

# The current state of patient safety culture in Lebanese hospitals: a study at baseline

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## Abstract

**Objective.** The objective of this study is to conduct a baseline assessment of patient safety culture in Lebanese hospitals.

**Design.** The study adopted a cross-sectional research design and utilized the *hospital survey on patient safety culture* (HSOPSC).

**Setting.** Sixty-eight Lebanese hospitals participated in the study (54% of all hospitals).

**Participants.** A total of 6807 hospital employees participated in the study including hospital-employed physicians, nurses, clinical and non-clinical staff, and others.

**Main Outcome Measures.** The HSOPSC measures 12 composites of patient safety culture. Two of the composites (frequency of events reported and overall perception of safety), in addition to questions on patient safety grade and number of events reported, are the four outcome variables.

**Results.** Survey respondents were primarily employed in medical and surgical units. The dimensions with the highest positive ratings were teamwork within units, hospital management support for patient safety, and organizational learning and continuous improvement, while those with lowest ratings included staffing and non-punitive response to error. Approximately 60% of respondents reported not completing any event reports in the past 12 months and over 70% gave their hospitals an 'excellent/very good' patient safety grade. Bivariate and multivariate analysis revealed significant differences across hospitals of different size and accreditation status.

**Conclusions.** Study findings provide evidence that can be used by policy makers, managers and leaders who are able to create the culture and commitment needed to identify and solve underlying systemic causes related to patient safety.

**Keywords:** patient safety culture, hospitals, hospital size, accreditation, Lebanon

## Introduction

Many safety-oriented organizations develop and foster a patient safety culture which is defined as the set of shared values, attitudes, perceptions, beliefs and behaviours that support safe practices among individuals in healthcare organizations [1, 2]. Open communication, teamwork and acknowledged mutual dependency are some components of a patient safety culture [1]. A positive patient safety culture guides the behaviours of healthcare professionals towards viewing patient safety as one of their highest priorities [3]. Patient safety culture assessments are required by international accreditation agencies. Such assessments are easiest to conduct through surveys that evaluate the perception of healthcare staff on many issues such as teamwork, management and leadership support to patient safety, staffing, incident reporting and other issues pertaining to safety [4].

Assessing the organization's existing safety culture allows organizations to obtain a clear view of the patient safety aspects requiring urgent attention [5]. Safety culture assessment surveys allow hospitals to identify the strengths and weaknesses of their safety culture [5] and to help care giving units identify the patient safety problems that they have [4]. In addition it allows them to benchmark their scores with other hospitals [6].

### Regional and Lebanese context

The paucity of research on patient safety in the Eastern Mediterranean Region (EMR) and Arab countries extends to Lebanon. Unpublished evidence from an eight-country study conducted in developing economies in the EMR estimated an adverse events rate of 8.2%. Death or permanent disability was observed in 40% of the cases [7]. Accreditation was one of the first initiatives to improve quality of care at the

policy and practice levels in Lebanon. In 2000, a hospital accreditation policy was developed and implemented to assess the quality of care in hospitals [8]. Since then, two national accreditation surveys have been held. The increased awareness about accreditation processes in Lebanon has translated into development of policies to improve quality of care and ensure patient safety at a number of hospitals and increased awareness of such issues among the health workforce, administrators and caregivers [9]. A study by El-Jardali *et al.* [10] indicated that Lebanese nurses perceived an improvement in quality of care during and after accreditation.

In 2009, a new chapter on patient safety was added to the new Lebanese handbook of accreditation of hospitals. The patient safety chapter requires hospitals to assess their patient safety culture for the third national accreditation survey which will be launched in 2011. In preparation for the next accreditation survey, hospitals have been developing a range of policies and procedures to improve safety [9]. The barrier does not appear to be the lack of tools to implement patient safety standards, but their proper implementation to ensure lasting change in practice such as promoting a patient safety culture.

### Study objectives

No baseline data is available about the current state of patient safety culture in Lebanese hospitals. This study aims to help hospitals better prepare for the next national accreditation survey by providing them with data on their patient safety culture. The specific objective of the study is to conduct a baseline assessment of patient safety culture in Lebanese hospitals. This study also attempts to understand factors (related to respondents and hospitals) that may affect the patient safety aggregate score and consequently the most critical issues related to patient safety culture.

## Methods

### Study design and setting

In an effort to assist hospitals in the assessment of their patient safety culture, the investigators invited all Lebanese hospitals to participate. The study adopted a cross-sectional design utilizing an adapted and customized version of the *hospital survey on patient safety culture* (HSOPSC) developed by the Agency for Healthcare Research and Quality. All the hospitals registered in the Lebanese Syndicate of Private Hospitals (126 hospitals) were contacted and invited to participate. To compare hospitals with similar service and care characteristics, hospitals were stratified by size, geographic location and accreditation status. Ethical approval for the conduct of this work was obtained from the Institutional Review Board of the American University of Beirut.

