


Patient Safety Culture and Associated Factors Among Health Care Providers in Bale Zone Hospitals, Southeast Ethiopia: An Institutional Based Cross-Sectional Study

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Musa Kumbi¹
Abduljewad Hussen¹ 
Abate Lette¹
Shemsu Nuriye²
Geroma Morka³

¹Department of Public Health, Goba Referral Hospital, Madda Walabu University, Goba, Ethiopia; ²Department of Public Health, College of Health Science and Medicine, Wolayta Sodo University, Sodo, Ethiopia; ³Department of Nursing, Goba Referral Hospital, Madda Walabu University, Goba, Ethiopia

Introduction: Patient safety is a serious global public health issue and a critical component of health care quality. Unsafe patient care is associated with significant morbidity and mortality throughout the world. In Ethiopia health system delivery, there is little practical evidence of patient safety culture and associated factors. Therefore, this study aims to assess patient safety culture and associated factors among health care providers in Bale Zone hospitals.

Methods: A facility-based cross-sectional study was undertaken using the “Hospital Survey on Patient Safety Culture (HSOPSC)” questionnaire. A total of 518 health care providers were interviewed. Analysis of variance (ANOVA) was employed to examine statistical differences between hospitals and patient safety culture dimensions. We also computed internal consistency coefficients and exploratory factor analysis. Bivariate and multivariate linear regression analyses were performed using SPSS version 20. The level of significance was established using 95% confidence intervals and a p-value of <0.05.

Results: The overall level of patient safety culture was 44% (95% CI: 43.3–44.6) with a response rate of 93.2%. Factor analysis indicated that hours worked per week, participation in a patient safety program, reporting of adverse events, communication openness, teamwork within hospital, organizational learning and exchange of feedback about error were among factors that were significantly associated with the patient safety culture.

Conclusion: According to the Agency for Health Research and Quality, the overall classification of patient safety score and most of the scores related to dimensions were low. Hours worked per week, participation in a patient safety program, reporting of adverse events and most safety dimensions were found to be factors associated with patient safety culture. Well-designed patient safety interventions need to be integrated with organizational policies to address all dimensions of patient safety culture.

Keywords: patient safety culture, health care providers, Bale Zone hospitals

Introduction

Patient safety is a serious global public health issue which is defined as the prevention of harm to patients with an emphasis on the system of care delivery that prevents errors, learns from the errors that do occur and is built on a culture of safety that involves health care professionals, organizations, and patients.^{1,11} Patient safety is a critical component of health care quality.² Even though the estimates of the size of the problem are scarce, particularly in developing and transitional countries, it is likely that millions

Correspondence: Abate Lette
Department of Public Health, Goba Referral Hospital, Madda Walabu University, PO Box 274, Goba, Ethiopia
Email abate.lette@yahoo.com

of patients worldwide suffer disabilities, injuries or death every year due to unsafe medical care.³

Patient safety culture has been defined as the values shared among organization members about what is important, their beliefs about how things operate in the organization, and the interaction of these within work unit and organizational structures and systems, which together produce behavioral norms in the organization that promote safety.^{4,5} Achieving a culture of safety requires an understanding of the values, beliefs, and norms about what is important in an organization and what attitudes and behaviors related to patient safety are expected and appropriate.⁶

Due emphasis should be given to addressing disparities in quality of care as the challenges of the current system may worsen if efforts fail to narrow the gaps. Quality and safety have been recognized as key issues in establishing and delivering accessible, effective and responsive health systems. The success of Ethiopia's Health Sector Transformational Plan (HSTP) will mainly be measured by the quality of health service and how well-equitable health outcomes are achieved.⁷ Unsafe patient care is associated with significant morbidity and mortality rates throughout the world, much of which may be amenable to timely intervention.⁸ Globally, an estimated average of 10% of all inpatient admissions result in a degree of accidental patient harm, and it is estimated that up to 75% of these gaps in health care delivery are preventable.⁹

In developing countries, the probability of a patient being harmed in hospitals is high, with the risk of health care-associated infection as much as 20 times higher than in developed countries.¹⁰ The African Region is particularly challenged by a lack of constructive assessments, comprehensive policies and strategies for patient safety, and health systems in Africa are in massive need of rapid evolution.⁷ A study conducted in eight developing countries indicated that of the 15,548 records reviewed 8.2% showed at least one adverse event, with a range of 2.5% to 18.4% per country. Of those adverse events, 83% were preventable and 30% were associated with the death of the patients.¹¹ According to a study done at Cairo University Hospitals, only 48.5% of the study participants reported the occurrence of patient safety events in their corresponding departments. The majority of respondents (79.3%) felt that errors are held against them and later kept in their files.^{12,27} Only 26.13% of studied nurses recorded high perceptions for overall patient safety culture. Two-third (77.90%) of respondents reported no adverse events during the last 6 months.^{13,28}

In Ethiopia, the overall patient safety score was (46%) . The overall patient safety grade as rated by the participants was acceptable (58.4%) and poor (20.1%).^{14,16} Working hours, level of staffing, teamwork, communication openness, reporting an event, and exchange of feedback about error were associated with patient safety culture.^{15,20} Circumstantial evidence shows that almost all errors committed during patient treatment have been treated traditionally through blaming and shaming. In addition to this, most medical errors are not reported and/or are hidden. To our knowledge, little work has been done on patient safety culture in other parts of Ethiopia. As the level of patient safety culture varies from one area to the other, the levels of patient safety culture and contributing factors also vary from one context to the other. The main aim of this study is to assess the level of patient safety culture and verify associated factors in Bale Zone Hospitals, Southeast Ethiopia.

