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## Key Words

Psychological Safety; Emergency Department; Covid-19; Survey Study; Pandemic

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Research Article

# Psychological Safety in the Emergency Department during the COVID-19 Pandemic: A Single Centre Survey Study

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## Abstract

The Emergency Department represents a complex healthcare setting for delivery of acute and emergent care, 24 hours a day. We set out to measure the level of psychological safety among emergency department staff during the ongoing Covid-19 pandemic. We have employed Clark TR's definition of psychological safety, which comes in four stages namely: Inclusivity, Learning Safety, Contributory Safety and Challenger Safety to carry this out through the use of a series of questions. Our team also decided to innovate and add another domain known as Behavioural Safety. This was thus considered as the fifth stage of psychological safety in our survey. As this is the first such survey on psychological safety conducted in our ED, we intended to view these parameters and domains as a baseline, for future studies as well as interventions. Moreover, having been through the Covid-19 pandemic, we do realise there may be some new perspectives, feelings and behaviours, which may have become inculcated by the experience of the staff. We thus felt this would be beneficial in gauging the current state of psychological safety as well as the future directions and trajectory we can plan for our survey results showed that across all the stages of psychological safety in the emergency department, doctors demonstrated a higher level of psychological safety as compared to nurses; with inclusion safety, learning safety and behaviour safety being the highest, whilst challenger safety was the lowest. In addition, there were no significant differences during subgroup analysis on gender and seniority and its impact on psychological safety.

## Introduction

Psychological safety is fundamental to effective teamwork, communication, and collaboration at the workplace. It is a multi-dimensional, dynamic team-level phenomenon where all team members believe they are safe in taking interpersonal risks and fostering team efficacy together when learning and performing in organizational work teams [1]. Psychological safety is particularly relevant to healthcare teams because they work in a highly complex, dynamic, and high stakes work contexts that requires them to work interdependently to coordinate safe patient care [2]. Psychological safety also facilitates the active process of allowing multidisciplinary healthcare teams to be formed and to work together cohesively in order to deliver increasingly complex patient care in the acutely unwell patients. Particularly in healthcare, junior and seniors physicians, nursing and allied healthcare staff need to feel psychologically safe in order to maintain and encourage key outcomes, such as: patient safety, enhanced learning and performance; which are key determinants of a flourishing interprofessional collaborative environment [3]. In a psychologically safe milieu, essential teamwork processes can evolve, including mutual performance monitoring, mutual trust, high-quality communication, decision making, team cohesion, team motivation, and conflict resolution [4]. How healthcare professionals relate to their colleagues is also deemed an antecedent of job satisfaction [5], which could in turn translate to productivity as well as personal and career growth. Despite all its emphasis, a culture of fear, blame, hierarchy and low psychological safety still exists within healthcare organizations; which is detrimental to patient safety, staff morale and organizational performance, leading to unreported errors, poor staff satisfaction and growth, as well as decreased patient safety [6]. The Emergency Department (ED) is responsible for the management of acute, life-threatening medical and surgical conditions on a 24-hour basis. As the first point of contact for the majority of patients, ED teams work collaboratively to diagnose and manage patients with acute problems in a timely fashion. In addition to the high demand for rapid triaging, assessment, management and disposition of large turnover of patients, the ongoing COVID-19 pandemic has illustrated how building and maintaining a strong, positive departmental culture propels staff resilience, perseverance, innovation and performance. Furthermore, as the fight against the pandemic continues to escalate for frontline healthcare workers worldwide with surges after surges, ascertaining and cultivating psychological safety is indeed necessary for healthcare teams to collectively



redesign processes and services to cope with new challenges rapidly, learn from mistakes and implement expeditious changes accordingly [7]. There has been a paucity of cross-level and multilevel research on psychological safety to date in the medical literature, with particular emphasis on staff in the ED [8]. Psychological safety is a complex multifaceted concept with rather limited understanding especially within the Asian context as compared to the Western environment and culture. The most common form of measure for psychological safety is a team-level survey [9-10]. In order to measure the level of psychological safety among ED staffs, especially during the ongoing pandemic, we have employed Clark TR's definition on psychological safety which comes in four stages namely: Inclusivity, Learning Safety, Contributory Safety and Challenger Safety [9].

