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The relationship between patient safety culture and attitudes toward incident reporting among registered nurses

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Abstract

Background Patient safety is a primary concern in healthcare due to errors and low incident reporting rates. A strong safety culture and positive attitudes towards reporting are crucial for improving patient safety culture (PSC). Overcoming barriers and conducting research can enhance incident reporting, foster a safety culture, and improve patient outcomes.

Aim To investigate the relationship between patient safety culture and attitudes toward incident reporting among Jordanian nurses.

Methodology This study employed a cross-sectional descriptive correlational design. A convenient sample of 307 registered staff nurses from Jordanian hospitals across different sectors was selected. Validated and translated questionnaires, which included the Incident Reporting Culture Questionnaire and the Hospital Survey on Patient Safety Culture, were used for data collection. Statistical analyses, such as descriptive and inferential statistics (including Pearson correlation, independent sample t-test, one-way ANOVA, and hierarchical regression analysis), were employed to address research questions using SPSS version 26.

Results The findings revealed that the Patient Safety Culture (PSC) organizational learning dimension had the highest positive response rate (70.6%), while the hands-off and transition dimension had the lowest score (24.9%). Approximately 43.6% of participants reported no events in the last 12 months, whereas only 4.2% reported experiencing 12 or more events. The overall perception of patient safety was rated as 'very good' by 55.7% of the participants. The results from the Incident Reporting Culture Questionnaire (IRCQ) indicated a moderate overall willingness among nurses to report incidents, along with positive attitudes toward implementing lessons learned from errors and offering feedback on incident reports. Significant differences in attitudes toward incident reporting were observed based on the type of hospital ($p=0.037$) and working hours ($p=0.012$). Moreover, significant correlations were found between Patient Safety Culture dimensions and Incident Reporting Culture Questionnaire dimensions. The most robust positive correlation was observed between the feedback and communication about errors dimension in Patient Safety Culture and the learning from errors dimension in Incident Reporting Culture

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Questionnaire ($r = 0.401$, $p = 0.000$). Through hierarchical multiple regression analysis, it was demonstrated that Patient Safety Culture significantly predicted attitudes toward incident reporting ($\beta = 0.441$, $p < 0.001$), while controlling for demographic variables.

Conclusion This study discovered a positive correlation between patient safety culture and attitudes toward incident reporting among Jordanian nurses. Enhancing patient safety culture and adopting non-punitive measures can effectively improve incident reporting behavior within healthcare settings.

Keywords Incident reporting (IR), Patient safety culture (PSC), Nurses, Jordan

Introduction

The value of patient safety in healthcare cannot be overstated. According to the Institute of Medicine (IOM), medical errors cause between 44,000 to 98,000 deaths annually in the United States alone [1]. One crucial strategy for improving patient safety is the diligent reporting of incidents, which plays a pivotal role in identifying and addressing the contributing factors behind medical errors. Nurses are critical in incident reporting as they are often the first to identify and report such events in healthcare settings [2]. However, the absence of a robust patient safety culture in many medical facilities remains a significant challenge [3], including in Jordan [4]. Patient safety culture, defined by values, attitudes, and behaviors that influence an organization's commitment to patient safety, is characterized by openness, transparency, and continuous improvement, essential for encouraging incident reporting and learning from errors [5]. Many healthcare organizations lack a strong patient safety culture, leading to insufficient support for incident reporting and reluctance to learn from mistakes. Studies have found that low rates of incident reporting among nurses are linked to a poor patient safety culture. For example, Yusuf and Irwan found in a systematic review that nurses who perceived a weak patient safety culture were less likely to report incidents, even when they recognized the potential for harm [6]. Similarly, Mihdawi et al. found that nurses who reported a lack of organizational support for patient safety were less likely to report incidents [7]. The willingness of nurses to disclose incidents is influenced by their perceptions of reporting accidents and the prevailing patient safety culture in their workplace [8]. The research underscores that nurturing a positive patient safety culture significantly enhances the likelihood of nurses reporting incidents [9], and factors such as fear of punitive measures, perceived benefits of reporting, and confidence in the reporting process influence nurses' attitudes towards incident reporting [10].

