



Patient Safety Culture among Physicians at Public Hospitals in Sana'a, Yemen: A Retrospective Cross-Sectional Study

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Abstract

Background: Patient safety is a critical component to the quality of health care, represents a global public health problem which affects countries at all levels of development. Healthcare organizations endeavour to improve their quality of care. Aims of study were to explore the patient safety culture among physicians according to AHRQ (Agency of Health Research and Quality) dimensions, to determine grade of patient safety at public hospitals, and to determine the rate of event reports.

Methods: A retrospective cross-sectional study, using hospital survey on patient safety culture to measure the 12 dimensions of the patient safety culture at public hospitals in Sana'a, Yemen. SPSS 20. was used for statistical analysis, descriptive analysis, and ANOVA f-test.

Results: Out of 384 physicians, positive response rate was (66%), revealing acceptable level of patient safety. The highest positive response rate was team-work within units (69.1%) while the lowest positive responses was nonpunitive response to errors (29.8%). Majority of respondents did not record any event report during the past 12 months. The results showed that hospital physicians had weak perception toward patient safety culture.

Conclusion: Patient safety is a low priority at public hospitals, there is a tendency for under-reporting of errors. To create a culture of safety and improvement, fear of blame must eliminate, and to create a climate of open communication, continuous learning and focus on leadership should be considered.

Keywords: patient safety culture, public hospitals, Sana'a Yemen.

Introduction

Patient safety represents a global public health problem which affects countries at all levels of development. World Alliance for Patient Safety was established in 2004 to mobilize global efforts to improve the patient safety of healthcare members. It becomes a major priority to policy makers, healthcare providers and managers [1]. International accreditation organizations require patient safety culture assessments, it is the first step for developing a strong patient safety culture. To evaluate the perception of healthcare staff on issues such as team work, actions must be taken by management and leadership to support and promote patient safety, frequency of incident reporting, and other patient safety culture [2].

History of patient safety is not limited to the current time, it has been known since thousands of years; practiced by Greeks when the physician Hippocrates swore to protect patient from any harm or damage [3]. In the modern era, the beginning was in the start of the eighties, with full magnitude appreciated in 1999 when the institute of medicine (IOM) of National Academy of Science released a report, To Err is human [4].

Agency of Healthcare Research and Quality (AHRQ) defines patient safety as the avoidance and prevention of patient injuries or adverse events resulting from the processes of health care delivery [5, 6]. AHRQ explains the safety culture of an organization as the product of individual and group values, attitudes, perceptions, competencies, and patterns of behavior that determine the commitment to the style

and proficiency of an organization's health and safety management [6]. In 2004, AHRQ designed a Hospital Survey on Patient Safety Culture (HSOPSC) [6, 7], which has a good criteria test [6, 8, 9]. As such, this survey has been selected as a tool to identify the physicians' perception of patient safety culture.

In 1999, the landmark report To Err Is Human reported that up to 98 000 people die because of medical errors each year in the United States [10]. Then, in 2009, Leape suggested that transparency patient-centered care, collaboration, teamwork, and accountability should be shared [11]. After that, many studies were conducted in many countries regarding patient safety culture by using hospital survey on patient safety culture. Organizational learning was the highest positive trait in Saudi Arabia [12]. whereas and non-punitive response to error was the lowest positive one in Egypt [13]. In Palestine, the highest positive score was for team work within units while the lowest score was for non-punitive response to error, rating patient safety level as excellent/very good [14]. The most recognized aspects of patient safety culture in Tehran were team work within units and non-punitive response to error [15]. In Slovak hospitals, the highest score was for overall perception of safety, staff also admitted to being fearful of adverse event reporting [16].

In Yemen, to the best of the researchers' knowledge, there is no enough research studies on medical errors and/or patient safety. Therefore, this research intends to provide a baseline database to this crucial

topic, with special focus on physicians who are the corner stone in providing health care services and are the team leaders. The aims of this study were to explore patient safety culture among physicians according to AHRQ dimensions, to determine the level of patient safety at public hospitals, and to determine the rate of event reports filled out and submitted by physicians in the last year.

The findings are supposed to provide healthcare organizations in Yemen a better understanding of patient safety culture.

