OPEN

Overview of Patient Safety Culture in Bosnia and Herzegovina With Improvement Recommendations for Hospitals

Šehad Draganović, PhD and Guido Offermanns, PhD*†*

Objectives: This study investigates the patient safety culture (PSC) in Bosnia and Herzegovina (BiH). We identify factors that contribute to higher patient safety and improved reporting of adverse events, thereby developing recommendations to improve PSC.

Methods: The study used a correlation design based on cross-sectional surveys in the healthcare sector of BiH (N = 2617). We analyzed the correlation between 9 PSC factors, 4 background characteristics (explanatory variables), and 2 outcome variables (patient safety grade and number of events reported). We also analyzed the variance to determine perceived differences in PSC across the various staff roles in hospitals.

Results: The highest rated PSC factors were Hospital handoffs and transitions and Hospital management support for patient safety and the lowest rated factor was Nonpunitive response to error. Each of the 9 factors showed considerable potential to improve from a hospital, department, and outcome perspective. A comparison of the various employee positions shows significant differences in the PSC perceptions of managers versus nurses and doctors as well as nurses versus doctors.

Conclusions: We found average scores for most PSC factors, leaving the considerable potential for improvement. Compared with the number of events reported and background characteristics, it is evident that PSC factors contribute significantly to patient safety. These factors are essential for the targeted development of PSC. We propose evidence-based practices as recommendations for improving patients' safety factors.

Key Words: hospital survey, patient safety culture, safety climate, hospital improvement, Bosnia and Herzegovina

(*J Patient Saf* 2022;18: 760–769)

The number of adverse events (AEs) that result from inadequate hospital provisions is substantial.[1–6] Recent studies have shown frequencies of up to 17.7% for AEs and 8.4% for preventable AEs.[7–11] Internationally, these incidents are the main cause of morbidity and mortality in health care sector[12,13] and a considerable burden on health care systems. For instance, an estimated 10% to 15% of healthcare expenditures can directly be attributed to the effects of patient safety incidents.[14,15]

Bosnia and Herzegovina (BiH) is located in the Balkan region of southeastern Europe, with an overall population of 3,301,000 and a gross domestic product (GDP) of 20.164 billion dollars.[16] An EU candidate member state since September 2016,[17] the country's economy has been steadily growing since 2013. However, unemployment in BiH remains high (18.44%),[18] its administrative apparatus (e.g., social system, healthcare and education system) is inefficient, and corruption is widespread.[19] The availability and quality of healthcare in BiH do not meet the needs of the population. Trust in the health system is alarmingly low amid rampant corruption.[20] According to the Lancet study of 2017, healthcare in BIH is the poorest in the region, ranking 76th among 195 countries.[21] These problems, including high unemployment, government deficits, and corruption substantially impact the country's overall development. Bosnia and Herzegovina needs to adopt new measures to enhance its safety, stability, and attractiveness, or risk collapsing in the long term.

One of the recommendations for reducing AEs is to develop a patient safety culture (PSC),[22] which is proven to reduce AE[23–25] and improve patient outcomes.[26] Patient safety culture is defined as a set of individual and group values, attitudes, skills, strategies and methods, or organization and behavior aimed at providing the safest possible health care.[27]

Recent years have seen the introduction of various instruments such as error reporting systems[28] and surgical safety checklists[29] to ameliorate PSC in healthcare organizations.[30] However, these instruments did not have the desired effect in all hospitals and countries.[31–33] For instance, studies have shown that introducing surgical safety checklists has not always led to a significant reduction in mortality and complication rates in surgical wards.[34–36] These studies conclude that the development of PSC[31,37–40] is necessary, in which these instruments (such as checklists or error reporting systems) can be grounded.[41]

When introducing such instruments, the overall system (structures, processes, results) must be taken into account. Realizing and improving PSC is thus an organizational and managerial task, shaped by the management's commitment and requiring several strategic measures. It is imperative to enact specific organizational management measures and organizational changes.[42–44] The primary prerequisite for developing a PSC is to develop targeted measurements.[45–47] To improve PSC, healthcare management must first understand how employees perceive their organizations' PSC.[48]

Currently, there are no data available on PSC in BiH. Thus, this study's primary goals are to evaluate the PSC in BiH and create a database for future strategic decisions to develop a better PSC. This also warrants an investigation into the relation between the factors of PSC and patient safety. Finally, the secondary goals are to provide the hospitals with recommendations for actions (e.g., standard handover reports) analogous to the PSC results of this study.

METHODS

Design and Setting

This correlational research is based on cross-sectional data, using the Bosnian adaption of the "Hospital Survey on Patient Safety Culture for Bosnia and Herzegovina" (HSOPSC-BiH).[49] Between September 2016 and February 2017, the survey was conducted in 9 hospitals in as many cities in BiH. The questionnaires were paper based as the insufficient technological infrastructure proved to be insufficient. Participants had the option of taking the empty questionnaire from a box in each unit and depositing completed

From the *University of Klagenfurt, Faculty of Management and Economics, Department of Organization, Human Resources, and Service Management, Klagenfurt; and †Karl Landsteiner Society, Institute for Hospital Organization, Vienna, Austria.

Correspondence: Šehad Draganović, PhD, University of Klagenfurt, Universitätsstraße 65-67, 9020 Klagenfurt am Wörthersee, Austria (e-mail: sehad.draganovic@aau.at).

The authors disclose no conflict of interest.

