ORIGINAL ARTICLE

THE URDU VERSION OF THE SAFETY ATTITUDE QUESTIONNAIRE (SAQ) FOR INPATIENT SETTINGS IN PAKISTAN: PSYCHOMETRIC PROPERTIES AND BASELINE DATA

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Background: This study aimed to test the psychometric properties of the Urdu version of the Safety Attitudes Questionnaire for inpatient settings in Pakistan. **Methods:** The SAQ short form (inpatient version) was translated with the back-translation technique into Urdu. The SAQ-Urdu was administered in three teaching hospitals in Pakistan to a sample of 483 front line healthcare personnel from August 2016 through December 2017. Confirmatory factor analysis was performed to test the factor structure of the responses. Cronbach's alphas and correlation coefficients were computed. Mean and percentage agreement scores for items were reported. **Results:** The response rate was 75%. Goodness-of-fit indices from the confirmatory factor analysis showed a reasonable model fit ($\chi 2=213.27$, df=125, $p<0.001$; CFI 0.94, RMSEA 0.044). Cronbach's alphas of survey factors (teamwork climate, safety climate, job satisfaction, perceptions of management, and working conditions) ranged from 0.71 to 0.87. In terms of mean percentage agreement scores, substantial variability was found at the clinical unit level. **Conclusion:** The Urdu version of the SAQ showed satisfactory internal psychometric properties. The attitudes around patient safety considerably vary and indicate a need for improvement.

Keywords: Patient safety; Healthcare; Pakistan; Safety culture

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INTRODUCTION

Safety is a critical component of high-quality healthcare. While medical errors have been estimated to be the third leading cause of death in USA[1], studies from different developed countries have suggested that between 2.9% and 16.6% of the admitted patients experience at least one adverse event during hospitalization. Up to 50% of these adverse events are preventable[2–5]. Similar figures have been reported from developing countries with adverse events ranging from 2.5% to as high as 18.4% of hospitalizations, of which up to 83% were preventable.[6]

Development of a patient safety culture in healthcare organizations has been associated with safe care and reduction of adverse events.[7–10] Safety culture has been defined as 'the attitudes, beliefs, perceptions, and values that employees share in relation to safety'[11] and is often measured using questionnaire-based instruments. Recent systematic reviews have documented history, development, and psychometric properties of a number of patient safety culture instruments.[12,13] Among the reviewed instruments, the Safety Attitudes Questionnaire (SAQ) has been commonly used to assess healthcare professionals' attitudes and perceptions toward patient safety.[14–16] In addition to comparing safety culture of different health organizations, SAQ has also been demonstrated to serve as a proxy outcome measure of patient safety culture for safety improvement interventions within an organization.[16,17]

Like other developing countries, there is limited evidence regarding patient safety culture available from Pakistan.[18,19] Only a few private hospitals collect patient safety data to fulfil accreditation requirements by an international accreditation organization. Most hospitals do not collect patient safety data primarily due to lack of any reporting requirement by regulatory bodies. Another challenge in patient safety culture assessment is the absence of instruments in Urdu – the national language of Pakistan. Patient safety culture assessment will be a remiss if it does not include all those involved in healthcare delivery. While medium of training for physician and nurses in Pakistan is largely English, non-physicians (nurses, paramedics, and other allied healthcare staff) are more comfortable communicating in Urdu. Hence, a reliable Urdu version of SAQ covering all types of healthcare professionals is imperative for effective assessment of local patient

safety culture. This study aimed to develop an Urdu version of SAQ after testing its psychometric soundness and provides baseline data for the concerned clinical units.

MATERIAL AND METHODS

This cross-sectional study was conducted in clinical units from one public and two private university hospitals of Peshawar – a provincial capital of Pakistan. One specialty unit was randomly selected from the hospitals' departments of internal medicine, paediatrics, general surgery, and obstetrics and gynaecology (OBGYN). One private hospital did not have a teaching paediatrics unit, and thus total number of study units was 11 (i.e., 4+4+3). All three university hospitals are large hospitals with an average inpatients bed count of 582 and were selected as they agreed to participate in the study. Similarly, the four major clinical specialties were selected due to the corresponding permissions from hospitals' management. All healthcare personnel (N=483) involved in direct patient care (including physicians, nurses, and paramedics), working full time, and with at least 1 month of working experience in the sample unit were invited to participate in the survey. Ethical approval was obtained from the institutional review board of Prime Foundation, Pakistan.