### Measures

A pilot testing phase preceded data collection and aimed at adapting the survey to fit the Lebanese Context and to verify

that the items and questions are comprehensible and clear. The HSOPSC is designed to measure 12 composites of culture pertaining to safety. See Table 1 for composites included in this tool [11].

The survey tool was translated into Arabic since hospital employees are more comfortable answering surveys in the Arabic language. Three hospitals participated in the pilot and 74 staff members who held various positions were surveyed. The participants were asked to complete both the English and the Arabic versions of the questionnaire with a 1-week time interval between the two administrations. This was done to avoid any potential bias from recalling answers from the first survey exposure. A committee composed of three quality officers (from three hospitals that were asked to participate in the pilot) and three members of the research team discussed the results and the comments provided by the participants on the questionnaire items. According to the participants, the items that needed modifications fell under the following composites: frequency of events reported, supervisor/manager expectations and actions promoting patient safety, communication openness and non-punitive response to error. Based on the participants' comments and the committee members' suggestions, modifications were made to the survey items.

### Participants

The survey targeted hospital staff including physicians, nurses, clinical and non-clinical staff, pharmacy and laboratory staff, dietary and radiology staff, supervisors and hospital managers. Hospitals were provided with a list of job positions of eligible staff and were asked to randomly sample 50% of the personnel within the indicated positions. Some hospital managers indicated that they did not have time to follow-up on data collection. Other hospitals, and after examining the content of questionnaire, indicated that their employees would not understand the survey terminology. These hospitals decided not to participate in the project altogether.

A total of 12 250 hospital employees fit the inclusion criteria. Of the 12 250 questionnaires sent to hospitals, 6807 were returned complete yielding an overall response rate of 55.56%.

### Data analysis

*Testing for the internal consistency and reliability.* Internal consistency of the instrument was measured by calculating Cronbach's coefficient  $\alpha$  for the 12 composites. The values ranged between 0.451 and 0.801 (see Table 1). According to the HSOPSC user's guide, a Cronbach's  $\alpha \geq 0.6$  is acceptable [11] whereas Bowling [12] states that a value of 0.5 or above indicates good internal consistency. However, when using psychological constructs, lower values of Cronbach's  $\alpha$  are expected due to the diversity of the constructs being measured [13]. In a recent study which assessed the culture of safety in Turkish primary healthcare

**Table 1** Cronbach's  $\alpha$  and distribution of positive responses for survey composites

| Composites and survey items   | Average percentage of positive response <sup>a</sup> |
|---|--|
| Overall perception of safety (Cronbach's $\alpha = 0.451$ )   | 72.5   |
| It is just by chance that more serious mistakes do not happen around here (R) <sup>b</sup>  | 64.1   |
| Patient safety is never sacrificed to get more work done  | 85.3   |
| We have patient safety problems in this unit (R)  | 60.3   |
| Our policies and procedures and systems are effective in preventing errors  | 78.6   |
| Supervisor/manager expectations and actions promoting patient safety (Cronbach's $\alpha = 0.568$ )   | 66.4   |
| My supervisor/manager says a good word when he/she sees a job done according to established patient safety procedures   | 55.7   |
| My supervisor/manager seriously considers staff suggestions for improving patient safety  | 73.5   |
| Whenever pressure builds up, my supervisor/manager wants us to work faster, even if it means taking shortcuts (R)   | 53.3   |
| My supervisor/manager overlooks patient safety problems that happen over and over (R)   | 83.3   |
| Organizational learning and continuous improvement (Cronbach's $\alpha = 0.499$ )   | 78.3   |
| We are actively doing things to improve patient safety  | 91.4   |
| Mistake have led to positive changes here   | 62.2   |
| After we make changes to improve patient safety, we evaluate their effectiveness  | 80.8   |
| Teamwork within units (Cronbach's $\alpha = 0.684$ )  | 82.3   |
| People support one another in terms of work in this unit  | 90.2   |
| When a lot of work needs to be done quickly, we work together as a team to get the work done  | 84.5   |
| In this unit, people treat each other with respect  | 84.2   |
| When members of this unit get really busy, other members of the same unit help out  | 70.1   |
| Non-punitive response to error (Cronbach's $\alpha = 0.534$ )   | 24.3   |
| Staff feel like their mistakes are held against them (R)  | 18.3   |
| When an event is reported, it feels like the person is being reported, not the problem (R)  | 37.1   |
| Staff worry that mistakes they make are kept in their personnel file (R)  | 17.7   |
| Staffing (Cronbach's $\alpha = 0.479$ )   | 36.8   |
| We have enough staff to handle the workload   | 39.7   |
| Staff in this unit work long hours which might affect patient care (R)  | 33.1   |
| We use/hire temporary/part-time staff which sometimes affects patient care (R)  | 49.0   |
| When the work is in 'crisis mode' (i.e. when the work pressure is too high) we try to do too much, too quickly (R)  | 27.3   |
| Hospital management support for patient safety (Cronbach's $\alpha = 0.631$ )   | 78.4   |
| Hospital management provides a work climate that promotes patient safety  | 79.3   |
| The actions of hospital management show that patient safety is a top priority   | 80.3   |
| Hospital management seems interested in patient safety only after an adverse event happens  | 75.6   |
| Teamwork across hospital units (Cronbach's $\alpha = 0.692$ )   | 56.0   |
| Hospital units do not coordinate well with each other and this might affect patient care (R)  | 48.9   |
| There is good cooperation among hospital units that need to work together   | 70.0   |
| It is often not easy to work with staff from other hospital units (R)   | 27.5   |
| Hospital units work well together to provide the best care for patients   | 77.1   |
| Hospital handoffs and transitions (Cronbach's $\alpha = 0.739$ )  | 49.7   |
| Things 'fall between the cracks', i.e. things might go uncontrolled and get lost (e.g. medical records, medical treatment, patient information and education, discharge criteria) when transferring patients from one unit to another (R) | 58.9   |
| Important patient care information is often lost during shift changes (R)   | 57.0   |
| Problems often occur in the exchange of information across hospital units (R)   | 27.4   |
| Shift changes are problematic for patients in this hospital (R)   | 57.8   |
| Communication openness (Cronbach's $\alpha = 0.460$ )   | 57.3   |
| Staff will freely speak up if they see something that may negatively affect patient care  | 61.1   |
| Staff feel free to question the decisions or actions of those with more authority   | 53.8   |
| Staff are afraid to ask questions when something does not feel right (R)  | 56.9   |

