

BMJ Open Patient safety culture and its determinants among healthcare professionals at a cluster hospital in Malaysia: a cross-sectional study

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ABSTRACT

Objective To assess the baseline level and mean score of every domain of patient safety culture among healthcare professionals at a cluster hospital and identify the determinants associated with patient safety culture.

Methods This cross-sectional study was conducted at a cluster hospital comprising one state and two district hospitals in Malaysia. The safety culture was assessed using the Safety Attitude Questionnaire (SAQ), which is a validated questionnaire. Using proportionate stratified random sampling, 1814 respondents were recruited, and we used the independent t-test, Pearson's χ^2 test and multiple logistic regression analysis for data assessment.

Results Only 23.9% of the respondents had positive patient safety culture levels (SAQ score $\geq 75\%$); the overall mean score was 67.82 ± 10.53 . The job satisfaction dimension had the highest percentage of positive responses (67.0%), with a mean score of 76.54 ± 17.77 . The factors associated with positive patient safety culture were age (OR 1.03, $p < 0.001$), gender (OR 1.67, $p = 0.001$), education level (OR 2.51, $p < 0.001$), work station (OR 2.02, $p < 0.001$), participation in patient safety training (OR 1.64, $p = 0.007$), good perception of the incident reporting system (OR 1.71, $p = 0.038$) and a non-blaming (OR 1.36, $p = 0.013$) and instructive (OR 3.31, $p = 0.007$) incident reporting system.

Conclusions Healthcare professionals at the cluster hospital showed unsatisfactory patient safety culture levels. Most of the respondents appreciated their jobs, despite experiencing dissatisfaction with their working conditions. The priority for changes should involve systematic interventions to focus on patient safety training, address the blame culture, improve communication, exchange information about errors and improve working conditions.

BACKGROUND

The healthcare system is extremely complex, where healthcare delivery is founded on patient safety. Patient safety entails avoiding preventable harm to patients during the healthcare process and reducing the risk of unnecessary injury associated with healthcare to an acceptable minimum. The WHO reports that approximately 1 in 10 patients are harmed while receiving healthcare, and

STRENGTHS AND LIMITATIONS OF THIS STUDY

- ⇒ This study reports the outcomes of patient safety culture in cluster hospitals in Malaysia.
- ⇒ The study has a good response rate.
- ⇒ The study covers both types of hospitals in Malaysia (specialist and non-specialist hospitals).
- ⇒ The respondents were from various categories of healthcare professionals.
- ⇒ A combination of Safety Attitude Questionnaire with qualitative methods such as peer observation, group discussions, analysis of the incident history of the organisation and audits of the safety management system is recommended to explore the main dimensions that influence patient safety culture.

approximately 43 million patient safety incidents occur annually.¹ Little can be accomplished if a patient feels or is unsafe when receiving medical treatment at healthcare facilities.² Thus, ensuring patient safety requires tremendous efforts from every member of a healthcare team.

The patient safety movement hit a milestone after the Institute of Medicine.³ Since then, patient safety has been at the forefront of healthcare. In Malaysia, for example, the Ministry of Health (MOH) formed the Patient Safety Council of Malaysia in January 2003 to ensure that people receive safe healthcare. Malaysia Patient Safety Goals were then introduced on 24 June 2013, outlining 13 essential areas in patient safety, with specific goals and targets. Since then, multiple programmes and efforts have been organised at both national and state levels to improve the awareness of healthcare staff regarding patient safety.

In the interest of patient safety, numerous studies have examined the causes of medical malpractices. Over the years, healthcare organisations' approaches to errors have shifted from person centred to system centred. The system-centred approach focuses on working conditions, rather than



