

Original Research Article

Patient safety knowledge and compliance among physicians in public hospitals in Lebanon

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ABSTRACT

Background: Patient safety (PS) remains a global healthcare concern. Physicians, through their central role, significantly influence PS culture and adverse event prevention. This research evaluates PS knowledge, attitudes, practices, and their determinants among physicians in Lebanese public hospitals.

Methods: This study is a secondary data analysis from a survey conducted with healthcare workers in Lebanese public hospitals in 2020-2021. Data were analyzed using descriptive statistics and multivariate linear regression to identify factors associated with PS compliance.

Results: The study included 111 physicians (67% men, 33% women; average age 34 years), with 62.2% working in rural areas. Six dimensions of PS knowledge yielded a mean score of 60/100 (SD=19.9). Mean compliance with PS goals was 58.8/100 (SD=10.7). Multivariate linear regression showed higher compliance associated with urban hospital location, alternating work schedules, presence of a PS office, higher PS knowledge scores, and lower frequency of reporting events.

Conclusions: Compliance was highest in urban hospitals with university affiliations, though exceptions indicated these factors alone don't guarantee robust PS practices. Physician engagement, institutionalized prioritization of safeguards, and enforced protocols were key determinants of successful implementation. Active monitoring mechanisms targeting physicians may yield significant improvements, as physicians often establish PS standards within hospitals. PS structures and protocols can be enhanced through reformed accreditation processes integrating more PS dimensions. Inter-hospital collaboration creating continued medical education modules for PS training has shown positive outcomes in Lebanon.

Keywords: Patient safety, Healthcare Compliance, International patient safety goals, Medical error prevention, Hospital accreditation, Patient safety culture

INTRODUCTION

Patient safety (PS) remains a paramount concern within the global healthcare landscape. Estimations from the World Health Organization (WHO) suggest that 1 in 10 patients suffers harm during hospital care. The repercussions of such incidents result in extended hospital

stays, long-term disabilities, potential fatalities, and a substantial financial burden on healthcare infrastructures.¹ An initial report by the US Institute of Medicine (IOM) in 1999 titled "To Err is Human: Building a Safer Health System" called for a comprehensive approach to improving PS culture (PSC).² Within such a culture, healthcare practitioners prioritize PS and are motivated to

report any adverse occurrences.² Among healthcare practitioners, physicians, by virtue of their central role in healthcare, have a major direct and indirect influence on PS. Their knowledge and practices shape the safety culture and the prevention of adverse events. Challenges like insufficient training and workload pressures can impede their proactive involvement in PS.³

The International Patient Safety Goals (IPSGs) were established in the early 2000s by the Joint Commission International (JCI) to help accredited hospitals address specific priority areas of PS and reduce medical errors.⁴ The current set of IPSGs focuses on 6 areas of PS: patient identification, communication, high-alert medications, wrong-site/patient/procedure surgery, healthcare-associated infections, and falls. The Hospital Survey on Patient Safety Culture (HSOPSC), developed by the Agency for Healthcare Research and Quality (AHRQ), provides a standardized instrument to assess PS culture at both unit and hospital-wide levels.^{5,6}

The Eastern Mediterranean Region (EMR) has been comparatively slow in adopting PS measures, with limited studies on PSC available from this region.⁷ In Lebanon, previous research focuses primarily on private hospitals and nursing staff rather than public hospital physicians and staffing.^{8,9}

The Ministry of Public Health (MOPH) in Lebanon has incorporated certain PS standards in the hospital accreditation system.¹⁰ Nevertheless, significant gaps exist pertaining to the evaluation of compliance with PS among various stakeholders in general and among physicians in particular. This research aims to bridge this gap by evaluating physician knowledge of IPSG, patient safety culture attitudes, IPSG compliance practices, and their determinants among physicians in Lebanese public hospitals. The study will also examine patient safety event reporting patterns and identify personal and structural factors that influence compliance behaviors.