It resonates that everyone needs to feel included within their own social context, in order to satisfy the desire to learn and contribute by challenging the status quo without the risk of damaging intrapersonal or interpersonal dynamics. On Inclusivity, it is simply about being non bias and non discriminatory to everyone, no matter what their rank or job title. It is about every single person having their right of "citizenship" in the department. Treating each other with trust, respect and kindness and making sure all groups of staff are represented in committees, change management ideas and work processes is crucial to ensure inclusivity. When people and staff feel included and safe, they learn better and are not afraid to ask questions to deepen their understanding. This is what the safe climate for learning encourages. Especially in the emergency department, where the learning is embedded, fast paced and opportunistic, all the more ensuring learning safety and being level headed with each other plays an important role. Learning safety is not just for the residents in training and juniors, it must also appeal to the seniors and faculty as they too re-engaged in lifelong and continuous learning. Age should not be barrier to asking questions for learning and understanding. Contributory safety is a very critical type of psychological safety in Medicine, where there are multiple layers of hierarchy and seniority. This is further dependent on the department culture and also ethnic practices. For example, this can be very different when comparing the more western versus the eastern or Asian culture. No matter what, all levels of staff can be heard and can contribute. This must be a common acceptance and can be a point to be reinforced and demonstrated during meetings, group sessions and the like. Challenger safety is likely the most difficult. This is because the staff must have attained all the other levels of psychological safety before they are ready to question, change practice or "challenge" the status quo. If the staff does not have the level of intended psychological safety, then they may keep their views and ideas close "to their chest" and not share it openly. Being able to nurture challenger safety is a sign we can develop, progress, innovate and move ahead together, with everyone. In addition, psychological safety also promotes certain characteristic behaviour which play an important role in healthcare teams [11]. Feeling psychologically safe can enable team members to engage in speaking up behaviour, such as asking questions, pointing out a mistake or near miss and making suggestions for improvement [6]. Speaking up is potentially particularly challenging in situations where there are intra-organizational (e.g. issues around patient safety and bed capacity) and inter-organisational (e.g. regulatory pressures from healthcare inspectorates) pressures [9]. Psychological safety also enables learning behaviours, such as proactively seeking help or feedback. Learning behaviours are integral to healthcare teams' ability to manage demanding conditions, with rapidly evolving knowledge and practice as well as their ability to learn from failure [12]. When healthcare professional prioritizes patient safety by engaging in speaking up and learning behaviours, it is indicative of their levels of psychological safety [6]. Within high-performing healthcare teams, having positive interpersonal relationships, effective role models and better teamwork climates certainly encourages healthcare professionals to speak up for safety [6]. Our team has decided to innovate and add this as the 5th stage: Behavioral Safety.

Methods

This study was undertaken by a team of senior physicians and senior nurses within the ED of the largest tertiary hospital in Singapore with the aim to perform a simple descriptive psychometric analysis on the varying degree of psychological safety based on five different stages executed during the peak of COVID-19 pandemic. The survey questionnaires were developed through recent literature reviews on validated and/or published studies, with cross checking among the team members. The survey included subsections on demographic information on the respondents, namely their occupation (doctor/nurse), age group, gender, seniority (junior/senior), years of experience and other previous working experience. The questionnaire Annex 1 consisted of 5 domains of psychological safety, with the corresponding number of items displayed in brackets:

Annex I: The Questionnaire

Please rate on Likert scale 1-5 (strongly disagree to strongly agree)

1. Inclusion Safety (8):

- I feel valued, belonged and included as part of the department
-I feel appreciated and listened to at work in the department.
-It is safe to take risk in my team at work in the department.
-If you make a mistake in the department, it is often held against you.
-No one would deliberately act in a way that undermines my effort
-People sometimes reject others for being different
-I have difficulty asking others for help in the department
-We often work as a team to find the systemic cause when something goes wrong

2. Supportive Learning Safety (6):

- If I have a problem I could depend on my team leader to be my advocate.
-People in your department value new ideas
-People in my department encourage continuation of learning, developing and growing
-People in my department resist untried approaches
-The team/department encourages and supports me to take on new tasks or to learn how to do things that have never been done before
-People in my department are eager to share information about what does and/or does not work