TABLE 1. Questionnaire Covering HSOPSC-BiH and Outcome Variables

Variable	Category	n	N%
What is your primary work area or unit in this hospital?	Many different hospital units/no specific unit	80	3.1%
	Medicine (nonsurgical)	450	17.2%
	Surgery	503	19.2%
	Radiology	84	3.2%
	Pediatrics	116	4.4%
	Emergency department	34	1.3%
	Intensive care unit (any type)	144	5.5%
	Psychiatry/mental health	170	6.5%
	Rehabilitation	250	9.6%
	Pharmacy	12	0.5%
	Laboratory	34	1.3%
	Anesthesiology	129	4.9%
	Other	279	10.7%
	No response	332	12.7%
What is your position in this hospital?	Nurse/registered nurse	1504	57.5%
	Doctor/specialist/assistant	515	19.7%
	Other health worker	231	8.8%
	Manager	134	5.1%
	Other	115	4.4%
	No response	118	4.5%
How long have you worked in this hospital?	<1 y	187	7.1%
	1–5 y	330	12.6%
	6–10 y	512	19.6%
	11–15 y	378	14.4%
	16–20 y	326	12.5%
	≥21 y	807	30.8%
	No response	77	2.9%
How long have you worked in your current work area/unit?	<1 y	269	10.3%
	1–5 y	507	19.4%
	6–10 y	635	24.3%
	11–15 y	370	14.1%
	16–20 y	285	10.9%
	≥21 y	467	17.8%
	No response	84	3.2%
Typically, how many hours per week do you work at this hospital?	<20 h/wk	23	0.9%
	20–39 h/wk	602	23.0%
	40–59 h/wk	1614	61.7%
	60–79 h/wk	208	7.9%
	80–99 h/wk	39	1.5%
	≥100 h/wk	35	1.3%
	No response	96	3.7%
How long have you worked in your current specialty or profession?	<1 y	197	7.5%
	1–5 y	419	16.0%
	6–10 y	530	20.3%
	11–15 y	354	13.5%
	16–20 y	319	12.2%
	≥21 y	685	26.2%
	No response	113	4.3%

(Continued next page)

TABLE 1. *(Continued)*

Variable	Category	n	N%
In the past 12 mo, how many event reports have you filled out and submitted?	No event reports	1827	69.8%
	1–2 event reports	446	17.0%
	3–5 event reports	131	5.0%
	6–10 event reports	52	2.0%
	11–20 event reports	21	0.8%
	≥21 event reports	13	0.5%
	No response	127	4.9%
Please assess your work area/unit in this hospital on overall patient safety.	Failing	18	0.7%
	Poor	96	3.7%
	Acceptable	693	26.5%
	Very good	936	35.8%
	Excellent	708	27.1%
	No response	166	6.3%
	Total	2617	100.0%

n, absolute frequencies; N%, relative frequencies.

questionnaires in the second box. Data collection took between 2 and 4 weeks at each hospital and was conducted in cooperation with the respective hospital manager. The survey encompassed all health professionals used at these hospitals; they could answer during or outside of their working hours. The hospitals were divided into 3 categories: small (1–199 hospital beds), medium (200–399 hospital beds), and large (400 or more hospital beds). We also defined 13 work areas and 5 staff roles within these work areas (Table 1). Ethical approval was obtained from the ethics committee of the University Clinical Center Tuzla (No 02-09/2-30/17), ethics committee of the University Clinical Center of the Republic of Srpska (No 01-9-621.2/16), and ethics committee of the Public Institution of Hospital Travnik (No 7409).

The Questionnaire

The survey was conducted using the HSOPSC-BiH, adapted from the HSOPSC and psychometrically tested based on empirical data from BiH.[49] The HSOPSC-BiH has 29 items across 9 factors: 4 unit factors (Supervisors and managers' expectations and actions promoting safety; Teamwork within units; Communication openness and feedback on errors; and Nonpunitive response to errors), three hospital factors (Hospital management support for patient safety; Teamwork across hospital units; and Hospital handoffs and transitions) and 2 outcome factors (Overall perceptions of safety and continuous improvement; and Frequency of event reporting). All items are based on 5-point Likert scale ratings ("strongly disagree" [1] to "strongly agree" [5]) or frequency ("never" [1] to "always" [5]).

The HSOPSC-BiH includes several demographic background variables (e.g., Primary work area, Staff position, Period in Current Hospital or Period in this Profession), 8 of which were used in the analysis, along with 2 outcome items (Tables 1, 3). The item "Please assess your work area/unit in this hospital on overall patient safety" (referred to here as the Patient safety grade) is advocated by Sorra and Dyer[50] as the most reliable outcome variable for overall patient safety and was used in their study and numerous other studies as an outcome variable.[51–55] The second outcome item "In the past 12 months, how many event reports have you filled out and submitted?" relates to the Number of events reported (see last 2 items in the Table 1).

Statistical Analysis

We used descriptive statistics to present background and study variables (Table 1). The factors were split into unit, hospital, and outcome levels and depicted accordingly (Table 2). The Spearman correlation was conducted to determine the relationship between 6 explanatory variables (Patient Safety Grade, Number of Events Reported, Period in Current Hospital, Period Worked in Current Unit, Hours Worked per Week, Period in this Profession) and the 9 factors of PSC (Table 3). Subsequently, we analyzed the variance for all professional groups (Table 4).[56] All analyses were based on the Statistical Package for Social Sciences (SPSS) 24.

RESULTS

Sample Characteristics

The questionnaire was distributed to all employees present at the time, resulting in 2617 participants (response rate, 54%). The response rate across hospitals ranged from 38% to 86%. Based on size definitions, 63.6% of healthcare professionals worked in large hospitals, 27.2% in medium hospitals, and 9.2% in small hospitals. The sample distribution based on the respondents' primary work areas, role, experience, work hours, and time spent in current specialty/hospital as well as the outcome variables of frequency of events reported and PSC perceptions can be found in Table 1.

Overall Patient Safety

The mean values for items based on 5-point Likert scale ratings ("strongly disagree" to "strongly agree") or frequency ("never" to "always") were calculated. All mean values less than 3 are to be interpreted as negative ("strongly disagree" and "disagree"). The mean value 3 is neutral (neither agree nor disagree). All mean values of factors greater than 3 are to be interpreted as positive values ("strongly agree" and "agree"). The mean values of all 4 unit-level variables are greater than 3, with "Nonpunitive response to error" just above this threshold (M = 3.03). The factors on the hospital level lie between 3.56 and 3.83, and the mean values of the outcome factors show satisfying values between 3.68 and 3.71. Table 2 lists the descriptive statistics of the 9 factors.