METHODS

This study is a secondary data analysis from a survey conducted with healthcare workers in Lebanese public hospitals in 2020-2021. While a previous paper focused on PS dimensions among nurses, this analysis specifically examines physicians working in all 28 public hospitals under the Ministry of Public Health supervision across Lebanon.⁹ The participating hospitals are geographically diverse, with 13 in urban/suburban regions and 15 in semi-rural/rural zones. Two public hospitals declined participation due to the COVID-19 crisis. The study targeted all physicians who had served in the same hospital for over six months and were available on the survey date, ensuring adequate exposure to departmental and hospital protocols, working environment, and orientation initiatives. The data collection instrument was a self-administered questionnaire combining elements from the Hospital Survey of patient safety culture

(HSOPSC) and knowledge assessment of IPSG from Joint Commission International hospital accreditation standards.^{6,11} Initially drafted in English, the questionnaire underwent translation to Arabic with expert assistance, followed by back-translation validation by the American Language Center. Both versions were expert-reviewed for relevance, comprehensiveness, and clarity before finalization. The questionnaire covered personal and professional attributes, hospital variables, organizational factors, PS culture elements, knowledge of IPSG, and observed medical errors.

The study's dependent variable was self-reported compliance with IPSG, measured on a 5-point Likert scale (1-Rare to 5-Always) across six key areas: patient identification, effective communication, safety of high-alert medications, correct patient procedures & surgery, prevention of hospital-acquired infection, and patient fall prevention. A composite compliance score was calculated by summing all question scores, ranging from 0 (total non-compliance) to 90 (complete compliance).

Independent variables included knowledge of IPSG, measured through multiple-choice questions across the same six areas, with correct answers scored as 1 and incorrect or "don't know" responses as 0. A composite knowledge score ranged from 0 to 94. Patient safety culture (PSC) was assessed through 11 dimensions: teamwork, response to error, communication openness, reporting patient safety events, staffing and work pace, organizational learning, leadership support, communication about error, hospital management support, hand-off information exchange, and overall perceptions of patient safety. A composite PSC score ranged from 0 to 160.

Personal and professional characteristics included age, gender, medical activity domain, medical school type, PS course exposure, and years of experience. Hospital characteristics encompassed hospital type, location, accreditation level, and PS structures (including committees, officers, programs, surveys, orientation, audits, and training). Additional outcomes measured included reported errors in the previous year and unreported witnessed medical errors.

For statistical analysis, all variables were described using frequencies and percentages for categorical variables, and means, standard deviations, and ranges for continuous ones. Associations between independent variables and IPSG compliance were examined using t-tests or ANOVA for categorical variables, while Pearson correlation coefficients were calculated for continuous variables. Multivariate linear regression was conducted to adjust for independent effects of variables with significant bivariate associations. Associations with p values ≤ 0.05 were considered significant. The R^2 coefficient was calculated to assess the percentage of outcome variability explained by the final multivariate model. All analyses were performed using SPSS statistical package.

RESULTS

The survey included 111 physicians, of whom 67% were men and 33% were women. The average age of the group was 34 years, with women significantly younger on average (30 years) compared to men (36 years), and over half of the group was single (55%) at the time of the survey. The majority were attending physicians (62.2%), with an average work experience of 11.5 years (SD=7). In their current practice, the respondents were distributed in

university (48.6%) or general (51.4%) hospitals. Most work locations (62.2%) were in rural areas. The vast majority of the hospitals were accredited at levels C and D (66.7%). Work hours varied, with only about 40.5% working 8 hours a day or less, and a majority (82.9%) alternating day shifts with night duties. About 65% reported the absence of PS training in their medical curriculum. Details regarding the personal and professional characteristics of the respondents can be found in Table 1.

Table 1: Demographic and professional characteristics of physicians in public hospitals in Lebanon in 2020 (n=111).

Variables	N	%
Gender		
Men	74	66.7
Women	37	33.3
Mean age in years (SD) (Range)	34.3 (9.4) (24-51)	
Marital status		
Single	61	55.0
Position*		
Resident	42	37.8
Attending	69	62.2
Hospital of current practice		
University	54	48.6
General	57	51.4
Hospital location		
Urban/suburban	42	37.8
Rural	69	62.2
Accreditation level from Ministry of Public Health (A-D)		
A & B	37	33.3
C & D	74	66.7
Work schedule		
Day only	19	17.1
Alternating	92	82.9
Number of daily work hours**		
12 hours	69	62.2
> 12 hours	42	37.8
Number of weekly work hours**		
Up to 40	9	8.1
More than 40	102	91.9
Mean number of patients		
during day shift (SD) (Range)	18.97 (10.8) (6-44)	
during night shift (SD) (Range)	22.8 (15.2) (2-44)	
Exposed to "Patient Safety" in medical curriculum		
Yes	39	35.1
No/ Don't Know	72	64.9

