

Article

Perception of safety climate among Indonesian nurses: A cross-sectional survey

Evi Harwiati Ningrum,¹ Sue Evans,² Sze-Ee Soh,² Arul Ernest²¹School of Nursing, Faculty of Medicine, Universitas Brawijaya, Malang, Indonesia; ²Monash University, Melbourne, Australia

Abstract

Background: The measurement of nurse perception on safety, and the factors associated to safety climate, direct the development of effective strategies in reducing adverse events, and patient safety improvement.

Design and Method: This research was quantified, using the teamwork and safety climate domains of an Indonesian translated version of the Safety Attitudes Questionnaire (SAQ-INA). The teamwork and safety climate domain scores were calculated, using the published SAQ-INA scoring algorithm. The univariate and multivariate median regression models were performed to examine the association between potential predictors and safety climate.

Result: The results showed that 279 nurses responded to the survey (82% response rate). While most of them had a positive attitude towards teamwork (n=170, 61%), fewer possessed the same mentality towards safety climate (n=109, 39%). The lowest level of teamwork was perceived by nurses working in the emergency department (median 71, interquartile range 12.5), and safety climate (median 64, interquartile range 14.2). Furthermore, those that worked in the private hospitals, also reported lower levels of safety climate, compared to nurses in the public health centres (median difference=-3.571, p=0.009).

Conclusion: Ward and hospital type were associated with the level of safety climate, perceived by nurses. Understanding the key areas, the intervention is best directed to target hospital wards with poor safety climate, in a bid to reduce adverse events, and improve patient safety.

Introduction

Patient safety is an emerging aspect of research in Indonesia, as the country progressively implements Jaminan Kesehatan Nasional (JKN), or National Universal Health coverage¹, which requires accreditation from all the empanels in the public and private hospitals.² Part of the accreditation standards, require hospi-

tals to demonstrate adequate safety assurance systems.³ While the safety documentation, compiling adverse events reporting activities, hospital acquired infection control, safety policies, and drug management procedures, were observed to be completed in most hospitals accreditation surveys conducted in 2015.⁴ Moreover, the patient safety culture within Indonesia healthcare organisation was rarely assessed. In five of nine hospitals assessed in Australian -Indonesian study shows there were no significant impact of accreditation on organisational culture.⁴ Therefore, it is not assumed that accredited hospitals, also have good organisational cultures, in relation to patient safety.

Safety culture comprises of, how an individual views, perceptions, and actions to safety management system demonstrated in an organisation.^{5,6} However, safety climate that represent the empirical characteristics of practice are often measured because culture is rather complex to be assessed quantitatively.⁷ Safety climate represents safety culture at one given point in time, and provides information about its implementation in health organisations.⁸ Furthermore, there are evidences from comparing most hospitals, as regards the high levels of safety climate, while those with low ranks of safety climate shows declining of healthcare outcomes including, longer length of stay,⁹ higher 30-readmission rates,¹⁰ and increased postoperative mortality rate.¹¹ With inpatient adverse event rates, estimated at 33% of admission in Indonesian hospitals,¹² it is hypothesised that, improving safety climate reduces detrimental issues, improve patient well-being, hospital care and financial stability in Indonesia.

The Safety Attitudes Questionnaire (SAQ),¹³ is presently the most widely used safety climate tool, with evidences that support its validity, and reliability.¹³ Recently, the SAQ was translated into Bahasa Indonesian (SAQ-INA), with the measurement properties being examined, using Rasch analysis.¹⁴ Findings showed that the teamwork and safety climate domains of the SAQ-INA, had adequate internal construct validity, and is appropriately used to estimate the perception of safety in Indonesian hospitals.¹⁴ Therefore, this study describes the perception of safety among nurses working in Indonesian hospitals, and examine the association between demographic, professional, and organisational factors, using the domains of the SAQ-INA tool.