Methodology

Study design

A retrospective cross-sectional study was conducted in three public hospitals in Sana'a, Yemen, namely, Al-Thawra General Hospital, Al-Kuwait Educational Hospital and 48 Model Hospital. The study lasted for nine months, from January till September 2014.

Population

The study population involved the physicians working at public hospitals in Sana'a, Yemen.

Sampling

Sample size of the study was calculated by using the formula of Kish Leslie 1965 [$N = Z^2 (P (1-P) / D^2)$]. Based on a previous study in Saudi Arabia, the expected proportion (over all perception of staff was 33%). The initial number of the sample size was 345 physicians. To avoid drop out, 35 physicians (10% of the primary number) were added, making the total sample size

380 physicians. 650 copies of the questioner were distributed, 451 were handed back- 8 of them were not filled up and 58 were excluded for incomplete or illegible responses. The remaining 199 copies were given back. The physicians were selected from all hospital departments, including all level of qualifications.

Data Collection

Questionnaire

Data collection took a period of three months, July–September 2014, by the means of the standardized questionnaire Hospital Survey on Patient Safety Culture (HSOPSC) released by the Agency for Healthcare Research and Quality (AHRQ) in 2004 (Tables 1&2). It contained 42 items to measure 12 dimensions of patient safety culture, each dimension included 3 or 4 items. Survey items were developed in a Likert 5-point-scale by which the responses were categorized in terms of agreement (5=strongly agree; 4=agree; 3=neither; 2=disagree; 1=strongly disagree) and frequency (5=always; 4=most of the time; 3=sometimes; 2=rarely; 1=never). Reverse worded was also included to provide consistency: 6,7, and 8. Approval was obtained from the research ethical committee of the University of Science and Technology. Permission to collect the data was granted by the hospitals administrations, details about the study were explained to the physicians, and oral consent was obtained firstly. To ensure the privacy of the respondents, the

less than an entire section, less than half of the items, or provided similar responses to all items were excluded.

Study Measures and Outcome Variables

The measured 12 dimensions of patient safety culture variable were: (A) Seven unit-level aspects of patient safety culture, including (1) Supervisor/manager expectations and actions promoting safety; (2) Organizational learning-continuous improvement; (3) Teamwork within units; (4) Communication openness; (5) Feedback and communication about error; (6) Nonpunitive response to error; (7) Staffing, (B) Three hospital-level aspects, including (1) Hospital management support for patient safety; (2) Team work across hospital units; (3) Hospital handoffs and transitions, and (C) Two outcomes: (1) Overall perceptions of safety; (2) Frequency of event reporting [6-8], in addition to patient safety grade and number of events reported.

Data analysis

The data was analyzed through two steps using Statistical Package for Social

Sciences (SPSS) version 20.0. These steps were: descriptive analysis (frequency and percentage), and ANOVA f-test (means of each groups of patient safety dimensions, f-test comparison of multiple means at once).

Validity Analysis:

Composite Scores and Intercorrelations

Composite score was created for the 12 dimensions of safety culture by obtaining the mean of the responses to items in each dimension (after any necessary reverse coding). A composite score calculated for each response, in relation to each of the 12 dimensions of safety culture. Since 5-point response scale was used for all items, composite scores ranged from 1.0 to 5.0 (1 = a low score and 5 = a high score). After calculating the composite scores, the safety culture dimensions were correlated with one another.

Reliability was examined across each of the 12 patient safety culture dimensions using Cronbach's alpha test, showing an acceptable reliability ranging from 0.54 to 0.89.

Table 1: Operational definition of dependent variables

No.	Variable Name	Definition	Scale
1	Patient safety culture among physicians,	<p>The 12 dimensions of patient safety are measured according to the guideline of AHRQ of the HSOPS at the following level:</p> <p>1- Strengths Patient safety. 2- Neutral Patient safety culture. 3- Weakness Patient safety culture.</p>	<p>Nominal</p> <p>The scoring level (cut of points) is used as follows:</p> <p>1- Strengths Patient safety equal and more than 75%. 2- Neutral Patient safety culture is between 50% - 75%. 3- Weakness Patient safety culture is 50 % or fewer.</p>