*Mean years of experience for resident=3 (SD=1.5) and for attending=11.5 (SD=7); **Mean number of daily work hours was 15.1 (SD=7.6) (Range=8-34) and of weekly work hours 56.3 (12.7) (Range=35-72)

Regarding organizational factors related to PS, 28% of physicians reported the presence of an office for PS and risk management in their hospital, and 32% stated that their hospital had established an integrated PS program. Furthermore, 15% indicated that their hospital had conducted a standardized survey of its staff to assess its PS culture, and 14% mentioned the existence of a

periodic training program on PS in their hospital. Only nine (8%) of participants reported that their hospital conducted periodic audits of the implementation of PS policies and procedures. Likewise, a mere four (4%) reported that the new employees' orientation program included PS policies and procedures. Details are presented in Table 2.

Table 2: Organizational factors regarding patient safety (PS) as reported by physicians in public hospitals in Lebanon in 2020 (n=111).

Variables	N	%
Office for PS and risk management present	31	27.9
Integrated PS program		
Yes	35	31.5
No/Don't know	76	68.5
Standardized staff survey to assess hospital's PS culture		
Yes	17	15.3
No/Don't know	94	84.7
Periodic audit of the implementation of PS policies and procedures*		
Yes	9	8.1
No/Don't know	102	91.9
Periodic training program on PS?		
Yes	16	14.4
No/Don't know	95	85.6
New employees' orientation program includes PS policies and procedures*		
Yes	4	3.6
No/Don't know	107	96.4

*Not remaining in the rest of the analysis for lack of variability.

Table 3: Knowledge and culture concerning International Patient Safety Guidelines (IPSG) among physicians in public hospitals in Lebanon in 2020 (n=111).

IPSG knowledge items*	Mean (SD) (Range 0-100)
Patient identification	80.5 (25.5)
Effective communication	55.5 (25.9)
Safety of high-alert medications	49.0 (34.0)
Surgical site Identification	58.8 (23.7)
Infection prevention and control	53.8 (25.8)
Patient risk for falling	50.0 (20.0)
Overall knowledge	60.0 (19.9)
IPSG culture items*	
Teamwork	63.3 (10.7)
Staffing and work pace	60.5 (8.0)
Organizational learning/ improvement	64.0 (14.0)
Response to error	59.5 (13.5)
Supervisor support for PS	60.0 (10.0)
Communication about error	60.0 (18.0)
Communication openness	59.5 (14.5)
Reporting PS events	44.0 (17.0)
Hospital management support for PS	66.0 (17.3)
Handoffs information exchange	65.3 (16.7)
Overall score	60.6 (6.5)
IPSG compliance items*	
Patient identification	68.0 (15.0)
Effective communication	58.7 (12.0)
Safety of high-alert medications	54.7 (15.3)
Surgical site identification	71.3 (14.7)
Infection prevention and control	46.0 (12.0)
Patient risk for falling	48.0 (20)
Overall score	58.8 (10.7)

Each item includes several specific associated questions.

Table 4: Compliance with the IPSG by personal characteristics as reported by physicians in public hospitals in Lebanon (2020) (n=111).

Variables	Mean (SD)	Correlation	P value
Personal characteristics			
Gender			
Men	52.1 (10.9)	--	0.23
Women	54.4 (6.1)		
Age in years	--	0.13	0.18
Marital status			
Single	53.6 (7.6)		0.40
Married	52.0 (11.5)		
Position			
Resident	49.5 (9.5)		0.00
Attending	54.9 (9.1)		
Years of experience	--	0.00	0.10
Exposed to “Patient Safety” in curriculum			
Yes	56.6 (4.7)		0.00
No/ Don’t Know	50.9 (10.9)		
Hospital of current practice			
University	54.6 (6.9)		0.08
General	51.3 (11.4)		
Hospital location			
Urban/suburban	59 (6.6)		<0.01
Rural	49.2 (9.2)		
Accreditation level from Ministry of Public Health			
A & B	49.3 (8.9)		0.84
C & D	54.9 (9.4)		
Work schedule			
Day only	46.4 (16.9)		<0.01
Alternating	54.2 (6.6)		
Number of daily work hours			
12 hours	49.7 (9.7)		<0.01
>12 hours	58.1 (6.6)		
Number of weekly work hours			
Up to 40	57.6 (6)		0.04
More than 40	52.5 (9.7)		
Number of patients			
During day shift		-0.03	0.76
During night shift		0.12	0.21