TABLE 2. Descriptive Statistics for HSOPSC-BiH

Variable	n	M	SD	95% CI		Sk	Ku
				−	+		
Unit level							
Supervisor, manager expectations and actions promoting safety	2538	3.58	0.94	3.52	3.62	−0.800	0.268
Teamwork within units	2486	3.68	0.86	3.59	3.68	−0.873	0.378
Communication openness and feedback about error	2403	3.45	0.81	3.39	3.47	−0.319	−0.336
Nonpunitive response to error	2379	3.03	0.87	2.93	3.01	0.046	−0.641
Hospital level							
Hospital management support for patient safety	2498	3.78	0.84	3.67	3.75	−0.946	0.967
Teamwork across hospital units	2485	3.56	0.78	3.45	3.53	−0.576	0.084
Hospital handoffs and transitions	2431	3.83	0.68	3.76	3.83	−0.713	0.730
Outcome							
Overall perceptions of safety and continuous improvement	1958	3.68	0.67	3.65	3.72	−0.773	1.063
Frequency of event reporting	2437	3.71	1.11	3.6	3.71	−0.572	−0.600

n, absolute frequencies; M, mean; SD, standard deviations; CI, confidence interval; Sk, skewness; Ku, kurtosis.

Factors Associated With Patient Safety Grade and Number of Events Reported

The Spearman correlations revealed that all factors correlate with the Patient safety grade and that a moderate connection/correlation can be seen in all unit-level factors. Thus, all correlations at the unit-level factors are significant. In comparison, the hospital's factors correlate more strongly ($P < 0.01\%$) with Patient safety grade. The 2 factors Hospital management support for patient safety and Teamwork across hospital units show a slightly higher correlation than the factor Hospital handoffs and transitions. Both outcome factors correlate with Patient safety grade. Overall perceptions of safety and continuous improvement show a moderate correlation, whereas Frequency of event reporting shows little correlation. All other variables, Number of events reported, Period in current hospital, Period worked in current unit, Hours worked per week, and Period in this profession, show little correlation with the factors. Moreover, the duration of employment and weekly working hours were not correlated with the 9 factors.

Comparison of Different Staff Roles

In the variance analysis, we differentiated between the mean values of the 4 different professional groups. Welch analysis of variance (ANOVA) revealed significant differences between at least 2 groups for all factors. The results indicate no significant differences for the first (Supervisor, manager expectations and actions promoting safety) and third factors (Communication openness and feedback about error). Managers rated Teamwork within units significantly higher than did other professional groups. The last unit factor, Nonpunitive response to error, showed a significant difference between nurses and managers. In terms of hospital factors, managers' ratings of Hospital management support for patient safety and Teamwork across hospital units were significantly higher than that of nurses and doctors. Moreover, the post hoc analysis results revealed that the latter factor is perceived to be significantly better by nurses than by doctors. Hospital handoffs and transitions showed that nurses were significantly less critical than doctors. Among the outcome factors, the key finding is that nurses are more likely to report incidents in the reporting system than doctors. This factor is relevant when analyzing the overall number of incidents reported annually; approximately 70% of the hospital staff surveyed did not report a single incident over the last 12 months.

DISCUSSION

This study evaluated PSC in BiH hospitals using HSOPSC-BiH. Overall, the results reveal considerable potential for improvement in PSC at all levels. The highest scores were given to Hospital handoffs and transitions, Hospital management support for patient safety, and Frequency of event reporting. These results are comparable with those of other studies.[51,55,57]

Hospital handoffs and transitions can have low values because of medical errors, treatment delays, increased risk of malpractice, and repeated treatments.[58–61] The good values obtained in this study cannot be explained based on background variables as there is hardly any correlation. Introducing effective interventions to improve handovers is of high priority for patient safety in BiH. Consequently, a first intervention could be to introduce standard handover reports, which may significantly reduce the number of errors and adverse events.[61]

Hospital management support for patient safety is one of the most widely discussed PSC factors in patient safety literature.[62–64] Managers shape an organization's culture by their preferences, resources, rewards, punishments, preoccupations, responses to organizational crises, etc.[65] The good results in BiH might be a result of a suitable management culture or management behavior. Research has shown that participative leadership has a positive effect on PSC in hospitals.[64,66,67] These results illustrate the benefits of implementing participative leadership and educational campaigns for managers.[68,69] The 2 strategic measures could play a significant role in improving hospital management support for patient safety.[70]

Establishing an error response system can be the first step toward a more open-minded hospital culture.[6] Simply introducing such a system might, however, be inadequate to improve PSC and reduce errors.[33] An effective error reporting system requires a bundle of additional management measures (e.g., training, building trust, publishing successful measures).[30,71,72] Another critical aspect of handling such a system: the easier the handling, the more incidents will be reported.[64,71,73] All hospitals surveyed had an error reporting system in place, which might be the main reason for this factor's high values. However, the number of incidents reported suggests that there remains considerable potential for improvement.

TABLE 3. Inferential Statistics With 9 Factors

	Patient Safety Grade	No. Events Reported	Period in Current Hospital	Period Worked in Current Unit	Hours Worked Per Week	Period in This Profession
Unit level						
Supervisor, manager expectations and actions promoting safety	rs = 0.320* (n = 2381)	rs = 0.058† (n = 2421)	rs = −0.055† (n = 2471)	rs = −0.044‡ (n = 2464)	rs = −0.013 (n = 2452)	rs = −0.056† (n = 2436)
Teamwork within units	rs = 0.323* (n = 2335)	rs = 0.035 (n = 2370)	rs = −0.044‡ (n = 2417)	rs = −0.024 (n = 2409)	rs = −0.021 (n = 2401)	rs = −0.057† (n = 2379)
Communication openness and feedback about error	rs = 0.363* (n = 2271)	rs = 0.127* (n = 2307)	rs = 0.016 (n = 2340)	rs = 0.016 (n = 2333)	rs = 0.018 (n = 2325)	rs = −0.015 (n = 2310)
Nonpunitive response to error	rs = 0.258* (n = 2245)	rs = 0.091* (n = 2283)	rs = −0.022 (n = 2314)	rs = 0.004 (n = 2310)	rs = 0.016 (n = 2302)	rs = −0.017 (n = 2286)
Hospital level						
Hospital management support for patient safety	rs = 0.437* (n = 2360)	rs = 0.034 (n = 2396)	rs = −0.030 (n = 2438)	rs = −0.009 (n = 2429)	rs = −0.028 (n = 2421)	rs = −0.035 (n = 2402)
Teamwork across hospital units	rs = 0.406* (n = 2348)	rs = 0.017 (n = 2379)	rs = −0.021 (n = 2424)	rs = −0.025 (n = 2417)	rs = −0.044‡ (n = 2405)	rs = −0.036 (n = 2387)
Hospital handoffs and transitions	rs = 0.300* (n = 2293)	rs = 0.030 (n = 2329)	rs = −0.055† (n = 2372)	rs = −0.040 (n = 2364)	rs = −0.010 (n = 2357)	rs = −0.032 (n = 2340)
Outcome						
Overall perceptions of safety and continuous improvement	rs = 0.407* (n = 1845)	rs = 0.044 (n = 1888)	rs = 0.004 (n = 1909)	rs = 0.011 (n = 1902)	rs = −0.028 (n = 1900)	rs = 0.002 (n = 1898)
Frequency of event reporting	rs = 0.296* (n = 2314)	rs = 0.051‡ (n = 2338)	rs = 0.038 (n = 2375)	rs = 0.035 (n = 2369)	rs = −0.016 (n = 2361)	rs = 0.034 (n = 2345)