In Jordan, several studies have been conducted to assess the state of PSC and incident reporting practices among healthcare professionals. A study involving 307 nurses and 144 physicians across seven hospitals found that nurses were more aware of incident reporting systems than physicians. However, both groups identified significant barriers to reporting, including the belief that reporting near misses was futile, lack of feedback, and fear of disciplinary actions [11]. Research involving 391 nurses from seven hospitals revealed that positive responses to PSC dimensions ranged from 20.0 to 74.6%, which are lower than benchmarks set by the Agency for Healthcare Research and Quality [12]. A study with 658 nurses highlighted strengths in teamwork within units but identified areas requiring improvement, such as communication openness, staffing, handoffs and transitions, non-punitive responses to errors, and teamwork across units. The study emphasized the need to shift from a culture of blame to one that supports open communication and learning from errors [13]. These studies were conducted in Jordan to address the critical need for understanding and improving patient safety within the country's healthcare system. By identifying existing perceptions, practices, and barriers related to PSC and incident reporting. This study examines research on patient safety culture levels and nurses' attitudes, willingness, and intentions to report errors, emphasizing factors related to their attitudes and willingness to disclose errors.

Methodology

Study design

The research design used in this study was a descriptive, cross-sectional design.

Settings and sample size

A convenience sampling among participants included 307 hospitalized nurses working in all departments at government and private hospitals; governmental hospital (Prince Hamza Hospital, located in Amman with 460 beds capacity and 42 specialties, Al-Salt Hospital located in Al Balqa'a with a capacity of 350 beds, and Al-Zarqa Hospital located in Al Zarqa with a capacity of 500 beds), private hospitals (Specialty Hospital in Amman, the Jabal Alzaytoon Hospital, and the Al-Hikmah Hospital). Sample size calculation was calculated based on a correlation test to ensure that the study has a power of 0.95, alpha = 0.05, and a medium effect size of 0.3. The minimum target sample size is 307. Registered nurses working in government and private hospitals, actively involved in

patient care and willing to participate in the study were included in this study, nurses on extended leave or not involved in direct patient care and newly hired nurses with limited experience in the hospital setting were excluded. The study conducted between October and November 2024.

Measurement

A self-reported questionnaire was distributed to nurses; the survey package was comprised of four main parts: 1. Sociodemographic Questionnaire: Age, gender, marital status, monthly income, years of experience.

HSOPSC (Hospital Survey on Patient Safety Culture): First developed by the Agency for Healthcare Research and Quality (AHRQ) in 2004 [14]. The HSOPSC is a 42-item instrument grouped into 12 composite dimensions and nine non-dimensional items, including two safety assessment items and seven demographic items. Each dimension is represented by three to five items measured with a 5-point.

Likert scale to ascertain agreement (strongly disagree to strongly agree) or frequency (never to always). The HSOPSC scoring involves calculating the average score for each dimension and the overall patient safety culture score. To calculate the average score for each dimension, the scores for all the items within that dimension are summed and divided by the number of items in that dimension. The overall patient safety culture score is calculated by averaging all 12 dimensions. The HSOPSC also provides a percentage positive response score for each dimension, which represents the percentage of respondents who answered positively to the items within that dimension. The percentage of positive response scores can be calculated by dividing the number of positive responses by the total number of responses and multiplying by 100.

These cut points are used to interpret the overall patient safety culture score and the scores for each of the 12 dimensions. A score above the neutral cut point is considered positive, while a score below the neutral cut point is considered negative. The Arabic version of the survey, translated and validated by (Al-Nawafleh et al.) [15], where the Cronbach alpha was 0.797, was used in the current study.

Incident Reporting Culture Questionnaire (IRCQ)

The 20-item Incident Reporting Culture Questionnaire (IRCQ) consisted of four factors answered on a five-point Likert scale [16]. The four factors comprised of Factor 1: Application of learning from errors, with five items and a score range value of 5 to 25; Factor 2: Readiness to provide feedback on incident reports, with six items (score range 6 to 30); Factor 3: Collegial atmosphere of unpleasantness and punishment, with five items and a possible score range value of 5 to 25; Factor 4: Incident management confidential and system driven, with four items (score range 4 to 20) [16]. As per Mjadu and Jarvis [17], the items of the scale are all summed together to generate a total IRCQ score.

The authors of the questionnaire tested reliability and validity: Criterion validity $r = 42$, $p = 0.001$; Cronbach alpha for the total IRCQ questionnaire was 0.83, and Cronbach alpha for Factors 1 to 4 were 0.73, 0.73, 0.70, 0.68, respectively [16]. There are no established cut points for interpreting the IRCQ scores. However, higher scores on the questionnaire indicate a more positive incident- reporting culture within the organization. Researchers may compare the scores of different units within the same organization to identify areas that need improvement. The survey was introduced to nurses in the Arabic language.