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individual mistakes.⁴ Further, the WHO Patient Safety Methods and Measures Working Group identified the need to understand a range of human factors such as managerial, team and individual characteristics that influence healthcare staff behaviour concerning patient safety. A WHO report identified safety culture as one of the 10 key human factors relevant to patient safety.⁵ Safety culture is defined as 'the product of individual and group values, attitudes, perceptions, competencies, and patterns of behaviour that determine the commitment to, and the style and proficiency of an organisation's health and safety management. Organisations with a positive safety culture are characterised by communications founded on mutual trust, by shared perceptions of the importance of safety and by confidence in the efficacy of preventive measures'.⁶ It influences the typical behaviours of workers in a particular ward or unit and determines the accepted practices within an organisation. Thus, evaluating the safety attitude and understanding the components and influencers of safety culture is important to develop strategies for creating a culture committed to providing patients with the safest possible care. Furthermore, reported patient safety-related incidents have increased over the years. In Malaysia, patient safety-related incidents such as medication errors, transfusion errors and patient falls have increased since 2014.⁷ An outpatient geriatric pharmacy reported 20 cases of medication errors daily, costing approximately RM111 924 per year. This increasing trend in medical malpractices raises concern, as it indicates that our healthcare facilities may not be safe for patients. It also has the potential to lead to medicolegal repercussions, which would tarnish the reputation of the MOH Malaysia and create a financial burden on the patients and the ministry.

Nevertheless, there remains a lack of published investigations of the level of patient safety culture among healthcare professionals in Malaysia. Few studies were conducted to assess the perception of different categories of healthcare professionals in Malaysia using different instruments and at a different setting.^{8–12} However, no study to date has assessed the patient safety culture in a cluster hospital setting in Malaysia. Therefore, it is crucial to evaluate the safety culture level among healthcare professionals and identify the associated factors.

The present study was conducted at a cluster hospital in the state of Kedah, Malaysia. A cluster hospital is defined as a group of hospitals in the same geographical

location within a state that collaborate and operate as one organisation; it is an MOH Malaysia initiative aimed at transforming healthcare service delivery in the country. Additionally, it has been recognised as a Government Transformation Program, a high-impact initiative by the Public Service Department, and one of the top 10 priorities of the MOH Plan of Action (2016–2020). The objective of the cluster hospital is to optimise resource utilisation. The hospitals collaborate and have an aligned flow of patients and services. A typical cluster hospital consists of a lead hospital (LH), which is usually a state hospital or major specialist hospital. Non-LHs (NLH) are typically the district non-specialist hospitals that provide specialist services based on the cluster hospital concept.

Thus, this study's main objective was to assess the baseline level and mean score of every domain of patient safety culture among healthcare professionals at a cluster hospital and identify the determinants associated with patient safety culture.

METHODS

Study design and sampling

This cross-sectional study was conducted at a cluster hospital consisting of a state hospital and two district hospitals in Malaysia. As all three hospitals are public hospitals, they implement similar patient safety practices and policies. Data were collected from December 2019 to February 2020. All doctors, pharmacists, nurses and assistant medical officers who were involved directly with patient care processes and who had been working at the hospitals for at least 4 weeks were included in the study. Those who worked in management and who were on a long leave were excluded from the study. Each hospital is detailed in [table 1](#).

The samples were selected through proportionate stratified random sampling to ensure that, throughout the population, the sample size selected from each subgroup was proportional to the size of that subgroup. The same sampling method was used to determine how many representatives from each professional category would be selected. The sample size required, which was calculated using StatCalc Epi Info V.7.2, was 778 at 95% CI and with 80% power. However, considering a dropout rate of 20%, the final sample size required was 934.

Table 1 Characteristics of LH and NLH

Parameter	LH	NLH1	NLH2
Type of hospital	State, specialist hospital	District, non-specialist hospital	District, non-specialist hospital
Beds (n)	1108	91	80
Healthcare professionals (n)	2799	184	159

LH, lead hospital; NLH1, non-lead hospital 1; NLH2, non-lead hospital 2.

Measures

One of the ubiquitously used tools for measuring patient safety culture in healthcare is the Safety Attitude Questionnaire (SAQ), which has been adapted for various clinical settings such as intensive care units, general inpatient settings, emergency services, operation theatres and pharmacies. Here, we used both English and Malay versions of the SAQ. The Malay version has been validated in the Malaysian healthcare setting,⁸ with good construct validity and internal consistency.¹³

The SAQ comprises 36 items for assessing six safety culture domains: teamwork climate (items 1–6), safety climate (items 7–13), job satisfaction (items 15–19), stress recognition (items 20–23), perceptions of management (items 24–28) and working conditions (items 29–32). Items 14 and 33–36 are not among the above-mentioned scales. All items are closed-ended questions, and respondents are required to indicate their agreement level on a 5-point Likert scale ranging from 1 (disagree strongly) to 5 (agree strongly). The respondents' demographic information such as age, gender, race, profession, education level, current working hospital and unit, length of service and working hours per week was obtained as well. Information on patient safety training and the incident reporting system in the organisation was also added to the questionnaire to assess the factors affecting patient safety culture levels among healthcare professionals. The questionnaire was distributed physically to the respondents during respondents' continuing medical education session. One of the researchers worked in one of the hospitals and was in charge of the other two hospitals.

