleagues and with those from other disciplines.

Implications for nursing and health policy

New approaches and policies are needed, based on the weak and the strong areas identified in this study. Job Satisfaction, Perception of Management and Teamwork were strong areas that need reinforcement, while Safety Climate, Stress Recognition and Working Conditions require improvement. Therefore, the Unit of Nursing Management at the Ministry of health in the Gaza

Strip level should develop a strategy for transforming the nursing work environment, which should be included in the national strategic plan and communicated to lower managerial levels in all hospitals. Examples of strategies include, but are not limited to, introducing performance-based bonuses, having more incentives and ensuring job autonomy.

At the hospital level, we found nurse managers scored higher than bedside nurses in all patient safety dimensions except Stress Recognition. This is also a window of opportunity for decision-makers to include nurse managers in the planning process and use them to create the required positive safety culture due to their degree of influence on nursing professionals' attitudes. Experienced nurses were more positive towards patient safety dimensions; thus, nursing administrators should have a policy of scheduling experienced nurses with newly employed, particularly on the evening and night shifts. Finally, working conditions, especially staff levels, are the area that most requires improvement. So, a targeted strategy is urgently needed at ministry and hospital level to ensure adequate staffing in all hospital wards to ensure safe practices and improve patient safety.

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Author contributions

Study design: AE and AA.

Data collection: AE and MR.

Data analysis: YA, AA and AE.

Study supervision: YA and AA.

Manuscript writing: AE, YA, AA and MR.

Critical revision for important intellectual content: AE, AA, YA and MR.

References

Aboshaiqah, A.E. & Baker, O.G. (2013) Assessment of nurses' perceptions of patient safety culture in a Saudi Arabia hospital. *Journal of Nursing Care Quality*, **28** (3), 272–280.

Aboul-Fotouh, A.M., Ismail, N.A., Ez Elarab, H.S. & Wassif, G.O. (2012) Assessment of patient safety culture among health-care providers at a teaching hospital in Cairo, Egypt. *Eastern Mediterranean Health Journal*, **18** (4), 372–377.

Agency for Healthcare Research and Quality (AHRQ) (2010) *Patient Safety Network. Patient Safety*. Available at: <http://psnet.ahrq.gov/prime.aspx?primerID55/> (accessed 15 February 2016).

Akbari Sari, A., et al. (2015) The incidence, nature and consequences of adverse events in Iranian hospitals. *Archives of Iranian Medicine*, **18** (12), 811–815.

Alayed, A.S., Loof, H. & Johansson, U.B. (2014) Saudi Arabian ICU safety culture and nurses' attitudes. *International Journal of Health Care Quality Assurance*, **27** (7), 581–593.

Ammouri, A.A., et al. (2015) Patient safety culture among nurses. *International Nursing Review*, **62** (1), 102–110.

Ausserhofe, D., et al. (2012) Nurse-reported patient safety climate in Swiss hospitals. *Swiss Medical Weekly*, **142**, w13501.

Bacha, A.M., et al. (2015) Job satisfaction of nursing staff in a university hospital. *Revista Brasileira Enfermagem*, **68** (6), 819–826.

Bahrami, M.A., Chalak, M., Montazeralfaraj, R. & Tafti, A.D. (2014) Iranian nurses' perception of patient safety culture. *Iran Red Crescent Medical Journal*, **16** (4), e11894.

Bates, D.W. (2007) Preventing medication errors: a summary. *American Journal Health System Pharmacy*, **64** (16), 1678.

Chaboyer, W., et al. (2013) CNE Article: safety culture in Australian intensive care units: establishing a baseline for quality improvement. *American Journal of Critical Care*, **22** (2), 93–102.

Department of Health and Children (2008) *Building a Culture of Patient Safety – Report of the Commission on Patient Safety and Quality Assurance*. Dublin. Available at: http://www.dohc.ie/publications/pdf/en_patient_safety.pdf?direct=1/ (accessed 27 October 2015).

El-Asady, R. (2009) *The WHO/EMRO Patient Safety Friendly Hospital Initiative*. Presented at Medhealth Damascus. Damascus, Syria. Available at: <http://www.ahfonline.net/presentations/Medical%20Conference/1Dr.%20Reham%20El%20Asady.pdf/> (accessed 29 November 2015).

El-Jardali, F., et al. (2014) Patient safety culture in a large teaching hospital in Riyadh: baseline assessment, comparative analysis and opportunities for improvement. *BMC Health Services Research*, **14**, 122.

France, D.J., et al. (2010) Measuring and comparing safety climate in intensive care units. *Medical Care*, **48** (3), 279–284.

Hamdan, M. (2013) Measuring safety culture in Palestinian neonatal intensive care units using the Safety attitude Questionnaire. *Journal of Critical Care*, **28** (5), 886.e7–886.e14.

Houser, J. (2012) *Nursing Research, Reading, Using and Creating Evidence*, 2nd edn. Jones and Bartlett Learning, Sudbury, MA.

Hughes, L.C., Chang, Y. & Mark, B.A. (2009) Quality and strength of patient safety climate on medical-surgical units. *Health Care Management Review*, **34** (1), 19–28.

