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Comparative Analysis of Patient Safety Culture Among Trained and Untrained Staff at the Educational Dental and Oral Hospital in Semarang: Cross-Sectional Study

Retno Kusniati[1]*, Etny Dyah Harniati[2], Yasinia Annisa Purbomurti[3]
[1]Department of Public Dental Health Sciences, Faculty of Dentistry, Universitas Muhammadiyah Semarang, Jawa Tengah, Indonesia
[2]Department of Dental Materials, Faculty of Dentistry, Universitas Muhammadiyah Semarang, Jawa Tengah, Indonesia
[3]Department of Oral Biology Faculty of Dentistry, Universitas Muhammadiyah Semarang, Jawa Tengah, Indonesia

***Corresponding Author: E-mail:** drg.retno@unimus.ac.id

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ABSTRACT

Introduction: Patient safety (PS) is crucial to healthcare services, including in dental practice. A good patient safety culture can reduce adverse events and improve the quality of care. Patient safety training is one strategy to improve safety culture. However, there are still gaps in the implementation of patient safety culture (PSC). This study aims to analyze the differences in patient safety culture between staff who have received patient safety training and those who have not.

Methods: This study was cross-sectional using the Hospital Survey on Patient Safety Culture (HSOPSC) questionnaire. Participants were staff at the Dental and Oral Hospital of the University of Muhammadiyah Semarang who met the inclusion criteria. Data were collected for two weeks, and statistical analysis was performed using the Mann-Whitney test to compare differences in patient safety culture between groups that had received training and those that had not.

Results: Of the 12 dimensions of patient safety culture, teamwork within the unit (89.6 %) and organizational learning–continuous improvement (85.8%) had the highest positive response rates. In contrast, the dimensions of staffing (35.4 %) and openness of communication (36.2%) recorded the lowest positive responses. Staff who had attended patient safety training showed a higher positive response than those who had not, but the results of the difference in mean scores with 95% confidence intervals (CI) proved to be statistically insignificant ($p = 0.563$).

Conclusion: Patient safety training increased the perception of safety culture, although there was no significant difference in scores between staff who had and had not attended training. A supportive work environment and good teamwork are essential in shaping a patient safety culture. Hospitals should consider strategies to increase staffing so that they are not working in “crisis mode” to maintain patient safety and to support the Indonesian Ministry of Health and WHO Patient Safety Action Plan.

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INTRODUCTION

Patient safety is defined as "a framework of organized activities that creates a culture, processes, procedures, behaviors, technologies, and environments in health care that consistently and sustainably reduce risks, reduce the occurrence of avoidable harms, make errors less likely to occur, and reduce their impact when they do occur" (1). During dental treatment common incidents include aspiration or ingestion of materials, incorrectly performed procedures or procedures performed in the wrong location, hard tissue damage, and soft tissue damage (2). Other studies report that dental medical errors can include errors in diagnosis, treatment planning, surgical procedures, medication administration, or other aspects of providing dental care (3). Dental practitioners have an ethical obligation to guarantee that their patients receive quality care. Higher-quality patient care, fewer clinical issues, fewer litigation, and increased legal security for dental practitioners are all linked to improved patient safety (4).

Nonetheless, the culture of safety and patient safety management in dentistry practices is not well established. Evidence of patient safety occurrences in dentistry practices supports hospitals' efforts to provide high-quality and safe healthcare services. Dental hospitals need to enhance their patient safety culture and quality as a hospital (5). Only 28% of respondents had reported at least one adverse incident, despite 58% of them knowing the process for doing so, according to earlier research conducted in a French university dentistry hospital. (6). Most people refuse to admit that there is a problem because of a "blame and shame" culture where failure results in moral and social punishment (7).

More than 3 million people die from unsafe care every year worldwide, and up to 4 out of 100 people die from hazardous care in developing nations (8,9). A weak safety culture has been identified as one of the causes of unsafe patient care (10). Adverse events are common in primary dental care and are significantly linked to dimensions of patient safety culture. Specifically, a stronger perception of patient safety and quality, along with improved work processes and standardization, serves as protective factors against adverse events (11). A positive patient safety culture is an essential part of healthcare quality management because it improves patient attitudes and perceptions of safety at the individual level, lowers the frequency of adverse events, and increases the overall safety of the healthcare delivery system. Previous studies stated that hospitals in Semarang already have socialization programs on patient safety but are not frequent and the intensity is rare (12). Patient safety training is effective because it is related to knowledge, attitudes and skills that are prerequisites for better performance and problem solving in clinical settings (13). This training activates systemic thinking and increases their involvement and teamwork (14). PS education has a positive impact on attitudes towards PS because subjects are involved in clinical settings over time and the subject's experience of PS increases gradually (15). Furthermore, previous studies reported that attitudes towards PS changed after educational interventions, so this is an important issue for patients (14,16).