Data were analysed using SPSS V.21, and the respondents' demographic characteristics and patient safety culture level were determined using univariate analysis. Before the analysis, three negatively worded items (items 2, 11 and 36) in the SAQ were reversed. Each item's score was calculated by converting the 5-point Likert scale into a 100-point scale: 1=0, 2=25, 3=50, 4=75 and 5=100. Each item's score within the same dimension was summed and divided by the number of items available for that dimension to obtain a score of 0–100. If a respondent's mean score was ≥ 75 , they had a positive safety culture for a given dimension. The respondent's overall score for the patient safety culture level was calculated using the same method.

The differences between two independent groups of normally distributed numerical data were analysed using an independent t-test and the association between two sets of categorical data was examined using Pearson's χ^2 test for independence. Multiple logistic regression was used to examine the association between risk factors and two outcome categories. All probability values were two sided, and a level of significance of $p < 0.05$ was considered as statistically significant. Finally, the model fitness was tested using the Hosmer-Lemeshow test and classification table.

Patient and public involvement

Patients or the public were not involved in the design, or conduct, or reporting, or dissemination plans of our research.

RESULTS

After 2000 questionnaires were distributed to the healthcare professionals who met the inclusion criteria, 1814 completed questionnaires were returned, resulting in an overall response rate of 90.7%.

Descriptive analysis

Demographic characteristics

Table 2 shows the respondents' general demographic characteristics. Most respondents were female and Malay, with a mean age of 34.29 years. The majority were from the non-doctor group, diploma holders and had been working at their current departments or units for approximately 5 years. Most respondents (95.6%) agreed that patient safety training was available at their organisation, and 81% had attended such programmes at least once. More than half of the respondents felt that the incident reporting system was punitive.

Patient safety culture score

The patient safety culture scores among the respondents are shown in table 3. Overall, less than a quarter of the respondents (23.9%) had a positive patient safety culture. Notably, more than half of the respondents had a negative attitude for most of the dimensions tested, except for job satisfaction. NLH respondents had a higher percentage of positive responses for the overall patient safety culture, compared with LH respondents.

The mean scores for each patient safety culture dimension are presented in table 4. The cluster hospital's overall mean score was 67.82, and the LH and NLH had comparable mean scores. The job satisfaction dimension had the highest mean score (76.54), followed by safety climate (69.36), teamwork climate (69.18), perception of management (64.87), stress recognition (62.80) and working condition (62.27). The NLH had higher mean scores than the LH for most dimensions, except stress recognition and working condition.

Bivariate analysis

Table 5 shows the result of the analysis to determine the associated factors for the patient safety culture among healthcare professionals in a cluster hospital. Overall, a significant association was noted between patient safety culture level and race ($p=0.004$), profession ($p < 0.05$), education level ($p < 0.001$), current working hospital ($p=0.044$), current department or unit ($p < 0.001$) and working hours per week ($p=0.0001$). There was also a significant association between patient safety culture score and patient safety-related questions.

Multivariate analysis

Multiple logistic regression was conducted to identify a model of the predictive factors associated with a positive

Table 2 Respondents' characteristics and patient safety activities

Demographic characteristics	Overall	
	(n=1800)	%
Age; mean (SD), median	34.29 (7.223), 33.00	
Gender		
Male	373	20.7
Female	1427	79.3
Race		
Malay	1567	87.1
Non-Malay	233	12.9
Profession		
Doctor	479	26.6
Non-doctor	1321	73.4
Education level		
Diploma	1189	66.1
Degree and above	611	33.9
Current working hospital		
Lead hospital	1532	85.1
Non-lead hospital	268	14.9
Location of work/department		
Medical based	549	30.5
Surgical based	589	32.7
Others	662	36.8
Length of service; mean (SD), median	63.65 (61.266), 48.00	
Working hours per week		
≤48	1258	69.9
>48	542	30.1
Availability of training on patient safety		
Yes	1720	95.6
No	80	4.4
Participation in patient safety programme or training		
Yes	1458	81
No	342	19
The overall perception of the incident reporting system		
Good	1619	89.9
Poor	181	10.1
The incident reporting system is punitive		
Yes	1128	62.7
No	672	37.3
Learnt something from the incidence reported (instructive incident reporting system)		
Yes	1707	94.8