Khater, W.A., Akhu Zaheya, L.M., Al-Mahasneh, S.I. & Khater, R. (2015) Nurses' perceptions of patient safety culture in Jordanian hospitals. *International Nursing Review*, **62** (1), 82–91.

Kirwan, M., Matthews, A. & Scott, P.A. (2013) The impact of the work environment of nurses on patient safety outcomes: a multi-level modelling approach. *International Journal of Nursing Studies*, **50** (2), 253–263.

Kristensen, S., et al. (2015) The patient safety climate in Danish hospital units. *Danish Medical Journal*, **62** (11), A5153.

- Kunaviktikul, W., et al. (2015) Nurses' extended work hours: patient, nurse and organizational outcomes. *International Nursing Review*, **62** (3), 386–393.
- Lee, W.C., et al. (2010) Hospital safety culture in Taiwan: a nationwide survey using Chinese version Safety Attitude Questionnaire. *BMC Health Services Research*, **10**, 234.
- Lucero, R.J., Lake, E.T. & Aiken, L.H. (2010) Nursing care quality and adverse events in US hospitals. *Journal of Clinical Nursing*, **19** (15–16), 2185–2195.
- Nabhan, A. & Ahmed-Tawfik, M.S. (2007) Understanding and attitudes towards patient safety concepts in obstetrics. *International Journal of Gynecology and Obstetrics*, **98** (3), 212–216.
- Najjar, S., et al. (2013) The Global Trigger Tool shows that one out of seven patients suffers harm in Palestinian hospitals: challenges for launching a strategic safety plan. *International Journal for Quality in Health Care*, **25** (6), 640–647.
- Najjar, S., Nafouri, N., Vanhaecht, K. & Euwema, M. (2015) The relationship between patient safety culture and adverse events: a study in Palestinian hospitals. *Safety in Health*, **1** (16), 2–9.
- Norden-Hagg, A., et al. (2010) Assessing safety culture in pharmacies: the psychometric validation of the safety attitudes questionnaire (SAQ) in a national sample of community pharmacies in Sweden. *BMC Clinical Pharmacology*, **10** (8), doi:10.1186/1472-6904-10-8.
- Page, A. (2004) *Keeping Patients Safe: Transforming the Work Environment of Nurses*. Institute of Medicine (US) Committee on the Work Environment for Nurses and Patient Safety. Washington (DC): National Academies Press (US). Available at: <https://www.ncbi.nlm.nih.gov/pubmed/25009849> (accessed 21 November 2015).
- Poley, M.J., et al. (2011) Patient safety culture in a Dutch pediatric surgical intensive care unit: an evaluation using the Safety Attitudes Questionnaire. *Pediatric Critical Care Medicine*, **12** (6), e310–e316.
- Raftopoulos, V. & Pavlakis, A. (2013) Safety climate in 5 intensive care units: a nationwide hospital survey using the Greek-Cypriot version of the Safety Attitudes Questionnaire. *Journal of Critical Care*, **28** (1), 51–61.
- Richardson, A. & Storr, J. (2010) Patient safety: a literature [corrected] review on the impact of nursing empowerment, leadership and collaboration. *International Nursing Review*, **57** (1), 12–21.
- Rigobello, M.C.G., et al. (2012) The climate of patient safety: perception of nursing professionals. *Acta Paulista de Enfermagem*, **25** (5), 728–735.
- Rogers, A.E., et al. (2004) working hours of hospital staff nurses and patient safety. *Health Affairs (Millwood)*, **23** (4), 202–212.
- Siddiqi, S., et al. (2012) Patient Safety Friendly Hospital Initiative: from evidence to action in seven developing country hospitals. *International Journal for Quality in Health Care*, **24** (2), 144–151.
- Sorra, J., et al. (2012) *Hospital Survey on Patient Safety Culture 2012 User Comparative Database Report*. Agency for Healthcare Research and Quality. Available at: <http://www.ahrq.gov/professionals/quality-patientsafety/patientsafetyculture/hospital/2012/index.html> (accessed 12 November 2015).
- Stone, P.W., et al. (2007) Nurse working conditions and patient safety outcomes. *Medical Care*, **45** (6), 571–578.
- Wu, Y., et al. (2013) The impact of nurse working hours on patient safety culture: a cross-national survey including Japan, the United States and Chinese Taiwan using the Hospital Survey on Patient Safety Culture. *BMC Health Services Research*, **13**, 394.
- Zeger, S.L., Liang, K.Y. & Albert, P.S. (1988) Models for longitudinal data: a generalized estimating equation approach. *Biometrika*, **44** (4), 1049–1060.

SUPPORTING INFORMATION

Additional Supporting Information may be found in the online version of this article:

Table S1 Mean, median and percent of positive responses among nursing professionals in public hospitals in Gaza Strip, 2014 (n = positive responses)

Table S2 Mean, standard deviation, percentage of agree, disagree and neutral responses of nursing professional per items of SAQ domains (Gaza Strip, 2014)