Significance for public health

There had been numerous studies, that showed poor safety climate and safety culture, perceived by health workers in medical services, which were associated with low hospital and protection measures such as, longer length of stay, higher 30 days readmission rates, and increased adverse events. Despite the importance, the investigation of safety climate is rarely reported by healthcare institution in Indonesia. The investigation of therapist perception towards safety climate, are essential data for Indonesian hospitals, as the nurse is the dominant workforce in the health system.

Design and Methods

Respondents of this cross-sectional study were Indonesian licensed nurses, delivering direct clinical care to patients in the emergency department (ED), with inpatient units, at a public and private hospital in East Java, Indonesia. Both hospitals have capacities of approximately 120 to 170 beds, and employed about 250 to 300 nurses, respectively. The respondents were made eligible for inclusion in this study, when they had performed over 7.5 working hours within a week, had been nurse on duty in respective ward for two-month period prior to the survey being administered.¹⁵ This criterion was applied to ensure that, those undertaking the survey had sufficient exposure to the safety climate within the organisation. Furthermore, ethical approval was provided by the Human Research Ethic Committee, at Monash University (MUHREC 2016-1409).

Data collection was overseen by the principal investigator (EN), that visited sites on a regular basis, to provide in-service education, and recruit respondents. The two research assistants, trained in confidentiality and privacy principles, distributed, collected, and kept the tally of surveys shared and returned, on a response rate tracker sheet, with the listed names of eligible nurses at each site, provided to the EN. After distributing an explanatory statement, and the SAQ-INA survey tool to eligible nurses, names appearing on the list were crossed off. After completion of the task,

respondents were advised to place the completed survey in an envelope, and have it returned to a sealed box, located in each ward. However, consents were inferred, whenever the survey was completed.

Measurement of safety climate dan factors associated with safety climate

Based on results from the validation study, the teamwork and safety climate domains of the SAQ-INA were used in this research, to quantify the level of safety climate. Teamwork climate is personnels' perception toward quality of collaboration, while safety climate is the perception of a strong, and proactive organisational commitment to safety system. The teamwork and safety climate domains of the SAQ-INA consists of six and seven items respectively, which were measured, using a five point Likert scale, that ranged from 1 (strongly disagree), to 5 (strongly agree). Furthermore, higher scores indicated that more positive attitudes existed, towards the particular safety domain assessed.

Additional questions regarding demographic (age, gender), professional (experience level, time length working in current unit, tenure, qualification), and organisational (employment status, ward type and class, number of shifts per week, work pattern) background of respondents, were also included in the survey. Ward type was classified into six categories namely, the emergency department (ED), medical, surgical, mixed surgical-medical, Intensive

Table 1. Characteristics of nurses that responded to the SAQ-INA (Safety Attitudes Questionnaire Indonesian version) questionnaire.

		Public hospital (n=141)		Private hospital (n=138)		Total (n=279)	
		n	(%)	n	(%)	n	(%)
Demographic factors							
Gender	Male	63	(45)	42	30	105	38
	Female	78	55	96	70	174	62
Age	≤ 30 years old	73	52	114	83	187	67
	>30 years old	68	48	24	17	92	33
Professional factors							
Level of Experience	≤ 5 years	80	57	94	68	174	62
	> 5 years	61	43	44	32	105	38
Qualification	RN div 1 (bachelor)	31	22	39	28	70	25
	RN div 2 (diploma)	110	78	99	72	209	75
Hospital Tenure	≤ 5 years	90	64	101	73	191	68
	> 5 years	51	36	37	26	88	31
Ward Tenure	< 1 year	69	49	31	22	100	36
	1-5 years	55	39	91	66	146	52
	> 5 years	17	12	16	12	33	12
Organisational factors							
Employment status	Government officer	56	40	0	0	56	20
	Non-government officer	85	60	92	67	177	63
	Contract staff	0	0	46	33	46	16
Ward type	Emergency	20	14	16	12	36	13
	Medical	39	28	15	11	54	19
	Surgical	24	17	14	10	38	14
	Mixed	17	12	28	20	45	16
	ICU	0	0	11	8	11	4
	Specialty	41	29	54	39	95	34
Number of shifts per week	≤ 1	63	44	46	33	109	39
	2-5 shifts per week	78	55	92	67	170	60
Work pattern	Rotation	109	77	137	99	246	88
	Day only	32	23	1	1	33	12

RN, registered nurse; ICU, intensive care unit.