*$P = 0.001$.

†$P = 0.01$.

‡$P = 0.05$.

rs, Spearman correlation coefficient.

TABLE 4. HSOPSC-BiH Factors—Comparison Between Staff Roles

Factor	Group	n	M	SD	95% CI −	95% CI +	ANOVA/Welch	Post Hoc‡
Supervisor, manager expectations and actions promoting safety	A: Nurse/registered nurse	1459	3.55	0.95	3.50	3.60	$F(3.422) = 3.006$, $P = 0.030$†	
	B: Doctor/specialist/assistant	507	3.65	0.92	3.57	3.73		
	C: Other health workers	225	3.53	0.97	3.40	3.66		
	D: Managers	126	3.74	0.81	3.60	3.88		
	Total	**2317**	**3.58**	**0.94**	**3.54**	**3.62**		
Teamwork within units	A: Nurse/registered nurse	1422	3.66	0.87	3.62	3.71	$F(3.429) = 7.656$, $P = 0.001$†	D
	B: Doctor/specialist/assistant	498	3.66	0.89	3.58	3.74		D
	C: Other health workers	219	3.67	0.85	3.56	3.78		D
	D: Managers	127	3.96	0.66	3.84	4.07		
	Total	**2266**	**3.68**	**0.86**	**3.64**	**3.72**		
Communication openness and feedback about error	A: Nurse/registered nurse	1391	3.44	0.80	3.40	3.48	$F(3.2199) = 1.406$, $P = 0.239$*	
	B: Doctor/specialist/assistant	493	3.51	0.82	3.44	3.59		
	C: Other health workers	207	3.41	0.76	3.31	3.52		
	D: Managers	112	3.51	0.80	3.36	3.66		
	Total	**2203**	**3.46**	**0.80**	**3.43**	**3.49**		
Nonpunitive response to error	A: Nurse/registered nurse	1369	2.98	0.88	2.93	3.03	$F(3.2173) = 4.276$, $P = 0.005$*	D
	B: Doctor/specialist/assistant	480	3.07	0.86	2.99	3.15		
	C: Other health workers	214	3.01	0.88	2.89	3.13		
	D: Managers	114	3.26	0.78	3.11	3.40		
	Total	**2177**	**3.02**	**0.87**	**2.98**	**3.05**		
Hospital management support for patient safety	A: Nurse/registered nurse	1442	3.77	0.84	3.72	3.81	$F(3.431) = 7.009$, $P = 0.001$†	D
	B: Doctor/specialist/assistant	503	3.73	0.89	3.65	3.81		D
	C: Other health workers	220	3.86	0.75	3.76	3.96		
	D: Managers	127	4.02	0.66	3.91	4.14		
	Total	**2292**	**3.78**	**0.84**	**3.75**	**3.81**		
Teamwork across hospital units	A: Nurse/registered nurse	1437	3.58	0.76	3.54	3.62	$F(3.414) = 11.664$, $P = 0.001$†	D
	B: Doctor/specialist/assistant	500	3.40	0.86	3.32	3.48		ACD
	C: Other health workers	217	3.61	0.76	3.50	3.71		
	D: Managers	123	3.78	0.61	3.67	3.89		
	Total	**2277**	**3.55**	**0.78**	**3.52**	**3.59**		
Hospital handoffs and transitions	A: Nurse/registered nurse	1413	3.87	0.67	3.83	3.90	$F(3.2224) = 4.075$, $P = 0.007$*	
	B: Doctor/specialist/assistant	489	3.78	0.68	3.72	3.84		A
	C: Other health workers	207	3.73	0.66	3.64	3.82		
	D: Managers	119	3.87	0.64	3.75	3.99		
	Total	**2228**	**3.83**	**0.67**	**3.81**	**3.86**		
Overall perceptions of safety and continuous improvement	A: Nurse/registered nurse	1134	3.71	0.65	3.68	3.75	$F(3.295) = 5.365$, $P = 0.001$†	
	B: Doctor/specialist/assistant	426	3.57	0.74	3.50	3.64		
	C: Other health workers	157	3.76	0.59	3.67	3.86		
	D: Managers	85	3.76	0.51	3.65	3.87		
	Total	**1802**	**3.69**	**0.67**	**3.66**	**3.72**		
Frequency of event reporting	A: Nurse/registered nurse	1400	3.79	1.10	3.73	3.85	$F(3.2228) = 4.548$, $P = 0.003$*	A
	B: Doctor/specialist/assistant	501	3.60	1.11	3.50	3.70		
	C: Other health workers	13	3.62	1.05	3.48	3.76		
	D: Managers	118	3.73	1.07	3.54	3.93		
	Total	**2232**	**3.73**	**1.10**	**3.68**	**3.77**		

Data in bold are total data for each factor.

*Equal variances assumed: 1-way ANOVA, Tukey HSD post hoc test.

†Equal variances not assumed: Welch test, Tamhane post hoc test.

‡Letters A, B, C, and D represent an independent group with a significantly higher mean value.

CI, confidence interval; M, mean; n, absolute frequencies; SD, standard deviations.