Table 2: Operational definition of independent variables

No	Variable Name	Definition	Scale
1	Age	Age of physicians	Discrete in years- (6 groups): 1. Less than 25 years 2. 25 to 30 years 3. 31 to 35 years 4. 36 to 40 years 5. 41 to 45 years 6. 46 and more
2	Gender	The gender of physicians	Nominal- divided into: 1. male 2. female
3	Marital status	Marital status of physicians	Nominal- divided into: 1. single 2. married
4	Level of qualification	Qualification of physicians	Nominal- divided into: 1-Consultant 2 -Specialist 3 -General DR 4 -Resident
5	Experiences	How many years of working in hospital	Nominal- divided into: 1- Less than 1 year 2- 1 to 5 years 3- 6 to 10 years 4- 11 to 15 years 5- 16 to 20 years 6- 21 years or more
6	Duration of working at hospital work area / unit	Length of working in his\ her unit\ area	Nominal- divided into: 1- Less than 20 hours per week 2- 20 to 39 hours per week 3- 40 to 59 hours per week
7	Working hours per week in hospital	How many hours they spend in work in hospitals per week	4- 60 to 79 hours per week 5- 80 to 99 hours per week 6- 100 hours per week or more

Results

Out of 650 copies of the questionnaire distributed to the respondents, 384 obtained valid responses (response rate 66%). Physician's' characteristics are displayed in

Table (3) below as: Male 208 (54.2%); Married 236 (61.5%), Specialist 136 (35.4%); Yemeni 366 (95.3%). Majority of the respondents work in surgery (21.9%).

Majority of the respondents, 374 (97.4%), have typical contact with patients. Half of the respondents, 192 (50.0%), have (1-5 years)

experience. Majority of the respondents, 153 (39.8%), work for (20-39 hours) per week.

Table 3: Demographic characteristics of respondents

Characteristics	N	%	Characteristics	N	%
Gender			primary work area/unit		
Male	208	54.2	Many different hospital units /No specific unit	12	3.1
Female	176	45.8	Medicine (non-surgical)	55	14.3
Nationality			Surgery	84	21.9
Yemeni	366	95.3	Obstetrics	43	11.2
Non-Yemeni	18	4.7	Pediatrics	39	10.2
Marital status			Emergency department	29	7.6
Single	148	38.5	Intensive care unit (any type)	16	4.2
Married	236	61.5	Psychiatry/mental health	5	1.3
Qualification level			Rehabilitation	2	0.5
Consultant	46	12.0	Dermatology	4	1.0
Specialist	136	35.4	Dentist	29	7.6
General	130	33.9	Radiology	13	3.4
Resident	72	18.8	Anesthesiology	16	4.2
Working hours per week			Other	37	9.6
<20 hours	76	19.8	Experience (years of working in the hospital)		
20-39 hours	153	39.8	Less than 1 year	112	29.2
40-59hours	119	31.0	1 to 5 years	192	50.0
60-79 hours	23	6.0	6 to 10 years	53	13.8
≥80hours	13	3.4	11 to 15 years	17	4.4
Contact with patient directly			16 to 20 years	3	0.8
Yes	374	97.4	21 years or more	7	1.8
No	10	2.6			

Table (4) demonstrates all dimensions of patient's safety culture. The highest positive score was for team work within units (69.1%), followed by organizational learning-continuous improvement (51.6%), and then overall perceptions of safety (47.8%), whereas the lowest score was for Nonpunitive response to error (29.8%).

Comparison of means for two outcome dimensions scores with respondents' characteristics.

Table (5) shows a significant association between overall perception of safety and frequency of events reported with work

area ($p<0.05$), working hours per week ($p<0.001$). Age had association only with frequency of events reported ($P=0.017$).

Table (6) shows that (56.3%) of the respondents had not reported any event report in the past 12 months and (45.8%) of them rated patient safety level at public hospitals as acceptable.

Comparison of means between outcome and 12 dimensions of patient safety culture

Patient safety grade was significantly associated with most of compensation measures ($p<0.05$), except staffing ($p=0.229$) and teamwork across units

($p=0.070$), Table (7). Number of reported events was significantly associated with most of the composites ($p<0.05$), except

staffing ($p=0.534$), team work across units ($p=0.457$), and overall perception of patient safety ($p=0.099$).