Data analysis

Data analysis was conducted using SPSS version 26 software. Descriptive analyses were initially conducted to explore the data and to describe the sample, such as calculating frequencies, means, and standard deviations for each variable. Continuous variables were reported as means and standard deviations. The categorical variables were reported as percentages. Inferential analysis was conducted to analyze the study's second research question using statistical tests, t-tests, and one-way ANOVA. The relationship between PSC and attitudes toward incident reporting was tested using the Pearson correlation and regression analysis. Based on this statement, the p-value ≤ 0.05 was considered statistically significant.

Results

Description of the population and sample

The response rate of this study is 91.3%, with 307 nurses participating from both governmental and private hospitals in Jordan. Incomplete surveys were excluded. The majority age group was 22–32 years (53%), with females making up 59.9% of the respondents, reflecting the overall gender composition of Jordanian nursing. Participants' experience ranged primarily from 1-6 years (35.8%). Regarding safety training, 57.3% of nurses reported having received training, indicating significant engagement in safety practices (Table 1).

Patient safety in the selected hospitals was measured by assessing different components. The PSC organizational learning dimension scored the highest positive response rate (70.6%), whereas the PSC hands-off and transition dimension scored the lowest positive response rates (24.9%) (Table 2).

Regarding the frequency of events reported, nearly half of the participants ($N = 134$, 43.6%) reported no events in the last 12 months, while only 13 (4.2%) of participants

Table 1 Characteristics of participants (*N* = 307)

Variable	*N*	%
Age category		
22-32	163	53
33-42	110	35.8
More than 43	34	11
Gender		
Male	123	40.1
Female	184	59.9
Years of experience		
1-6 years	110	35.8
7-12 years	75	24.4
13-15 years	81	26.3
More than 15 years	41	13.3
Previous training courses in safety		
Yes	176	57.3
No	131	42.7
Type of hospital		
Governmental	189	61.6
Private	118	38.4
Department		
Medical	133	43.3
Surgical	99	32.2
Delivery	35	11.4
Others	40	13
Work-status		
Full time	261	85
Part-time	46	15

N number, % Percentage

Table 2 Composite levels for the PSC (*N* = 307)

PSC composites	Average positive responses %	M	SD
Teamwork within unit	27.4%	3.63	0.62
Supervisor\manager expectations and actions promoting patient safety	58.9%	3.04	0.45
Organizational learning	70.6%	3.69	0.52
Management support for patient safety	53.4%	3.11	0.64
The overall perception of patient safety	55.3%	3.28	0.47
Feedback and communication about errors	53%	3.50	0.74
Communication openness	40.7%	3.07	0.67
Teamwork across units	65.1%	3.13	0.57
Staffing	56%	2.60	0.43
Hands-off and transition	24.9%	3.25	0.70
Non-punitive response to errors	66.4%	2.42	0.61
Group mean composite score.		3.14	1.09

N number, % Percentage

reported that 12 or more events happened in the last 12 months (Fig. 1).

For the overall perception of safety culture, participants were asked to respond to one question rated on five points. The findings showed that more than half of the participants (*N* = 171, 55.7%) rated their hospitals as having a "very good "level of PSC, while only 5 (1.6%) rated their institutions as "poor "in PSC.

For IRCQ 1, the average score was 17.5 ± 2.9, with 61.2% of nurses providing positive responses, indicating a favorable attitude towards learning from errors. The Cronbach's alpha coefficient was 0.752, suggesting satisfactory internal consistency. For IRCQ 2, the average score was 21.16 ± 3.14, with 63.2% of nurses ready to provide feedback on incident reports, indicating positive inclination. The Cronbach's alpha coefficient was 0.744, indicating acceptable internal consistency. For IRCQ 3, the mean score was 13.6 ± 2.95, with 50.4% of nurses reporting unfavorable collegial atmospheres. The Cronbach's alpha coefficient was 0.659, indicating moderate internal consistency. For IRCQ 4, the average score was 12.8 ± 2.24, with 45.9% of nurses favoring a confidential, system-driven incident management approach. The Cronbach's alpha coefficient was 0.661, indicating moderate internal consistency. The IRCQ total scale showed an average score of 65.1 ± 7.92, with 55.2% positive responses, suggesting a moderate overall willingness to report incidents. The Cronbach's alpha coefficient was 0.704, indicating acceptable internal consistency (Table 3).