Hospital staff should be trained to develop patient safety and risk management skills to develop their patient safety competency (17). Innovation in patient safety competency education and evaluation has been recommended to improve patient safety among hospital healthcare workers (18,19). Although the importance of patient safety training has been recognized for more than ten years, it is still underutilized and underappreciated in most countries (20). Lack of leadership to embrace new patient safety content, funding and providing training are challenges in patient safety implementation (21). This study aims to investigate Patient Safety Culture among staff who have received patient safety training compared to those who have not and to prove whether the trained staff showed significantly higher positive response to patient safety. Evaluation results at four time points showed that participants' safety knowledge and competency increased significantly after the training program ($p < 0.001$). The training effectively improved patient safety competency in the long term (13). Another study revealed that trainers and trainees prioritized patient safety (22).

METHOD

Research Design

This study is a cross-sectional study using the Hospital Survey on Patient Safety Culture (HSOPSC) developed by the Agency for Health Research and Quality (AHRQ) to assess patient safety culture among staff at the dental and oral hospital of Muhammadiyah University of Semarang.

Participants

All employees from every department in Muhammadiyah University of Semarang's dental and oral hospital are part of the target group. The following requirements must be fulfilled by participants: (1) a person who has been employed for the last month prior to the study's execution, and (2) a willing participant throughout the data gathering phase. Staff members who declined to participate, however, were excluded. 66.3% of respondents were screened based on inclusion and exclusion criteria so that 65 questionnaires were distributed to the staff.

Instrument

The research instrument used in this study was the Hospital Survey on Patient Safety Culture (HSOPSC) questionnaire (23). The questionnaire was published by an agency that has repeatedly used this survey instrument in United States hospitals to compile data and publish annual reports on the status of patient safety culture (23). In addition, several researchers have reported the application of this questionnaire in healthcare settings from several countries around the world (24–31). The survey questionnaire has been translated and adapted from English into bahasa. Native English speakers with no medical background and unaware of the original version performed the back translation fluently. Active English speaker with a medical background reviewed the translated version to ensureit reflected the sameitem content as the original version. Validity test was measured using r value while Cronbach's alpha was used to test reliability. All statistical analysis used SPSS 25.

HSOPSC contains 42 items, including favourable and unfavourable questions. Teamwork within units, staffing, organizational learning–continuous improvement, non-punitive response to error, supervisor/manager expectations and actions promoting patient safety, management/supervisors' support for patient safety, teamwork across units, handoffs and transitions, overall perception of patient safety, feedback and communication about error, communication openness, and frequency of reported events are among the 12 dimensions that make up HSOPSC. The items have response choices based on a five-point Likert scale from "strongly disagree" to "strongly agree" or "never" to "always. Respondents' answers to favourable statements stating that they agree/strongly agree or always/often offer are chopped into positive responses, while respondents' answers stating that they disagree/strongly disagree or rarely/never offer are chopped into negative responses, and vice versa for unfavourable statements. The first section of the instrument includes sociodemographic variables like age, gender, and others.

Data Collection Procedures

The HSOPSC was distributed to a single point of contact in several units or departments accessible to respondents at the beginning of their workday. The survey distribution was accompanied by a supporting cover letter that guided respondents on completing and returning the survey and a consent form. Furthermore, the cover letter requested respondents to complete the survey within three days (29). The unit head acts as a reminder and coordinates the filling out of the questionnaire. Each survey questionnaire was assigned a unique tracking ID code to track unreturned questionnaires and other staff members who may not have received the survey. All data collection activities were completed within 2 weeks. The collected questionnaires were rechecked for errors and completeness. A score ranging from 5 to 1 was given based on the responses given by the respondents (positive or negative); the more positive, the higher the score.

Data Analysis

Descriptive statistics (percentages and frequencies) were used to describe respondents' demographic background, job-related characteristics, and the level of patient safety culture. A p-value of 0.05 was used as the level of statistical significance. The Mann-Whitney test was used to see if there were differences between groups because the results of the Kolmogorov Smirnov test show that the data distribution is not normal. The total patient safety score of 12 dimensions was used to analysed the differences between staff who had received training or not.