The original extended version of SAQ has 60 items and been adapted for diverse clinical settings like inpatient units, intensive care units, operating rooms and outpatient settings.[14,15,17] We decided to use the short form version of SAQ for its usability, psychometric properties, and broad implementation.[15] The short form version of SAQ consists of 34 items (i.e., 30 core items with 4 items requiring a separate response for hospital and unit level). Previous SAQ studies have identified six factors (scales) related to safety climate: teamwork climate (6 items), job satisfaction (5 items), stress recognition (4 items), safety climate (7 items), perception of management (4 items), and working conditions (4 items).[15,20,21] All SAQ responses are given on a 5-point Likert scale (1 = disagree strongly, 2 = disagree slightly, 3 = neutral, 4 = agree slightly, 5 = agree strongly) in addition to a "not applicable" option for each item. Items 2 and 11 are negatively worded and thus reverse-coded in analyses.[22]

In order to develop an Urdu version of SAQ, one bilingual health expert translated the short form English version of SAQ into Urdu. The translated Urdu version was assessed for clarity, word selection, and appropriate capture of the item's meaning in Pakistani healthcare setting by two of the authors. Once the necessary modifications were made, a different bilingual health expert (who had never seen the original SAQ form before) translated the Urdu SAQ version back into English. The translated English version was compared to the original SAQ English form by an independent health researcher to assess if all the items had the same meaning.[23] A pilot study using Urdu version of SAQ (i.e., SAQ-Urdu) was performed on doctors, nurses and paramedics in four clinical units of one private hospital. The preliminary results revealed good reliability for all six factors. However, like previously reported, the factor of stress recognition's association with safety culture was significantly weaker than other five factors and therefore removed from the final version of SAQ-Urdu.[24] Additional minor modifications were made (like changing the term unit to 'ward', and physicians to 'doctors') before administering the SAQ-Urdu for this study.

The SAQ-Urdu was administered from August through December 2017 in 11 clinical units through hand delivery and team meetings. Reminders were given to all participants after 7 days and again after 14 days to enhance the response rate. All questionnaires not returned after 20 days were regarded as non-responses.

Demographic characteristics of participants related to gender, profession and years working in their profession were also collected. To describe sample characteristics, descriptive statistics were reported as means and standard deviations. The percentage agreement for all respondents within a clinical unit was calculated for each factor by using the 'agree strongly' and 'agree slightly' options for each item. The overall score for each factor was calculated by taking mean of the relevant factor items in the survey (items 2 and 11 were reverse coded before computing factor score).[15]

The psychometric properties of the SAQ-Urdu were assessed using confirmatory factor analysis. The used fit indices included model chi-square test statistic, comparative fit index (CFI), Tucker-Lewis index (TLI), root mean square error of approximation (RMSEA), standardized root mean square residuals (SRMR). The recommended cut-off values were >0.90 for CFI and TLI, <0.08 for RMSEA, <0.10 for SRMR[25], and chi-square test *p*-value of >0.05[26] (though low p-values are possible for good models[27]).

The construct validity was assessed by computing Pearson correlation coefficients between the six factor scores.[28] The internal reliability of the factors was measured using Cronbach α value of ≥0.60 for each factor.[29] All

statistical analyses were performed using STATA 13 (StataCorp, College Station, TX).

RESULTS

The clinicians (i.e. physicians, nurses and paramedic staff) completed a total of 361 questionnaires with an overall response rate of 75%. Physicians had slightly higher response rate (i.e. 77%) than nurses and paramedic staff (70%). On average, nurses and paramedic staff had 9.5 years of experience in their current units whereas physicians had an experience of 4.8 years. Half of all respondents (51%) were female. The detailed socio-demographic and professional characteristics are given in table-1.

