Safety Attitudes among Vietnamese Medical Staff in a Vietnam Disadvantaged Area: Latent Class Analysis

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Purpose: We conducted this study with the aim of characterizing safety attitudes (SA) among medical staff in a disadvantaged area of Vietnam and examining associated factors with SA.

Methods: A cross-sectional survey was conducted on 442 health staff members at four hospitals in Son La Province from June until August 2021. We used the Vietnamese shortened edition of the Safety Attitudes Questionnaire to measure the SA of study participations. We chose latent class analysis (LCA) to identifying the number of latent classes of SA among the study subjects. Multinomial logistic regression was used to examine factors associated with the identified SA classes.

Results: The results of our LCA showed that there were three latent classes, namely high SA group (n=150, 33.9%), moderate SA group (n=236, 53.4%), and low SA group (n=56, 12.7%). The multinomial logistic regression analysis found that medical staff who had university education and above, who were nurses, and who served in non-clinical areas were more likely to be in the moderate SA group and in the high SA group than in the low SA group.

Conclusion: Based on these results, several recommendations could be made to improve the SA of healthcare workers in disadvantaged areas. Further research with larger sample sizes and more diverse populations is needed to confirm these findings and to develop effective interventions to improve the SA of healthcare workers in disadvantaged areas.

Keywords: Patient safety, Attitude, Vietnam, Latent class analysis

Ⅰ. Introduction

The proliferation of medican incidents led to a medical issue that needs attention. The World Health Organization (WHO) has reported that low-income countries have had over 134 million medical incidents, resulting in 2.6 million annual deaths [1]. It was also estimated that 1 in 10 patients is harmed and 1 in 300 people die while receiving hospital care in high-income countries [1]. In contrast, many studies showed that 50% of medical incidents could be preventable [2,3], if health workers' safety attitudes (SA) can be increased. If SA were improved in low- and middle-income countries, the rate of preventable medical events could be as high as 83% [4,5]. The empirical evidence has thus emphasized the necessity of enhancing healthcare workers' attitudes towards patient safety.

Safety attitudes pertain to the shared attitudes, beliefs, values, and underlying assumptions that shape how individuals perceive and address safety matters within their organization [2]. Attitudes towards patient safety are known to relate to health workers' happiness, workplace bullying, quality of care delivered and job satisfaction [3,6,7] . Medical staff members who possess positive SA are also more likely to display beneficial behaviors concerning patient safety [8,9]. Around the world, the trend of research to assess SA is more common, especially in Europe and Asia. [10-12]. The results from these studies reflected the SA status of health workers and a part of hospital's quality. Additionally, if SA research is conducted on a broader scale, it may partially reflect the quality of a region's or a country's healthcare system.

Nevertheless, there is still lack of evidence about SA in disadvantage areas in low- and middle-income countries. For example, SA are still an issue that has not been systematically studied in Vietnam [13], particularly in disadvantaged areas. Son La Province is an economically deprived, mountainous province located in the Northwest region of Vietnam. Consequently, we conducted this study to characterize the SA of medical staff in a disadvantaged area of Vietnam and identify associated factors with SA.

Ⅱ. Methods

1. Study design and study subjects

This was a cross-sectional study on health professionals in Son La Province, Vietnam. Out of 500 health professionals who were from three district hospitals (Song Ma District general hospital, Moc Chau District general hospital, and Thao Nguyen General Hospital) and one provincial hospital (Lung Hospital), 442 completed the research questionnaire (response rate: 88.4%). The study was carried out between September and November 2020, with data gathering taking place between June and August 2021. Participants had to meet the study's inclusion requirements, which included working at one of the four hospitals at the time. Those who were absent throughout the study period for reasons like work travel or holidays, as well as those who declined to participate in the study, were subject to exclusion criteria.