Continued

Table 2 Continued

Demographic characteristics	Overall	
	(n=1800)	%
No	93	5.2
Will report patient safety incidents to the higher authority		
Yes	1750	97.2
No	50	2.8

n=frequency.

patient safety culture (table 6). The factors included in the model and that were significantly associated with positive patient safety culture were age, gender, education level, working department/unit, participation in patient safety training, good perception of incident reporting and learning systems, and non-blaming and instructive incident reporting systems in the organisation. The model fitness was tested using the Hosmer-Lemeshow test ($p=0.788$) and the classification table (76.5%). Nagelkerke's R^2 showed that this logistic model explained 11.4% of the variation in the outcome variable.

DISCUSSION

The response rate of the present study is 90.7%; thus, it is considered good and positive compared with that of previous local studies that used the same instrument, which was 58.0%–83%.^{8 11 12 14} Further, other local studies have used tools other than the SAQ, and recorded lower response rates (ie, 78%–81%), compared with that of the present study.^{9 15} Furthermore, the response rate in our study was higher compared with international benchmarking data in the USA, UK and New Zealand, which was 65.7%–72.2%,¹⁶ and other studies conducted across the world.^{17–20} The greater response rate in our study may be potential because this is the first study on patient safety conducted in our cluster hospital community; therefore, most departments were interested in participating. The high response rate could also be an obvious indication of employee commitment and dedication to quality issues, all of which signify responsible conduct. Further, the administered questionnaire has positive features, which makes it more user-friendly, compared with other tools. Among those features are self-administered questionnaires with clear terms and limited number of items that only require a short time for respondents to complete.

At our cluster hospital, the respondents lacked a patient safety culture, far below the international benchmarking standard, which is appropriately 60%,¹⁶ and that of other previous international studies.^{17 21–25} However, compared with previous local studies, we recorded a higher percentage of positive responses than Sarifulnizam *et al*.¹² and comparable responses to Samsuri *et al*.⁸ We noted that the NLH had a greater proportion

Table 3 Patient safety culture levels among healthcare professionals

Patient safety culture score by domain	Overall		LH		NLH	
	(n=1800)	%	(n=1532)	%	(n=268)	%
Teamwork climate						
Negative	1133	62.9	975	63.6	158	59.0
Positive	667	37.1	557	36.4	110	41.0
Safety climate						
Negative	1149	63.8	1000	65.3	149	55.6
Positive	651	36.2	532	34.7	119	44.4
Job satisfaction						
Negative	594	33.0	518	33.8	76	28.4
Positive	1206	67.0	1014	66.2	192	71.6
Stress recognition						
Negative	1049	58.3	864	56.4	185	69.0
Positive	751	41.7	668	43.6	83	31.0
Perceptions of management						
Negative	1279	71.1	1099	71.7	180	67.2
Positive	521	28.9	433	28.3	88	32.8
Working conditions						
Negative	1389	77.2	1165	76.0	224	83.6
Positive	411	22.8	367	24.0	44	16.4
Overall safety culture						
Negative	1370	76.1	1179	77.0	191	71.3
Positive	430	23.9	353	23.0	77	28.7

n=frequency.
LH, lead hospital; NLH, non-lead hospital.

of respondents with a positive patient safety culture. This finding correlates with Samsuri *et al*⁸, who found that respondents in smaller institutions had a more positive safety culture than those working in hospitals. Other studies have also stated that smaller institutions tend to have a better safety culture compared with large

institutions.²⁶ The reason could be that small institutions, such as NLH, have more similar environments and smaller work communities, whereby workers are more likely to hold and share the same climate. Only the job satisfaction dimension had a high percentage of positive responses (>60%), similar to other previous local