Approximately 70% of the participants did not report a single incident in the last 12 months, and only approximately 25% of the participants reported 1 or more incidents (Table 1). This warrants introducing simple and easily managed systems, appropriate management measures, and a nonpunitive environment for a well-functioning error reporting system.[74]

The factors Supervisor, manager expectations and actions promoting safety; Teamwork within units; Teamwork across hospital units; and Overall perceptions of safety and continuous improvement yielded average results and are comparable to those of Slovenia.[75]

The supervisor's perceptions were rather negative as opposed to those of hospital management, potentially because of the middle management's inconsistent implementation of safety guidelines. A key aspect when evaluating PSC is to test the consistency between the policies postulated at the organizational level and their implementation at all sublevels.[76] This underlines the importance of regularly checking the implementation of all guidelines, ideally by a supervisor well versed in participative leadership and behavior (e.g., motivating employees). Participative leadership is positively correlated with staff perceptions of supervisory leadership support for patient safety[64]; it positively influences management success, employee performance, and employee satisfaction.[77–79]

Efforts to enhance Teamwork within and across units are immensely high on the agenda in health care[80] as failures in this area account for 68% of adverse effects.[81] To improve teamwork, many hospitals have introduced various training programs such as Crew Resource Management (CRM), Medical Team Training (MTT), and Team Strategies and Tools to Enhance Performance and Patient Safety (TeamSTEPPS). Several studies have revealed the positive changes in teamwork resulting from such programs.[82–84] This study's results act as a signal for the importance of introducing such programs and of implementing other tools such as handover reports, checklists, briefings, etc, as they have a positive influence on team communications[85,86] and improve the overall treatment process.[87,88]

The low mean value of the outcome factor Overall perceptions of safety and continuous improvement reflects the overall PSC situation in BiH. The previously mentioned recommendations will have to be implemented along with error management training[89] and debriefings[90] to improve the results.

The factors Nonpunitive response to error and Communication openness and feedback about error score very low. A recent meta-analysis comparing many studies conducted worldwide revealed that the factor Nonpunitive response to error generally exhibits low values.[91] A study conducted in Iran showed similar findings, whereby the factors regarding communication had the lowest scores.[92]

Norms of openness are characterized by a nonpunitive environment in which health professionals feel safe to voice their concerns. Open communication channels enable health professionals to share information and knowledge and ask for help.[93] Studies have shown proof of the positive correlation between open communication and PSC.[67,73,94] Norms of openness are conducive to a nonpunitive environment and open communication channels, leading to an improvement in PSC.[94]

Our results suggest the existence of a so-called blame culture in BiH, whereby the staff do not dare highlight flaws in the system. This is confirmed by the respondents' commentaries, whereby "negative incidents were not reported for fear of sanctions." These results call for focusing on system failures rather than blaming individuals to ultimately reduce the mortality rate and the number of adverse events and costs incurred.[95]

The findings obtained from inferential statistics indicated that all 9 factors correlate to some extent with the outcome variable Patient safety grade. All other variables, Number of events reported, Period in current hospital, Period worked in current unit, Hours worked per week, and Period in this profession barely correlate with the PSC factors. Above all, this shows that the number of reported events and employment duration do not influence communication, teamwork, handovers, etc. Other studies indicate a different phenomenon whereby PSC decreases with employment years in a specific unit.[96] This might be because the more experienced healthcare professionals are, the less likely they are to be satisfied with hospital processes and systems.[54]

A comparison of professional groups yielded valuable findings in terms of developing PSC. The analysis results show that nurses and doctors significantly differ in only 2 factors (Hospital handoffs and transitions and Frequency of event reporting), whereby nurses perceived better handovers and higher rate of error reporting in the system. In comparison, managers responded with significantly better evaluations than doctors and nurses for Teamwork with units, Teamwork across hospital units, Hospital Management support for patient safety, and Nonpunitive response to error.

Limitations

This study was conducted in 9 hospitals only and cannot be considered a national study. Another limitation is that PSC was solely measured using a questionnaire. Comprehensive PSC measurement would call for using additional methods such as interviews or observations. Moreover, the study at hand presents but a snapshot of the PSC status in BiH and should ideally be conducted repeatedly across time. The results are comparable with international studies with unchanged factors only.

Implications of Findings

The study at hand raises awareness of PSC, which is no simple undertaking, as health professionals and patients in BiH are confronted with inconceivable problems in highly developed countries. The results present a sound basis for the Ministry of Health to develop further measures to improve healthcare sector performance. Each hospital surveyed is contacted to share the results, set their priorities accordingly, and implement the recommended course of action. All hospitals outside the scope of this survey can estimate their PSC status using the confidence intervals.

Future Research Directions

As a next step, this study should be repeated to enable longitudinal analysis. Then, health professionals should be interviewed to gain insights into the underlying causes of and possible explanations for the results obtained in both studies. Moreover, future studies might integrate other aspects influencing PSC (and the healthcare systems as a whole) into their research. For instance, 30 participants in the present study reported that BiH has yet to overcome considerable challenges in terms of its difficult political situation, poor infrastructure, corruption, brain drain, etc. Including these aspects might represent rewarding avenues for future research.

CONCLUSIONS

The PSC in BiH is on an average level and needs to be improved. We demonstrate that all 9 PSC factors have considerable potential to improve from a hospital, department, and outcome perspective. However, new measures are required to improve the PSC. The results presented in this study can act as a sound basis for such an endeavor.

ACKNOWLEDGMENTS

The authors thank the participants for participating in the interviews and completing the evaluation survey. The authors also

thank all the hospitals involved for their support in enabling this study. The authors thank Dr Nikoloz Gambashidze for his comments on an earlier draft of this manuscript.