Overall, the confirmatory factor analysis (CFA) indicated a good model fit for the entire safety construct. The CFI, and TLI were >0.90 and the RMSEA was <0.08. The goodness-of-fit-indices for the model are shown in Table-2. All correlations between factors were moderately positive and statistically significant (p<0.01). Among the five factors, job satisfaction had the highest mean factor score (4.0±0.9), followed by teamwork climate (3.9±0.7). Working conditions had the lowest mean factor score (3.5±0.9). For each factor, the mean score, Cronbach's alpha value, and the relevant Pearson correlation coefficient are given in table-3.

The SAQ item descriptive including minimum, maximum, and mean percentage of healthcare workers holding positive attitude toward each SAQ item are shown in table-4. Three items had more than 80% of mean percentage agreement. These items were 'it is easy for personnel here to ask of questions when there is something that they do not understand' (91%), 'I have the support I need from other personnel to care for patients' (87%), and 'this is a good place to work' (84%). On the other end, items with less than 40% of mean percentage agreement were related to perceptions of management and included the items of 'hospital management supports my daily efforts' (35%), and 'hospital management supports my daily efforts' (36%). Figure 1 illustrates the distribution and variability in the mean percentage agreement of hospital employees for five SAQ-Urdu factors across clinical units.

The Cronbach's alpha for the five factors of teamwork climate, safety climate, job satisfaction, perceptions of management, and working condition ranged from 0.71 to 0.87. The Cronbach's alpha value for the 18-item SAQ-Urdu was 0.91.

Table-1: Response rates and characteristics of respondents by care giver type

Characteristics	Physicians	Nurses	Total
Response rate (returned/administered)	76.6 (267/349)	70.1 (94/134)	74.8 (361/483)
Female, % (n)	49.1 (131)	56.4 (53)	50.9 (184)
Public hospital, % (n)	52.8 (141)	23.4 (22)	45.2 (163)
Practice experience in years, mean ± SD	4.8±7.0	9.5±9.3	6.0±7.9
Clinical Specialty, % (n)			
Internal Medicine	29.2 (78)	31.9 (30)	29.9 (108)
General Surgery	30.7 (82)	38.3 (36)	32.7 (118)
Paediatrics	16.9 (45)	16.0 (15)	16.6 (60)
Obstetrics and Gynaecology	23.2 (62)	13.8 (13)	20.8 (75)

Table-2: Results of confirmatory factor analysis (CFA)

Goodness of fit index	Entire model (n=361)
Chi-square Test of Model Fit (df, p-value)	213.27 (125, <0.001)
Chi-square Test of Model Fit for the Baseline Model (df, p-value)	1560.68 (153, <0.001)
Comparative Fit Index (CFI)	0.94
Tucker-Lewis-Index (TLI)	0.92
Root Mean Square Error of Approximation (RMSEA)	0.044
90% CI for RMSEA	0.034, 0.054
Probability RMSEA ≤ .05	0.82
Standardized Root Mean Squared Residual (SRMR)	0.044

Table-3: Mean factor scores and intercorrelations of the five factors*

Factor	Mean	SD	1	2	3	4	α
1. Teamwork climate	3.99	0.68					0.75
2. Safety climate	3.61	0.73	0.65				0.71
3. Job satisfaction	4.05	0.87	0.56	0.61			0.86
4. Perceptions of management	3.61	0.87	0.60	0.60	0.61		0.85
5. Working condition	3.55	0.96	0.50	0.55	0.56	0.64	0.87