Table 4 Mean scores of patient safety culture by dimension

Patient safety culture domains	Overall		LH		NLH	
	Mean (SD)	Positive response (≥75) (%)	Mean (SD)	Positive response (≥75) (%)	Mean (SD)	Positive response (≥75) (%)
Teamwork climate	69.18 (12.83)	37.1	69.03 (12.84)	36.4	70.08 (12.75)	41.0
Safety climate	69.36 (12.55)	36.2	69.03 (12.42)	34.7	71.25 (13.17)	44.4
Job satisfaction	76.54 (17.77)	67.0	76.27 (17.90)	66.2	78.10 (16.96)	71.6
Stress recognition	62.80 (24.68)	41.7	63.70 (24.41)	43.6	57.65 (25.58)	31.0
Perception of management	64.87 (16.24)	28.9	64.68 (16.26)	28.3	65.93 (16.13)	32.8
Working condition	62.27 (12.64)	22.8	62.57 (12.73)	24.0	60.56 (11.97)	16.4
Overall safety culture	67.82 (10.53)	23.9	67.80 (10.53)	23.0	67.90 (10.54)	28.7

LH, lead hospital; NLH, non-lead hospital.

Table 5 Factors associated with patient safety culture

Variable	Patient safety culture		P value
	Negative n (%)	Positive n (%)	
Age: median (IQR)	32.00 (10.0)	35.00 (11.0)	<0.05
Gender			
Male	281 (75.3)	92 (24.7)	0.693
Female	1089 (76.3)	338 (23.7)	
Race			
Malay	1175 (75.0)	392 (25.0)	0.004
Non-Malay	195 (83.7)	38 (16.3)	
Profession			
Doctor	405 (84.6)	74 (15.4)	<0.05
Non-doctor	965 (73.1)	356 (26.9)	
Education level			
Diploma	843 (70.9)	346 (29.1)	<0.001
Degree and above	527 (86.3)	84 (13.7)	
Current working hospital			
LH	1179 (77.0)	353 (23.0)	0.044
NLH	191 (71.3)	77 (28.7)	
Location of work/department			
Medical	406 (74.0)	143 (26.0)	<0.001
Surgical	411 (69.8)	178 (30.2)	
Others	553 (83.5)	109 (16.5)	
Length of service; median (IQR)	48.00 (85.0)	50.50 (91.0)	0.069
Working hours per week			
≤48	926 (73.6)	332 (26.4)	0.0001
>48	444 (81.9)	98 (18.1)	
Availability of training on patient safety			
Yes	1296 (75.3)	424 (24.7)	0.0004
No	74 (92.5)	6 (7.5)	
Participation in patient safety programme or training			
Yes	1074 (73.7)	384 (26.3)	<0.05
No	296 (86.5)	46 (13.5)	
The overall perception of the incident reporting system			
Good	1209 (74.7)	410 (25.3)	<0.05
Poor	161 (89.0)	20 (11.0)	
The incident reporting system is punitive			
Yes	862 (76.4)	266 (23.6)	0.692
No	508 (75.6)	164 (24.4)	
Learnt something from the incidence reported (instructive incident reporting system)			
Yes	1283 (75.2)	424 (24.8)	0.0001
No	87 (93.5)	6 (6.5)	
Will report patient safety incidents to the higher authority			
Yes	1325 (75.7)	425 (24.3)	0.019

Continued

Table 5 Continued

Variable	Patient safety culture		P value
	Negative n (%)	Positive n (%)	
No	45 (90.0)	5 (10.0)	

LH, lead hospital; NLH, non-lead hospital.

studies.^{11 12} The other five dimensions showed low positive responses between 22% and 41%.