Participants from governmental hospitals had a mean score of 65.83 ± 7.32 for attitudes toward incident reporting, while private hospital nurses scored slightly lower at 63.89 ± 8.70, indicating a higher attitude among governmental hospital nurses. Levene's test (F = 5.889, p = 0.016) showed unequal variances. The t-test revealed a significant difference between the groups (t = 2.008, df = 216.865, p = 0.046) with a 95% confidence interval of 0.03601 to 3.82876. Full-time participants had a mean score of 64.61 ± 8.068 (standard error mean = 0.49945), while part-time participants scored 67.78 ± 6.487 (standard error mean = 0.95650). Levene's test (F = 1.706, p = 0.192) showed equal variances, and the t-test indicated a significant difference between full-time and part-time workers (t = − 2.523, df = 305, p = 0.012) (Table 4).

As illustrated in Table 5, the results revealed a significant positive relationship between the total score of PSC and the total score of IRCQ (r = 0.473, p = 0.000). Additionally, many PSC dimensions were positively or negatively correlated with IRCQ dimensions. For example, the PSC Feedback and communication about errors dimensions had the strongest value, significantly positively correlated with IRCQ learning from errors dimension (r = 0.401, p = 0.000). On the contrary, the strongest significant negative correlation was between the PSC staffing dimension and IRCQ learning from the errors dimension (r = − 0.159, p = 0.005).

Hierarchical multiple regression analysis examined the unique relationship between PSC and IRCQ. Type of Hospital, Employment, and Medical Department was

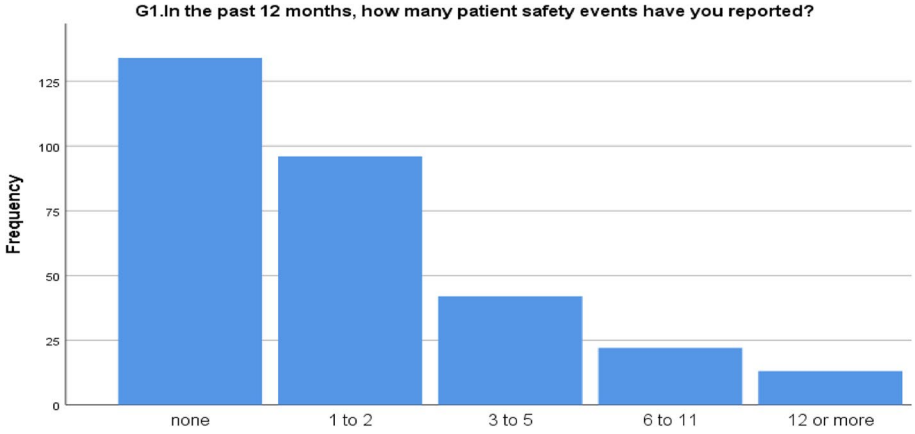

Fig. 1 Frequency of events reported in the last 12 months

Table 3 Incident reporting attitude and willingness levels (*N* = 307)

Incident reporting factor	M ± SD	Range	Positive responses rate %	Cronbach's alpha
Application of learning from errors (IRCQ 1)	17.5 ± 2.9	8–24	61.2%	0.752
Readiness to provide feedback on incident reports (IRCQ 2)	21.16 ± 3.14	12–29	63.2%	0.744
Collegial atmospheres of unpleasantness and punishment (IRCQ 3)	13.6 ± 2.95	6–21	50.4%	0.659
Incident management: confidential and system-driven (IRCQ 4)	12.8 ± 2.24	6–20	45.9%	0.661
IRCQ total scale	65.1 ± 7.92	39–82	55.2%	0.704

N number, *%* Percentage, *M* mean, *SD* standard deviation

entered into the first regression analysis model, while PSC was entered into the second model. Overall, the two regression models were significant, $P < 0.001$. For the final model, R-squared = 0.25, adjusted R-squared = 0.24. Demographic variables accounted for 7% of the variance in nurses' performance, while PSC accounted for 19% additional variance above and beyond the 7% accounted for by the first model. In the second model (Table 6), both Employment (B = 0.143, $P = 0.005$) and PSC (B = 0.441, $P < 0.001$) significantly predicted IRCQ.