Methods and Materials

Study Design, Area and Period

A facility-based cross-sectional design was conducted from February 1 to February 30, 2017, in Bale Zone hospitals, in south-eastern Ethiopia. In this zone, there are four functional government hospitals (Goba, Robe, Ginnir, and Delomena Hospitals). The hospitals deliver health services in many specialty areas including gynecology and obstetrics, surgery, pediatrics and child health, internal medicine, ophthalmology, psychiatry, and dentistry. This study targets health care providers of hospitals, like physicians, dentists, nurses, ophthalmologists, health officers, midwives, psychiatrists, pharmacists, physiotherapists, environmental and occupational health practitioners, anesthetists, laboratory and radiology staff.

Inclusion Criteria

All health care providers who have worked at least for 6 months prior to data collection were included.

Exclusion Criteria

Health care providers that were on education, long-term training, and extended leave at the time of survey distribution were excluded.

Sample Size Determination and Techniques

According to the data gathered from Bale Zone hospitals, the total number of health care providers currently on the job for at least 6 months in the hospitals at the time of data collection was 556. Since the number of health care

providers are manageable, all the health care providers fulfilling the inclusion criteria were included.

Data Collection Procedure and Tool

Data were collected by pretested and structured self-administered questionnaire. An English questionnaire was used as it is the main language of communication by professionals in Ethiopian hospitals. Data were collected by eight public health staff and supervised by four public health professionals with MPH degrees.

The Hospital Survey on Patient Safety Culture (HSOPSC) tool was adopted⁶ to collect data. The tool was designed to assess hospital staff opinions about patient safety issues, medical errors, and event reporting. It includes 42 items that measure 12 dimensions or composites of patient safety culture: ‘Communication openness’ (3 items), ‘Feedback and communication about errors’ (3 items), ‘Frequency of events reported’ (3 items), ‘Handoffs and transitions’ (4 items), ‘Management support for patient safety’ (3 items), ‘Non-punitive response to error’ (3 items), ‘Organizational learning–continuous improvement’ (3 items), ‘Overall perceptions of patient safety’ (4 items), ‘Staffing’ (4 items), ‘Supervisor/manager expectations and actions promoting safety’ (4 items), and ‘Teamwork across and within units’ (4 items each). The response to each item in the questionnaire was assessed using a 5-point Likert scale of agreement (from 1: “Strongly disagree” to 5: “Strongly agree”) or frequency (from 1: “Never” to 5: “Always”). The HSOPSC included both positively and negatively worded items. There were also two single-item outcome variables: the overall patient safety grade (measured on a scale of “Excellent”, “Very good”, “Acceptable”, “Poor”, and “Failing”) and the number of events reported in the past 12 months. Background characteristics and systemic variables of participants included questions related to job category, type of hospital (teaching/referral, district), work experience (overall and in the current working area), work setting, working hours per week staff position, whether they have direct interaction with patients, tenure in their work area/unit, patient safety training, participation in safety program and adverse event reporting, etc.

Data Processing and Analysis

Data were checked, edited, coded, and entered into a database using Epi-info Version 7.00 and exported to Statistical Package for Social Science (SPSS) version 20 for further analysis.

The frequency distribution of all the variables was examined to check for data entry errors. Most of the

variables were described using descriptive statistics. Negatively worded items were first reverse coded so that a higher score would indicate a more positive response.

The AHRQ⁶ recommends the use of “average positive” for calculating each item score. Percent positive is the proportion of positive responses (e.g. agree or strongly agree) to positively worded items or negative responses (e.g. disagree or strongly disagree) to negatively worded items. Composite scores were computed by adding the items within the composite scales and dividing by the total number of responses with non-missing values. We defined areas of strength as those responses for which 75% of the respondents answered positively; between 50% and 75% was considered an average response whereas areas requiring improvement were those responses that scored below 50%.⁶

To determine the reliability of the questionnaire, Cronbach’s alpha internal consistency test was used for each dimension and showed an acceptable level of internal consistency, i.e. Cronbach’s $\alpha = 0.80$. Dimensions with Cronbach’s alpha values ≥ 0.6 were subjected to principal component analysis (PCA) (Table 1). The item deletion was done in order to ensure that the Cronbach’s alpha value for each composite was at least 6. Even though there was no effect on the overall reliability, exclusion of the item “we have enough staff to handle the workload” would result in the “staffing” dimension reliability increasing from 0.16 to 0.51. Also, an exclusion of the item “Hospital management seems interested in patient safety only after an adverse event happens” would result in the “hospital management support for patient safety” dimension reliability increasing from 0.41 to 0.82.

One way analysis of variance (ANOVA) was used to compare mean scores of dimensions across hospitals and post hoc tests were conducted to identify the differences when the ANOVAs were significant.

All assumptions of factor analysis were checked using Kaiser–Meyer–Olkin test and Bartlett’s test. Accordingly, the KMO value was 0.78 which means the data were appropriate for factor analysis. Bartlett’s test of sphericity for the instrument showed sufficient inter-item correlations ($\chi^2 = 5863$; $df = 465$, $p < 0.001$). Factor analysis was employed for Likert scale instruments to extract factor(s) representing each of the scales and to obtain factor scores. Factors with eigenvalues greater than one were considered in subsequent analyses. Factor scores were computed for the item identified to represent patient safety culture dimension scale by varimax rotation. Factor loadings greater than 0.40 indicate that an item is related or associated with a given factor and retain only factor loading ≥ 0.40 .