(continued)

Continued

| Composites and survey items  | Average percentage of positive response <sup>a</sup> |
|--|--|
| Feedback and communications about error (Cronbach's $\alpha = 0.645$ )   | 68.1   |
| We are given feedback about changes put into place based on event reports  | 58.2   |
| We are informed about errors that happen in this unit  | 71.3   |
| In this unit, we discuss ways to prevent errors from happening again   | 74.5   |
| Frequency of events reported (Cronbach's $\alpha = 0.809$ )  | 68.2   |
| When a mistake is made, but is caught (noticed, discovered) and corrected before it affects the patient, how often is this reported? | 67.9   |
| When a mistake is made, but has no potential to harm the patient, how often is this reported?  | 61.9   |
| When a mistake is made that could harm the patient, but does not, how often is this reported?  | 74.9   |

<sup>a</sup>The composite-level percentage of positive responses was calculated using the following formula: [number of positive responses to the items in the composite/total number of responses to the items (positive, neutral and negative) in the composite (excluding missing responses)]  $\times$  100. <sup>b</sup>Negatively worded items that were reverse coded (R).

centres using a Turkish version of the HSOPSC, 0.40 was chosen as a cut-off value for the Cronbach's  $\alpha$  [14].

Further analysis exploring variations revealed wide variations in Cronbach's  $\alpha$  by profession of respondents. For instance, within the composite score for communication openness, nurses had the lowest Cronbach's  $\alpha$  (0.431) whereas physicians had the highest (0.610). As for the composite score measuring staffing, respondents holding positions in the administration had the lowest score (0.423) whereas pharmacists had the highest (0.572). The effect of respondent's position on their perception of factors influencing patient safety culture is an issue which requires further examination.

*Analysis of survey composite scores.* The HSOPSC is composed of 42 items that measure 12 composites. The HSOPSC included both positively and negatively worded items. Items were scored on a five-point frequency scale (including a neutral category). The percentage of positive responses for each item and composite was calculated; negatively worded items were reversed when computing per cent positive response rates. Composite-level scores were computed by summation of the items within the composite scales and dividing by the number of items with non-missing values (see Table 1).

Confirmatory factor analysis was performed to verify factor loading. Results revealed acceptable eigenvalues and per cent variance explained. All composites loaded on one factor with the exception of overall perception of safety and supervisor/manager expectations and actions promoting safety each of which loaded on two factors. Results are not detailed in this manuscript.

*Univariate analysis.* Positive responses in positively worded items were 'agree/strongly agree' or 'most of the time/always'. Positive responses in negatively worded items were 'disagree/strongly disagree' or 'never/rarely'. We defined areas of strengths as items for which 75% of respondents answer positively, whereas areas requiring improvement as those scoring below 50% [11]. The HSOPSC also includes

questions on the number of events reported over the past 12 months and the patient safety grade that respondents give to their work area/unit. Additional univariate analyses were conducted to summarize demographic characteristics of hospitals and respondents.

*Bivariate analysis.* Bivariate analyses (*t*-test and ANOVA) were used to examine differences in patient safety culture composites across hospitals of different size and accreditation status. Cross tables were constructed to examine statistical associations between hospital characteristics and patient safety grade and number of events reported.

*Multivariate regression analysis.* A multivariate model was then constructed to examine the effect of respondent and hospital characteristics on safety culture measures. An aggregate score was constructed through summation of the patient safety composites. This aggregate composite score was then regressed (using linear regression) against respondent and hospital characteristics including respondent gender, age, experience at the hospital, type of instruction from which respondent received their degrees, position at the hospital, interaction with patients, hospital accreditation status and hospital size.