Table 4: Dimension composites, items positive scores, and Cronbach’s α test

Dimension	Strongly disagree/ disagree		Neither		strongly agree/ agree	
	F	%	F	%	F	%
Team work within unit (Cronbach’s $\alpha = 0.60$)	69.1					
People support one another in this unit	52	13.5	20	5.2	312	81.3
When a lot of work needs to be done quickly, we work together as a Team to get the work done	58	15.1	55	14.3	271	70.6
In this unit, people treat each other with respect	39	10.2	42	10.9	303	78.9
When one area in this unit gets really busy, others help out	156	40.6	52	13.5	176	45.8
Supervisor expectation and action promoting patient safety (Cronbach’s $\alpha =0.84$)	48.4					
My supervisor/manager says a good word when he/she sees a job done according to established patient safety procedures	96	25.0	42	10.9	246	64.1
My supervisor/manager seriously considers staff suggestions for improving patient safety	115	29.9	60	15.6	209	54.4
Whenever pressure builds up, my supervisor/manager wants us to work faster, even if it means taking shortcuts	159	41.4	66	17.2	159	41.4
My supervisor/manager overlooks patient safety problems that happen over and over	129	33.6	67	17.4	188	49.0
Organization learning continuous improvement (Cronbach’s $\alpha = 0.80$)	51.6					
We are actively doing things to improve patient safety	94	24.5	50	13.0	240	62.5
Mistakes have led to positive changes here	153	39.8	65	16.9	166	43.2
After we make changes to improve patient safety, we evaluate their effectiveness	140	36.5	55	14.3	189	49.2
Management Support for Patient Safety (Cronbach’s $\alpha = 0.80$)	43.6					
Hospital management provides a work climate that promotes patient safety	161	41.9	54	14.1	169	44.0
The actions of hospital management show that patient safety is a top priority	144	37.5	59	15.4	181	47.1
Hospital management seems interested in patient safety only after an adverse event happens	152	39.6	64	16.7	168	43.8
Overall Perception of Patient safety (Cronbach’s $\alpha = 0.65$)	47.8					
Patient safety is never sacrificed to get more work done	97	25.3	62	16.2	224	58.5
Our procedures and systems are good at preventing errors from happening	136	35.4	47	12.2	201	52.3
It is just by chance that more serious mistakes don’t happen around here	198	51.6	69	18.0	117	30.5
We have patient safety problems in this unit	111	28.9	52	13.5	221	57.6
Team work across units (Cronbach’s $\alpha = 0.69$)	46.0					
There is good cooperation among hospital units that need to work together	131	34.1	66	17.2	187	48.7
Hospital units do not coordinate well with each other	153	39.8	47	12.2	184	47.9
Hospital units work well together to provide the best care for	134	34.9	69	18.0	181	47.1

patients						
It is often unpleasant to work with staff from other hospital units	186	48.4	58	15.1	140	36.5
Staffing (Cronbach's $\alpha = 0.54$)	43.8					
We have enough staff to handle the workload	181	47.1	26	6.8	177	46.1
Staff in this unit work longer hours than is best for patient care	168	43.8	46	12.0	170	44.3
We use more agency/temporary staff than is best for patient care	212	55.2	72	18.8	100	26.0
We work in "crisis mode" trying to do too much, too quickly	115	29.9	65	16.9	204	53.1
Handoffs and transitions (Cronbach's $\alpha = 0.71$)	38.2					
Things "fall between the cracks" when transferring patients from one unit to another	116	30.2	74	19.3	194	50.5
Important patient care information is often lost during shift changes	170	44.3	47	12.2	167	43.5
Problems often occur in the exchange of information across hospital units	143	37.2	68	17.7	173	45.1
Shift changes are problematic for patients in this hospital	158	41.1	67	17.4	159	41.4
Non punitive response to error (Cronbach's $\alpha = 0.54$)	29.8					
Staff feel like their mistakes are held against them	126	32.8	81	21.1	177	46.1
When an event is reported, it feels like the person is being written up, not the problem	112	29.2	69	18.0	203	52.9
Staff worry that mistakes they make are kept in their personnel file	105	27.3	58	15.1	221	57.6
Dimension	Never/ Rarely		Sometimes		Most of Time/ Always	
	F	%	F	%	F	%
Feedback and Communication about error (Cronbach's $\alpha = 0.77$)	41.7					
We are given feedback about changes put into place based on event reports	158	41.1	113	29.4	113	29.4
We are informed about errors that happen in this unit	101	26.3	105	27.3	178	46.4
In this unit, we discuss ways to prevent errors from happening again	104	27.1	91	23.7	189	49.2
Communication openness (Cronbach's $\alpha = 0.54$)	37.5					
Staff will freely speak up if they see something that may negatively affect patient care	104	27.1	111	28.9	169	44.0
Staff feel free to question the decisions or actions of those with more authority	135	35.2	115	29.9	134	34.9
Staff are afraid to ask questions when something does not seem right	129	33.6	138	35.9	117	30.5
Frequency of events reported (Cronbach's $\alpha = 0.85$)	34.4					
When a mistake is made, but is caught and corrected before affecting the patient, how often is this reported?	159	41.4	113	29.4	112	29.2
When a mistake is made, but has no potential to harm the patient, how often is this reported?	170	44.3	87	22.7	127	33.1
When a mistake is made that could harm the patient, but does not, how often is this reported?	140	36.5	87	22.7	157	40.9
F= Frequency						