Table 1 Percent Average Positive Response for an Item-Level and Composite Scores at Bale Zone Hospitals, Southeast Ethiopia, 2017 (N=518)

Composite and Items	^a Average Percent Positive	Mean(SD)
Teamwork within hospital units ((Cronbach's $\alpha = 0.72$))		
1. People support one another in this unit	82.2	3.99(1.06)
2. When a lot of work needs to be done quickly, we work together as a team to get the work done	78.6	3.95(1.05)
3. In this unit, people treat each other with respect	70.3	3.82(1.09)
4. When one area in this unit gets really busy, others help out	62.4	3.58(1.23)
Organizational learning – Continuous improvement (Cronbach's $\alpha = 0.65$)		
1. We are actively doing things to improve patient safety	80.5	4.03(0.95)
2. Mistakes have led to positive changes here	60.2	3.48(1.14)
3. After we make changes to improve patient safety, we evaluate their effectiveness	59.5	3.51(1.18)
Non-punitive response to error (Cronbach's $\alpha = 0.53$)		
1. Staff feel like their mistakes are held against them	26.4	2.81(1.09)
2. When an event is reported, it feels like the person is being written up, not the problem (R ^b)	31.9	2.95(1.07)
3. Staff worry that mistakes they make are kept in their personnel file (R)	35.3	2.92(1.20)
Staffing (Cronbach's $\alpha = 0.51$)		
1. We have enough staff to handle the workload	27.2	2.36(1.33)
2. Staff in this unit work longer hours than is best for patient care (R)	33	2.69(1.32)
3. We work in “crisis mode,” trying to do too much, too quickly (R)	30.7	2.77(1.28)
Overall perception of safety (Cronbach's $\alpha = 0.15$)		
1. Patient safety is never sacrificed to get more work done	42.7	3.10(1.20)
2. Our procedures and systems are good at preventing errors from happening	53.9	3.27(1.26)
3. It is just by chance that more serious mistakes do not happen around here (R)	43.1	3.11(1.23)
4. We have patient safety problems in this unit (R)	41.5	2.97(1.30)
Supervisor/manager expectations and actions promoting safety (Cronbach's $\alpha = 0.82$)		
1. My supervisor/manager says a good word when he/she sees a job done according to established patient safety procedures	42.9	2.90(1.35)
2. My supervisor/manager seriously considers staff suggestions for improving patient safety	39	2.70(1.38)
3. Whenever pressure builds up, my supervisor/manager wants us to work faster, even if it means taking shortcuts (R)	43.8	3.22(1.19)
4. My supervisor/manager overlooks patient safety problems that happen over and over (R)	41.3	3.13(1.21)
Communication openness (Cronbach's $\alpha = 0.67$)		
1. Staff will freely speak up if they see something that may negatively affect patient care	47.1	3.24(1.26)
2. Staff feel free to question the decisions or actions of those with more authority	34.2	2.95(1.20)
3. Staff are afraid to ask questions when something does not seem right (R)	43.1	3.19(1.32)
Table 4- Percent average positive response for an item-level and composite scores at Bale zone hospitals, Southeast Ethiopia, 2017(N=518) (continued...).		
Feedback and communication about error (Cronbach's $\alpha = 0.76$)		
1. We are given feedback about changes put into place based on event reports	38.8	2.89(1.32)
2. We are informed about errors that happen in this unit	36.1	3.06(1.17)
3. In this unit, we discuss ways to prevent errors from happening again	54.1	3.31(1.22)

(Continued)

Table 1 (Continued).

Composite and Items	^a Average Percent Positive	Mean(SD)
Frequency of event reporting (Cronbach's $\alpha = 0.73$)		
1. When a mistake is made, but is caught and corrected before affecting the patient, how often is this reported?	37.3	3.08(1.19)
2. When a mistake is made, but has no potential to harm the patient, how often is this reported?	34	2.80(1.19)
3. When a mistake is made that could harm the patient, but does not, how often is this reported?	40.2	3.01(1.22)
Hospital management support for patient safety (Cronbach's $\alpha = 0.82$)		
1. Hospital management provides a work climate that promotes patient safety	29.3	2.49(1.34)
2. The actions of hospital management show that patient safety is a top priority	29.7	2.66(1.29)
3. Hospital management seems interested in patient safety only after an adverse event happens (R)	32.4	2.78(1.26)
Teamwork across hospital unit (Cronbach's $\alpha = 0.64$)		
1. There is good cooperation among hospital units that need to work together	51.7	3.39(1.08)
2. Hospital units work well together to provide the best care for patients	47.5	3.25(1.14)
3. Hospital units do not coordinate well with each other (R)	42.5	3.15(1.14)
4. It is often unpleasant to work with staff from other hospital units (R)	45.2	3.25(1.11)
Table 4- Percent average positive response for an item-level and composite scores at Bale zone hospitals, Southeast Ethiopia, 2017(N=518) (continued...).		
Hospital handoffs and transitions (Cronbach's $\alpha = 0.77$)		
1. Things "fall between the cracks" when transferring patients from one unit to another (R)	31.9	2.89(1.13)
2. Important patient care information is often lost during shift changes (R)	35.3	2.98(1.11)
3. Problems often occur in the exchange of information across hospital units (R)	29	2.83(1.09)
4. Shift changes are problematic for patients in this hospital (R)	34	2.93(1.14)
Overall level of patient safety culture dimensions (Cronbach's $\alpha = 0.80$)	44	3.11(0.35)

Notes: ^a Mean percentage of positive responses calculated according to AHRQ instructions for every respondent. ^b Negatively worded items that were reverse coded (R).