Ethical Approval

This study obtained ethical approval from the Health Research Ethics Committee of the Dental and Oral Hospital of the Muhammadiyah University of Semarang, ethics number 003/RSGM.KEPK/PE/2024 on October 8, 2024.

RESULTS

Female staff are more numerous. Most respondents are over 25 years old, and most have an education equivalent to a bachelor's degree. Health workers are more numerous than medical or dental students. Most staff work 8 hours or more, many work in 2 work shifts, and many have direct contact with patients (Table 1).

Table 1. Demographic Characteristics

Characteristics	Trained (n=46)	Untrained (n=19)
Age		
≤25	14 (50)	14 (50)
>25	32 (86.5)	5 (13.5)
Gender		
Man	10 (76.9)	3 (23.1)
Woman	36 (69.2)	16 (30.8)
Level of education		
Diploma 3	12 (75)	4 (25)
Bachelor	19 (63.3)	11 (36.7)
Profession	6 (75)	2 (25)
Master	5 (71.4)	2 (28.6)
Specialist	3 (100)	0 (0)
PhD	1 (100)	0 (0)
Profession		
Medical	13 (86.7)	2 (13.3)
Health workers	24 (80)	6 (20)
Dental Student	8 (47.1)	9 (52.9)
Non-Health	1 (33.3)	2 (66.7)
Work unit		
Central Surgery	1 (100)	0 (0)
Pharmacy	3 (100)	0 (0)
Front Office	1 (50)	1 (50)
Nutrition	1 (50)	1 (50)
Emergency Room	8 (88.9)	1 (11.1)
Integration Clinic	8 (47.1)	9 (52.9)
Clinical Laboratory	2 (100)	0 (0)
Radiology	1 (100)	0 (0)
Inpatient	1 (100)	0 (0)
Outpatient	15 (71.4)	6 (28.6)
Medical records	5 (83.3)	1 (16.7)
Years of service (year)		
≤3	38 (70.4)	16 (29.6)
>3	8 (72.7)	3 (27.3)
Length of working (hour/day)		
≤8	43 (69.4)	19 (30.6)
>8	3 (100)	0 (0)
Shift		
1	15 (71.4)	6 (28.6)
2	27 (67.5)	13 (32.5)
3	4 (100)	0 (0)
Contact with patients		
Yes	40 67.8)	19 (32.2)
No	6 (100)	0 (0.0)

Source: Primary Data

Out of 12 dimensions of patient safety culture, 3 dimensions recorded relatively high positive response rates: teamwork within the unit (89.6%) and organizational learning–continuous improvement (85.8%). Regarding teamwork within the unit, the areas of strength were supporting and respecting each other. For organizational learning–continuous improvement, the areas of strength were actively doing things to improve patient safety and evaluating any changes to improve patient safety. The dimensions that recorded relatively low positive response rates were staffing (35.4%) and openness of communication (36.2%). Regarding staffing, many respondents stated that

they were working in "crisis mode," trying to do too much, too fast. Regarding openness of communication, some respondents were afraid to ask questions when something did not seem right. The results of observations during the study showed that medical personnel were responsible for direct exposure to operational pressure and the volume of patients coming for treatment and clinical care. In contrast, staff responsible for administration and management, although still affected by medical services, usually also experienced more coordinative or managerial pressure, not directly on the burden of patient services. More than half of the respondents had positive respons overall perception of patient safety (69.2%) (Table 2).