3. Contributor Safety (5):

- Working with the members of the department, my unique skills and talents are valued and utilized
-It is easy to speak up about what is in my mind regarding new ideas/recommendations/ or suggestions
-People are able to bring up problems and tough issues freely
-People value new ideas and are interested in better ways of doing things
-Unless an idea has been around for a long time no one in this department wants to hear it

4. Challenger Safety (5):

- I am very comfortable in speaking up (e.g. disagreements, personal issues, varying point of views etc.)
-I feel very comfortable to suggest new ideas to change certain things or ways of working
-I prefer expressing my opinion privately or off-line rather than addressing them directly with the group
-Differences in opinions are welcome
-People are open to alternative ways of getting work done

5. Behaviors Safety (27):

Kindly rate the behaviors you have experienced while working in DEM on Likert scale 1-5 (strongly disagree to strongly agree)

Table with 6 columns: Voice Behaviors (6), Defensive voice behaviors (2), Supportive Behaviors (7), Unsupportive behaviors (3), Learning-oriented behaviors (7), Familiarity behaviors (2). Rows include Communicating opinions, Asking questions, Providing information, Providing feedback, and Providing solutions.



Correcting others		Acknowledging achievements		Looking for improvements/ideas	
		Delegating tasks		Acknowledge own mistakes	

-The Learning Organization Survey [Garvin D, Edmondson A, Gino F (2008). Is yours a learning organization? Harvard Business Review, March: 109-116]

- O'Donovan, R., McAuliffe, E. Exploring psychological safety in healthcare teams to inform the development of interventions: combining observational, survey and interview data. BMC Health Serv Res 20, 810 (2020).

- Edmondson A (1999) Psychological safety and learning behavior in work teams. Adm Sci Q. 44: 350-383.

- Clark, R. Timothy (March 2020). The 4 Stages of Psychological Safety: Defining the Path to Inclusion and Innovation. Berrett-Koehler Publishers.

Inclusion Safety (8), Supportive Learning Safety (6), Contributor Safety (5), Challenger Safety (5) and Behaviour Safety (27). The Behaviour Safety domain, which we added, was further subdivided into 6 sub-domains: Voice Behaviour (6), Defensive Voice Behaviour (2), Supportive Behaviour (7), Unsupportive Behaviour (3), Learning Oriented Behaviour (7), and Familiarity Behaviour (2). Each of the 51 statements was given a 5-point Likert rating of "Strongly Disagree" to "Strongly Agree". Subsequently a cross-sectional web-based survey with link and QR code was disseminated to all physicians and nurses currently working in the ED during the period of August to October 2021, with data collated anonymously and electronically under FORMSG™.

### Statistical analysis

#### Baseline characteristics

Demographic characteristics of the respondents were summarized as count (%) for the doctors and nurses.

#### Reversing of item response

The items within each domain were rated on a scale of 1 to 5 with response 1, 2, 3, 4 and 5 indicating Strongly Agree, Agree, Neutral, Disagree and Strongly Disagree respectively. Item responses were reversed whenever appropriate so that a score of 5 almost indicated the most positive response and a score of 1, the least positive response. As an example: the first statement under Inclusion Safety scale reads "I feel valued, belonged and included as part of the department" which is positively worded, had its response score reversed in this mapping manner: 1<sup>o</sup> 5, 2<sup>o</sup> 4, 3<sup>o</sup> 3, 4<sup>o</sup> 2, 5<sup>o</sup> 1. All the negative worded items (e.g. "If I make a mistake in the department, it is often held against me.") will not have their response score reversed to maintain the consistency of having the lowest score of 1 to indicate the least positive response. Under the new coding scheme, the scores are now interpreted as 5: Very Strong Safety, 4: Strong Safety, 3: Neutral, 2: Poor Safety, 1: Very Poor Safety.

#### Computation of mean domain score / total domain score

For each domain, the total score and mean score for each respondent was computed. Total score was computed by taking the sum of item responses in that domain and mean score by dividing the total score by the number of items in that domain. For the Behavior scale which had many subscales, a single mean domain score per respondent was computed based on the average of all 27 items in that scale. Higher total and mean domain scores are interpreted as having stronger safety responses.