*All Pearson correlation coefficients were significant at p<0.01

Table-4: Safety Attitudes Questionnaire item descriptive

	Percentage item missing data	Mean±SD	Percentage agree (min agree-max agree)	Percentage disagree (min disagree-max disagree)	Factor loading*
Teamwork Climate					
Nurse input is well received in this clinical area.	0.8	3.57±1.06	60 (36-74)	17 (8-31)	0.41
In this clinical area, it is difficult to speak up if I perceive a problem with patient care (reversed scores presented = 'higher is better').	1.4	3.45±1.19	44 (18-64)	19 (10-28)	-**
Disagreements in this clinical area are resolved appropriately (i.e., not *who* is right, but *what* is best for the patient).	0.6	3.96±1.01	76 (62-97)	10 (0-24)	0.63
I have the support I need from other personnel to care for patients.	0.6	4.18±0.90	87 (81-93)	6.6 (0-12)	0.49
It is easy for personnel here to ask questions when there is something that they do not understand.	0.0	4.34±0.78	91 (81-100)	4.4 (0-19)	0.59
The physicians and nurses here work together as a well-coordinated team.	1.4	3.88±1.04	73 (36-94)	11.1 (0-31)	0.69
Safety Climate					
I would feel safe being treated here as a patient.	0.3	3.80±1.07	72 (59-87)	14 (0-25)	0.65
Medical errors are handled appropriately in this clinical area.	0.5	3.82±0.96	71 (47-100)	11 (0-19)	0.67
I know the proper channels to direct questions regarding patient safety in this clinical area.	1.1	4.00±0.98	59 (35-77)	7 (0-18)	-**
I receive appropriate feedback about my performance.	1.4	3.20±1.19	50 (26-87)	32 (6-67)	0.61
In this clinical area, it is difficult to discuss errors (reversed scores presented = 'higher is better').	1.7	3.44±1.16	59 (47-81)	26 (6-37)	0.20
I am encouraged by my colleagues to report any patient safety concerns I may have.	0.3	3.78±0.96	73 (52-94)	13 (3-26)	0.55
The culture in this clinical area makes it easy to learn from the errors of others.	1.9	4.03±0.69	64 (44-81)	4 (0-12)	-**
Job Satisfaction					
I like my job.	3.0	4.24±0.77	65 (29-89)	3 (0-14)	-**
Working here is like being part of a large family	2.5	4.10±0.87	65 (52-87)	5 (0-14)	-**
This is a good place to work	2.8	4.13±0.81	84 (62-95)	4 (0-14)	0.34
I am proud to work in this clinical area	0.5	4.02±0.97	77 (45-94)	7 (3-12)	0.85
Morale in this clinical area is high.	1.7	3.92±0.97	58 (40-74)	7 (0-23)	-**
Perceptions of Management					
Unit Management supports my daily efforts	1.4	3.60±1.06	64 (19-91)	19 (5-45)	0.58
Unit Management doesn't knowingly compromise patient safety	1.9	3.64±1.01	49 (31-69)	14 (3-26)	-**
Unit Management is doing a good job	0.8	3.95±0.85	60 (31-81)	6 (0-29)	-**
Problem personnel are dealt with constructively by our unit management	1.1	3.66±0.94	64 (38-82)	12 (0-29)	0.46
I get adequate, timely info about events that might affect my work, from unit management	1.9	3.72±0.98	52 (31-87)	11 (0-29)	-**
Hospital Management supports my daily efforts	3.6	3.26±1.02	35 (5-57)	19 (9-29)	-**
Hospital Management doesn't knowingly compromise patient safety	1.7	3.43±0.98	41 (23-59)	15 (5-34)	-**
Hospital Management is doing a good job	2.5	3.59±1.02	58 (24-81)	15 (3-40)	0.49
Problem personnel are dealt with constructively by our hospital management	2.8	3.55±0.95	46 (19-69)	10 (0-28)	-**
I get adequate, timely info about events that might affect my work, from hospital management	3.0	3.33±1.11	36 (9-58)	19 (3-36)	-**
Working Conditions					
The levels of staffing in this clinical area are sufficient to handle the number of patients	3.9	3.65±1.17	48 (36-59)	17 (6-34)	-**
This hospital does a good job of training new personnel	0.0	3.44±1.13	56 (21-81)	24 (6-55)	0.65
All the necessary information for diagnostic and therapeutic decisions is routinely available to me	2.2	3.59±1.12	63 (21-94)	21 (0-43)	0.45
Trainees in my discipline are adequately supervised.	1.4	3.63±1.07	67 (45-100)	17 (0-38)	0.76

* The standardized factor loading for item 26 was significant at $p<0.05$; all remaining standardized factor loadings were significant at $p<0.001$.
** Items for which the aggregate of 'non-applicable' and 'missing' values was more than 25% were excluded from confirmatory factor analyses.