Care Unit (ICU), and specialty wards (paediatric, stroke, and cardiovascular). Ward class categories of lower, upper, and no class were also created for classification, based on the payment arrangements made by patients in each ward. Lower class wards included patients that were fully covered by the Indonesian Health Coverage (UHC), while those of the upper class provided services for patients that were able to afford co-payment, or private fees. The no class category was used for patients, treated in ED, ICU, the stroke, and cardiovascular units.

Statistical analysis

Descriptive statistics were used to examine the characteristics of respondents in the two Indonesian hospitals, and the SAQ-INA teamwork and safety climate domain scores. The scores of The SAQ-INA consists of domain scores calculated in accordance with the published scoring algorithm,¹³ the percentage of positive scale scores (≥ 75 out of 100), that indicate the proportion of respondents who were more likely to choose positive response (*i.e.*, strongly agree and agree options).

Univariate and multivariate median (quantile) regression models were used, to assess the strength of the association between demographic (gender and age), professional (level of experience, work tenure, qualification), and organisational factors (employment status, ward type design, work and shift pattern), with teamwork and safety climate.¹⁶ Furthermore, the outcomes were skewed by the use of median regression, and transformation of data did not improve the distribution. Univariate regression models were initially computed for each predictor, with the teamwork and safety climate domains of the SAQ-INA. Variables that shows medium association ($p < 0.2$) after univariate analysis, were subsequently entered into a multivariate quantile regression model, using a backward stepwise method.¹⁶ During the multivariate analysis, a stepwise regression model was used, with the probability of variable inclusion and exclusion set at $p = 0.01$ and $p = 0.05$, respectively. Any factors not associated significantly with the teamwork and safety climate domain ($p > 0.05$), was removed from the model. Furthermore, differences between median of each predictor variable, were calculated for teamwork and safety climate domain.

Table 2. Teamwork climate and safety climate scores for teamwork climate and safety climate domain scores assessed by demographic, professional and organisational factors.

		Teamwork climate		Safety climate	
		Median	IQR	Median	IQR
Overall sample		75.0	8.3	71.4	10.7
Demographic factors					
Gender	Male	75.0	12.5	71.4	12.5
	Female	75.0	12.5	69.6	10.7
Age group	≤ 30 years old	75.0	12.5	71.4	10.7
	> 30 years old	75.0	12.5	67.8	14.2
Professional factors					
Level of experience	≤ 5 years	75.0	13.5	71.4	10.7
	> 5 years	75.0	10.4	67.8	14.2
Qualification	RN div 1	75.0	9.3	71.4	12.5
	RN div 2	75.0	14.5	71.4	10.7
Hospital tenure	≤ 5 years	75.0	12.5	71.4	10.7
	> 5 years	75.0	11.4	67.8	13.3
Ward tenure	< 1 year	75.0	12.5	71.4	14.2
	1-5 years	75.0	12.5	71.4	10.7
	> 5 years	75.0	10.4	67.8	12.5
Organisational factors					
Employment status	Government officer	75.0	8.3	67.8	10.7
	Non-government officer	75.0	16.6	71.4	14.2
	Contract staff	75.0	13.5	71.4	10.7
Ward type	Emergency	70.8	12.5	64.2	14.2
	Medical	75.0	12.5	67.8	10.7
	Surgical	75.0	12.5	71.4	7.1
	Mixed	75.0	12.5	67.8	12.5
	ICU	75.0	8.3	78.5	14.2
	Specialty	75.0	16.6	71.4	10.7
Ward class	Lower	75.0	12.5	71.4	10.7
	Upper	75.0	12.5	67.8	12.5
	No class	75.0	12.5	67.8	14.2
Number of shift per week	≤ 1 shift per week	75.0	10.4	71.4	14.2
	2-5 shifts per week	75.0	13.5	71.4	11.6
Work pattern	Rotation	75.0	12.5	71.4	10.7
	Day only	75.0	14.6	67.8	16.0
Hospital	Public	75.0	12.5	71.4	10.7
	Private	75.0	12.5	67.8	14.2