Discussion

The study's findings revealed both similarities and differences when compared to existing national and international literature as follows:

Levels of PSC and attitudes toward IR

The findings indicate that healthcare professionals in Jordanian hospitals generally perceive patient safety culture (PSC) positively. Notably, "PSC organizational learning" received the highest positive perception, suggesting that hospitals prioritize learning from incidents and fostering continuous improvement. This aligns with studies by Chen and Li [18], El-Jardali et al. [19], and Tereanu et al. [20], which highlight the role of organizational learning in enhancing PSC. Nurses, in particular, view their institutions as proactive in incident-based learning, reinforcing their confidence in the system's ability to evolve and improve [21]. This proactive stance is critical for reducing errors and ensuring patient safety, as supported by Raeissi et al. [22]. The emphasis on organizational learning suggests a cultural shift where error reporting is encouraged, not penalized. Studies by Burlison et al. [23], Waterson et al. [24], and Malak et al. [25] reinforce this, demonstrating how hospitals that integrate learning into their safety strategies experience greater improvements in patient outcomes. However, despite this progress, the least favorable perception was related to the "hands-off and transition approach," indicating persistent weaknesses in communication and handovers. Poor transitions of care remain a well-documented risk factor for adverse events, as highlighted by [26–30]. The fact that over 50% of Jordanian nurses rated their hospitals as "very good" in terms of PSC is a promising sign, reflecting institutional efforts to prioritize patient safety through structured policies and teamwork [7, 25]. This aligns with earlier research [13, 31], further supported by the World Health Organization, which recognized Jordan's commitment to patient safety improvements [32]. One particularly noteworthy finding is that nurses highly valued feedback on incident reports, reinforcing the importance of transparent and constructive feedback mechanisms. Studies support the notion that well-structured feedback enhances reporting behaviors and contributes to a cycle of continuous improvement [33, 34]. This study highlights the importance of bridging the gap between learning and practice, suggesting that while PSC is perceived positively, further efforts are needed to improve communication during patient transitions. Hospitals should focus on structured handover protocols and

Table 4 Differences in IRCQ and PSC among Jordanian nurses based on their demographic characteristics

Variable	IRAQ		PSC	
	M±SD	*P*-value	M±SD	*P*-value
Age category				
22-32	65.24±7.93	0.091	3.15±0.31	0.297
33-42	64.11±7.59		3.18±0.3	
More than 43	67.47±8.58		3.09±0.29	
Gender				
Male	64.44±7.44	0.238	3.13±0.31	0.310
Female	65.51±8.22		3.17±0.30	
Years of experience				
1-6 years	64.59±7.93	0.806	3.17±0.28	0.835
7-12 years	65.45±7.75		3.15±0.30	
13-15 years	65.78±6.36		3.12±0.31	
More than 15 years	64.98±9.08		3.17±0.34	
Previous training courses in safety				
Yes	65.34±8.12	0.508	3.16±0.32	0.775
No	64.74±7.66		3.15±0.29	
Type of hospital				
Governmental	65.83±7.32	0.037	3.17±0.29	0.489
Private	63.89±8.7		3.14±0.32	
Department				
Medical	63.43±8.73	0.003	3.09±0.27	<0.001
Surgical	66.97±5.49		3.23±0.28	
Delivery	64.20±8.17		3.09±0.29	
Others	66.67±8.87		3.27±0.40	
Work-status				
Full time	64.61±8.06	0.012	3.15±0.31	0.811
Part-time	67.78±6.48		3.17±0.26	

N number, % Percentage

interdisciplinary communication training to mitigate risks associated with care transitions [35–38].