Data were analysed using SPSS 17.0 at a significance level of 0.05.

## Results

### Characteristics of participating hospitals

Sixty-eight hospitals agreed to participate in the study (53.9% of all Lebanese hospitals). The characteristics of the hospitals varied with regards to hospital size, geographic region and accreditation status (Table 2).

**Table 2** Hospital characteristics and response rates

| Characteristics             | Hospitals <i>N</i> (%) | Participants                     |                                |                   |
|-----------------------------|------------------------|----------------------------------|--------------------------------|-------------------|
|                             |                        | Distributed surveys ( <i>N</i> ) | Completed surveys ( <i>N</i> ) | Response rate (%) |
| <b>Hospital size</b>        |                        |                                  |                                |                   |
| Small (<100 beds)           | 47 (69.1)              | 5966                             | 3316                           | 55.6              |
| Medium (100–199 beds)       | 17 (25.0)              | 5014                             | 2646                           | 52.8              |
| Large (≥200 beds)           | 4 (5.9)                | 1270                             | 845                            | 66.5              |
| <b>Geographic region</b>    |                        |                                  |                                |                   |
| Beirut                      | 6 (8.8)                | 1726                             | 954                            | 55.3              |
| Bekaa                       | 11 (16.2)              | 1604                             | 962                            | 60.0              |
| Mount Lebanon               | 21 (30.9)              | 4221                             | 2479                           | 58.7              |
| North                       | 18 (26.5)              | 2732                             | 1321                           | 48.4              |
| South                       | 12 (17.6)              | 1967                             | 1091                           | 55.5              |
| <b>Accreditation status</b> |                        |                                  |                                |                   |
| Yes                         | 58 (85.3)              | 10 420                           | 5767                           | 55.3              |
| No                          | 10 (14.7)              | 1830                             | 1040                           | 56.8              |

### Demographic characteristics of respondents

In total, 6807 healthcare staff members (66.8% female) completed surveys. Many respondents were less than 30 years old (45.5%) and were employed in medical units (25.6%) and surgical units (22.9%). Nurses comprised the majority of respondents (57.8%). Most respondents held technical degrees (39.2%), while 36.8% held university degrees. Respondents reported having 1–5 years of experience at the hospital (38.1%) and 77.8% reported that their work involves direct patient contact (Table 3).

### Composites and outcomes

The safety culture dimensions with the highest positive score measured teamwork within units (82.3%), hospital management support for patient safety (78.4%), and organizational learning and continuous improvement (78.3%). Dimensions scoring the lowest were hospital handoffs and transitions (49.7%), staffing (36.8%) and non-punitive response to error (24.3%) (Fig. 1).

Approximately 60% of respondents reported that they had not completed any event reports in the past 12 months (Fig. 2). Over 70% of respondents gave their hospital ‘excellent’ (18.6%) or a ‘very good’ (54.8%) patient safety grade (Fig. 3).

### Areas of strength and areas with potential for improvement

Areas of strength reflected items in the highest scoring composites. Within the composite for teamwork within units, issues reflecting employee support of their colleagues’ work, teamwork under pressure and respect were all found to be areas of strength. As for hospital management support for patient safety, items reflecting the supportive work climate, considering patient safety as a top priority and increased interest in patient safety not only after the occurrence of an

adverse event all had high positive responses. Items within the composite for organizational learning and continuous improvement also reflected areas of strength for participating hospitals.

Some composites had a low per cent positive score but still included items which appeared to be areas of strength according to respondents. For instance, within the subscale measuring supervisor/manager expectations and actions promoting patient safety, 83.3% of respondents reported that their manager does not overlook recurring patient safety problems. It is interesting to observe that all items within the composites measuring staffing and the non-punitive response to error were all found to be areas requiring improvement in participating hospitals.

### Accreditation and hospital size

Further analyses were conducted using *t*-test and ANOVA. Higher mean safety scores were observed for smaller hospitals. Higher scores were observed for accredited hospitals for both frequency of events reported and overall perception of patient safety (Table 4). Accredited hospitals were found to have higher scores on several composites (Table 4).

### Patient safety grade and number of events reported

Cross tables were created to understand trends in response to the categorical outcome variables patient safety grade and number of events reported. Respondents working in accredited hospitals were more likely to report an ‘excellent/very good’ patient safety grade (74.2%), and less likely to report a ‘poor or failing’ grade (2.3%). Moreover, respondents in accredited hospitals were more likely to report more than five events over the past year (7.7%), and less likely to report no events (57.5%) (Table 5).