REFERENCES

1. Aranaz-Andrés JM, Aibar-Remón C, Limón-Ramírez R, et al. Prevalence of adverse events in the hospitals of five Latin American countries: results of the 'Iberoamerican Study of Adverse Events' (IBEAS). *BMJ Qual Saf*. 2011;20:1043–1051.
2. Aranaz-Andrés JM, Aibar-Remón C, Vitaller-Burillo J, et al. Impact and preventability of adverse events in Spanish public hospitals: results of the Spanish National Study of Adverse Events (ENEAS). *Int J Qual Health Care*. 2009;21:408–414.
3. Zegers M, de Bruijne MC, Wagner C, et al. Adverse events and potentially preventable deaths in Dutch hospitals: results of a retrospective patient record review study. *Qual Saf Health Care*. 2009;18:297–302.
4. Sousa P, Uva AS, Serranheira F, et al. Estimating the incidence of adverse events in Portuguese hospitals: a contribution to improving quality and patient safety. *BMC Health Serv Res*. 2014;14:311.
5. Schwendimann R, Blatter C, Dhaini S, et al. The occurrence, types, consequences and preventability of in-hospital adverse events—a scoping review. *BMC Health Serv Res*. 2018;18:521.
6. Institution of Medicine; Committee on Quality of Health Care in America. *To Err Is Human*. Kohn LT, Corrigan JM, Donaldson MS, eds. Washington, DC: National Academies Press; 2000.
7. Andrews LB, Stocking C, Krizek T, et al. An alternative strategy for studying adverse events in medical care. *Lancet*. 1997;349:309–313.
8. Baker GR, Norton PG, Flintoft V, et al. The Canadian Adverse Events Study: the incidence of adverse events among hospital patients in Canada. *CMAJ*. 2004;170:1678–1686.
9. Davis P, Lay-Yee R, Briant R, et al. Adverse events in New Zealand public hospitals I: occurrence and impact. *N Z Med J*. 2002;115:U271.
10. Michel P, Quenon JL, de Sarasqueta AM, et al. Comparison of three methods for estimating rates of adverse events and rates of preventable adverse events in acute care hospitals. *BMJ*. 2004;328:199.
11. Vincent C, Neale G, Woloshynowych M. Adverse events in British hospitals: preliminary retrospective record review. *BMJ*. 2001;322: 517–519.
12. Jha AK, Larizgoitia I, Audera-Lopez C, et al. The global burden of unsafe medical care: analytic modelling of observational studies. *BMJ Qual Saf*. 2013;22:809–815.
13. de Vries EN, Ramrattan MA, Smorenburg SM, et al. The incidence and nature of in-hospital adverse events: a systematic review. *Qual Saf Health Care*. 2008;17:216–223.
14. Zhan C, Miller MR. Excess length of stay, charges, and mortality attributable to medical injuries during hospitalization. *JAMA*. 2003;290: 1868–1874.
15. Slawomirski L, Auraaen A, Klazinga N. The economics of patient safety: Strengthening a value-based approach to reducing patient harm at national level. *OECD Health Working Papers*, No. 96, Paris: OECD Publishing; 2017.
16. The World Bank. Bosnia and Herzegovina. January 1, 2021. Available at: https://data.worldbank.org/country/bosnia-and-herzegovina. Accessed January 12, 2021.
17. European Commission. Enlargement: candidate countries and potential candidates. May 29, 2019. Available at: https://ec.europa.eu/environment/enlarg/candidates.htm. Accessed January 18, 2021.
18. Statista. Bosnia-Herzegovina: unemployment rate from 1999 to 2020. November 11, 2020. Available at: https://www.statista.com/statistics/453933/unemployment-rate-in-bosnia-herzegovina/. Accessed January 12, 2021.
19. Jarke H, Džindo A, Jakob L. Healthcare access in Bosnia and Herzegovina in the light of European Union accession efforts. *South Eastern Eur J Public Health (SEEJPH)*. 2019.
20. Transparency International. The Analysis of the Legal-Institutional Framework and Policies for Prevention the Analysis of the Legal-Institutional Framework and Policies for Prevention of Corruption in Health in Bosnia and Herzegovina has been published. A memorandum of understanding: Analiza pravonoinstitucionalnog okivra i politika prevencije korupije u zdravstvenom sektoru BiH. January 1, 2019. Available at: https://healthworks.ti-health.org/projects/curing-the-unhealthy-health-system-in-bosnia-and-herzegovina/. Accessed January 28, 2021.
21. GBD 2015 Healthcare Access and Quality Collaborators. Healthcare Access and Quality Collaborators. Healthcare Access and Quality Index based on mortality from causes amenable to personal health care in 195 countries and territories, 1990–2015: a novel analysis from the Global Burden of Disease Study 2015. *Lancet*. 2017;390:231–266.
22. National Patient Safety Foundation. *Free From Harm: Accelerating Patient Safety Improvement Fifteen Years After to Err Is Human*. Boston, MA: National Patient Safety Foundation; 2015.
23. Mardon RE, Khanna K, Sorra J, et al. Exploring relationships between hospital patient safety culture and adverse events. *J Patient Saf*. 2010;6: 226–232.
24. Najjar S, Nafouri N, Vanhaecht K, et al. The relationship between patient safety culture and adverse events: a study in palestinian hospitals. *Saf Health*. 2015;1:27.
25. Wang X, Liu K, You LM, et al. The relationship between patient safety culture and adverse events: a questionnaire survey. *Int J Nurs Stud*. 2014; 51:1114–1122.
26. Singer S, Lin S, Falwell A, et al. Relationship of safety climate and safety performance in hospitals. *Health Serv Res*. 2009; 44:399–421.
27. Emanuel L, Berwick D, Conway J, et al. What exactly is patient safety? In: Henriksen K, Battles JB, Keyes MA, et al, eds. Advances in Patient Safety: New Directions and Alternative Approaches (Vol. 1: Assessment). Rockville (MD): Agency for Healthcare Research and Quality, 2008.
28. Leape LL. Reporting of adverse events. *N Engl J Med*. 2002;347: 1633–1638.
29. Haynes AB, Weiser TG, Berry WR, et al. A surgical safety checklist to reduce morbidity and mortality in a global population. *N Engl J Med*. 2009; 360:491–499.
30. Moumtzoglou A. Factors that prevent physicians reporting adverse events. *Int J Health Care Qual Assur*. 2010;23:51–58.
31. Naveh E, Katz-Navon T, Stern Z. Readiness to report medical treatment errors: the effects of safety procedures, safety information, and priority of safety. *Med Care*. 2006;44:117–123.
32. Chassin MR, Galvin RW. The urgent need to improve health care quality. Institute of Medicine National Roundtable on Health Care Quality. *JAMA*. 1998;280:1000–1005.
33. Jeffs L, Law M, Baker GR. Creating reporting and learning cultures in health-care organizations. *Can Nurse*. 2007;103:16–17, 27–28.
34. Urbach DR, Govindarajan A, Saskin R, et al. Introduction of surgical safety checklists in Ontario, Canada. *N Engl J Med*. 2014;370: 1029–1038.
35. Reames BN, Krell RW, Campbell DA, et al. A checklist-based intervention to improve surgical outcomes in Michigan: evaluation of the Keystone Surgery program. *JAMA Surg*. 2015;150:208–215.
36. de Jager E, McKenna C, Bartlett L, et al. Postoperative adverse events inconsistently improved by the World Health Organization surgical safety checklist: a systematic literature review of 25 studies. *World J Surg*. 2016; 40:1842–1858.