Median and interquartile range were described because there was skewness of the SAQ-INA data.

Results and Discussions

Characteristics of respondents are fully summarised accordingly in Table 1. Out of the 340 surveys that were distributed to nurses working in 17 wards across the two hospitals, 279 of it were returned, providing an overall response rate of 82% (77% and 87% in both public and private hospitals, respectively). Most respondents were female nurses (n=174, 62%), with ages younger than 30 years old (n=187, 67%). The majority (n=246, 88%) of respondents were rostered, to work both during the day and night, while also being shown that, they had been working for less than five years (n=174, 62%). However, most nurses (n=209, 75%), received their trainings at vocational nursing colleges (nurse division 2), with 63% (n=77), employed as permanent non-government staff, which means salaries were paid to them from the hospital budget, and not by the state administration.

Nurse perception on teamwork and safety climate

During this study, 61% of most Indonesian nurses (n=171), had positive perception toward their teamwork, while only 39% (n=108), reported their positive attitude toward safety. Table 2 best describes the median teamwork and safety climate, according to demographic, professional and organisational groups. The median teamwork climate SAQ-INA score was 75.0 (IQR 8.3), which was higher, compared to that of the safety climate (median 71.4, IQR 10.7) (Figure 1).

Level of teamwork and safety climate in public versus private hospitals

The teamwork and safety climate domain scores for ward type, in both public and private hospitals The Figures 1 and 2, respectively. Regardless with type of hospital, the lowest level of teamwork climate (median 70.8; IQR 12.5), and the safety climate (median 64.2; IQR 14.2) were described by nurses working in ED.

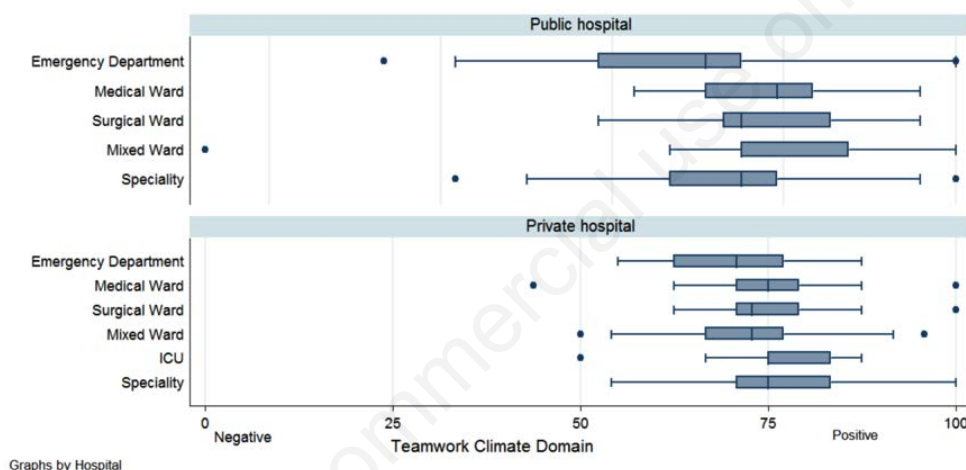


Figure 1. Boxplot of SAQ-INA teamwork climate domain scores, by hospital and ward type.