#### Analysis of mean domain score and its association with occupation and seniority

Visual displays in the form of boxplots of the mean domain scores in males and females for each occupation were shown in side-by-side panels. Descriptive statistics of median (range) were reported for the mean domain scores or total domain scores by subgroups of interest and compared between groups by Mann-Whitney test. Association between seniority and years of work in ED of respondents was tested by chi-square test. Since there was good correlation between these 2 characteristics, we chose to only

associate seniority with mean domain score for each occupation separately. The same type of exploratory analysis and statistical testing as described above was repeated.

## Results

### A) Demographics Results

Table 1A: Demographic characteristics of all respondents.

	Category of staff				
	Doctor (N=69)		Nurse (N=81)		
	Count	Column N %	Count	Column N %	
Age (years)	20-30	27	39.1%	19	23.5%
	30-40	32	46.4%	41	50.6%
	40-50	5	7.2%	12	14.8%
	50-60	4	5.8%	6	7.4%
	60-70	1	1.4%	3	3.7%
Gender	Female	22	31.9%	59	72.8%
	Male	45	65.2%	18	22.2%
	Not disclosed	2	2.9%	4	4.9%
Seniority of staff	Junior Doctor	53	76.8%		
	Senior Doctor (AC and above)	16	23.2%		
	Junior Nurse			14	17.3%
	SSN and NC			67	82.7%
Work experience	Less than a year	26	37.7%	3	3.7%
	1 - 10 years	31	44.9%	41	50.6%
	11 - 20 years	7	10.1%	27	33.3%
	21 - 30 years	1	1.4%	3	3.7%
	Over 30 years	4	5.8%	7	8.6%
Any previous work experience before SGH DEM?	No	12	17.6%	27	33.8%
	Yes	56	82.4%	52	65.0%
	Not disclosed	0	0.0%	1	1.3%

Out of the 150 respondents, there were 69 doctors (46%) and 81 nurses (54%) who participated in the study. Out of the doctors, age cohorts of 20-30 and 30-40 years have the maximum percentage of doctors whereas the majority of the nurses belong to the 30-40 age group. Nurses with age above 40 to 70 is 25.9%, which is higher than that of doctors falling in the same category. There is a clear dominance of male doctors with 65.2% which is approximately double the number of female doctors (31.9%). In case of nurses the females dominated at 72.8%. 76.8% of doctors were in junior positions while 82.7% of nurses were in senior positions. The majority of doctors (44.9%) and nurses (50.6%) have 1-10 years of work experience with a significant number of doctors (37.7%) who have been working less than a year in the hospital.



**Table 1B:** Subcategory of Respondents

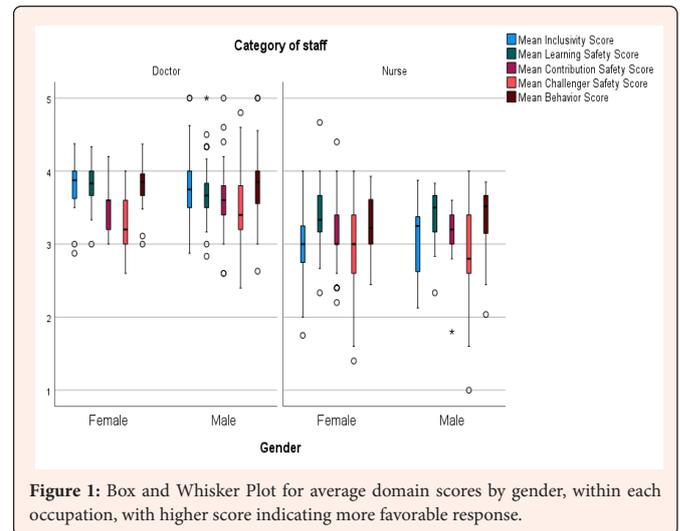
Job Title	Category of staff				
	Doctor		Nurse		
	Count	Column N %	Count	Column N %	
EN			6	7.4%	
SN			8	9.9%	
SSN			62	76.5%	
NC			5	6.2%	
MO	37		53.6%		
SR	16		23.2%		
AC & Above	16		23.2%		

The job titles of Enrolled Nurse (EN), Staff Nurse (SN), Senior Staff Nurse (SSN) and Nurse Clinician (NC) belong to the nursing group with SSN and NC falling under the senior category. Of all the nurses, the majority (76.5%) of nurses are in the SSN category only. 17.3 % of the nurses belong to the junior nurse category (EN and SN) whereas 82.7% nurses belong to the senior nurse category (SSN and NC). Among the doctors, Medical Officers (MO) and Senior Residents (SR) belong to the junior category whereas Associate Consultant (AC) and above belong to the senior doctor category. Of the total number of doctors, the majority (53.6%) of doctors are MOs and 23.2% belong to the senior category.