2. Questionnaire

In this study, the Vietnamese-translated shortened version of the Safety Attitudes Questionnaire (SAQ) [14] was utilized. The SAQ consists of two sections: a demographic characteristics section and a SA section consisting of 36 items. The demographic characteristics section gathered information on gender, age (in years), marital status, occupation, education level, work experience (in years), duration of employment at the hospital (in years), job position (staff vs. manager/leader), work field (clinical and sub-clinical or non-clinical field), and the level of the hospital (province or region). All of the items in the SA sections were in a 5-item Likert scale. The SA section included 6 original scales of the SAQ and one new self-made, additional scale. The structure of this section was: teamwork climate (6 items), safety climate (7 items), job satisfaction (5 items), stress recognition (4 items), perceptions of management, working conditions (6 items) and other factors (5 items) - the new scale. The Cronbach's alpha showed that total 36 items and items in each scale were all greater than 0.7 (Appendix Table 1), which indicated that the SA section was extremely reliable.

3. Analysis plan

We used latent class analysis (LCA) to evaluate evidence for hidden classes of SA among health workers because the LCA finds application in various domains within medical research, including but not limited to, mental health [15], substance abuse [16], and healthcare attitudes [17]. The advantages of utilizing LCA in these studies lie in its ability to uncover hidden or unobserved subgroups within a population, allowing for a more nuanced understanding of complex phenomena [18]. By identifying distinct classes, LCA facilitates the examination of heterogeneity and provides a framework for targeted interventions and tailored approaches to enhance healthcare outcomes [19,20].

In this particular study, we chose to employ LCA to ascertain the latent class structure of SA among health workers. By leveraging LCA, we aimed to identify underlying subgroups within the population of health workers based on their SA. Understanding the diversity of SA among health workers is crucial for implementing effective interventions and training programs that address specific needs within each subgroup, ultimately promoting safer practices and enhancing patient care.

Initially, we began by evaluating the fit of a 2-class model, and then systematically increased the number of latent classes in the model until it was evident that the addition of further latent classes was not warranted. To determine this, we evaluated the following indices of comparative model fit. The "entropy" index was used to identify the suitable model of the analysis [21]. After determining, the best model solution identified was 3 classes (Appendix Table 2). We used the 1-way analyses of variance (ANOVAs) to indentify the difference of scores of each section according to 3 latent classses (Appendix Table 3). Based on the results, we named the classes in order were: high SA grooup with 150 individuals (33.9%), moderate SA group with 236 individuals (53.4%), and low SA group with 56 individuals (12.7%).

To examine differences in the demographic characteristics of the study population among the

three latent classes, 1-way analyses of variance (ANOVAs) were used for continuous variables and Chi-square tests were used for categorical variables. Finally, multinomial logistic regression with step-wise backward methods was used to determine the association between demographic characteristics of medical staff and SA latent classes. The low SA latent class was used as the reference to compare with other classes. The relative risk ratio (RRR) was used to identify associated factors in classes of SA. Statistical significance was determined with a *p*-value < .05. The data management was carried out using the Epidata 3.1 program, while the R programming language was used for data analysis.

4. Ethics

According to Resolution No. 616/ QD-DHYHN dated 2 April 2021, the Ha Noi Medical University authorized the project. The subjects were given a thorough explanation of the study's objectives, and only those who verbally and willingly consented to participate were handed questionnaires. No one who took part in this study was under any kind of pressure. The participants had been informed of their right to leave at any time if they did not care about potential bad outcomes, and they were aware that the data collection was exclusively done for research purposes. The research's findings were used solely to further clinical practice and for no other reason. Information about the medical staff was kept private. All participants in the study agreed and signed for voluntary participation.

III. Results

1. Demographic information

The majority of participants were married and more than half had a postgraduate degree (Table 1). The majority of those who participated in the research were women. The participants were 34.1 years old on average (SD=9.1). The majority of the study's participants worked as nurses. The participants had worked for an average of 10.2 years (SD=8.8). More than half of the participants had worked at the present hospital for more than 10 years, with an average tenure of 9.4 years (SD=8.3). The majority of the participants had jobs as staffs. Most of the participants worked in the clinical and sub-clinical sectors. The majority of the medical specialists who were part of the study's sample were employed by local hospitals.