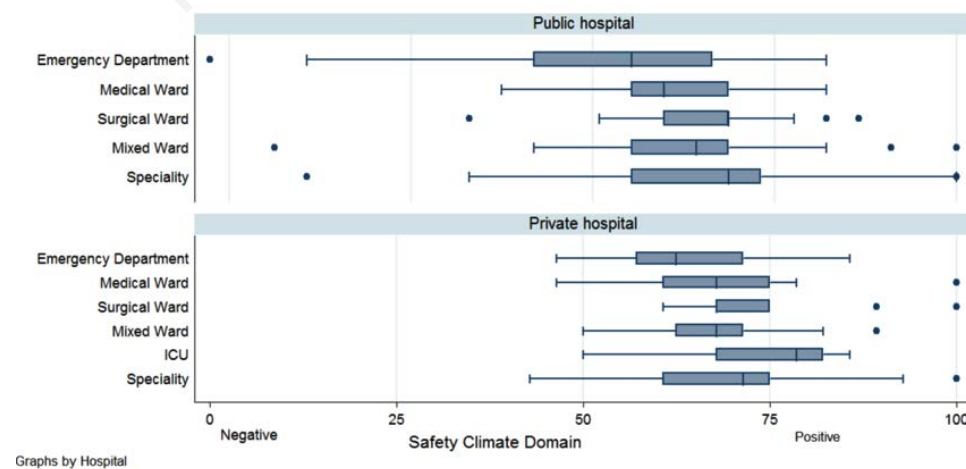


Figure 2. Boxplot of SAQ-INA safety climate domain scores, by hospital and ward type.

Factors associated with teamwork and safety climate

The result of the univariate analysis using quantile regression for the teamwork climate and safety climate domains were presented in Table 3. Multivariate regression was performed only for the safety climate because other most factors was not significantly associated with the teamwork climate but ward type (median difference 4.2, 95% CI, 0.1, 8.3), in the univariate analysis (Table 3). Significant predictors of high safety climate domain scores in the multivariate model included comparisons between female and male nurses, with working in all clinical areas (medical, surgical, mixed, and ICU wards) being compared to the ED. Furthermore, predictors of having low perception of safety climate included comparisons between those over 30 years and those aged <30, with those working in a private hospital compared to those in the public medical centres.

This is the first study measuring nurse perceptions of safety in Indonesian nurses, using a validated instrument that is Indonesian version of the SAQ (SAQ-INA) tool. While another Indonesian study had attempted to estimate safety culture, researchers used the Hospital Survey On Patient Safety Culture (HSOPSC) tool, which had not been appropriately validated in Indonesia, as results should be interpreted with caution.^{18,19} This study showed that, the teamwork climate domain's score was higher than that of the safety climate. Furthermore, the clinical area where nurses worked, was also observed to be the strongest determinant of teamwork and safety climate.²⁰ This highlights the importance of explorative studies, to assess the causes of poor safety climate including, a culture of blame or unsupportive leaders in healthcare institutions, while also considering that clinical areas are where the strategies to improve climate should be focused on.

Table 3. Table univariate and multivariate quantile regression of the SAQ-INA domains score across demographic, professional and organisational factors.