In the present study, the overall mean score was slightly higher than that of a study conducted among pharmacists in Melaka (67.82 vs 65.6). Five out of six dimensions had higher mean scores compared with those recorded by Samsuri *et al*⁸; in increasing score order, they were working condition (62.27 vs 54.8), perception of management (64.87 vs 62.20), teamwork climate (69.18 vs 67.6), safety climate (69.36 vs 66.8) and job satisfaction (76.54 vs 67.3). Compared with international benchmarking data, safety climate, job satisfaction, perception of management and working condition dimensions had higher

mean scores, while the teamwork climate mean score was comparable to the benchmarking data.¹⁶

In the study, the stress recognition dimension had a lower mean score compared with international benchmarking data by Sexton *et al* (62.80 vs 65.90), other international studies^{16 22 23} and the local research by Samsuri *et al*.⁸ The stress recognition dimension is defined as an acknowledgement of how stressors influence performance; a lower score means that the surveyed staff members have relatively low recognition of the performance consequences of stress and fatigue. This sense of invulnerability can also be observed in several other professions such as in the aviation industry, and appears to

Table 6 Multiple logistic regression

Variable	Overall safety culture			
	Wald	Adj OR	95% CI	P value
Age; median (IQR)	13.046	1.03	1.02 to 1.05	<0.001
Gender				0.001
Male	11.896	1.67	1.25 to 2.24	
Female		1.00		
Education level				<0.001
Diploma	35.547	2.51	1.85 to 3.34	
Degree and above		1.00		
Location of work/department				<0.001
Medical based	7.136	1.49	1.11 to 2.00	
Surgical based	23.059	2.02	1.51 to 2.68	
Others		1.00		
Participation in patient safety programme or training				0.007
Yes	7.321	1.64	1.15 to 2.34	
No		1.00		
The overall perception of the incident reporting system				0.038
Good	4.303	1.71	1.03 to 2.83	
Poor		1.00		
The incident reporting system is punitive				0.013
Yes		1.00		
No	6.107	1.36	1.07 to 1.73	
Learnt something from the incidence reported (instructive incident reporting system)				0.007
Yes	7.405	3.31	1.40 to 7.85	
No		1.00		

be more prevalent in healthcare settings.^{27 28} Our results showing that medical workers do not fully understand the impact of stress and exhaustion mirror the findings of others,^{10 18} as they are too accustomed to busy work schedules and heavy workloads. Therefore, staff members should admit that stress, high workload and sleep deprivation are among the causes of reduced job performance and increased risk of medical malpractices.

Although higher than the international benchmarking scores, the mean score of the working condition dimension reported in our study was the lowest among the six dimensions examined. This finding is similar to that of some studies.^{8 12 22 27} The mean score and positive response rate were lowest in the NLH, compared with the LH. This finding reflects employees' frustration with work environment quality and logistic support such as staffing and equipment. Further analysis of the items under this dimension revealed that most respondents from both the LH and NLH disagreed with the statement 'the level of staffing in this clinical area is sufficient to handle the number of patients'. This finding is expected from respondents in the LH, which is a state tertiary hospital with a high workload. However, the NLH respondents also indicated insufficient levels of staffing at their hospitals. This observation may be because although the NLH is a non-specialist district hospital, the workload has risen following the extension of specialist services to the NLH after the cluster hospital model was introduced; however, the number of staff remained the same. Lack of staff, increased patient volume, expansion of clinical services and higher expectations from other healthcare professionals may have contributed to the increased workload, which could jeopardise patient safety.

The job satisfaction dimension had the highest positive response rate among all dimensions in the SAQ, despite most staff being dissatisfied with their working conditions. Our finding is congruent with that of local studies conducted at a teaching hospital and at public hospitals.^{11 12} Here, 67.0% of the respondents had a positive response (score >75%) for this dimension, which is higher than that reported in local studies^{8 11} as well as international benchmarking data,^{16 29} where the positive response rate was 46.2%–62.7%. Our finding is also consistent with other previous studies.^{18 23} Job satisfaction positivity indicates that most of the cluster hospital staff, especially the NLH staff, are relatively pleased with their jobs and that they have positive work experiences. This finding is based on the high percentage of participants who answered positively for the item 'I like my job' (82.6%), the highest scored item in the SAQ. The value of job satisfaction cannot be overlooked because it is imperative that it increases workers' enthusiasm and enhances work efficiency and quality, indirectly improving patient safety. Those with higher job satisfaction would more likely be actively involved in accepting and implementing future quality enhancement strategies.