Table 5: Comparison of means for two outcome composite scores according to respondent characteristics

Respondents characteristics	Overall Perception of Safety			Frequency of Events Reported		
	Mean	SD	p- value	Median	IQR	p- value
Work area/unit in this hospital			0.033			0.051
Many different hospital units	3.1	.51		1.0	0.00	
Medicine (non-surgical)	3.1	.79		1.0	2.00	
Surgery	2.7	.80		2.0	1.50	
Obstetrics	2.7	.75		1.0	1.00	
Pediatrics	3.0	.95		1.0	1.00	
Emergency department	3.0	.94		2.0	2.00	
Intensive care unit (any type)	2.8	.86		2.0	2.50	
Dentist	3.0	.87		1.0	0.00	
Radiology	3.0	.58		1.0	2.00	
Anesthesiology	2.4	1.15		2.0	3.00	
Other	3.2	1.02		1.0	1.00	
Age			0.069			0.017
less than 25	3.1	0.92		1.0	1.00	
25 to 30 years	2.8	0.85		1.0	2.00	
31 to 35 years	2.9	0.87		1.0	1.00	
36 to 40 years	3.2	0.87		1.0	2.00	
41 to 45 years	2.9	0.89		2.0	2.00	
46 and more	2.5	0.73		2.0	2.75	
Qualification level			0.736			0.075
Consultant	2.8	0.87		2.0	2.00	
Specialist	2.9	0.81		1.0	2.00	
General doctor	2.9	0.96		1.0	1.00	
Resident doctor	2.9	0.83		1.0	1.00	
Years of working in hospital			0.132			0.095
Less than 1 year	2.9	0.89		1.0	1.00	
1 to 5 years	3.0	0.86		1.0	1.00	
6 to 10 years	2.6	0.74		2.0	2.50	
11 to 15 years	2.8	1.01		1.0	1.50	
16 to 20 years	3.3	0.58		2.0		
21 years or more	3.0	1.15		1.0	1.00	
Working hours per week in hospital			<0.001			<0.001
Less than 20 hours per week	3.1	0.81		1.0	1.00	
20 to 39 hours per week	3.0	0.88		1.0	2.00	
40 to 59 hours per week	2.7	0.83		2.0	2.00	
60 to 79 hours per week	2.4	0.79		2.0	3.00	
80 to 99 hours per week	2.4	0.98		1.0	1.00	
100 hours per week or more	2.3	1.03		2.5	2.00	

		F	%
An overall grade on patient safety	Excellent	17	4.4
	Very Good	104	27.1
	Acceptable	176	45.8
	Poor	75	19.5
	Failing	12	3.1
No of event reports in the past 12 months	no event report	216	56.3
	1 to 2 event reports	76	19.8
	3 to 5 event reports	44	11.5
	6 to 10 event reports	28	7.3
	11 to 20 event reports	14	3.6
	21 event reports or more	6	1.6