		Univariate quantile regression						Multivariate quantile regression*		
		Teamwork climate			Safety climate			Safety climate		
		Median difference	p-value	95% CI	Median difference	p-value	95% CI	Median difference	p-value	95% CI
Demographic factors										
Gender	Male	Ref								
	Female	0	1.000	-2.3-2.3	3.6	0.044	0.1-7.0	3.6	0.006	1.0-6.0
Age	≤ 30 years	Ref								
	> 30 years	0	1.000	-1.7-1.7	-3.6	0.020	-6.6-0.6	-3.6	0.009	-6.3, -0.9
Professional factors										
Level of experience	≤ 5 years	Ref								
	> 5 years	0	1.000	-2.3-2.3	-3.6	0.017	-6.5-0.6			
Qualification	RN div 1	Ref								
	RN div 2	0	1.000	-2.4-2.4	0	1.000	-3.3-3.3			
Hospital tenure	≤ 5 years	Ref								
	> 5 years	0	1.000	-2.3-2.3	-3.6	0.047	-7.1-0.0			
Ward tenure	< 1 year	Ref								
	1-5 years	0	1.000	-2.4-2.4	0	1.000	-3.9-3.9			
	>5 years	0	1.000							
	-3.8-3.7	-3.6	0.241	-9.6-2.4						
Organisational factors										
Employment status	Government officer	Ref								
	Non-government officer	0	1.000	-2.5-2.5	3.6	0.035	0.3-6.9			
	Contract staff	0	1.000	-3.2-0.2	3.6	0.105	-0.7-7.9			
Ward type	Emergency	Ref								
	Medical	4.2	0.002	1.6-6.7	3.6	0.160	-1.4-8.6	7.1	0.001	2.8-11.4
	Surgical	4.2	0.003	1.4-6.9	7.1	0.010	1.8-12.5	7.1	0.002	2.5-11.8
	Mixed	4.2	0.002	1.5-6.8	3.6	0.176	-1.6-8.8	7.1	0.002	2.6-11.7
	ICU	4.2	0.047	0.1-8.3	14.3	0.001	6.3-22.3	17.8	0.000	10.9-24.8
	Specialty	4.2	0.001	1.8-6.5	7.1	0.002	2.6-11.7	10.7	0.000	6.7-14.7
Ward class	Lower	Ref								
	Upper	0	1.000	-2.4, 2.4	-3.6	0.087	-7.7-0.5			
	No class	0	1.000	-1.8, 1.8	-3.6	0.024	-6.7-0.5			
Number of shift per week	≤1 shift per week	Ref								
	2-5 shifts per week	0	1.000	-2.7-2.7	0	1.000	-3.8-3.8			
Work pattern	Rotation	Ref								
	Day only	0	1.000	-4.8-4.8	-3.6	0.131	-8.2-1.1			
Hospital	Public	Ref								
	Private	0	1.000	-2.5-2.5	-3.6	0.014	-6.4-0.7	-3.6	0.009	-6.2-0.9

*Only associated factors that had significant p value in univariate model were inputted to multivariate model.

Furthermore, this study observed that 61% of nurses from both participating Indonesian hospitals, had positive attitudes toward teamwork climate. This differed to a similar study conducted in six acute Australian hospitals, which observed only 51% of nurses had positive attitudes toward teamwork climate.²¹ This difference is probably due to the distinguished belief, values and characteristics between the two countries.²² However, only 39% of nurses had a positive attitude towards safety climate. Similar results were observed in studies undertaken in Australia,²¹ United States,²³ Switzerland,²³ Sweden²⁴ and Malaysia,²⁵ which showed that doctors, nurses and pharmacists scored higher in the teamwork domain, compared to the safety climate region. This further suggests that health practitioners were more likely to perceive good collaboration with team members, rather than discussing concerns around patient safety. As safety climate measures the view and perception of nurses on how a healthcare organisation demonstrate its patient safety system and policy, results coming in that, just over a third of health practitioners had a positive attitude towards safety climate is concerning, with suggestions that they probably feel unsupported and resistant to speak up, whenever safety incidents occurred in their wards.

The lowest level of teamwork and safety climate were reported by nurses who perform service in ED, compared to other wards. This is similar to the finding a large multi-site US study, which observed that ED nurse reported poorer safety climate, compared to other areas of care.²⁶ Ineffective teamwork is often a sense of inferiority manifestation, and the hierarchical relationship between physicians and nurses, hinder the establishment of a very good teamwork.^{26,27} Nurses that often perceived less recognition from other professionals, tend to limit themselves from team engagement.²⁶ The importance of having effective teamwork and safety climate in this environment is not understated. A distinguishing characteristic of working in an ED is that, nurses are managing patients often with an unclear diagnosis,²⁸ in time critical situations, and most times, in an overcrowded environment.^{29,30} With a culture of poor teamwork and safety climate, all in a setting where nurses need to perform rapid assessments, while also trying to make accurate judgements, the opportunity for error to occur is pronounced. Recently, an evaluation of Indonesian national insurance observed that free medical service provided by Indonesian health system was not supported with adequate referral system between general practice and hospitals thus patients crowd in ED.³¹ Therefore, nurse in ED need a multifaceted intervention that include reorganize work conditions and supervising staff behaviour.