Before fitting a linear regression model, first, the assumptions were checked. Accordingly, the assumption of linearity checked through scatter plot, normality checked by plotting histogram and P-P plots and homoscedasticity was checked by plotting scatter plot of standardized residuals against the standardized predicted values and all assumptions were satisfied. The Durbin Watson statistics was used to check the assumption of independence of errors and autocorrelations. Multicollinearity assumption was checked through tolerance and Variance Inflation Factor (VIF) and there was no evidence of Multicollinearity.

Simple linear regression analysis was performed, and variables with a p-value < 0.25 were exported to multivariable linear regression analysis. The significance level was declared at p-value<0.05. The categorical independent variables were entered as dummy variables. A beta coefficient with a 95% confidence interval was used to describe statistically significant

variables. Enter method was employed to enter independent variables of all models.

Data Quality Management

To ensure the completeness, accuracy, and consistency of data collection, a discussion session was held each day of the data collection period. Thorough checking was done before receiving the filled questionnaires from each data collector. After their willingness to participate in the study, data collectors and supervisors were trained for 3-day about the questioner and how to administer it. The questionnaire was pre-tested in Dodola primary hospital on 5% of the staff (i.e. 20 health care providers) before data collection to check consistency; correction was taken by identifying potential problem areas and logistic plan for data collection was done.

Operational definition level of patient safety culture: measured by the health care workers' response on the HSOPSC questionnaire for the 12 patient safety culture

dimensions (42 items) and was considered as representing an overall level of patient safety culture.

$$\% \text{ of positive responses} = \frac{\text{Number of positive responses to the items in the dimension}}{\text{Total number of responses to the items}} \times 100$$

Composite scores were computed by summation of the items within the composite scales and dividing by the number of items.⁶

Ethical Consideration

Ethical approval was obtained from the research ethics committee of Goba Referral Hospital, Madda Walabu University. Official permission letters were obtained from the Bale Zone Health Department and respective hospitals. Written informed consent was obtained from individual participants. No personal identification or name was used, and participants had full right to participate or refuse participation in this study.

Results

Background Characteristics of Respondents

Five hundred eighteen health care providers were interviewed to yield a response rate of 93.2%. Three hundred one (58.1%) of the interviewed participants were males. The mean age of the respondents was 29.1 (SD of 5.1) years and the age of the study participants ranged from 22 to 48 years. Two hundred eighty-three (54.6%) of the respondents were married, while 222 (42.9%) were single. Concerning educational status, 225 (43.4%) of the respondents held a bachelor's degree. Professionally, 225 (43.4%) of the respondents were nurses and 112 (21.6%) of respondents were working in the Gynecology & Obstetrics unit. A majority of the respondents [382 (73.7%)] had work experience of less than or equal to 5 years. Also, 514 (96.3%) respondents had direct interaction or contact with the patients and 388 (74.9%) of the respondents had not received any training on patient safety. Three hundred thirty-five (64.7%) of the respondents reported that hospital management blame them when medical errors happened (Table 2).

Patient Safety Culture Dimensions

In this study, the overall level of patient safety culture was 44% (95% CI: 43.3–44.6) and the 12 patient safety

Table 2 Background Characteristics and Systemic Factors of Participants at Bale Zone Hospitals, Southeast Ethiopia, 2017 (N=518)

Variables	Response Category	Number	Percent (%)
Sex	Male	301	58.1
	Female	217	41.9
Age	<=29	342	66
	30–44	163	31.5
	≥45	13	2.5
Religion	Orthodox	295	56.9
	Muslim	115	22.2
	Protestant	92	17.8
	Others*	16	3.1
Marital Status	Single	222	42.9
	Married	283	54.6
	Widowed/ divorced	13	2.6
Educational status	Diploma	178	34.4
	Bachelor degree	225	43.4
	Medical doctors	106	20.5
	Master degree	9	1.7
Profession	Medical doctor	106	20.5
	Nurse	225	43.4
	Midwives	71	13.7
	Laboratory technician	33	6.4
	Pharmacist	32	6.2
	Anesthetist	10	1.9
	Others**	41	8
Primary work unit	Different work area	61	11.8
	Medical	46	8.9
	Surgery	103	19.9
	Gyn.& Obstetrics	112	21.6
	Pediatrics	40	7.7
	Emergency departmentt	27	5.2
	Pharmacy	38	7.3
	Laboratory	41	7.9
	Others***	50	9.7
Work experience	<=5	382	73.7
	6–10	92	17.8
	≥11	44	8.5

(Continued)

Table 2 (Continued).

Variables	Response Category	Number	Percent (%)
Direct contact with the patients	No	19	3.7
	Yes	499	96.3
Patient safety training	No	388	74.9
	Yes	130	25.1
Participation in patient safety program	Never	376	72.6
	At least once per year	143	27.4
Ever reported adverse event	No	325	62.7
	Yes	193	37.3
Hospital management blame when medical errors happened	No	183	35.3
	Yes	335	64.7
Hours worked per week (hours)	39–59	357	68.9
	≥60	161	31.1
Inadequacy of logistic and other resource in this hospital	No	172	33.2
	Yes	346	66.8

Notes: Others* (catholic, waqeffata), others ** (health officer, radiography technician, dental health, ophthalmology, psychiatrists, emergency surgeon), others *** (outpatient department, TB clinic, ophthalmic department, X-ray department, VCT unit).

culture dimensions ranged from 30.5% to 73.2%. The dimension with the highest average percentage positive responses was “teamwork within unit” (73.4%) while the two lowest average percentage positive responses were “management support for patient safety” (30.5%) and “non-punitive response to error” (31.2%). All composite scores of dimensions were less than 50% except for “Organizational learning–continuous improvement” (66.7%) and “Teamwork within units” (73.4%) (Table 3).