Differences in IRCQ and PSC among Jordanian nurses based on their demographic characteristics

The present study revealed significant variations in attitudes toward incident reporting and patient safety culture (PSC) among Jordanian nurses based on demographic characteristics such as hospital type, weekly working hours, and working department. Governmental hospitals exhibited marginally higher incident reporting attitudes compared to private hospitals, supported by an independent samples t-test showing higher mean scores for governmental hospital nurses. This aligns with prior research linking positive incident-reporting attitudes to a supportive safety climate in hospitals [39]. Governmental hospitals typically prioritize patient safety and have robust reporting systems, while private hospitals might prioritize financial aspects, affecting their reporting culture [40, 41]. Similar patterns were found in Iran, where public hospital nurses demonstrated more positive incident-reporting attitudes due to a stronger safety culture and better resources [42]. The disparity, though statistically significant, was modest, suggesting other factors also play a role. Future research could explore the interaction between organizational and individual factors. The study also identified significant differences in incident reporting attitudes based on employment status, with part-time nurses exhibiting more favorable attitudes than full-time nurses, possibly due to lower burnout and fewer professional commitments [43, 44]. Limited research exists on the relationship between working hours and incident-reporting attitudes, but studies on other healthcare professionals suggest part-time employees have lower stress levels and higher job satisfaction, which may translate into

Table 5 The relationship between PSC dimensions and IRCQ dimensions (*N* = 307)

PSC composites	Attitude toward incident reporting dimension									
	IRCQ1	IRCQ 2			IRCQ 3		IRCQ 4		IRCQ total	
	R	*P*	*r*	*P*	*r*	*P*	*r*	*P*	*R*	*P*
Team-work within unit	**0.305	0.000	**0.318	0.000	**0.166	0.003	**0.213	0.000	0.473**	0.000
Supervisor\manager expectations	0.093	0.103	**0.187	0.001	*0.123	0.031	**0.201	0.000		
Organizational learning	**0.391	0.000	**0.393	0.000	0.22	0.704	**0.323	0.000		
Management support for PS	**0.329	0.000	**0.347	0.000	0.104	0.068	**0.201	0.000		
The overall perception of PS	**0.228	0.000	**0.223	0.000	− 0.002	0.973	0.083	0.148		
Feedback about errors	**0.401	0.000	**0.389	0.000	0.024	0.674	**0.312	0.000		
Communication openness	**0.183	0.001	**0.231	0.000	0.027	0.636	**0.192	0.001		
Team-work across units	**0.363	0.000	**0.352	0.000	*0.124	0.03	**0.165	0.004		
Staffing	**− 0.159	0.005	− 0.091	0.111	− 0.016	0.779	− 0.06	0.297		
Hands-off	− 0.26	0.656	0.066	0.252	**0.192	0.001	− 0.099	0.084		
Non-punitive response	0.041	0.470	0.028	0.621	**0.244	0.000	0.027	0.639		
Total PSC score										

r: Pearson correlation, P: significance

**Correlation is significant at the 0.01 level

*Correlation is significant at a 0.05 level

Table 6 Multiple regression analysis to examine the unique relationship between PSC and IRCQ

Model		Unstandardized Coefficients		Standardized Coefficients	t	*P*-value
		B	Std. Error	Beta		
1	(Constant)	59.019	2.537	-	23.265	0.000
	Type of Hospital	− 1.542	0.916	− 0.095	− 1.684	0.093
	Employment	3.368	1.233	0.152	2.732	0.007
	Medical Department	2.764	0.899	0.173	3.074	0.002
2	(Constant)	25.500	4.481	-	5.691	0.000
	Type of Hospital	− 1.481	0.821	− 0.091	− 1.804	0.072
	Employment	3.159	1.105	0.143	2.859	0.005
	Medical Department	1.377	0.822	0.086	1.676	0.095
	PSC	11.341	1.307	0.441	8.680	0.000

better-reporting attitudes [45]. Furthermore, the study found significant variations in incident reporting attitudes and PSC based on the working department, with surgical department nurses reporting higher IRCQ and PSC scores than medical department nurses. Surgical departments, due to the complexity and invasiveness of procedures, often enforce stringent patient safety protocols, leading to a more positive safety climate and heightened incident reporting awareness [46]. These insights contribute to a deeper understanding of the complex dynamics influencing incident reporting attitudes and PSC within the nursing profession, offering valuable directions for future research and targeted interventions to enhance patient safety.