2. Associated factors with class membership

The low SA group was selected as the reference group in order to compare with the other groups (Table 2). The final model identified three variables that influenced the latent classes were education level, occupation and working field. Specifically, for the comparison of the moderate SA group versus the low SA group, study participants were more likely to be classified in the moderate SA group if they had university education or above; worked as nurses; and worked in non-clinical areas. The comparison of the high SA group with the low SA group also showed a similar pattern.

Table 1. The demographic of study population according to safe attitude latent classes.

Variable	Demographics n (%)	Overall (n=442)	Low SA (n=56, 12.7%)	Moderate SA (n=236, 53.4%)	High SA (n=150, 33.9%)	p-value
Age (years)	20 - 29	165 (37.3)	22 (39.3)	82 (34.7)	61 (40.7)	
	30 - 39	180 (40.7)	24 (42.9)	96 (40.7)	60 (40.0)	.60
	40 - 49	54 (12.2)	6 (10.7)	29 (12.3)	19 (12.7)	
	≥ 50	43 (9.7)	4 (7.1)	29 (12.3)	10 (6.7)	
	Mean (SD)	34.1 (9.1)	32.7 (8.2)	34.9 (9.5)	33.4 (8.6)	.14
Gender	Male	155 (35.1)	22 (39.3)	74 (31.4)	59 (39.3)	.22
	Female	287 (64.9)	34 (60.7)	162 (68.6)	91 (60.7)	
Married status	Married	370 (83.7)	48 (85.7)	199 (84.3)	123 (82.0)	.76
	Single/Divorce	72 (16.3)	8 (14.3)	37 (15.7)	27 (18.0)	
Education level	University and above	256 (57.9)	26 (46.4)	143 (60.6)	87 (58.0)	.16
	Under university	186 (42.1)	30 (53.6)	93 (39.4)	63 (42.0)	
Occupation	Nurse	212 (48.0)	18 (32.1)	104 (44.1)	90 (60.0)	‹.001
	Others (doctors, pharma- cists, technicists, ...)	230 (52.0)	38 (67.9)	132 (55.9)	60 (40.0)	
Working years	1 - 5 years	180 (40.7)	27 (48.2)	87 (36.9)	66 (44.0)	.18
	› 5 years	262 (59.3)	29 (51.8)	149 (63.1)	84 (56.0)	
	Mean (SD)	10.1 (8.8)	9.29 (8.2)	10.7 (9.2)	9.61 (8.4)	.37
Time working at hospital	1 - 5 years	170 (38.5)	25 (44.6)	85 (36.0)	60 (40.0)	.44
	› 5 years	272 (61.5)	31 (55.4)	151 (64.0)	90 (60.0)	
	Mean (SD)	9.43 (8.3)	8.26 (7.3)	10.1 (8.6)	8.83 (7.9)	.18
Working position	Leader	64 (14.5)	5 (8.9)	42 (17.8)	17 (11.3)	.10
	Staff	378 (85.5)	51 (91.1)	194 (82.2)	133 (88.7)	
Working filed	Clinical and sub-clinical	291 (65.8)	46 (82.1)	134 (56.8)	111 (74.0)	‹.001
	Non-clinical	151 (34.2)	10 (17.9)	102 (43.2)	39 (26.0)	

Table 2. Factors associated with safety attitudes latent classes.