Six dimensions of PS knowledge were assessed. The overall mean was 60 on a scale of 0-100 (SD=19.9). The dimension with the highest mean score was "patient identification". All other items were relatively lower. The same approach was used to assess the organizational "culture" supportive of PS. This variable was composed of ten dimensions. The overall mean of PS culture score across all ten dimensions was 60.6 (SD=6.5) on a 0-100 standardized scale. The dimension with the highest mean score was the perception of "hospital management support for PS" (mean=66.0). The dimension with the lowest mean score was "reporting PS events" (mean=44.0).

The outcome variable for this analysis was the actual "compliance" of participants with IPSG, with an overall score derived from six dimensions with Likert scale responses. The overall mean IPSG compliance score across the six dimensions was 58.8 (SD=10.7) on a 0-100 standardized range. Of those dimensions included in "compliance", the one with the highest score was for "identification of surgical site" (mean=71.3). The dimension with the lowest mean compliance was "infection prevention and control" (mean=46). Details regarding PS knowledge and organizational culture, and respondents' PS compliance are available in Table 3.

In bivariate analysis, it was found that personal characteristics significantly associated with higher IPSG

compliance were: being an attendant (vs. a resident), having been exposed to PS training in the medical curriculum, working in an urban/suburban hospital (vs. a rural one), and working in day and night alternating shifts (vs. in day shifts only). Remarkably, there were no differences in compliance by gender, age, marital status, years of professional experience, type of hospital or its accreditation, or number of patients under care. Details are presented in Table 4.

Two of the four hospitals' organizational characteristics remaining in the analysis were significantly correlated with the "compliance" outcome. These were the existence of a dedicated PS/risk management office and the existence of periodic PS training in the hospitals. Having

an integrated PS program established at the hospital and conducting staff surveys on PS culture did not show significant differences in reported compliance (Details in Table 5).

Physicians' overall knowledge of PS guidelines positively correlated with compliance with recommended practices. All the knowledge dimensions composing this score were also significantly associated with "compliance". In contrast, neither the overall score of organizational culture nor any of its particular dimensions were associated with compliance. The only exception was "reporting PS events" with an inverse significant association whereby lower reporting was associated with higher compliance. Details can be found in Table 6.

Table 5: Compliance with the IPSPG by organizational characteristics as reported by physicians in public hospitals in Lebanon (2020), (n=111).

Variables	Mean (SD)	P value
Organizational characteristics		
Office for PS and risk management		
Yes	55.7 (12.1)	0.06
No/Don't know	51.8 (8.2)	
Hospital established an integrated PS program		
Yes	55.1 (7.8)	0.11
No/Don't know	51.9 (10.2)	
Standardized survey of its staff to assess its PS culture		
Yes	51.7 (14.7)	0.56
No/Don't know	53.1 (8.4)	
Periodic training program on PS		
Yes	60.3 (8.2)	<0.01
No/Don't know	51.7 (9.3)	

Table 6: Compliance with the IPSPG by knowledge and cultural characteristics as reported by physicians in public hospitals in Lebanon (2020) (n=111).

Variables	Correlation	P value
IPSPG knowledge		
Patient identification	0.3244	<0.01
Effective communication	0.4463	<0.01
Safety of high-alert medications	0.3951	<0.01
Surgical site Identification	0.4967	<0.01
Infection prevention and control	0.4057	<0.01
Patient risk for falling	0.6268	<0.01
Overall knowledge	0.5449	<0.01
Overall score	0.55	<0.01
IPSPG culture		
Teamwork	-0.10	0.28
Staffing and work pace	-0.05	0.63
Organizational learning/ improvement	0.14	0.14
Response to error	-0.12	0.21
Supervisor support for PS	0.05	0.58
Communication about error	-0.09	0.32
Communication openness	0.03	0.79
Reporting PS events	-0.19	0.04
Hospital management support for PS	0.00	0.10
Handoffs information exchange	-0.03	0.76
Overall score	-0.07	0.44

Table 7: Compliance with the IPSG by personal characteristics of physicians, and PS knowledge and culture in public hospitals in Lebanon where they practiced in 2020: Multivariate linear regression model (n=111).