The relationship between PSC and attitude toward IR

The current study reveals a significant positive relationship between the total scores of PSC and IRCQ, indicating that as participants' perception of patient safety culture improves, their attitude toward incident reporting becomes more positive. This underscores the interconnection between a positive patient safety culture and healthcare professionals' willingness to report safety incidents. A robust patient safety culture encourages and supports incident reporting without fear of reprisal, viewing it as crucial for patient safety improvement [47]. The significant correlation between PSC and IRCQ scores suggests that healthcare professionals who perceive a positive patient safety culture are more likely to have positive attitudes toward incident reporting, seeing it as essential for identifying risks and enhancing safety outcomes [48]. This moderate positive correlation highlights the importance of nurturing a positive patient safety culture within healthcare organizations, promoting attitudes that support incident reporting, and enabling the capture and analysis of data for targeted interventions [49]. While this correlation suggests a relationship, it does not imply causation; factors such as organizational policies, leadership support, and resources influence incident-reporting attitudes. Further research is needed to explore this relationship's underlying mechanisms and mediators. The study also finds a significant positive relationship between "Teamwork within a unit" and all attitude dimensions toward incident reporting (IRCQ), aligning with previous studies that emphasize team communication and collaboration in promoting safety culture and incident reporting. The "supervisor/manager expectations and actions promoting patient safety" dimension in PSC is positively associated with IRCQ dimensions like readiness of reporting, atmospheres of punishment, and incident management, suggesting that active promotion of patient safety by supervisors and managers increases comfort and reduces fear of retribution among healthcare professionals. Additionally, the "organizational learning" dimension in PSC is positively associated with IRCQ, indicating that healthcare professionals are more likely to value incident reporting when they perceive it as contributing to patient safety improvements. Conversely, the study shows a negative correlation between the "Staffing" PSC dimension and the "learning from errors" dimension of attitude toward incident reporting among Jordanian nurses. This suggests that lower perceptions of staffing levels correlate with decreased willingness to learn from errors and report incidents, consistent with research in other regions like Eastern Asia and Slovakia [50, 51]. Reasons for this negative correlation include the creation of a stressful work environment due to insufficient staffing, leading to increased workload and job dissatisfaction, which reduces the willingness to learn from errors and report incidents [52–54]. Inadequate staffing can also result in more errors and adverse events, negatively affecting patient outcomes and creating a culture of blame and fear of reprisal, further discouraging incident reporting and learning from errors [55–57]. Additionally, a lack of resources and support for incident reporting can hinder nurses' willingness to report incidents if they feel their reports will not be taken seriously or result in meaningful action [58, 59].

These findings highlight the need to foster a safety culture in healthcare by promoting open communication, encouraging incident reporting, and providing feedback to healthcare workers. Further research is needed on the relationship between PSC and incident-reporting attitudes in diverse healthcare settings and the role of cultural norms, professional identity, and leadership.

Strengths and limitations

No study is perfectly designed to avoid all limitations, and this study is no exception. Its limitations include limited generalizability due to its specific context (Jordanian hospitals), the potential bias of self-reported data, the cross-sectional design limiting causal conclusions, a small sample size reducing statistical power, and a limited number of measured variables that may not fully capture factors influencing incident reporting behavior. Despite these limitations, the study provides valuable insights into the relationship between patient safety culture (PSC) and attitude toward incident reporting among Jordanian nurses. It used validated instruments, had a diverse sample, and had practical implications for healthcare organizations and policymakers. The findings contribute to the literature on PSC and incident-reporting behavior, particularly in the Middle Eastern context, and offer a baseline for future research in this area.

Conclusions

In conclusion, a positive perception of participants toward PSC and attitude toward IR. Additionally, the findings showed that PSC dimensions, including organizational learning, non-punitive response, staffing, and hands-off were significant predictors of attitude toward incident reporting. The study's findings suggest that developing a positive patient safety culture and providing a non-punitive response to incidents can increase incident-reporting behavior among Jordanian nurses.

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Authors' contributions
NA, AHR, and MHB performed the literature search, and collect and interpret the data. NA, AHR, MHB, MSA, IAO, and A.R.A. drafted the work and contributed to the writing of this manuscript. SM, AHR, MHB, and MSA performed the analysis. KM, AHR, MHB, MSA, and IAO edited and drafted the final version of this manuscript. IAO reviewed the final version to be published.

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Data availability
All data that were analyzed during this study are included in this article, and further inquiries can be directed to the corresponding author.

Declarations

Ethics approval and consent to participate
The authors' permission to use the tools was gained. The IRB of Al-Zarqa University provided ethical approval (8/2022). The study complied with all ethical guidelines and regulations set forth by the ethics committee. The study was conducted according to the guidelines of the Declaration of Helsinki and approved by the Institutional Review at all sites. Written informed consent was obtained from all participants.

Consent for publication
Not applicable.

Competing interests
The authors declare no competing interests.

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