Our study also reveals that teamwork climate and safety climate had the second highest mean scores

after the job satisfaction dimension, with 37.1% and 36.2% positive responses, respectively, which is similar to other studies.^{8 10 16 30} Two items scored lowest under these dimensions: the respondents perceived difficulty in reporting problems with patient care, and it was also difficult to discuss errors in their clinical area, indicating that the existing culture in that area was unreliable and discouraging towards a patient safety culture and incident reporting. Experts state that the influence of teamwork should not be underestimated.³¹ Many studies have shown that teamwork can dramatically enhance patient outcomes and reduce preventable errors.^{32 33} In the current dynamic medical climate, healthcare professionals have recognised the value of knowledge and complementary skills. However, mutual confidence and two-way communication capabilities between team members should be strengthened. A survey also concluded that the principal characteristics of a safety culture are teamwork within the unit and honest and open communication among healthcare professionals and with patients.³⁴ Thus, improvements should be made to encourage staff to communicate, particularly when patient care and safety are concerned.

The predictive factors identified as significantly associated with positive patient safety culture are similar for most studies. Those working in surgery-based and medical-based departments were more likely to have a positive patient safety culture, relative to other categories. The findings may be linked to their working environment, which may cause them to perceive safety issues differently. Other departments may not consider some of these issues as relevant.²¹ Those in surgery-based departments deal with surgical procedures; thus, they are more susceptible to patient safety concerns, as they could face medicolegal implications for an error or incident such as incorrect surgery and retained foreign bodies such as gauze.

Patient safety-related training and education were identified as other important factors in achieving improved patient safety.³⁵ This finding is congruent with a study conducted in Kuwait, which found that the perception of patient safety culture decreased among those who did not attend patient safety courses or lectures.^{21 36} Further, healthcare professionals who did not receive any information about patient safety, either during their initial professional education or throughout their professions, had more negative attitudes to most of the dimensions of patient safety, compared with those who had received the information. A study that examined the effect of training on nurses' attitudes towards patient safety found that training had a significant positive impact on nurses' safety attitudes, particularly on the perception of management, job satisfaction and safety climate dimensions.³⁷ Our finding is also in line with that of other studies.^{38 39}

Consequently, we may conclude that patient safety education is vital in healthcare professionals' patient safety attitudes. Organisational learning and continuous development such as staff training are reported as strengths

due to the capacity of healthcare organisations to create a knowledge-enhancing environment for learning. Realising the importance of training, the MOH Patient Safety Unit has incorporated a patient safety training module for house officers during their orientation programmes before they begin their graduate training. The course, which is inspired by the WHO Multi-professional Curriculum Guide, is intended to provide house officers with relevant exposure and information to enhance patient safety. For the other healthcare professional categories, our cluster hospital has developed an initiative to conduct multiple courses regularly to ensure continuous awareness and updated patient safety knowledge.

Incident reporting, root causes and risk analyses were also identified as the most critical factors for achieving positive patient safety culture. Our study shows a significant association between the incident reporting system and positive patient safety culture. The association between a non-punitive reporting system and patient safety culture is in line with most studies on patient safety factors.^{35 38–42} Most studies also mention a lower response towards non-punitive responses to error.^{36 41 43} Such findings indicate that a blame-and-shame culture in the workplace hinders accountability and causes workers to feel insecure and become prone to hiding their shortcomings, rather than sharing their concerns related to patient safety. Working in such an atmosphere would hinder learning from mistakes; individuals would only be criticised and punished while system errors are overlooked.

Another study conducted in Beijing found that effective safety culture had not been achieved, as the incidents reported did not receive useful feedback, and openly discussing errors and incidents in the department was not encouraged.¹⁸ This situation is similar to that of our study, in which 36.0% of respondents agreed that discussing errors in their clinical areas was challenging. However, most of our respondents agreed that they learnt from the incidents reported. This was achieved by ensuring that staff members were informed about the incidents or errors and advised on the changes implemented. The practices and guidelines for preventing errors were also reviewed appropriately. Healthcare organisations should use incident reporting to strengthen patient safety culture and improve service quality. This can transform an organisation's existing blame culture from one where an error is viewed as a personal failure to one where errors are considered potential areas for improvement.