Table 2. Dimensions of Patient Safety Culture

Criteria	SD f (%)	D f (%)	N f (%)	A f (%)	SA f (%)	Percentage of positive response rate (%)	Average positive response (%)
Teamwork within units							
People in this unit support each other.	0 (0)	0 (0)	2 (3.1)	41 (63.1)	22 (33.8)	96.9	89.6
When one area of the unit is busy, another area helps out.	1 (1.5)	5 (7.7)	11 (16.9)	40 (61.5)	8 (12.3)	73.8	
When there is much work to be done quickly, we work together to get the job done.	0 (0)	1 (1.5)	5 (7.7)	35 (53.8)	24 (36.9)	90.7	
We respect each other	0 (0)	0 (0)	2 (3.1)	26 (40)	37 (56.9)	96.9	
Staffing							
RSGM has sufficient human resources so that the workload is not too heavy.	5 (7.7)	14 (21.5)	17 (26.2)	22 (33.8)	7 (10.8)	44.6	35.4
Staff in this unit work longer hours to provide patient care.	1 (1.5)	25 (38.5)	13 (20)	18 (27.7)	8 (12.3)	40	
We use the best agency/temporary staff to provide patient care.	2 (3.1)	17 (26.2)	13(20)	26 (40)	7 (10.8)	29.3	
We are working in “crisis mode” trying to do too much, too fast.	3 (4.6)	15 (23.1)	18 (27.7)	24 (36.9)	5 (7.7)	27.7	
Organizational learning–continuous improvement							
We are actively doing things to improve patient safety.	0 (0)	0 (0)	1 (1.5)	41 (63.1)	23 (35.4)	98.5	85.8
Mistakes have brought about positive change here	3 (4.6)	6 (9.2)	9 (13.8)	40 (61.5)	7 (10.8)	72.3	
After we make changes to improve patient safety, we evaluate their effectiveness.	0 (0)	1 (1.5)	2 (3.1)	46 (70.8)	16 (24.6)	95.4	
Mistakes that have been made are kept to oneself	12 (18.5)	38 (58.5)	9 (13.8)	4 (6.2)	2 (3.1)	77	
Non-punitive response to errors							
Staff felt the blame was being placed on them	4 (6.2)	23 (35.4)	21 (32.3)	16 (24.6)	1 (1.5)	41.6	43.9
When an incident is reported, it feels like the person has been recorded as not a problem	3 (4.6)	23 (35.4)	25 (38.5)	14 (21.5)	0 (0)	40	
The mistakes that have been made are hidden within the scope of the personnel themselves.	9 (13.8)	31 (47.7)	18 (27.7)	7 (10.8)	0 (0)	61.5	
Staff are concerned that mistakes they make are recorded in their personnel files.	0 (0)	21 (32.3)	25 (38.5)	18 (27.7)	1 (1.5)	32.3	
Supervisor/Manager expectations and actions promoting patient safety							
My boss spoke words of wisdom when he saw the work being done according to established patient safety procedures.	0 (0)	1 (1.5)	9 (13.8)	31 (47.7)	24 (36.9)	84.6	70

Criteria	SD f (%)	D f (%)	N f (%)	A f (%)	SA f (%)	Percentage of positive response rate (%)	Average positive response (%)
Whenever work pressure increases, the boss wants us to work faster, even if it means taking shortcuts.	1 (1.5)	21 (32.3)	20 (30.8)	19 (29.2)	4 (6.2)	35.4	
My manager takes staff suggestions seriously to improve patient safety.	0 (0)	4 (6.2)	10 (15.4)	34 (52.3)	17 (26.2)	78.5	
My boss ignored the patient safety issues that occurred	21 (32.3)	32 (49.2)	8 (12.3)	3 (4.6)	1 (1.5)	81.5	
Management/supervisors' support for patient safety							
New hospital management becomes interested in patient safety only after an adverse event occurs.	12 (18.5)	31 (47.7)	8 (12.3)	14 (21.5)	0 (0)	66.2	78
Hospital management maintains a work climate that prioritizes patient safety.	0 (0)	2 (3.1)	14 (21.5)	34 (52.3)	15 (23.1)	75.4	
Hospital management actions demonstrate that patient safety is a top priority.	0 (0)	1 (1.5)	4 (6.2)	36 (55.4)	24 (36.9)	92.3	
Teamwork across units							
Units in RSGM do not want to coordinate well with each other	8 (12.3)	35 (53.8)	8 (12.3)	10 (15.4)	4 (6.2)	66.1	71.9
Hospital units work together well to provide the best care for patients.	0 (0)	2 (3.1)	6 (9.2)	32 (49.2)	25 (38.5)	87.7	
When working with staff from other units, it often feels uncomfortable	5 (7.7)	33 (50.8)	19 (29.2)	7 (10.8)	1 (1.5)	58.5	
There is good cooperation between RSGM units when it is necessary to work together.	0 (0)	5 (7.7)	11 (16.9)	32 (49.2)	17 (26.2)	75.4	
Handoffs and transitions							
Shift changes are a problem for patients at this hospital	9 (13.8)	30 (46.2)	18 (27.7)	5 (7.7)	3 (4.6)	60	54.4
Important patient care information is often forgotten during shift changes	6 (9.2)	33 (50.8)	14 (21.5)	11 (16.9)	1 (1.5)	60	
Problems often occur in the exchange of information between hospital units.	3 (4.6)	25 (38.5)	19 (29.2)	15 (23.1)	3 (4.6)	43.1	
The overall perception of patient safety							
Patient safety remains a consideration in completing more work and is never neglected.	0 (0)	1 (1.5)	3 (4.6)	37 (56.9)	24 (36.9)	93.8	69.2
We have concerns regarding patient safety in this unit.	6 (9.2)	43 (66.2)	11 (16.9)	4 (6.2)	1 (1.5)	75.4	
The procedures and work systems at RSGM are good at preventing errors from occurring.	0 (0)	3 (4.6)	12 (18.5)	34 (52.3)	16 (24.6)	76.9	
It's just a coincidence that serious errors don't occur around here.	5 (7.7)	15 (23.1)	29 (44.6)	14 (21.5)	2 (3.1)	30.8	