37. Vogus TJ, Sutcliffe KM. The impact of safety organizing, trusted leadership, and care pathways on reported medication errors in hospital nursing units. *Med Care*. 2007;45:997–1002.
38. Bosk CL, Dixon-Woods M, Goeschel CA, et al. Reality check for checklists. *Lancet*. 2009;374:444–445.
39. Pronovost P, Needham D, Berenholtz S, et al. An intervention to decrease catheter-related bloodstream infections in the ICU. *N Engl J Med*. 2006; 355:2725–2732.
40. Pronovost PJ, Goeschel CA, Colantuoni E, et al. Sustaining reductions in catheter related bloodstream infections in Michigan intensive care units: observational study. *BMJ*. 2010;340:c309.
41. Gandhi TK, Kaplan GS, Leape L, et al. Transforming concepts in patient safety: a progress report. *BMJ Qual Saf*. 2018;27:1019–1026.
42. Schrappe M. Patientensicherheit in Deutschland: Wo stehen wir im Jahr 2020? *Präv Gesundheitsf*. 2013;8:49–55.
43. Schrappe M. Patient safety: a topic of the future, the future of the topic [in German]. *Bundesgesundheitsblatt Gesundheitsforschung Gesundheitsschutz*. 2015;58:4–9.
44. Lauterbach K, Lüngen M, Schrappe M. *Gesundheitsökonomie, Management Und Evidence Based Medicine: Handbuch Für Praxis, Politik Und Studium*. Bonn: Schattauer; 2010.
45. Manser T, Brösterhaus M, Hammer A. You can't improve what you don't measure: safety climate measures available in the German-speaking countries to support safety culture development in healthcare. *Z Evid Fortbild Qual Gesundhwes*. 2016;114:58–71.
46. An J, Kim SJ, Park S, et al. The effects of patient education on patient safety: can we change patient perceptions and attitudes?: lessons from the Armed Forces Capital Hospital in Korea. *Int J Qual Health Care*. 2017;29: 392–398.
47. Tricarico P, Castriotta L, Battistella C, et al. Professional attitudes toward incident reporting: can we measure and compare improvements in patient safety culture? *Int J Qual Health Care*. 2017;29:243–249.
48. Nieva VF, Sorra J. Safety culture assessment: a tool for improving patient safety in healthcare organizations. *Qual Saf Health Care*. 2003; 12(Suppl 2):ii17–ii23.
49. Draganović Š, Offermanns G, Davis RE. Adaptation of the Agency for Healthcare Research and Quality's 'Hospital survey on Patient Safety Culture' to the Bosnia and Herzegovina context. *BMJ Open*. 2021; 11:e045377.
50. Sorra JS, Dyer N. Multilevel psychometric properties of the AHRQ hospital survey on patient safety culture. *BMC Health Serv Res*. 2010; 10:199.
51. Danielsson M, Nilsen P, Rutberg H, et al. A national study of patient safety culture in hospitals in Sweden. *J Patient Saf*. 2019;15:328–333.
52. Olsen E. Workers' perceptions of safety culture at a hospital [In Norwegian]. *Tidsskr Nor Laegeforen*. 2007;127:2656–2660.
53. Karimi S, Yaghoubi M, Rahi F, et al. Patient's safety culture form the viewpoint of nurses working at selected charity, private, and public hospitals of Isfahan. *Int J Health Syst Disas Manag*. 2015;3:36–40.
54. El-Jardali F, Dimassi H, Jamal D, et al. Predictors and outcomes of patient safety culture in hospitals. *BMC Health Serv Res*. 2011;11:45.
55. Wagner C, Smits M, Sorra J, et al. Assessing patient safety culture in hospitals across countries. *Int J Qual Health Care*. 2013;25:213–221.
56. Field AP. *Discovering Statistics Using IBM SPSS Statistics*. 5th ed. Sussex: SAGE; 2018.
57. Vlayen A, Hellings J, Claes N, et al. A nationwide hospital survey on patient safety culture in Belgian hospitals: setting priorities at the launch of a 5-year patient safety plan. *BMJ Qual Saf*. 2012;21:760–767.
58. Apker J, Mallak LA, Gibson SC. Communicating in the "gray zone": perceptions about emergency physician hospitalist handoffs and patient safety. *Acad Emerg Med*. 2007;14:884–894.
59. Ye K, McD Taylor D, Knott JC, et al. Handover in the emergency department: deficiencies and adverse effects. *Emerg Med Australas*. 2007; 19:433–441.
60. Greenberg CC, Regenbogen SE, Studdert DM, et al. Patterns of communication breakdowns resulting in injury to surgical patients. *J Am Coll Surg*. 2007;204:533–540.
61. Starmer AJ, O'Toole JK, Rosenbluth G, et al. Development, implementation, and dissemination of the I-PASS handoff curriculum: a multisite educational intervention to improve patient handoffs. *Acad Med*. 2014;89:876–884.
62. Zohar D. Safety climate and beyond: a multi-level multi-climate framework. *Saf Sci*. 2008;46:376–387.
63. Flin R, Mearns K, O'Connor P, et al. Measuring safety climate: identifying the common features. *Saf Sci*. 2000;34:177–192.
64. Zaheer S, Ginsburg L, Chuang YT, et al. Patient safety climate (PSC) perceptions of frontline staff in acute care hospitals: examining the role of ease of reporting, unit norms of openness, and participative leadership. *Health Care Manage Rev*. 2015;40:13–23.
65. Schein EH. Organizational culture. *Am Psychol*. 1990;45:109–119.
66. Frankel A, Grillo SP, Pittman M, et al. Revealing and resolving patient safety defects: the impact of leadership WalkRounds on frontline caregiver assessments of patient safety. *Health Serv Res*. 2008;43: 2050–2066.
67. Verschoor KN, Taylor A, Northway TL, et al. Creating a safety culture at the Children's and Women's Health Centre of British Columbia. *J Pediatr Nurs*. 2007;22:81–86.
68. Pettker CM, Thung SF, Norwitz ER, et al. Impact of a comprehensive patient safety strategy on obstetric adverse events. *Am J Obstet Gynecol*. 2009;200:492.e1–492.e8.
69. Allard J, Bleakley A, Hobbs A, et al. Pre-surgery briefings and safety climate in the operating theatre. *BMJ Qual Saf*. 2011;20:711–717.
70. Sacks GD, Shannon EM, Dawes AJ, et al. Teamwork, communication and safety climate: a systematic review of interventions to improve surgical culture. *BMJ Qual Saf*. 2015;24:458–467.
71. Garbutt J, Waterman AD, Kapp JM, et al. Lost opportunities: how physicians communicate about medical errors. *Health Aff (Millwood)*. 2008;27:246–255.
72. VanGeest JB, Cummins DS. *An Educational Needs Assessment for Improving Patient Safety: Results of a National Study of Physicians and Nurses*. Boston, MA: National Patient Safety Foundation; 2003.
73. Cohen MM, Kimmel NL, Benage MK, et al. Implementing a hospitalwide patient safety program for cultural change. *Jt Comm J Qual Saf*. 2004;30: 424–431.
74. Smits M, Wagner C, Spreeuwenberg P, et al. Measuring patient safety culture: an assessment of the clustering of responses at unit level and hospital level. *Qual Saf Health Care*. 2009;18:292–296.
75. Robida A. Perception of patient safety culture in Slovenian acute general hospitals. *Slov Med J*. 2013;82:648–660.
76. Zohar D, Hofmann DA. Organizational culture and climate. In: Kozlowski Steve WJ, ed. *The Oxford Handbook of Organizational Psychology*. Oxford: University Press; 2012:643–666.
77. Derue D Scott, Craig J, Wellman E, et al. Trait and behavioral theories of leadership: an integration and meta-analytic test of their relative validity. *Pers Psychol*. 2011;64:7–52.
78. Judge TA, Piccolo RF. Transformational and transactional leadership: a meta-analytic test of their relative validity. *J Appl Psychol*. 2004;89: 755–768.
79. Judge TA, Piccolo RF, Ilies R. The forgotten ones? The validity of consideration and initiating structure in leadership research. *J Appl Psychol*. 2004;89:36–51.