Patient Safety Culture Items

Our study revealed the positive response rate for each of the items ranged from 22% to 85%. The highest positive response rate of the items was “People support one another in this unit” (82.2%), while the lowest positive response rate of the item was “We have enough staff to handle the workload (27.2%). Altogether, there were 24 items (of 41 safety culture items) with less than 50% of the average positive scores (Table 1).

Patient Safety Grade and Number of Event Reporting

Overall, 64 (12.4%) and 152 (29.3%) of the respondents rated the patient safety grade as excellent and poor, respectively (Figure 1).

The majority, 453 (87.4%) of respondents never reported any event in their hospital over the past 12 months (Figure 2).

Factors Associated with Patient Safety Culture

In the first model, the effects of the respondent’s characteristics and some systemic factors of patient safety culture were assessed. In this model, variables such as physician category of staff position, hours worked per week, primary work area (surgery and pharmacy), participation in patient safety program, and adverse event reported showed an association (Table 4).

Association Between Dimension of Safety and Level of Patient Safety Culture

In the second model, patient safety culture factor scores were included and tested the association on patient safety culture. Items with low reliability coefficients (non-punitive response to error, staffing and overall perceptions of safety) were excluded from the analysis. All composite scores were highly associated with the level of patient safety culture (P-value <0.001) and also selected for the final model (Table 5).

The multivariable analysis model explained 75% of the variance in the patient safety culture. Multivariate analysis showed that Physician profession, hours worked per week, participation in patient safety program, adverse event reported, teamwork within hospital, organizational learning, communication openness, frequency of event reporting, feedback & communication, management support for patient safety, teamwork across hospital and hospital hand-offs and transitions were found to be significantly associated with the patient safety culture (Table 6).

Discussion

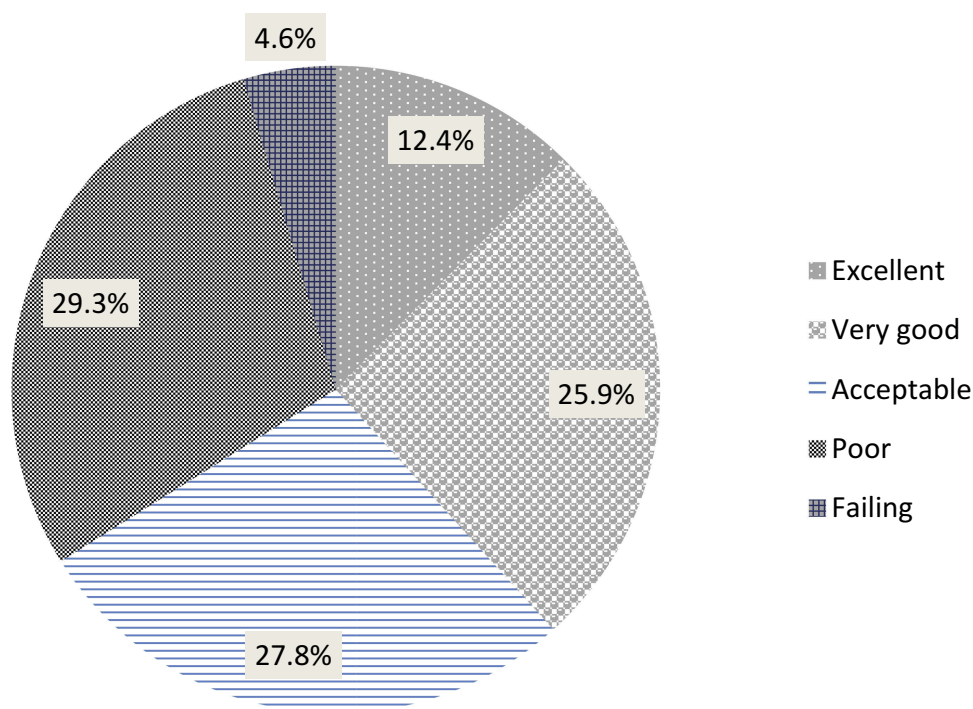
This study assessed the current status of patient safety culture in Bale Zone hospitals using the HSOPSC instrument. The present study revealed that the overall positive response rate for all dimensions of the HSOPSC survey showed that the hospitals had poor/low patient safety culture as well as areas with the potential for

Table 3 Patient Safety Culture Composite Level Results of Bale Zone Hospitals, Southeast Ethiopia, 2017(N=518)