The COVID-19 pandemic has severely affected the world since 2020, imposing extraordinary burdens and challenges on the medical system and healthcare workers worldwide. Healthcare workers have had to deal with the uncertainties of the diagnosis and management of this unknown emergent disease, unfamiliarity with new job scopes resulting from redeployment and changes in care delivery models, and increased workload, which all contribute to stress.⁴⁴ Working in such demanding conditions impairs the capacity of hospital staff to provide safe and effective treatment, magnifies weariness and

contributes to poor patient safety.⁴⁵ During this time of crisis, the quality of care for patients without COVID-19 was also greatly affected, mostly as the consequence of medical staff being redeployed to attend to the rapid surge of COVID-19 cases. A study on the impact of the COVID-19 pandemic on safety culture reported decreased SAQ scores among nurses compared with before pandemic era.⁴⁶ Incident reporting, which is one of the important factors in achieving a positive patient safety culture, was also reduced significantly during the COVID-19 pandemic.⁴⁶

It is noteworthy that the multivariate analysis model developed in the present study only explained 11.4% of the variance in the positive patient safety culture (Nagelkerke's $R^2=0.114$, $p<0.001$). Our finding is similar to that of Alqattan *et al.*,³⁶ but the variance is lower than that of other studies.^{39 47} Perhaps the R^2 could have been increased if we had included more predicted variables in this study. Several factors in previous studies with high R^2 are worth considering for inclusion in our study. The most common factor is the number of events reported by the respondents.^{8 41 43 47} The details regarding the implementation of an incident reporting system are also crucial.^{26 39 47 48} It is also beneficial to obtain input on whether staff are exposed to information on patient safety during their initial education.²¹

Limitations

Few limitations were noted in this study. First, our study's data were only collected from a cluster hospital; our state has two other cluster hospitals located in the central and southern regions of Kedah. However, we consider that our study's findings provide a reasonably representative view of the patient safety culture that can be expected in the other two cluster hospitals in Kedah, as their settings were identical to those in our cluster. Another drawback is that we did not explore the connection between patient safety culture and the number of events reported by respondents and the patient outcome. Further research is required to identify the complicated relationship between patient safety culture and incident reporting system, the number of reporting, patient outcome and how the data produced can be translated into action and learning points. The findings are crucial and can guide us in interventions and improvements to create a safe healthcare system and reduce adverse medical outcomes.

The use of a questionnaire to evaluate safety culture or a particular safety environment plays an essential role in planning the evaluation of an institution's safety culture. Although a useful tool, SAQ has its limitation; it assesses staff's beliefs regarding the safety culture, rather than their real safety behaviour.³⁰ Notably, SAQ tests the current attitude regarding patient safety; however, there may be differences between attitudes and actual practice. Therefore, to explore the dimensions that influence patient safety in more detail, SAQ should be combined with qualitative methods such as peer observation, group discussions, analysis of organisation's incident history and

audits of the safety management system.^{27 36 49} A wide gap in research remains regarding how data obtained from different methods are related and how to combine them to get a complete safety culture view. Despite these limitations, we believe this research offers useful insight into our organisations' baseline patient safety culture.

CONCLUSIONS

Overall, only a minority of the healthcare professionals at our cluster hospital have a positive patient safety culture (SAQ score $\geq 75\%$), which is far below the international benchmarking standard. Attention should be paid to most of the safety culture dimensions: working condition, perception of management, safety climate, team-work climate and stress recognition. Although the mean scores of the dimensions were mostly higher than the international standards, no dimension reached the 75% minimum score to be recognised as an area of strength. The significant findings include employees' frustration with work environment quality and logistics, particularly staffing levels in the clinical area. There is also much room for improvement in communication regarding patient safety issues and errors, indicating that the organisation's existing culture is not reliable and encouraging towards patient safety culture and incident reporting. Staff were also overly accustomed to busy work schedules and heavy workloads; thus, they did not recognise the impact of stress on their work performance and patient safety. Staff members should admit that stress, high workload and sleep deprivation are among the causes of reduced job performance and increased risk of medical malpractices. Despite that, most respondents expressed satisfaction with their job; this presents an opportunity, as those with higher job satisfaction are more likely to be actively involved in accepting and implementing future quality enhancement strategies.

Meanwhile, management commitment towards patient safety improvement activities is vital in nurturing healthcare professionals' positive culture. Patient safety training and the incident reporting system are two critical factors that should be emphasised to improve patient safety culture. Organisations should consider and implement a non-punitive and instructive incident reporting system as an instrument that can strengthen the patient safety culture.

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