80. Costar DM, Hall KK. Improving team performance and patient safety on the job through team training and performance support tools: a systematic review. *J Patient Saf*. 2020;16:S48–S56.

81. The Joint Commission. National patient safety goals effective. January 15, 2021. Available at: https://www.jointcommission.org/standards/national-patient-safety-goals/. Accessed February 12, 2021.

82. Hughes AM, Gregory ME, Joseph DL, et al. Saving lives: a meta-analysis of team training in healthcare. *J Appl Psychol*. 2016;101:1266–1304.

83. Boet S, Bould MD, Fung L, et al. Transfer of learning and patient outcome in simulated crisis resource management: a systematic review. *Can J Anaesth*. 2014;61:571–582.

84. Nielsen PE, Goldman MB, Mann S, et al. Effects of teamwork training on adverse outcomes and process of care in labor and delivery: a randomized controlled trial. *Obstet Gynecol*. 2007;109:48–55.

85. Kleiner C, Link T, Maynard MT, et al. Coaching to improve the quality of communication during briefings and debriefings. *AORN J*. 2014;100: 358–368.

86. Porter AJ, Narimasu JY, Mulroy MF, et al. Sustainable, effective implementation of a surgical preprocedural checklist: an "attestation" format for all operating team members. *Jt Comm J Qual Patient Saf*. 2014; 40:3–9.

87. Mukhopadhyay D, Wiggins-Dohlvik KC, MrDutt MM, et al. Implementation of a standardized handoff protocol for post-operative admissions to the surgical intensive care unit. *Am J Surg*. 2018;215:28–36.

88. Krimminger D, Sona C, Thomas-Horton E, et al. A multidisciplinary QI Initiative to improve OR-ICU handovers. *Am J Nurs*. 2018;118:48–59.

89. Keith N, Frese M. Effectiveness of error management training: a meta-analysis. *J Appl Psychol*. 2008;93:59–69.

90. van Dyck C, Frese M, Baer M, et al. Organizational error management culture and its impact on performance: a two-study replication. *J Appl Psychol*. 2005;90:1228–1240.

91. Okuyama JHH, Galvao TF, Silva MT. Healthcare professional's perception of patient safety measured by the hospital survey on patient safety culture: a systematic review and meta-analysis. *ScientificWorldJournal*. 2018; 2018:9156301.

92. Azami-Aghdash S, Ebadifard Azar F, Rezapour A, et al. Patient safety culture in hospitals of Iran: a systematic review and meta-analysis. *Med J Islam Repub Iran*. 2015;29:251.

93. Chuang YT, Ginsburg L, Berta WB. Learning from preventable adverse events in health care organizations: development of a multilevel model of learning and propositions. *Health Care Manage Rev*. 2007;32: 330–340.

94. Liu Y, Kalisch BJ, Zhang L, et al. Perception of safety culture by nurses in hospitals in China. *J Nurs Care Qual*. 2009;24:63–68.

95. Berwick DM. Improvement, trust, and the healthcare workforce. *Qual Saf Health Care*. 2003;12(suppl 1):i2–i6.

96. Bodur S, Filiz E. A survey on patient safety culture in primary healthcare services in Turkey. *Int J Qual Health Care*. 2009;21:348–355.