Predictors	Moderate SA	High SA
	RRR (95%CI)	RRR (95%CI)
Education level		
University and above	1	1
Under university	0.4 (0.2 to 0.8)	0.5 (0.2 to 0.9)
Occupation		
Nurse	1	1
Others (doctors, pharmacists, technicists, …)	0.4 (0.2 to 0.7)	0.2 (0.1 to 0.5)
Working filed		
Clinical and sub-clinical	1	1
Non-clinical	4.8 (2.2 to 10.2)	2.5 (1.1 to 5.7)

Low SA =the reference group; RRR= Relative risk ratio

Ⅳ. Discussion

Patient safety is a critical component of healthcare delivery and requires the attention of all healthcare professionals. The attitudes of healthcare workers towards patient safety culture are crucial in ensuring the delivery of high-quality care. The present study aims to identify the number of classes of SA and associated factors among medical staff in Vietnam. We utilized LCA to identify different classes of SA and investigate the influence of level of hospital, occupation, and working field on SA.

1. SA scores in latent classes

All the three SA latent classes in this research had total scores of the questionnaire that were relatively high, with each group scoring over 120 points. This finding was higher than that reported in previous research conducted in China, where the mean total score was 73.74 (SD=12.43, on a scale of 100) [22]. In another study in China, conducted by Kexin Jiang et al. (2019), the total SAQ patient safety score was 70.22 (SD=8.08) [23]. The observed differences may be attributed to variations in cultural differences and medical policies between the two countries.

2. Associated factors with class membership

Our findings differ from those of prior studies. Factors affecting patient SA in this study included level of hospital, occupation, and working field. In contrast, in Chinese studies, factors affecting SA were identified as gender, age, years of experience, location, workplace, marital status, and education level [22,24]. The differences may be attributable to variations in the economic circumstances of the study locations in China, where the studies were conducted in locations with higher incomes than our study area.

The level of education and occupation were found to impact the SA of medical staff in Vietnam. Hospital staff with under-university education were less likely to be in the moderate and high SA groups. Regarding occupation, the results of our study suggested that being a nurse was associated with the high SA class, which is in line with a study conducted in China [22] that found that nurses scored higher than doctors in most aspects.

Working field was another interesting element uncovered in our investigation. The SAQ revealed that departments with regular direct patient interaction scored substantially lower than those without. This may be related to the higher stress levels brought on by working in clinical departments, which see an increase in patient volume every day and thus have a larger workload. Also, there is a considerable danger of exposure in the clinical and laboratory work settings, which could influence employees' attitudes toward patient safety.

3. Strengths and limitations

Our study has several strengths. The use of LCA provided a robust approach to identify latent SA groups based on the answers of the medical staff, which minimized information bias during data collection. However, there are some limitations to this study. As a cross-sectional design, we cannot establish a causal relationship between factors and patient safety culture among healthcare workers. Furthermore, our study was conducted in a single province in Vietnam, which may limit its generalizability. Future research should expand to other regions and larger samples to enhance the generalizability of the findings.

V. Conclusion

The present study found that there were three latent classes of SA among medical staff of a disadvantaged area in Vietnam. Our study also revealed that the level of education, occupation, and working field were significant factors affecting SA among medical staff in Vietnam. Our findings highlight the importance of considering individual factors in promoting patient safety culture in healthcare settings, particularly at the grassroots level and emphasize the need for further research on this topic.

VI. Reference

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Appendix Table 1. Cronbach's alpha of questionnaire.

SAQ factors	Cronbach's alpha
Teamwork climate (6 items)	0.71
Safety climate (7 items)	0.74
Job satisfaction (5 items)	0.94
Stress recognition (4 items)	0.90
Perceptions of management (6 items)	0.84
Working conditions (3 items)	0.80
Other factors (5 items)	0.70
Total questionnaire (36 items)	0.93

Appendix Table 2. Results used to determine the number of latent classes.

| Model	Number of latent	Entropy
Model 1	1	–
Model 2	2	0.974
Model 3	**3**	**0.966**
Model 4	4	0.970
Model 5	5	0.981

Appendix Table 3. Safety attitudes scores, overall and by safety attitudes latent class.