	Patient Safety Grade								Number of Events Reported							
	Failing /Poor		Acceptable		Very Good /Excellent		<i>F</i>	<i>P</i>	0		1 - 5		> 5		<i>F</i>	<i>P</i>
	M	SD	M	SD	M	SD			M	SD	M	SD	M	SD		
Teamwork Within Units	3.1	0.81	3.6	0.62	3.9	0.62	34.76	<0.001	3.5	.73	3.7	.76	3.8	.51	5.58	.004
Supervisor expectation and action promoting patient safety	2.7	0.84	3.2	0.63	3.4	0.68	26.30	<0.001	3.1	.77	3.2	.73	3.6	.45	9.64	<0.001
Organization learning continuous improvement	2.5	0.89	3.2	0.79	3.7	0.80	55.15	<0.001	3.0	.91	3.4	.89	3.6	.82	16.16	<0.001
Management Support for Patient Safety	2.5	0.70	3.0	0.66	3.4	0.51	50.64	<0.001	2.9	.75	3.1	.61	3.3	.56	9.56	<0.001
Overall Perception of Patient safety	2.9	0.69	3.2	0.56	3.2	0.58	7.13	0.001	3.1	.64	3.2	.52	3.1	.64	2.33	.099
Feedback and Communication about error	2.5	0.95	3.0	0.77	3.6	0.79	53.56	<0.001	2.9	.90	3.2	.92	3.8	.66	22.18	<0.001
Communication openness	2.6	0.71	3.0	0.64	3.3	0.69	22.82	<0.001	2.9	.77	3.1	.60	3.3	.53	9.31	<0.001
Frequency of events reported	2.1	0.94	2.7	1.03	3.6	0.93	60.27	<0.001	2.5	1.09	3.1	1.06	3.5	.97	20.91	<0.001
Team wok across units	3.0	0.65	3.1	0.49	3.0	0.55	2.68	0.070	3.1	.60	3.0	.51	3.1	.40	0.78	.457
Staffing	2.9	0.72	3.0	0.65	3.0	0.62	1.48	0.229	3.0	.67	3.0	.66	2.9	.57	0.63	.534
Handoffs and transition	3.5	0.78	3.2	0.72	2.7	0.72	33.84	<0.001	3.3	.75	2.9	.76	2.6	.80	18.80	<0.001
Nonpunitive response to error	3.4	0.84	3.3	0.73	3.0	0.90	6.10	0.002	3.3	.78	3.3	.84	2.7	.82	11.83	<0.001

M= Mean, SD = stranded division

Discussion

This study used HSOPSC to measure patient safety culture among physicians at public hospitals in Sana'a, Yemen. Response rate was 66% higher than AHRQ 61% [18]. All dimensions of patients safety culture were neutral, with positive response scores lower than 75%. Mean age of physicians was 2.8 ± 1.24 years. Specialists were 136 (35.4%) of the respondents, in which (21.9%) of them had been working in surgery. Majority of the respondents had typical contact with patients 374 (97.4%). Half of the respondents, 192 (50.0%), had 1-5 years' experience whereas 153 (39.8%) of them had 20-39 working-hours per week.

The highest score of patient safety dimensions was in team work within units (69.1%), followed by organizational learning-continuous improvement (51.6%), while the lowest score was in Nonpunitive response to error (29.8%). In addition (56.3%) of the respondents had not been reporting any event report in the past 12 months. There was a significant association between overall perception of safety and frequency of events reported with work area ($p < 0.05$) and working hours per week ($p < 0.001$).

Team work within units scored the highest positive response rate, similar to some other studies [14, 15, 18]. It means that the staff show support and respect in their unit or department, they are cooperative, and they coordinate the work as a team. It had a significant association with patient safety level and number of events reported. Although it was higher than in Ain-shams (58%) [13], it was lower than in Saudi

Arabia 84% [12], USA(80%) [19] and Palestine (71%) [14].