### Patient safety culture aggregate score

Regression analysis revealed that respondents whose experience at the hospital ranged from 11 to 15 years or was  $\geq 21$

**Table 3** Socio-demographic and professional characteristics of respondents

| Characteristics   | N (%)       |
|---|-------------|
| <b>Gender</b>   |             |
| Female  | 4547 (66.8) |
| Male  | 2103 (30.9) |
| Missing   | 157 (2.3)   |
| <b>Age (years)</b>  |             |
| <30   | 3097 (45.5) |
| 30–45   | 2801 (41.1) |
| 46–55   | 511 (7.5)   |
| $\geq 55$   | 180 (2.6)   |
| Missing   | 218 (3.2)   |
| <b>Degrees</b>  |             |
| School degree   | 1038 (15.3) |
| University degree   | 2515 (36.8) |
| Technical degree  | 2666 (39.2) |
| Experience  | 12 (0.2)    |
| Missing   | 576 (8.5)   |
| <b>Work area/unit where respondents spend most of their work time</b> |             |
| Many different hospital units/no specific unit                        | 779 (11.4)  |
| Administration  | 619 (9.1)   |
| Medical   | 1740 (25.6) |
| Surgical  | 1562 (22.9) |
| Diagnostics   | 760 (11.2)  |
| Other   | 654 (9.6)   |
| Missing   | 693 (10.2)  |
| <b>Respondents' positions at the hospital</b>                         |             |
| Nurse   | 3934 (57.8) |
| Physician   | 251 (3.7)   |
| Pharmacist  | 69 (1.0)    |
| Other health professions  | 121 (1.8)   |
| Unit assistant/clerk/secretary/technician                             | 930 (13.7)  |
| Administration  | 204 (3.0)   |
| Quality and safety  | 115 (1.7)   |
| Other   | 753 (11.1)  |
| Missing   | 430 (6.3)   |
| <b>Experience in current hospital (years)</b>                         |             |
| <1  | 836 (12.3)  |
| 1–5   | 2591 (38.1) |
| 6–10  | 1307 (19.2) |
| 11–15   | 903 (13.3)  |
| 16–20   | 445 (6.5)   |
| $\geq 21$   | 536 (7.9)   |
| Missing   | 189 (2.8)   |
| <b>Job involves direct contact with patients</b>                      |             |
| Yes   | 5294 (77.8) |
| No  | 1239 (18.2) |
| Missing   | 274 (4.0)   |

years had 1.31 (SEM = 0.395) and 1.361 (SEM = 0.490) higher scores in the patient safety culture aggregate score (Table 6). Gender was found to be borderline significant ( $P = 0.066$ ) where females had lower scores than males ( $\beta = -0.374$ , SEM = 0.203). Moreover, significantly higher scores in the aggregate patient safety culture score were observed for nurses ( $\beta = 1.488$ , SEM = 0.293) and pharmacists ( $\beta = 3.418$ , SEM = 0.863). However, administrative staff had a significantly lower patient safety aggregate score ( $\beta = -1.496$ , SEM = 0.565) (see Table 6). Respondents who had no interaction with patients were found to have a significantly lower patient safety culture composite score ( $\beta = -4.043$ , SEM = 0.269). Additionally, respondents working at accredited hospitals were found to have a significantly higher patient safety culture composite score ( $\beta = 1.014$ , SEM = 0.265) (Table 6). Respondents working at medium-sized hospitals were found to have a  $-0.631$  (SEM = 0.196) lower score whereas those working at large-sized hospitals were found to have a  $-1.658$  (SEM = 0.298) lower patient safety culture composite score (see Table 6).

### Discussion

To our knowledge, this study is the first of its kind to systematically investigate the current state of patient safety culture in Lebanese hospitals. Survey respondents were primarily employed in medical units and surgical units. The dimensions with the highest positive ratings were teamwork within units, hospital management support for patient safety, and organizational learning and continuous improvement, while those with lowest ratings included staffing and non-punitive response to error. Approximately 60% of respondents reported not completing any event reports in the past 12 months and over 70% gave their hospitals an 'excellent/very good' patient safety grade. Bivariate and multivariate analysis revealed significant differences across hospitals of different size and accreditation status.

The study results revealed that communication and hospital handoffs and transitions affect the patient safety culture in Lebanese hospitals. Many respondents reported difficulty working with staff from other units and admitted that major problems occur in the exchange of information across units. Communication within and across hospital units is critical in a healthcare environment as the patient is usually treated by several healthcare practitioners and specialists in multiple settings [15]. Evidence has shown that communication problems are major contributors to adverse events [16]. High quality and safe care depends on the ability of healthcare providers to communicate well with patients and with other health professionals [17]. As such, difficulties in communication may jeopardize patient safety.