Furthermore, this study observed that nurses delivering care in the ICU, reported the highest level of safety climate. A high safety climate and positive attitudes towards safety was consistent with a study conducted in five Greek ICUs.³² The ICU nurses who have better perception toward safety climate is probably due to its well-established safety management and governance framework.³³ As the centre of hospital quality indicator, ICUs tend to have high mortality rates, and increased chances of medication error.^{34,35} Therefore, complex standards and requirements such as adequate staff to patient ratios, senior nurse who own intensive care training certification and at least one specialist is on duty at all times.³⁶ Furthermore, ICUs which occupied limited numbers of ventilator machine usually have small bed capacity in a well-structured environment.^{36,37} Therefore, these circumstances foster safe working

environments, while contrasting those encountered by nurses working in ED.

In this study, an association was observed between the type of hospital a nurse worked in (*i.e.*, public or private), and the safety climate domain score. While variation in safety climate across hospitals had been demonstrated in past studies,^{21,23,25} the association between public and private hospitals have no previous history being explored. The poorer safety climate reported in the private hospital is indirect impact of its higher financial pressures and typical private governance.³⁸ In contrast with nurses in public hospital that paid by district or provincial government as civil servants, nurses working in private hospitals are non-government officers who receive salary from a hospital-independent budget (predominantly from a small number of sole payers).³⁹ The cost of logistic supply for safety activities such as, hand sanitizer, a required disposable materials are not reimbursed by universal health coverage, thus it is self-funded by hospital.^{1,31,40} Furthermore, private hospitals in Indonesia face undeniable financial challenges, possibly leading to poor implementation of safety policy perceived by their nurses. Therefore, safety improvement initiatives in private hospitals, should be modified to be more cost effective, without compromising patient safety.

This study has some noteworthy limitations. Initially, the perception of safety reported by nurses in this small study in the two hospitals, does not represent the attitudes of other health professions. However, it is most likely that, the attitude of nurses towards teamwork and safety climate, possibly permeates to other health professionals working together with them, as known to all that nurses generally constitute the largest workforce in hospitals (58%).⁴¹ Furthermore, the view of nurses in this study, does not represent that of those in other Indonesian hospitals. Attempts to minimise this impact was made, by recruiting across numerous types of clinical areas in both private and public hospitals. Nonetheless, because the population involved included only nurses from two hospitals in East Java, results does not represent Indonesian acute medical centres in general. Therefore, most Indonesian hospitals operate under the same framework of universal health coverage, which means they all possess similar safety systems, and standards of quality care.¹

Conclusions

Nurses in Indonesian hospitals are found to have more positive attitudes towards teamwork, compared to safety climate. The clinical aspects of the profession were also a consistent predictor of teamwork level and safety climate perceived by Indonesian nurses. This study duly recommends that, research should now focus on investigating the factors within high performing clinical wards, in a bid to help explain good teamwork and safety climate, which in turn enables these findings to be shared more broadly. Strategies such as, TeamSTEPPS^{42,43} and multidisciplinary rounds, that reviews quality-safety checklists, help in improving communication, with teamwork and safety culture, provided that effective implementation, and support are made available by the institution. Therefore, results from this study provides a baseline measurement, on which the strategies are measured.

Correspondence: Sue Evans, School of Public Health and Preventive Medicine, Monash University, Melbourne, Australia, Ph: +61 3 990 30017, Email: sue.evans@monash.edu.au

Key words: Nurses; perception on safety; safety attitudes; teamwork climate; safety climate.

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