SD: strongly disagree; D: disagree; N: neutral, A: agree; SA: strongly agree

Table 3. Dimensions of Patient Safety Culture

Criteria	A	O	S	R	N	Percentage of positive response rate (%)	Average positive response (%)
Feedback and communication about errors							
We were informed about an error that occurred in the unit.	0 (0)	5 (7.7)	19 (29.2)	13 (20.0)	28 (43.1)	63.1	69.2
In the unit, we discuss ways to prevent errors from happening again.	1 (1.5)	1 (1.5)	8 (12.3)	23 (35.4)	32 (49.2)	84.6	
We were given feedback on the changes implemented based on incident reports.	1 (1.5)	3 (4.6)	22 (33.8)	20 (30.8)	19 (29.2)	60	
Communication openness							
Staff are free to speak up if they see something that might negatively impact patient care.	2 (3.1)	5 (7.7)	17(26.2)	19 (29.2)	22 (33.8)	63	36.2
Staff are afraid to ask questions when something doesn't seem right.	19 (29.2)	18 (27.7)	22 (33.8)	4 (6.2)	2 (3.1)	9.3	
Frequency of reported events							
When an error occurs but is corrected before it causes patient harm, how often is this reported?	1 (1.5)	8 (12.3)	15 (23.1)	22 (33.8)	19 (29.2)	63	64.6
When an error occurs but does not have the potential to harm the patient, how often is this reported?	1 (1.5)	7 (10.8)	15 (23.1)	23 (35.4)	19 (29.2)	64.6	
When making errors that potentially harm patients, how often are these reported?	2 (3.1)	6 (9.2)	14 (21.5)	14 (21.5)	29 (44.6)	66.1	

A: always; O: often; S: sometimes; R: rarely; Ne: never

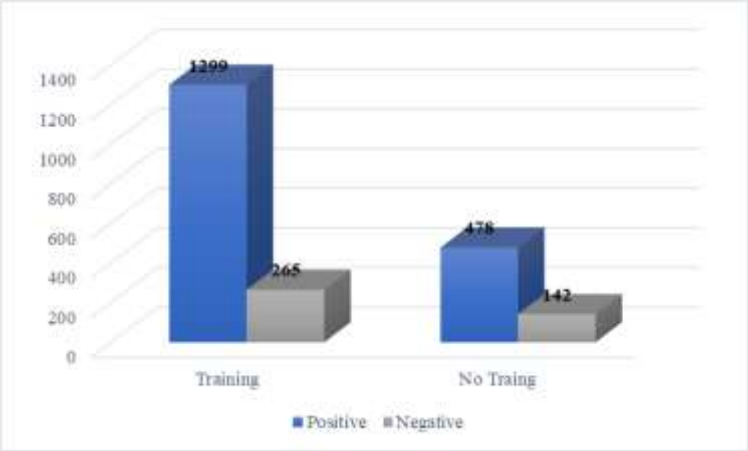

Figure 1. Positive and negative responses between trained and untrained

The diagram above shows that staff receiving patient safety training responded more positively. Of all the HSOPSC question items, the negative responses were far below the positive responses. Most staff who had and had not received patient safety training responded positively to the patient safety culture (Figure 1).

Table 4. Differences in PSC between staff who have received training and those who have not.

PS training experience	Mean±SD	p-value
Once	156.15±13.650	0 .563
Never	152.05±16.338	

Staff who received patient safety training got an average score of 156.15, while those who had not received training got 152.05. Based on the results of the Man-Whitney test, there was no significant difference related to the patient safety culture score (Table 4).