Variable	Coefficient	P value
Full model		
Position (residents vs. attending physicians)	3.7	0.04
Exposed to PS in the medical curriculum (yes/no)	2.4	0.10
Hospital location (urban/suburban vs. rural)	6.9	<0.01
Work schedule (Alternating vs. daytime only)	7.5	<0.01
Daily work hours (12 hours vs. more)	-4.2	0.05
Weekly work hours (40 hours vs. more)	1.3	0.60
Office for PS and risk management	5.9	<0.01
Periodic training program on PS	2.8	0.17
PS knowledge score	0.11	0.01
Reporting Patient Safety Events (0-10)	-1.04	0.02
Best fit model		
Hospital location (urban/suburban vs. rural)	8.0	<0.01
Work schedule (daytime only vs. Alternating)	-9.3	<0.01
Office for PS and risk management	6.2	<0.01
PS knowledge score	0.15	<0.01
Reporting patient safety events (0-10)	-0.8	<0.01
Adjusted R2=52,4%		

Table 8: Medical errors ever witnessed by physicians in public hospitals in Lebanon, in 2020, (n=111).

Variables	Observed	Reported (%)	Not reported (%)
N (%)	111	38 (34.2)	73 (65.77)
Inappropriate medical diagnosis	80	24 (30.00)	56 (70.00)
Error in laboratory test results	82	28 (34.15)	54 (65.85)
Error in radiology test results	57	28 (49.12)	29 (50.88)
Error in effective communication	62	28 (45.16)	34 (54.84)
Error in medication preparation and administration	56	25 (44.64)	31 (55.36)
Error during patient surgery	78	27 (34.62)	51 (65.38)
A patient infected by nosocomial infection	85	27 (31.76)	58 (68.24)
Patient fall	84	29 (34.52)	55 (65.48)
Error in patient identification	41	21 (51.22)	20 (48.78)

All significantly associated variables found in the bivariate analysis were included in a multivariate analysis to assess their independent effects on IPSG compliance among the surveyed physicians in Lebanese hospitals. In the full model, the variables with significant adjusted effects with higher compliance were: physicians who were residents compared to attending physicians, physicians in urban or suburban hospitals compared to rural ones, those with higher PS knowledge scores and those working only daytime shifts compared to those with alternating shifts. The presence of an office for PS and risk management was significantly linked to better. However, a higher frequency of PS events observed and reported was related to lower compliance ($p=0.02$). The best-fitting regression model included the hospital location, work schedule, presence of a PS office, PS knowledge score, and frequency of reporting events explained 52.5% of the variance in IPSG compliance. Details can be found in Table 7.

The study investigated medical errors ever witnessed but not reported by physicians in public hospitals in Lebanon in 2020. All 111 participating physicians had witnessed a medical error in the year before the survey, but the majority (66%) did not report the error(s). The most commonly unreported medical error was inappropriate medical diagnosis (70%), followed by a nosocomial infection in a patient (68%), error in laboratory test results (66%), patient fall (65%), and error in patient surgery (65%). The medical error with the highest reporting rate was an error in patient identification (51%) and an error in radiology test results (49%). Details can be found in Table 8.

DISCUSSION

This analysis of physicians working in public hospitals offers crucial insights into PS practice in Lebanon despite its limited sample. Institutional structures for PS were found to be limited, with inconsistent implementation of

audits and orientation programs across surveyed hospitals. Compliance was generally higher in urban hospitals with university affiliations, though notable exceptions suggest that location and affiliation alone don't guarantee robust PS practices. The rural public hospital in Nabatieh, for instance, reported results comparable to those of the largest public hospital in Beirut, demonstrating that smaller rural hospitals can achieve high compliance levels with sufficient physician commitment to international PS goals.

Physicians from Nabatieh who reported PS audits and orientation programs were significantly older (median age 32 years versus 28 years overall), suggesting they may hold senior positions contributing to institutional compliance. Their overlapping reports regarding both PS measures highlight a proactive stance toward PS, potentially serving as a model for other smaller institutions in resource-limited settings. These findings, though from a limited sample, emphasize that effective PS practices can be implemented with adequate commitment and leadership regardless of hospital size or location, though further research with larger samples is needed to validate these observations.