Safe attitude section	Overall Mean (SD) (n=442)	Low SA Mean (SD) (n=56, 12.7%)	Moderate SA Mean (SD) (n=236, 53.4%)	High SA Mean (SD) (n=150, 33.9%)	p-value
Teamwork climate	22.9 (2.15)	20.5 (2.00)	22.4 (1.44)	24.5 (1.98)	<.001
Safety climate	26.9 (2.26)	24.3 (2.24)	26.3 (1.24)	28.8 (1.97)	<.001
Job satisfaction	21.5 (2.59)	18.2 (2.56)	21.0 (1.85)	23.6 (1.74)	<.001
Stress recognition	12.8 (3.14)	13.7 (1.84)	12.8 (3.19)	12.3 (3.37)	.019
Perceptions of management	24.2 (2.56)	20.4 (2.04)	23.6 (0.955)	26.5 (2.29)	<.001
Working conditions	12.2 (1.36)	10.2 (1.18)	12.0 (0.560)	13.4 (1.23)	<.001
Other factors	18.8 (1.81)	16.4 (1.88)	18.7 (1.07)	20.0 (1.67)	<.001
Total questionnaire	139 (10.4)	124 (8.39)	137 (5.15)	149 (7.37)	<.001

Appendix 4. Safety attitudes: frontline perspectives from this patient care area.

Safety Attitudes: Frontline Perspectives from this Patient Care Area

I work in the (clinical area or patient care area where you typically spend your time): This is in the
Department of: Please complete this survey with respect to your experiences in this clinical area.

- Use number 2 pencil only.
- Erase cleanly any mark you wish to change.

Correct Mark ● Incorrect Marks ✓ ⊗ ⊖ ◉

Not Applicable
Agree Strongly
Agree Slightly
Neutral
Disagree Slightly
Disagree Strongly

Please answer the following items with respect to your specific unit or clinical area.
Choose your responses using the scale below:

A	B	C	D	E	X
Disagree Strongly	Disagree Slightly	Neutral	Agree Slightly	Agree Strongly	Not Applicable

1. Nurse input is well received in this clinical area. Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ Ⓧ
2. In this clinical area, it is difficult to speak up if I perceive a problem with patient care. Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ Ⓧ
3. Disagreements in this clinical area are resolved appropriately (i.e., not *who* is right, but *what* is best for the patient). Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ Ⓧ
4. I have the support I need from other personnel to care for patients. Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ Ⓧ
5. It is easy for personnel here to ask questions when there is something that they do not understand. Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ Ⓧ
6. The physicians and nurses here work together as a well-coordinated team. Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ Ⓧ
7. I would feel safe being treated here as a patient. Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ Ⓧ
8. Medical errors are handled appropriately in this clinical area. Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ Ⓧ
9. I know the proper channels to direct questions regarding patient safety in this clinical area. Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ Ⓧ
10. I receive appropriate feedback about my performance. Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ Ⓧ
11. In this clinical area, it is difficult to discuss errors. Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ Ⓧ
12. I am encouraged by my colleagues to report any patient safety concerns I may have. Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ Ⓧ
13. The culture in this clinical area makes it easy to learn from the errors of others. Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ Ⓧ
14. My suggestions about safety would be acted upon if I expressed them to management. Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ Ⓧ
15. I like my job. Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ Ⓧ
16. Working here is like being part of a large family. Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ Ⓧ
17. This is a good place to work. Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ Ⓧ
18. I am proud to work in this clinical area. Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ Ⓧ
19. Morale in this clinical area is high. Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ Ⓧ
20. When my workload becomes excessive, my performance is impaired. Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ Ⓧ
21. I am less effective at work when fatigued. Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ Ⓧ
22. I am more likely to make errors in tense or hostile situations. Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ Ⓧ
23. Fatigue impairs my performance during emergency situations (e.g. emergency resuscitation, seizure). Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ Ⓧ
24. Management supports my daily efforts: Unit Mgt Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ Ⓧ Hosp Mgt Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ Ⓧ
25. Management doesn't knowingly compromise pt safety: Unit Mgt Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ Ⓧ Hosp Mgt Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ Ⓧ
26. Management is doing a good job: Unit Mgt Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ Ⓧ Hosp Mgt Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ Ⓧ
27. Problem personnel are dealt with constructively by our: Unit Mgt Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ Ⓧ Hosp Mgt Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ Ⓧ
28. I get adequate, timely info about events that might affect my work, from: Unit Mgt Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ Ⓧ Hosp Mgt Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ Ⓧ
29. The levels of staffing in this clinical area are sufficient to handle the number of patients. Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ Ⓧ
30. This hospital does a good job of training new personnel. Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ Ⓧ
31. All the necessary information for diagnostic and therapeutic decisions is routinely available to me. Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ Ⓧ
32. Trainees in my discipline are adequately supervised. Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ Ⓧ
33. I experience good collaboration with nurses in this clinical area. Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ Ⓧ
34. I experience good collaboration with staff physicians in this clinical area. Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ Ⓧ
35. I experience good collaboration with pharmacists in this clinical area. Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ Ⓧ
36. Communication breakdowns that lead to delays in delivery of care are common. Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ Ⓧ