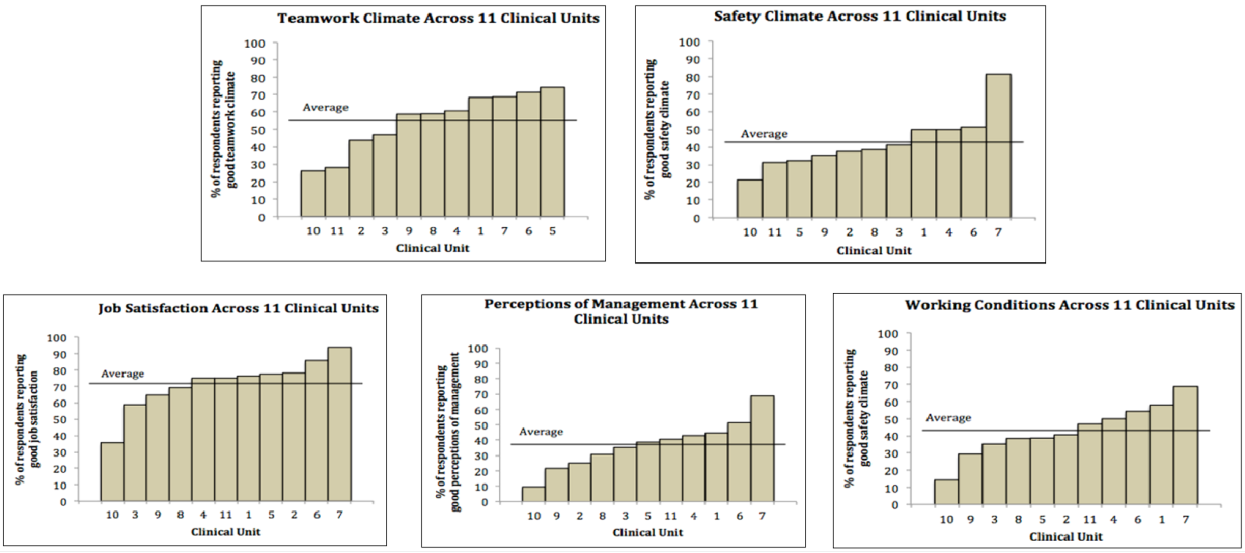

Figure-1: Distribution of mean percentage agreement scores for 11 clinical units of surveyed hospitals. Percentage agreements scores are computed as the percentage of respondents within a clinical unit who answered agree slightly or agree strongly on each of the items within a factor.

DISCUSSION

Safety attitude Questionnaire (SAQ) has been translated and administered in multiple languages, but this study for the first time translated SAQ into Urdu and presented its psychometric properties after administering the SAQ-Urdu in Pakistani hospital settings.

The SAQ-Urdu's reliability was found to be as strong as the SAQ reliability reported by other Norwegian, Swiss, and English versions of SAQ studies.[14,15,21] Cronbach alphas for all factors were greater than 0.70. Using goodness-of-fit indices from the CFA, the construct validity for the SAQ-Urdu was satisfactory. Although, p-value of less than 0.001 is against the fit of the model to the data, the TLI (0.92) and CFI (0.94) exceeded the recommended values of 0.90, and the RMSEA (0.044) was less than the suggested value of 0.08.[25] The SRMR (0.04) value was also below the critical value of 0.10. The five factors were moderately correlated with one another with highest correlation between teamwork climate and safety climate (r=0.65). Based on the above, we consider the SAQ-Urdu to be a strong candidate for future assessments of patient safety culture. Except the job satisfaction factor, the mean percentages of positive attitudes toward the safety factors of teamwork climate, safety climate, perceptions of management, and working conditions were below the international standard of 60%.[24]

Wide variations in scores within safety factors may have been due to the varying level of emphasis on patient safety factors among clinical units within a hospital as well as between different hospitals. Overall, the factor of perceptions of management had the lowest average percentage positive score (Figure-1) which means that on average respondents' scores were more negative for perceptions of management items. The recent management reforms in one of the surveyed hospitals may have contributed to the negative perception of management.