Physician engagement, institutionalized prioritization of patient safeguards, and enforced protocols appear to be vital determinants of successful implementation across the rural-urban divide. Discrepancies in PS knowledge and practice among physicians underscore an urgent need for systematic professional education and stricter institutional monitoring to uphold PS norms across all Lebanese public healthcare facilities. Building comprehensive, standardized PS training and audit processes could lead to more uniformly high standards of patient care regardless of hospital location or physician experience.

The significant association between the presence of a PS office and higher compliance with IPSG underscores the value of active monitoring and oversight mechanisms targeting physicians. As leaders in establishing PS standards, physicians may be more inclined to maintain rigorous compliance when they feel their practices are being consistently monitored through formal channels like a PS office. This accountability fosters a culture where physicians take personal responsibility for ongoing education, protocol adherence, and proactive incident reporting. Implementing robust monitoring systems could therefore drive sustained improvements in PS practices across facilities.

Hospital accreditation may be one avenue to ensure proper implementation of PS culture. In Lebanon, the Ministry of Public Health (MOPH) manages accreditation for both public and private hospitals. Historically, these accreditations focused on structural elements rather than outcomes and quality measures, highlighting the need for reform.^{12,13} Recognizing this gap, MOPH comprehensively revised its hospital accreditation

standards in December 2022, developed with the French National Authority for Health and national experts. The new standards emphasize quality management and clinical outcomes, covering critical PS areas like medication management, infection prevention, surgical safety, and high-risk situation management.¹⁴ This demonstrates MOPH's commitment to aligning Lebanon's healthcare system with international best PS practices.

Individual knowledge of IPSG is also crucial for physicians' practices. Physicians demonstrated higher knowledge in dimensions like "patient identification," which may be more intuitive, but exhibited lower knowledge and compliance in areas traditionally associated with nursing duties, such as infection prevention and control. Doctors working only daytime shifts, when nurses are more available, appeared less familiar with PS dimensions than those working alternating schedules, who may occasionally handle non-medical tasks. This occupation-based difference is evident in the concomitant study of PS among nurses in public hospitals, whose knowledge and awareness exceeded that of physicians using the same measurement tools.⁹ While nurses receive comprehensive PS protocol training, similar adapted training should be developed for physicians, as some hospitals have begun implementing PS awareness in orientation programs for residents and younger attending physicians.

Regarding error reporting, physicians tended to disregard errors related to their own medical practices while emphasizing those outside their domain. Despite all physicians witnessing medical errors, less than a third reported such events, likely relying on nursing staff for monitoring and reporting. The tendency to report radiology and laboratory errors more than medical diagnosis and surgical errors suggests a cultural bias viewing errors as causes for blame rather than opportunities for system improvement. In contrast, nurses in the same context were more likely to report various errors they noticed.⁹ These negative perceptions affecting physician compliance represent a crucial area for continued professional education.

This study has several limitations. The convenience sampling approach could introduce selection bias, and the relatively small sample size focusing on public hospitals may limit generalizability. However, non-participants were randomly distributed across specialties and experience, and only two of twenty-eight public hospitals refused access due to COVID-19 patient burdens. While a larger sample would enhance statistical power, the data likely reflect the general state of PS in public hospitals, though physician recall bias or social desirability bias may have led to overestimation of positive results and underestimation of negative aspects. Public hospitals represent only a minor component of Lebanon's hospital sector compared to private institutions. PS in private hospitals was assessed over ten years ago, showing concerns like understaffing, poor communication, and

fear of punitive responses to error reporting.^{13,15} El-Jardali et al found that rural private hospitals had more positive safety perceptions, suggesting that more affluent patients in the private sector may demand higher quality services compared to poorer patients in public hospitals.¹⁶ However, staffing and workload issues affecting PS culture were identified in both sectors.¹⁶ While competition has incentivized private hospital progress, the public system serving disadvantaged populations requires focused attention to address PS concerns through system-wide efforts promoting transparency, non-punitive error management, leadership commitment, and continuous monitoring.

Progress in patient safety across Lebanese hospitals requires concerted efforts from multiple stakeholders addressing issues at different levels. The Ministry of Public Health should implement a comprehensive training program with clear PS guidelines to effectively leverage the revised accreditation standards. A robust monitoring and evaluation framework with regular data analysis and feedback loops is essential to assess impact and identify areas for enhancement.