Patient Safety Culture Dimension	Number of Items	Cronbach's Alpha	Total Variance Explained (in %)	Positive Safety Culture Score (in %)
Teamwork within units	4	0.72	55.3	73.4 (71.4–75.2)
Organizational learning – Continuous improvement	3	0.65	60	66.7 (64.4–69.0)
Non-punitive response to error	3	0.53	51.6	31.2 (28.9–33.6)
Level of staffing	4	0.51	68.5	33.9 (31.9–35.9)
Perception of patient safety	4	0.15	44.6	45.3 (43.1–47.4)
Supervisor expectations and actions promoting safety	4	0.82	68.8	41.7 (39.6–43.9)
Communication openness	3	0.67	53.4	41.5 (39–43.9)
Feedback and communication about error	3	0.76	70.5	43 (40.5–45.5)
Frequency of event reporting	3	0.73	65	37 (34.8–39.6)
Management support for patient safety	3	0.82	57.2	30.5 (28.3–32.8)
Teamwork across hospital unit	4	0.64	76.6	46.5 (44.4–48.7)
Hospital handoffs and transitions	4	0.77	59.4	33 (31–35)
Overall level of patient safety culture	42	0.80	64	44 (43.3–44.6)

improvement and some areas that require urgent improvements. The overall level of patient safety culture of this study is comparable to the findings from Jimma Zone, Amhara region, Iran and India.^{12–15} However, the present study scored lower results when compared with the findings from local study SNNP¹⁶ and other developing countries like China, Lebanon, Oman, Saudi Arabia, Taiwan, and Yemen, respectively.^{17–20} This possible

explanation for the difference might be due to the differences in organizational behavior between countries. Those countries might have better management values, organizational commitments, leadership and relationships within hospital staff. Other possible reasons might be due to high economic development and those countries which had initiated patient safety issue early compared to our country.¹⁵

**Figure 1** Patient safety grade among participants at Bale zone hospitals, southeast Ethiopia.

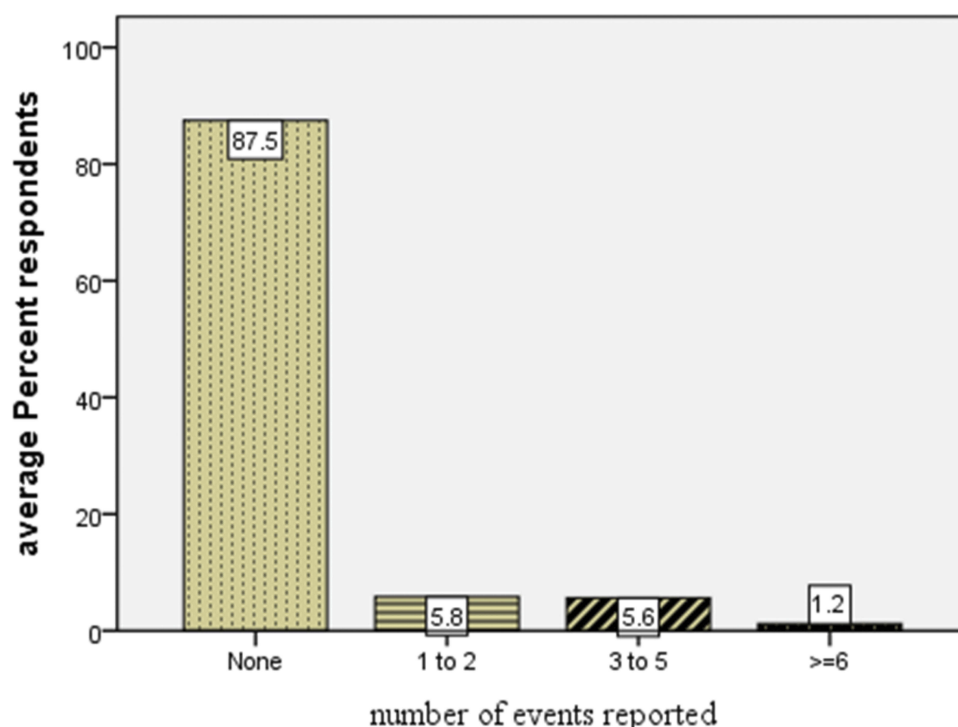


Figure 2 Average percentages of self-reporting events in the past 12 months.

None of the patient safety culture dimension composites score fits the criteria for areas of strength as per the guideline of HSOPSC. This also showed a severe deficit of patient safety culture in the studied hospitals. This is not surprising given the tremendous work and emphasizes on universal health care coverage, and that interest in quality is only a recent focus of attention. Despite significant improvements in health care services, issues related to quality and safety have been inconsistently integrated into the Ethiopian health care system but, recently, the government ratified strategies for improving quality nationwide in the next 5 years.^{6,29}

In this study “teamwork within department” and “organizational learning” dimensions were area of highest average positive response rate. This indicates respondents are positive in supporting one another, working together as a team and doing things to improve patient safety. This result is concordant with the finding from Jimma zone, Amhara region, Kuwait, Chinese, Lebanese, Oman, Saudi hospitals, Taiwanese and Yemen.^{14,15,17–21}

Our study revealed that almost all patient safety culture dimensions suggested areas with potential for improvement. This finding highlights deficiencies in almost all patient safety culture dimensions and indicates the presence of low patient safety practice in the study area. The composites with the lowest average percent positive

responses were ‘Management support for patient safety’ and ‘non punitive response to error’ with average positive response rate. This finding suggests health care workers in this study area feel that hospital management did not provides a conducive work climate that promotes patient safety and further that their mistakes and event reports are held against them and that mistakes are kept in their personal file. A similar finding was also observed in studies done in Jimma zone, Northern Ethiopia, Tunisia, Oman, India, Sri lanka, and Kuwait^{14,15,18,22,23} but received a higher rating in Iran.¹³

In this study, only 12.6% of respondents within hospitals reported at least one event in their hospital over the past 1 year. This finding is lower than reports from Amhara region hospitals, according to which two-thirds of health care staffs reported at least one event, Jimma zone, SNNP hospitals, Lebanon, Saudi Arabia, and Iran.^{14–16,24,25} In order for a patient safety program to be, successful, strong leadership is needed. When leadership and management are committed to a culture of safety, the whole organization will follow and thus disclosing events and finding their root causes become an organizational process.

