Abstract No. 118

Better Teamwork Climate Was Associated with Lower Catheter-Related Bloodstream Infection and Unscheduled Return to Intensive Care Units-Taiwan Patient Safety Culture Survey

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Introduction:

Many safety initiatives have been developed to decrease the incidences of severe complications common to intensive care unit (ICU) patients. Nevertheless, all these safety initiatives would not be realized unless the ICU and its caregivers are committed to patient safety. Teamwork climate reflects how caregivers from the same work unit perceive quality of collaboration between personnel. Evidences showed that the combination of teamwork improvement and evidence-based guidelines can improve patient safety. The Taiwan Joint Commission on Hospital Accreditation (TJCHA) has introduced valid safety culture measurement tool to Taiwanese hospitals since 2007. However, the linkage between teamwork climate and patient's clinical outcomes has not been thoroughly examined in Taiwan.

Objectives:

To measure caregivers' perceptions to teamwork climate and to examine its association with patient's clinical outcome in ICUs.

Study Designs:

- Questionnaire survey: The TJCHA initiated the Taiwan Patient Safety Culture Survey in 2008, using the adapted Chinese version Safety Attitudes Questionnaire (SAQ-C). The SAQ-C was a questionnaire with 32 core items for 5 dimensions—teamwork climate, safety climate, job satisfaction, perception to the hospital management, and working conditions. Response options for each teamwork item ranged from 1 (disagree strongly) to 5 (agree strongly). Each item was scored by converting the 5-point Likert scale to a 100-point scale. Responses to each of 6 items for a dimension teamwork were summed and then divided by six to create the teamwork score. A respondent was reported to hold positive attitude to teamwork if his or her teamwork score is 75 or higher.
- Settings: ICUs of all 18 medical centers in Taiwan.
- Participants: ICU caregivers who have worked in the ICU for at least 4 weeks.
- Administration of survey: The SAQ-C was administrated to all participated ICUs from May 31 to June 30, 2008. The number of questionnaire sent to each ICU was estimated based on the reported number of all types of caregivers.
- Clinical outcome measures: (1) the mean catheter-related bloodstream infection (CRBSI) rate in ICUs. CRBSI rate was defined as the number of culture-proved infection caused by catheter implemented at patient's body per 1000 catheter-day; (2) the unscheduled ICU return rate within 24 hours due to unstable conditions, which was defined as the person-times of ICU return of the same patient within 24 hours per 100 discharges from the ICU. The TPSCS taskforce invited the participated hospitals to submit their average CRBSI and unscheduled return rates in ICUs between May 1 and July 31, 2008.
- Data analysis: (1) Using each hospital ICU as unit of analysis, the minimum, maximum, and mean percentage of ICU caregivers holding positive attitude for each TC item and the whole dimension were compared. (2) Factors associated with individual's perception to ICU teamwork were assessed by the univariate and multivariate logistic regressions. Generalized estimating equation (GEE) method was used to adjust for the clustering effects of respondents working in the same ICU. (3) The association between the mean percentage of ICU caregivers holding positive teamwork perception and each of the safety parameters was plotted and analyzed by Pearson's correlation analysis.

Results:

- Survey responses: 3559 valid questionnaires were returned from ICUs of 18 medical centers, with an average response rate 74.4% and Cronbach's alpha value 0.748.
- Variations in teamwork climate across ICUs (Figure 1): The mean percentage of ICU caregivers of the hospital holding positive attitude for each item and the whole teamwork dimension are shown in Table 1. The mean score of positive attitude to teamwork was 46.4, lower than the suggested international standard 60. Among all items, nurses input and disagreement management were less likely to be perceived positively for ICU caregivers.

Figure 1.

There were wide variations in healthcare workers' perception to teamwork climate of their working ICUs in Taiwan. The national mean of all participating ICUs was 46.4

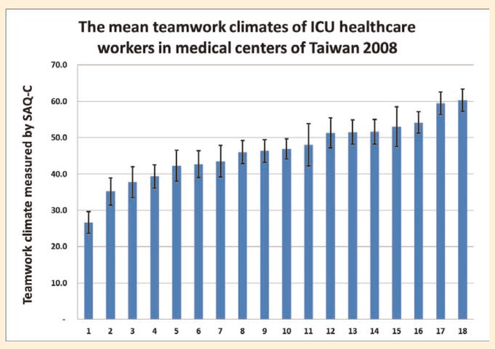


Table 1.