The Syndicate of Private Hospitals, influential in setting norms across Lebanon's hospital care system, can impact the public sector through physicians working in both sectors and by shaping patient expectations for standards of care.¹⁷ The SPH should fulfill a social responsibility role by supporting PS training and awareness needs of nearby public hospitals and encouraging collaboration and knowledge-sharing between public and private institutions. Joint training programs, workshops, and a national PS network could identify best practices and develop innovative solutions for improving outcomes. A successful example of such collaboration occurred in the United States in 2004, where hospitals, healthcare organizations, and PS experts implemented evidence-based interventions that saved an estimated 122,300 lives over 18 months.¹⁸

Hospital managers play a major role in advancing PS, even in resource-limited public rural facilities. Accreditation requirements can motivate managers, as demonstrated by successful PS implementation in Lebanese hospitals that underwent accreditation.¹⁹ Public reporting of PS improvements may attract more self-paying patients, as a study by Ammar et al found that Lebanese patients prioritize safety and quality when selecting healthcare providers.²⁰ Managers should establish and maintain PS offices, committees, and regular training programs to ensure consistent adherence to IPSG among all healthcare professionals. This cultural shift requires leadership commitment demonstrated through clear communication of objectives, resource provision, data collection and reporting, and prioritization of PS as a strategic goal.¹⁵ Regular surveys and audits can encourage patients and families to voice safety concerns and allow healthcare professionals to report issues confidentially without fear of blame. Dayekh et al

emphasized that including patient families in safety training alongside healthcare professionals can result in measurable outcome improvements.²¹

The Lebanese orders of physicians can develop specialized continued medical education modules addressing PS issues from physicians' perspectives. A systematic review by Cervero et al found that CME activities positively impact physician performance and patient outcomes.²² LOP should require PS modules during orientation for all physicians joining hospitals, aligning with WHO recommendations in the "Global Patient Safety Action Plan 2021-2030" emphasizing PS training for all healthcare professionals.²³ Some Lebanese hospitals already include PS criteria in new doctors' orientation as a voluntary measure influenced by PS-related ISO requirements.

Medical education curricula should formally prepare physicians for PS practices rather than leaving this to informal guidance from senior attendants and nursing staff. In Lebanon, 18.4% of hospital managers and directors suggested that PS integration into medical curricula would benefit patients, while 93% of medical students considered such integration important.¹⁵ This academic approach to PS education is also proposed in the WHO action plan for PS.²⁴

Research on patient safety culture remains under-prioritized in health management and policies across the MENA region, as evidenced by the scarcity of publications on this issue in Lebanon and neighboring Arab countries. Funding for PS research should be prioritized by both private and public sectors, focusing on developing and evaluating interventions to improve outcomes and exploring the long-term impact on healthcare quality, patient outcomes, and costs. This aligns with the Jeddah Declaration from the 4th Global Ministerial Summit on PS (2019), which emphasized investing in research to develop evidence-based solutions, especially in low- and middle-income countries.²⁵

Policymakers and hospital leaders should prioritize investments in PS infrastructure, training, and support systems across both public and private sectors, including establishing dedicated PS units, providing ongoing education for healthcare professionals, and fostering a culture of transparency and shared responsibility. By learning from each other's experiences, hospitals can identify best practices and develop innovative solutions to improve PS outcomes, enhancing the quality of hospital care for Lebanon's increasingly aging and fragile population.²⁶

CONCLUSION

In conclusion, addressing PS challenges in Lebanese hospitals requires participation from multiple stakeholders. Lebanon's small size facilitates cooperation among these entities. This study advances understanding

of patient safety implementation in resource-limited healthcare settings by demonstrating that effective patient safety practices can be achieved in smaller public hospitals when sufficient physician leadership and institutional commitment are present, regardless of location or university affiliation. The findings reveal that structural factors such as dedicated patient safety offices and systematic monitoring mechanisms are more predictive of compliance with IPGs than hospital size or geographic location. The research identifies critical knowledge gaps among physicians in areas traditionally managed by nursing staff and highlights physician-specific barriers to error reporting in the Middle Eastern context, providing evidence that targeted interventions focusing on physician engagement and institutional accountability can significantly improve patient safety outcomes within constrained public healthcare systems.

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