Safety culture includes three major components, a just culture, a reporting culture and a learning culture [1] Event reporting as an essential component for achieving learning culture, can happen in a non-punitive environment where events can be reported without people being blamed [20] Our result of non-punitive response to error had the lowest score, revealing that half of the physicians were not reporting errors. That is to say, most of them were afraid of committing mistakes, feeling like unwilling to write up any problem. Therefore, organization learning continuous improvement was low. This result comes in line with some other studies stating that training opportunities empower physicians to improve patient safety are limited, thus investing the importance of training is important to improving patient safety outcomes²¹. However, non-punitive responses to error in this study was higher than in Saudi Arabia (22%) [12], Ain-shams (19.5%) [13], Turkey (18%) [22] and Palestine (17%) [14], but lower than in the USA (44%) [19]. Frequency of events reported was higher than in Turkey (12%) [12] and Ain-shams (33.4%) [13], but lower than in Palestine (35%). [14] Learning continuous improvement was lower than in the USA (72%) [19], Palestine (62%) [14], Ain shams (78.2%) [13] and Saudia Arabia (84%) [12]. All the three dimensions had significant association with patient safety grade and number of events reported. To have successful patients safety program there is

a need for strong leadership to create the suitable culture and commitment necessary to solve underlying system causes of medical errors, and to avoid any harm to patients. As the managers practice the culture of safety, the whole organization staff will follow all principles of patient safety culture [2]. Our results showed low support from hospital management for patient safety as signified in the low frequency of events reported, and the limited likelihood of having a better overall perception of safety among respondents. This result is in consistency with most of previous study [12-15, 19].

Effective communication within and across healthcare providers are important to remove any harms to patients; the highest contributing factor to adverse events is defect of communication [17,24]. The results showed low scores of communication openness, feedback and communication about error. This led to the decreased frequency of events reported, in support of the significant association between number of events reported and patient safety level. Moreover, low scores on communication, and hospital handoffs and transitions reduced the likelihood of having a better perception of safety among respondents. Teamwork across units was higher than in Ain shams [13,23] and Saudi Arabia [12], but lower than in the USA [19]. Handoff and transition was higher than in Ain shams [13].

Staffing received a low score. Staff is the most predictor of patient safety, its strong capability and motivated workforce are among of the biggest challenges for hospitals today². A strong correlation

between the availability of healthcare providers and population health outcomes has been approved [2]. Our results showed less positive score on staffing, representing the decreased likelihood of the respondents to show a higher level of patient's safety, and their reduced likelihood to report the events, problems and mistakes related to patient care and safety.

Overall perception of patient's safety culture is an indicator of good procedures and systems for preventing errors and the lack of patient safety problems [6,7]. The respondents' positive response was weak in this concern (47.8%), lower than in the USA (62%) [19], Turkey (59%) [22], but higher than in Ain shams (27.2%) [13]. It had a significant association with working hours per week, and work area. Its weakness was reflected in all dimensions.

Patient safety level association with the overall perception and with majority of dimensions was acceptable in this study, unlike in Saudi Arabia which was excellent and in Palestine it was very good.

More than half of the respondents did not report any event report during the past 12 months, reflecting low perception about patient safety culture and conforming a significant association between most of dimensions and the number of events reported.

Conclusions

Patient safety is a minor priority at Yemeni public hospitals, there is a tendency for under reporting of errors whether harmful to patients or not. Error reporting is an important determinant of patient safety culture. To create culture of safety and

improvement fear of blame must be eliminated, so as to eradicate the prevalent culture of blaming. All dimensions of patient safety culture recorded low scores of positive responses, reflecting the need for improvement. Such improvement requires system changes, such as creating a climate of open communication, fostering continuous learning and focusing on leadership quality, because they are essential elements for effective improvement of patient safety. The outcomes of study are expected to help policy makers make important decisions towards the improvement of patient safety. Finally, more studies are suggested to be conducted on the weak areas of patient safety and how to improve it.

Recommendations

Administration staff of public hospitals, the Ministry of Public Health and the leaders of healthcare organizations in Yemen are recommended to give patient safety a top strategic priority. Hospital management should assess and redesign their current patient's safety system. Blame-free system for identifying threats to patients, sharing information, and learning from events should be all functional components of collaborative environment.

Advantages and Limitations

This is the first study on patient safety culture at public hospitals in Sana'a, Yemen. The results of the study provide some evidence to help the concerned Yemeni decision makers develop effective strategies to improve health care quality and to ensure patient safety. However, our study was limited to a small number of respondents which may not reflect the

whole picture of patient safety culture of all healthcare provider in Sana'a.

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