The minimum, maximum, and mean (±SD) percentage of positive attitude for each teamwork item of 18 participated ICUs

Teamwork climate items	% holding positive attitudes		
	Minimum	Maximum	Mean±SD
TC1 Nurse input is well received in this clinical area.	35.8	65.3	48.1±8.4
TC2 In this clinical area, it is difficult to speak up if I perceive a problem with patient care (reverse question)	60.0	80.2	73.4±5.4
TC3 Disagreements in this clinical area are resolved appropriately	43.7	66.7	57.1±6.4
TC4 I have the support I need from other personnel to care for patients.	54.1	83.5	72.7±7.2
TC5 It is easy for personnel here to ask questions when there is something that they do not understand.	64.1	90.6	80.6±6.2
TC6 The physicians and nurses here work together as a well-coordinated team.	51.5	71.6	62.9±6.4
Overall	26.6	60.3	46.4±8.5

- Factors associated with positive teamwork perceptions (Table 2)

  Gender, education levels and full-time employees were not significantly associated with positive teamwork perception. Adjusting by the multivariate analysis, physicians were 2.3 times more likely and pharmacists were 56.3% ($p<0.001$) less likely to have positive attitude than nurses. ICU caregivers with 1-5 and 6-10 year experiences were 12.9% and 21.8% ($p=0.014$) less likely to have positive teamwork than those with less than 1-year experience. ICU caregivers with management job were 2.6 times more likely to felt positive attitude than those without management job ($p<0.001$). The clustering effects were not significant because similar results were obtained by GEE analysis.

Table 2.

Factors associated with caregivers' perception to teamwork climate in intensive care units, analyzing using multivariate logistic regression. No significant clustering effect was confirmed by generalized estimating equation methods

Variables		Number (%)	Odds ratio	*p*
Gender	Female	3,425 (96.2)	1.000	
	Male	134 (3.8)	0.837	0.437
Job discipline	Nurses	3,011 (84.6)	1.000	
	Physicians	66 (1.9)	2.298	0.011
	Pharmacists	83 (2.3)	0.437	0.001
	Administrative clerks	52 (1.5)	0.739	0.306
	Technicians	42 (1.2)	1.209	0.548
	Others	305 (8.6)	0.842	0.169
Education levels	High school	44 (1.2)	1.000	
	Undergraduate	3,400 (95.5)	0.822	0.539
	Graduate	115 (3.2)	1.157	0.699
Working experiences	< 1 year	369 (10.4)	1.000	
	1-5 years	849 (23.8)	0.871	0.188
	6-10 years	1,196 (33.6)	0.782	0.014
	>10 years	826 (23.2)	1.072	0.528
Full-time employee	No	194 (5.5)	1.000	
	Yes	3,365 (94.5)	0.974	0.864
Management job	No	3,378 (94.9)	1.000	
	Yes	181 (5.1)	2.595	<0.001

- Association between teamwork and outcomes (Figure 2&3)

  The percentage of healthcare workers, who held positive teamwork climate perception to their working ICUs, was significantly associated with patients' likelihoods of getting catheter-related bloodstream infection ($r= -0.668$, $p=0.002$) and the unscheduled return rates ($r= -0.719$, $p=0.006$).

Figure 2.

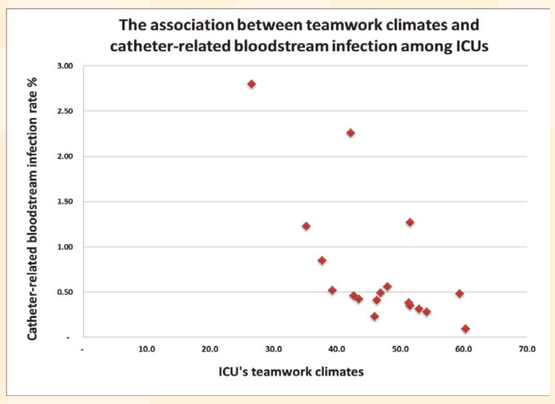
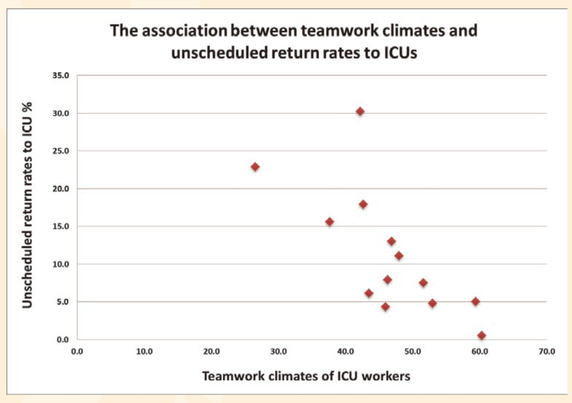


Figure 3.



Conclusions:

The teamwork climate perceived by caregivers is not mature enough for the majorities of the ICUs in Taiwan. Lower teamwork climate was documented to be associated with worse clinical outcomes for the high-morbid patients in ICUs. Further team-training programs and regular surveys shall be an integral part of the safety initiatives in ICUs.

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