The present study revealed variations in patient safety culture dimensions across hospital in terms of ‘teamwork within hospital departments’, “organizational learning”,

Table 4 Association of Background Characteristics of Respondents and Systemic Factors with Patient Safety Culture at Bale Zone Hospitals, Southeast Ethiopia, 2017 (N=518)

Variables	No.(%)	Unstandardized B Coefficients		P-value	95% CI for β
		β	Standard Error		
Type of hospital					
Referral ^a	226(43.6)	1.0			1.0
General	98(18.9)	0.61	0.33	0.068	(-0.05, 1.27)
District	194(37.5)	0.46	0.27	0.095	(-0.08, 0.98)
Age		-0.001	0.03	0.957	(-0.05, 0.05)
Staff position					
Nurse	296 (57.1)	1.0			
Physician	106(20.5)	-0.94	0.32	0.004	(-1.58, -0.30)*
Others*	116(22.4)	-0.44	0.31	0.167	(-1.06, 0.18)
Primary work unit					
Gyn.& Obstetrics	112(21.6)	1.0			1.0
Many different work area	61(11.8)	-0.34	0.41	0.410	(-1.14, 0.47)
Medical	46(8.9)	0.69	0.45	0.135	(-0.22, 1.60)
Surgery	103(19.9)	-0.79	0.33	0.017	(-1.44, -0.14)*
Pediatrics	40(7.7)	0.68	0.49	0.167	(-0.29, 1.66)
Emergency dep't	27(5.2)	0.78	0.59	0.192	(-0.39, 1.94)
Pharmacy	38(7.3)	-1.09	0.50	0.031	(-2.09, -0.10)*
Laboratory	41(7.9)	-0.22	0.49	0.654	(-1.18, 0.74)
Others**	50(9.7)	0.27	0.57	0.629	(-0.84, 1.38)
Work experience (in years)		0.02	0.03	0.586	(-0.04, 0.07)
Hours worked per week (hrs)		0.02		0.002	(0.01, 0.03)*
Direct contact with the patients					
No	19(3.7)	1.0	1.0		
Yes	499(96.3)	0.97	0.70	0.167	(-0.41, 2.35)
Patient safety training					
No	388(74.9)	1.0	1.0		
Yes	130(25.1)	-0.40	0.30	0.187	(-0.99, 0.19)
Participation in patient safety program					
Never	376(72.6)	1.0	1.0		
At least once per year	143(27.4)	1.45	0.29	<0.001	(0.88, 2.02)**
Ever reported adverse event					
No	325(62.7)	1.0		1.0	
Yes	193(37.30)	1.46	0.27	<0.001	(0.94, 1.98)**
Management encourage reporting of events					
No	258(49.8)	1.0		1.0	
Yes	260(50.2)	1.65	0.25	<0.001	(1.16, 2.15)

Notes: Others*: health officer, radiography technician, midwives, lab technicians, pharmacist, anesthetist, dental health, ophthalmologist, psychiatrist, emergency surgery), others**: outpatient department, TB clinic, ophthalmic department, X-ray department, VCT unit.

“staffing”, “Perception of patient safety”, “feedback and communication about error”, “hospital management support for patient safety”, ‘teamwork across hospital departments, and

‘hospital handoffs and transitions’. Similar findings were reported from a study conducted at Jimma Zone hospitals and SNNP hospitals for most of the dimensions except for

Table 5 Association Between Dimensions of Patient Safety Score and Level of Patient Safety Culture at Bale Zone Hospitals, Southeast Ethiopia, 2017 (N=518)

Variables	Unstandardized B Coefficients		P-value	95% CI for β
	β	Standard Error		
Teamwork within department	1.56	0.11	<0.001	(1.34, 1.78)
Organizational learning	1.52	0.11	<0.001	(1.29, 1.75)
Manager expectations and actions	1.38	0.12	<0.001	(1.15, 1.61)
Communication openness	1.05	0.12	<0.001	(0.81, 1.29)
Feedback and communication to error	1.67	0.11	<0.001	(1.45, 1.89)
Frequency of event reporting	1.58	0.11	<0.001	(1.36, 1.79)
Management support for patient safety	1.21	0.12	<0.001	(0.97, 1.45)
Hospital handoffs and transitions	1.38	0.12	<0.001	(1.15, 1.61)
Teamwork across hospital	1.63	0.11	<0.001	(1.41, 1.84)

Note: The test was significant at P-value <0.001.

‘Perception of patient safety’, feedback and communication about error and staffing which is the same across the hospitals.¹⁵

Our study indicated that hours worked per week, participation in patient safety program, adverse event reported, teamwork within hospital, communication openness, feedback, and communication when error occurred were found to be significantly associated with the patient safety culture. Similar findings were reported also from studies conducted at Jimma Zone hospitals.^{15,26} Also, dimensions like organizational learning, frequency of event reporting, management support for patient safety, teamwork across hospital, and hospital handoffs and transitions were predictors of patient safety culture. This result was not consistent with other studies.^{15,16} This might be due to the differences in the study settings and time.

The findings presented in this study can act as a basis to inform stakeholders in hospitals and initiate them to develop acceptable standards for patient safety system and implement interventions targeted to reduce the impact of these factors on the quality of hospital care are needed. In order to institutionalize improvement of patient safety culture in health systems, it is critical to ensure that policies, organizations, procedures, and resources for health service quality improvement and patient safety are aligned and integrated. Hospital management should be trained in patient safety culture assessment and involved in hospital walking rounds to communicate and build awareness of the staff on dimensions of patient safety culture.