The majority of respondents voiced concerns about under-staffing and high workloads. In addition to being overworked [18], medical personnel in under-staffed hospitals are often faced with stress, anxiety and depression which increase the risks of catastrophic incidents [19]. Therefore, Lebanese hospitals can benefit from strategies to improve

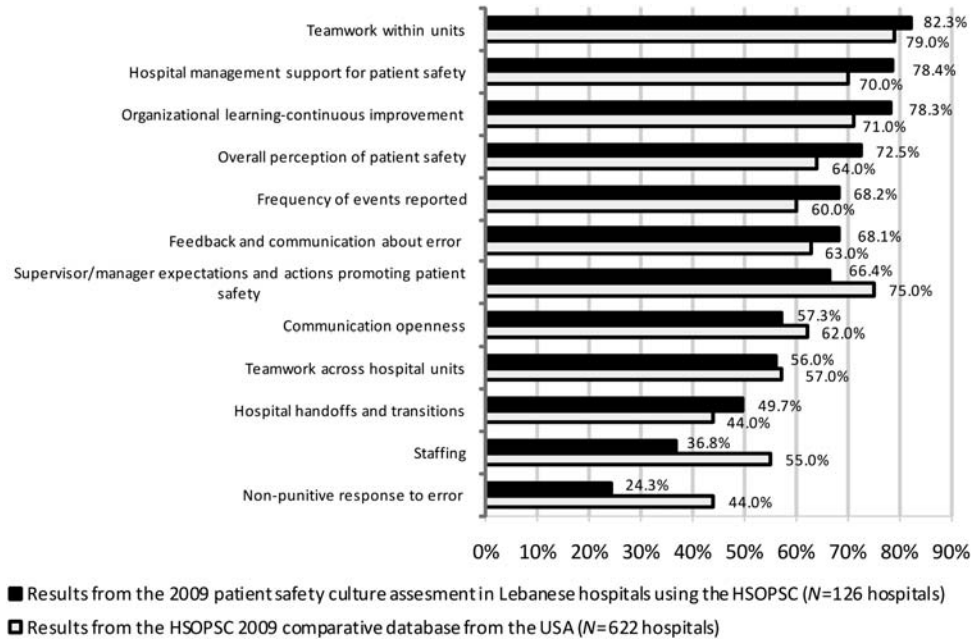


Figure 1 Composite-level average per cent positive response for all participating hospitals.

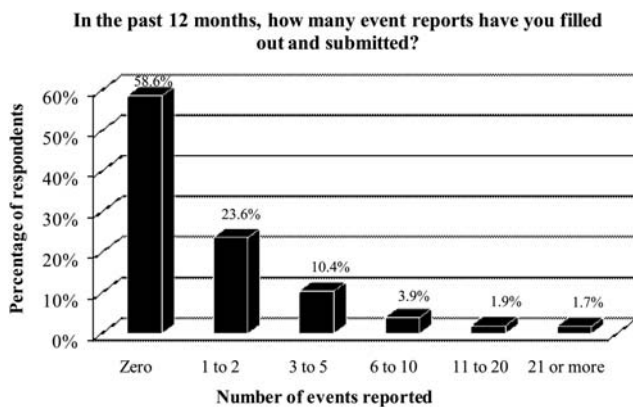


Figure 2 Percentage of respondents reporting events in the past 12 months.

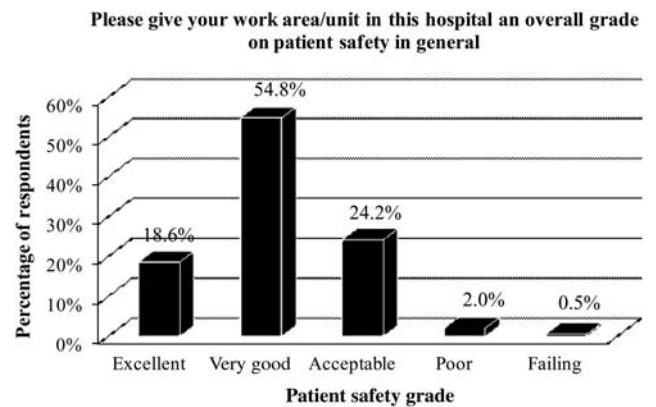


Figure 3 Percentage of respondents giving their work area/unit a patient safety grade.

working conditions are required to assist health professionals in avoiding errors and ensuring patient safety.

Patient safety improvements can only occur in learning organizations where preventive measures are taken after adverse events and near misses are identified, reported and analysed. Therefore, under-reporting of events can hinder organizational improvement specifically regarding patient safety. A study conducted by Van Geest and Cummings [20] revealed that a punitive response to error is a major barriers for disclosure of errors upon their identifications. In our study, the non-punitive response to error scored the lowest among all composites thus highlighting the presence of a punitive response to errors in Lebanese hospitals as perceived by respondents. The majority of respondents felt that their mistakes are held against them and later kept in their files.

Accreditation was found to have a positive effect on numerous patient safety culture predictors (frequency of

events reported, overall perception of safety, event reporting, patient safety grade, teamwork and communication, and the patient safety aggregate score). Quality improvement initiatives are gaining increasing attention in Lebanon [8] that accreditation has improved the quality of care in Lebanese hospitals [10]. However, staffing received lower scores in accredited hospitals. This may be due to the fact that accreditation is often viewed as an additional work requirement imposed by the administration on hospital staff [21]. Staff members are required, in addition to their work, to hold meetings and conduct quality improvement projects to meet accreditation standards [21]. This places additional workload on personnel working in already under-staffed hospitals.