DISCUSSION

Teamwork in the unit recorded the highest positive response from the 12 dimensions of patient safety culture. This figure is higher than the average of previous studies. For example, in Ghana, teamwork in the unit recorded a positiv0065 response rate of 81.5% (32), in Alexandria recorded a positive response rate of 62.1% (7), and in public hospitals Iran 68.6% (31). Patient safety culture practices encourage stronger teamwork in healthcare settings. When patient safety principles are consistently applied, each team member is encouraged to support each other and share responsibility for patient safety. On the other hand, staffing recorded the lowest positive response rate in this study. Previous studies have supported this finding that other countries also recorded staffing still getting low positive responses in Nigeria, only around 30.5% (31)and in Croatia, around 32.5% (33).

This demonstrates that the majority of respondents believed that there was not enough staff to manage the patient safety workload. They felt there was too much to do and were in a hurry. In addition to being a place for health services, the dental and oral hospital where the research was conducted is also a place for integrated education and research in the field of dental education. The staff's workload is increased by the growing number of patients seeking dental care outside of their normal range; yet, they must also focus on dental teaching and research. It has been proposed that patient safety can be increased by two to three times when there is enough staff available to manage the workload and working hours. However, insufficient personnel leads to tension, anxiety, and sadness, which raises the likelihood of unfavorable events (34).

According to other studies, patient safety culture is linked to the availability of patient safety training and involvement in patient safety programs or training (35), and respondents who had received patient safety training gave better answers than those who had not. Other crucial elements in attaining better patient safety were found to be patient safety education and training. This result is in line with other studies that showed those who did not attend patient safety lectures or courses had lower opinions of the patient safety culture (36,37). However, staff who have not received training do not differ from staff who have received training based on the average score. The staff still show positive responses in accordance with the principles of patient safety, because they are used to working with colleagues who have received training. The process of habituation, supervision, and daily interaction allows for the transfer of knowledge and patient safety values, thus creating consistent standards of behavior among all staff.

Furthermore, healthcare personnel who did not receive patient safety knowledge throughout their initial professional education or employment exhibited higher negative attitudes toward the majority of patient safety dimensions than those who did. According to a study that looked at how training affected nurses' attitudes about patient safety, training significantly improved nurses' attitudes about safety, especially when it came to management perceptions, job satisfaction, and safety climate aspects (38–40). The attitudes of healthcare professionals toward patient safety are greatly influenced by patient safety education. Healthcare organizations' ability to establish a knowledge-enhancing learning environment led to the reporting of organizational learning and continuous development, including staff training, as strengths.

There was no significant difference in scores between those who had undergone patient safety training and those who had not. Still, overall, the patient safety culture received a positive response. This is because there is a supportive work environment, where patient safety practices have become part of the collective habit. Staff who have not received formal training are still accustomed to applying patient safety principles in their daily tasks because they are influenced by colleagues who have received training, as well as through supervision and familiarization in the workplace. Thus, the transfer of knowledge and cultural safety occurs informally between fellow staff. A work

environment accustomed to implementing a good patient safety culture makes all staff follow an organization's habits and work systems (41,42). This allows respondents to implement the patient safety culture that has been implemented even though they have not received patient safety training. Good teamwork in the unit is a trigger for all staff in the unit to work together to achieve goals, including improving patient safety culture. As other studies have shown, one of the main factors that is significantly related to patient safety culture is teamwork (43).

CONCLUSION

This study shows that someone who has attended patient safety training gives a higher positive response. The training has provided a good experience for staff regarding patient safety culture. Even if other colleagues have never received patient safety training, with a good working environment and teamwork in a compact unit, other staff will also positively respond to patient safety culture. However, on the other hand, educational dental and oral hospital experience "crisis mode." This proves that training alone may not be enough without systemic staffing adjustments in educational dental and oral hospital. They should still pay attention to balanced staff placement so that staff do not work in "crisis mode". Further research can explore patient safety culture with longitudinal or mixed research methods.

AUTHOR'S CONTRIBUTION STATEMENT

RK: conceptualization, investigation, methodology, supervision, data analysis, writing–original draft, writing–review and editing; EDH: methodology, writing–original draft; S: methodology; formal analysis, writing–original draft; YAP: formal analysis, resources;

CONFLICTS OF INTEREST

All authors have no conflict of interest regarding this article.

DECLARATION OF GENERATIVE AI AND AI-ASSISTED TECHNOLOGIES IN THE WRITING PROCESS

This manuscript was completed without the use of generative AI tools nor AI-assisted technologies.

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