A limitation of this study was that in addition to the cross-sectional design, perceptions of other administrative bodies were not included. Even though honestly explaining the objective and significance of the study was tried to minimize the effect, the possibility of under- or over-reporting could not be ruled out. Although the internal consistency of the survey was suitable, the reliability analysis of individual constructs identified dimensions with lower than adequate levels of reliability ($\alpha < 0.6$). Finally, the HSPOC as a patient safety measure might not explicitly evaluate safety issues that would arise as a result of resource limitations, such as infrastructure.

Conclusion

According to the classification of Agency for Health Research and Quality (AHRQ), the overall level of patient safety score and most of the scores related to dimensions were lower than the recommended standard. The trend of reporting adverse events or errors in hospitals is poor. Most dimensions of the patient safety culture revealed significant differences in their score across hospitals. Hours worked per week, participation in patient safety program, adverse event reported, and most patient safety dimensions were factors that compromise overall patient safety culture. Based on this finding, well-designed patient safety interventions are needed to be integrated with organizational policies, particularly the pressing need to address all dimensions of patient safety culture. A further study on the perception of other administrative bodies on patient safety culture is recommended.

Abbreviations

ADR, adverse drug reaction; ANOVA, one-way analysis of variance; AHRQ, Agency for Health Research and Quality; CI, confidence interval; FMOH, Federal Ministry of Health; HSOPSC, Hospital Survey on Patient Safety Culture; HSTP,

Table 6 Factors Associated with Patient Safety Culture, Using Multivariate Linear Regression Analysis, at Bale Zone Hospitals, Southeast Ethiopia, 2017 (N=518)

Variables	No.(%)	Unstandardized B Coefficients		95% CI for β
		β	Standard Error	
Type of hospital				
Referral ^a	226(43.6)	1.0		
General	98(18.9)	0.19	0.25	(-0.29,0.68)
District	194(37.5)	-0.01	0.23	(-0.45,0.44)
Staff position				
Nurse ^a	296(57.1)	1.0		
Physician	106(20.5)	1.24	0.23	(0.78, 1.68)**
Others	116(22.4)	0.02	0.21	(-0.39,0.43)
Primary work unit				
Gyn. and Obstetrics ^a	112(21.6)	1.0		1.0
Medical	46(8.9)	-0.07	0.27	(-0.59, 0.48)
Surgery	103(19.9)	-0.37	0.22	(-0.80, -0.06)
Pediatrics	40(7.7)	0.28	0.29	(-0.29,0.85)
Emergency department	27(5.2)	0.27	0.33	(-0.38, 0.93)
Pharmacy	38(7.3)	0.25	0.32	(-0.38,0.87)
Hours worked per week (hrs)		-0.01	0.004	(-0.002,-0.015)*
Direct contact with the patients				
No ^a	19(3.7)	1.0		1.0
Yes	499(96.3)	-0.04	0.38	(-0.79,0.72)
Patient safety training				
No ^a	388(74.9)	1.0		1.0
Yes	130(25.1)	-0.18	0.18	(-0.55,0.18)
Participation in patient safety program				
Never ^a	376(72.6)	1.0		
At least once per year	143(27.4)	0.49	0.19	(0.12, 0.87)*
Ever reported adverse event				
No ^a	325(62.7)	1.0		
Yes	193(37.3)	0.36	0.18	(0.01, 0.71)*
Management encourage reporting of events				
No ^a	258(49.8)	1.0		
Yes	260(50.2)	-0.09	0.19	(-0.45, 0.28)
Teamwork within department	518(100)	0.92	0.08	(0.75, 1.08)**
Organizational learning	518(100)	0.49	0.08	(0.32, 0.66)**
Manager expectations and actions	518(100)	0.10	0.10	(-0.09, 0.29)
Communication openness	518(100)	0.35	0.08	(0.18, 0.52)**
Feedback and communication to error	518(100)	0.51	0.10	(0.31, 0.72)**
Frequency of event reporting	518(100)	0.36	0.09	(0.18,0.53)**
Management support for patient safety	518(100)	0.33	0.09	(0.13, 0.52)*
Hospital handoffs and transitions	518(100)	0.74	0.08	(0.57, 0.89)**
Teamwork across hospital	518(100)	0.55	0.09	(0.37, 0.73)**
Model summary (R square =0.74, adjusted R square =0.73, p value<0.001)				

Notes: ^a =Reference group, *p-value <0.05, **p-value<0.001.

Health Sector Transformation Plan; KMO, Kaiser–Meyer–Olkin test; PCA, principal component analysis; SD, standard deviation; SNNP, Southern nation, nationalities of Ethiopia; SPSS, Statistical Package for Social Science; VIF, variance inflation factor; WHO, World Health Organization.

Ethics Approval and Informed Consent

The study was performed by interviewing health care providers of hospitals after an ethical consent was obtained from Madda Walabu University ethical clearance committee and individual written, informed consent was obtained from the study participants.

Data Sharing Statement

The data will be made available upon request.

Author Information

MK is a lecturer and an academic and research coordinator at Madda Walabu University, AH is a lecturer and head of public health department at Madda Walabu University, AL and GM are lecturers at Madda Walabu University, and SN is a lecturer at Wolayta Sodo University.

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Author Contributions

All authors made substantial contributions to conception and design, acquisition of data or analysis and interpretation of data; took part in drafting the article or revising it critically for important intellectual content; gave final approval of the version to be published; and agree to be accountable for all aspects of the work.

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Disclosure

The authors declare that they have no competing interests in this work.

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