Hospital size was another factor affecting the patient safety culture. Small-sized hospitals were found to have a more positive perception of safety and higher scores on event reporting and all composite scores with the exception of staffing. This

**Table 4** Comparison of means for composite scores across accreditation status and hospital size

|  | Accreditation status mean (SD) |             |                  | Hospital size mean (SD) |             |             |                  |
|--|--------------------------------|-------------|------------------|-------------------------|-------------|-------------|------------------|
|  | Yes                            | No          | <i>P</i> -value  | Small                   | Medium      | Large       | <i>P</i> -value  |
| Frequency of events reported                                 | 3.91 (1.03)                    | 3.84 (1.03) | <i>0.047</i>     | 3.95 (1.00)             | 3.87 (1.03) | 3.81 (1.08) | <i>0.001</i>     |
| Overall perception of safety                                 | 3.84 (0.69)                    | 3.71 (0.68) | <i>&lt;0.001</i> | 3.84 (0.67)             | 3.80 (0.69) | 3.76 (0.71) | <i>0.012</i>     |
| Supervisor/manager expectations and actions promoting safety | 3.67 (0.77)                    | 3.64 (0.71) | 0.255            | 3.73 (0.73)             | 3.61 (0.78) | 3.59 (0.77) | <i>&lt;0.001</i> |
| Organizational learning and continuous improvement           | 3.95 (0.65)                    | 3.85 (0.67) | <i>&lt;0.001</i> | 3.96 (0.64)             | 3.93 (0.66) | 3.88 (0.68) | <i>0.007</i>     |
| Teamwork within units  | 4.03 (0.65)                    | 3.97 (0.67) | <i>0.007</i>     | 4.06 (0.63)             | 4.02 (0.65) | 3.91 (0.69) | <i>&lt;0.001</i> |
| Communication openness                                       | 3.62 (0.89)                    | 3.50 (0.91) | <i>&lt;0.001</i> | 3.66 (0.88)             | 3.56 (0.92) | 3.49 (0.86) | <i>&lt;0.001</i> |
| Feedback and communications about error                      | 3.94 (0.89)                    | 3.74 (0.96) | <i>&lt;0.001</i> | 3.93 (0.89)             | 3.92 (0.92) | 3.83 (0.88) | <i>0.027</i>     |
| Non-punitive response to error                               | 2.60 (0.82)                    | 2.48 (0.74) | 0.082            | 2.64 (0.81)             | 2.54 (0.81) | 2.50 (0.78) | <i>&lt;0.001</i> |
| Staffing   | 2.86 (0.77)                    | 2.91 (0.73) | 0.082            | 2.94 (0.76)             | 2.79 (0.77) | 2.82 (0.73) | <i>&lt;0.001</i> |
| Hospital management support for patient safety               | 3.97 (0.80)                    | 3.91 (0.78) | <i>0.031</i>     | 4.00 (0.76)             | 3.94 (0.84) | 3.86 (0.81) | <i>&lt;0.001</i> |
| Hospital handoffs and transitions                            | 3.30 (0.86)                    | 3.30 (0.88) | 0.915            | 3.36 (0.83)             | 3.26 (0.90) | 3.22 (0.88) | <i>&lt;0.001</i> |
| Teamwork across hospital units                               | 3.40 (0.78)                    | 3.35 (0.75) | <i>0.068</i>     | 3.44 (0.74)             | 3.39 (0.82) | 3.24 (0.76) | <i>&lt;0.001</i> |

SD, standard deviation.

Italic values indicate statistical significance.

**Table 5** Distribution of two outcome variables across hospital characteristics

|                               | Patient safety grade <i>N</i> (%) |             |                 |                  | Number of events reported <i>N</i> (%) |                   |                   |                 |
|-------------------------------|-----------------------------------|-------------|-----------------|------------------|--|-------------------|-------------------|-----------------|
|                               | Excellent or very good            | Acceptable  | Poor or failing | <i>P</i> -value  | No event reports                       | 1–5 event reports | >5 events reports | <i>P</i> -value |
| Hospital size                 |                                   |             |                 |                  |  |                   |                   |                 |
| Small (<100 beds)             | 2214 (73.1)                       | 748 (24.7)  | 66 (2.2)        | 0.563            | 1600 (58.2)                            | 948 (34.5)        | 199 (7.2)         | 0.179           |
| Medium (100–199 beds)         | 1751 (74.0)                       | 553 (23.4)  | 61 (2.6)        |                  | 1235 (59.1)                            | 684 (32.7)        | 172 (8.2)         |                 |
| Large (≥200 beds)             | 550 (72.5)                        | 187 (24.6)  | 22 (2.9)        |                  | 389 (58.2)                             | 240 (35.9)        | 39 (5.8)          |                 |
| Hospital accreditation status |                                   |             |                 |                  |  |                   |                   |                 |
| Yes                           | 3871 (74.2)                       | 1224 (23.5) | 121 (2.3)       | <i>&lt;0.001</i> | 2687 (57.5)                            | 1621 (34.7)       | 361 (7.7)         | <i>0.001</i>    |
| No                            | 644 (68.8)                        | 264 (28.2)  | 28 (3.0)        |                  | 537 (64.2)                             | 251 (30.0)        | 49 (5.9)          |                 |

Italic values indicate statistical significance.

does not come as a surprise as large hospitals may face greater challenges in implementing quality work than small hospitals [22]. A study which aimed at assessing the impact of accreditation as perceived by nurses showed that the differential improvement in quality as a result of accreditation was larger in small- and medium-sized hospitals [10].