BACKGROUND INFORMATION

Have you completed this survey before? ○ Yes ○ No ○ Don't Know   **Today's Date (month/year):**_____
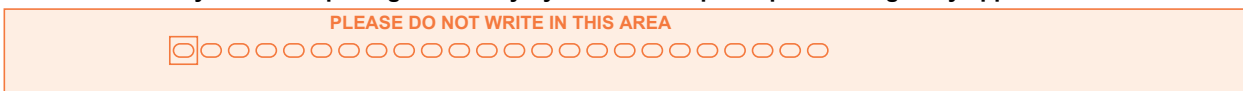
Position: (mark only one)
○ Attending/Staff Physician ○ Registered Nurse ○ Clinical Support (CMA, EMT, Nurses Aide, etc.)
○ Fellow Physician ○ Pharmacist ○ Technologist/Technician (e.g., Surg., Lab, Rad.)
○ Resident Physician ○ Therapist (RT, PT, OT, Speech) ○ Admin Support (Clerk/Secretary/Receptionist)
○ Physician Assistant/Nurse Practitioner ○ Clinical Social Worker ○ Environmental Support (Housekeeper)
○ Nurse Manager/Charge Nurse ○ Dietician/Nutritionist ○ Other Manager (e.g., Clinic Manager)
○ Other:_____

Mark your gender: ○ Male ○ Female   **Primarily** ○ Adult ○ Peds ○ Both
Years in specialty: ○ Less than 6 months ○ 6 to 11 mo. ○ 1 to 2 yrs ○ 3 to 4 yrs ○ 5 to 10 yrs ○ 11 to 20 yrs ○ 21 or more

Thank you for completing the survey - your time and participation are greatly appreciated.

PLEASE DO NOT WRITE IN THIS AREA
▢ ○

UTHealth™

The University of Texas
Health Science Center at Houston

Medical School

University of Texas at Houston-Memorial Hermann
Center for Healthcare Quality and Safety

November 5, 2015

Dear Dr. Thang Nguyen Huu,

You have our permission to use any of the following Safety Attitudes Questionnaires and the corresponding scoring keys:

    Safety Attitudes Questionnaire – Short Form
    Safety Attitudes Questionnaire – Teamwork and Safety Climate
    Safety Attitudes Questionnaire – Ambulatory Version
    Safety Attitudes Questionnaire – ICU Version
    Safety Attitudes Questionnaire – Labor and Delivery Version
    Safety Attitudes Questionnaire – Operating Room Version
    Safety Attitudes Questionnaire – Pharmacy Version
    Safety Climate Survey

Please note, we do not have editable versions for any of the SAQ surveys but feel free to modify the surveys to meet your research endeavors.

Respectfully,

University of Texas at Houston-Memorial Hermann
Center for Healthcare Quality and Safety Team

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https://med.uth.edu/chqs/