Comparing our item results with SAQ international benchmark data, our scores were lower for the items of 'nurse input is well received in this clinical area' (60% vs. 73% agree), 'I would feel safe being treated here as a patient' (72% vs. 75% agree), 'I know the proper channels to direct questions regarding patient safety in this clinical area' (59% vs. 64% agree), 'I am encouraged by my colleagues to report any patient safety concerns I may have' (73% vs. 78% agree), 'the culture in this clinical area makes it easy to learn from the errors of others' (64% vs. 72% agree), 'I like my job' (65% vs. 85% agree), and 'I get adequate, timely info about events that might affect my work, from hospital management' (36% vs. 42% agree).[15] Such 'low performing' items in comparison to the international benchmarking data present significant challenges to the clinical and administrative leadership in the hospitals.

Our findings suggest that much needs to be done to develop a safety culture in participating units and hospitals. In order to improve, the patient safety culture must be assessed across different care settings in Pakistani context. The SAQ-Urdu is easily administered and has been found to be a reliable patient safety culture assessment instrument. Hospital managers can assess and track the safety culture as a whole or one of its domains/factors (like teamwork climate) in specific units. Multiple studies have shown that improvements in teamwork significantly improve patient outcomes and

reduce avoidable errors.[30,31] More studies are required to assess clinical teamwork, patient safety culture, and the magnitude of their impact on clinical outcomes in Pakistan's hospital settings.

The SAQ-Urdu based survey results can be used to inform organizational policies toward facilitating organization's clinical workforce and improving performance indicators. For instance, in this study, whether hospital management supported employees' daily efforts got the lowest score (35.2%) and, on most perceptions of hospital management items, only about two-fifth of employees felt positive about management's role in their clinical practice. Such insights can help hospital management prioritize measures to better engage their workforce, support their work and, in turn, improve quality of care. At a broader level, for concerns related to working conditions, healthcare authorities (provincial healthcare commissions and Department of Health) can offer support to hospital management, especially in cases of public hospitals. This study has some limitations. First, primarily due to the 'not applicable' option, this study found 14 of the 30 items with high missing value rates (25.2 to 30.2%) that necessitated omission of such items from further analyses.

Previous studies have also reported missing value rates for certain items as high as 53.6%.[14,21] Majority of the items with missing values were related to the factors of perceptions of management (hospital management related items more than that of unit's) and working conditions. While other studies have reported similar trends, in our study, one hospital had recently undergone management reforms that may have contributed to high missing values for the perceptions of management and job satisfaction related items.[14,21] High missing values rates for some items like 'I get adequate, timely info about events that might affect my work' and 'I know the proper channels to direct questions regarding patient safety in this clinical area' may have been due to absence of effective electronic medical records systems or formal patient safety event reporting mechanisms in the three survey hospitals. Second, the study findings have not been linked to the clinical quality and safety indicators. Further studies correlating SAQ-Urdu based safety culture findings with clinical quality indicators in Pakistan's context can help determine the SAQ-Urdu's utility as a predictive instrument for patient safety.

CONCLUSION

The 18-item Urdu version of the SAQ demonstrates satisfactory psychometric properties, however, it requires additional research using large sample size studies. SAQ-Urdu is easy to administer and crosses the language barrier that hampers non-physician's safety culture assessment in Pakistan. This study should be considered a first step to develop a valid and reliable SAQ-Urdu instrument for Pakistan's healthcare inpatient settings.

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AUTHORS' CONTRIBUTION

MHK: Data acquisition and write up of the manuscript. MFZ: Conceiving idea, statistical analysis and write up of the manuscript. SMAS, MOA, SA, SHA: Data acquisition and write up of the manuscript. MI: Provided supervision and write up of the manuscript.

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