Results from the US are compared to those reported in this study in Fig. 1. Comparisons revealed that major areas of strengths were teamwork within units and the patient safety grade. The score on non-punitive response to error, although low in US hospitals (44%), was much better than the score in Lebanese hospitals (24.3%) [23]. In spite of this, US hospitals still face problems in reporting events whereby 52% of respondents reported no events in the 12 months preceding the survey in 2009. This percentage is slightly

higher in Lebanese hospitals (58.6%). Finally, staffing received a score of 36.8% in Lebanese hospitals as compared to 55% in US hospitals [23] (see Fig. 1).

Several limitations to this work need to be acknowledged. Since the majority of respondents were nurses and unit assistants/clerks/secretaries/technicians, the results reflect the perception of these two respondent groups. However, it should be noted that the sample also included physicians, pharmacists, administrative staff and quality and safety staff. Another limitation relates to the low Cronbach's  $\alpha$  values for the composite scores measuring patient safety culture at Lebanese hospitals. Such low scores may have resulted from translation to Arabic and that some terminology may be specific to the international context rather than that in Lebanese hospitals. The concept of patient safety culture is novel in.



**Table 6** Factors associated with patient safety aggregate score

|   | $\beta$         | SEM   | <i>P</i> -value  |
|---|-----------------|-------|------------------|
| Age (years)                                   |                 |       |                  |
| < 30  | Reference group |       |                  |
| 30–45   | –0.344          | 0.239 | 0.149            |
| 46–55   | –0.410          | 0.451 | 0.364            |
| ≥ 55  | –1.183          | 0.729 | 0.105            |
| Gender  |                 |       |                  |
| Male  | Reference group |       |                  |
| Female  | –0.374          | 0.203 | 0.066            |
| Experience at the hospital (years)            |                 |       |                  |
| < 1   | Reference group |       |                  |
| 1–5   | –0.248          | 0.276 | 0.368            |
| 6–10  | 0.270           | 0.331 | 0.415            |
| 11–15   | 1.313           | 0.395 | <i>0.001</i>     |
| 16–20   | 0.539           | 0.479 | 0.260            |
| ≥ 21  | 1.361           | 0.490 | <i>0.006</i>     |
| Graduated from                                |                 |       |                  |
| Technical school                              | Reference group |       |                  |
| University                                    | 0.000           | 0.209 | 0.997            |
| School  | –0.537          | 0.324 | 0.097            |
| Hospital                                      | –1.602          | 1.017 | 0.115            |
| Position at the hospital                      |                 |       |                  |
| Other   | Reference group |       |                  |
| Nurse   | 1.488           | 0.293 | <i>&lt;0.001</i> |
| Physician                                     | –0.422          | 0.540 | 0.435            |
| Pharmacist                                    | 3.418           | 0.863 | <i>&lt;0.001</i> |
| Other health professions                      | –0.066          | 0.678 | 0.922            |
| Unit assistant/clerk/<br>secretary/technician | –0.161          | 0.341 | 0.637            |
| Administration                                | –1.496          | 0.565 | <i>0.008</i>     |
| Quality and safety                            | –0.973          | 0.693 | 0.160            |
| Interaction with patients                     |                 |       |                  |
| Interaction                                   | Reference group |       |                  |
| No interaction                                | –4.403          | 0.269 | <i>&lt;0.001</i> |
| Hospital accreditation status                 |                 |       |                  |
| Non-accredited                                | Reference group |       |                  |
| Accredited                                    | 1.041           | 0.265 | <i>&lt;0.001</i> |
| Hospital size                                 |                 |       |                  |
| Small   | Reference group |       |                  |
| Medium  | –0.631          | 0.196 | <i>0.001</i>     |
| Large   | –1.658          | 0.298 | <i>&lt;0.001</i> |
| Constant                                      | 35.701          | 0.755 | <i>&lt;0.001</i> |
| <i>N</i>                                      | 5511            |       |                  |
| <i>R</i> <sup>2</sup>                         | 0.104           |       |                  |

SEM, standard error of the mean.

Italic values indicate statistical significance.

Lebanese hospitals and this may partially explain the variable scores across survey composites. Finally, the response rate was 55.56%, another potential limitation. However, this is comparable to the average US hospital response rate of 52% [23].

## Conclusion

Patient safety should be a top strategic priority for policy makers, managers, leaders and frontline staff. In order to promote patient safety practices, countries in the region should invest in assessing patient safety culture in their healthcare organizations.

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