**B) Psychological Safety comparison between Doctors and Nurses**

There are 5 main domains corresponding to the stages with 6 sub-domains under Behavior Safety [Table 2]. Out of these 11 domains, means and medians for both doctors and nurses were mostly identical therefore the distributions were more or less symmetrical. For the doctors, behavior safety, inclusion safety and learning safety were the top 3 scoring domains respectively. As for the nurses, learning safety and behavior safety were the top 2 scoring domains with the rest scoring the same. The responses for

all domains were significantly higher for doctors as compared to nurses ( $p < 0.01$  for all 5) both for females and males. Doctors have scored up to the maximum possible score in every domain except for challenger safety. Whereas the nurses have scored up to the maximum possible score only in familiarity behaviour. Within each occupation category, there were no significant differences between males and female respondents. There were more male doctors and female nurses therefore it is not fair to compare exclusively by genders of all respondents.



**Figure 1:** Box and Whisker Plot for average domain scores by gender, within each occupation, with higher score indicating more favorable response.

[Figure 1] For inclusivity score and learning safety score, female doctors have slightly more positive responses in comparison to male doctors. For contribution and challenger safety score, the male doctors have slightly more positive responses as compared to the female doctors. Lastly, for Behaviour score, it was more or less identical for both the female and male doctors. On the other hand, for nurses, inclusivity, learning safety, contribution safety and behavior score showed slightly more positive responses in male nurses as opposed to female nurses; and the reverse was observed for challenger safety. The responses for all domains were significantly higher for doctors as compared to nurses ( $p < 0.01$  for all 5) for both females and males. Within each occupation category, there were

**Table 2:** Association of domain (stages) scores with occupation type

Stage (Min-Max score)	Doctor					Nurse					p-value
	Mean	Median	SD	Min	Max	Mean	Median	SD	Min	Max	
Inclusion Safety score (1-40)	30	30	3	23	40	24	24	4	14	32	< 0.001
Learning Safety score (1-30)	23	22	2	17	30	20	20	2	14	28	< 0.001
Contribution Safety score (1-25)	18	18	2	13	25	16	15	2	9	22	< 0.001
Challenger Safety score (1-25)	17	17	3	12	24	15	15	3	5	20	< 0.001
Voice behavior score (1-30)	23	24	4	11	30	19	19	4	8	27	< 0.001
Defensive voice behavior score (1-10)	7	8	2	2	10	5	6	2	2	8	< 0.001
Supportive behavior score (1-35)	27	28	4	16	35	23	23	4	11	29	< 0.001
Unsupportive behavior score (1-15)	10	10	2	5	15	9	9	2	3	12	< 0.001
Learning oriented behavior score (1-35)	27	27	3	17	35	24	25	4	8	29	< 0.001
Familiarity behavior score (1-10)	8	8	1	6	10	7	7	1	4	10	0.012
Total behavior Safety score (1-135)	102	104	12	66	135	87	87	12	54	106	< 0.001



Table 3A: Comparison across seniority among doctors

Stages	Doctors										p-value
	Junior N=53					Senior N=16					
	Mean	Median	SD	Max	Min	Mean	Median	SD	Max	Min	
Inclusivity score	30	30	3	23	40	30	31	4	23	36	1.000
Learning safety score	23	22	2	17	30	23	23	3	17	26	0.230
Contribution safety score	18	18	2	13	25	18	18	3	13	23	0.529
Challenger safety score	17	17	2	13	24	17	18	3	12	22	0.509
Total behavior score	104	104	11	80	135	97	100	13	66	113	0.086

Table 3B: Comparison across seniority among nurses

Stages	Nurses										p-value
	Junior N = 14					Senior N = 67					
	Mean	Median	SD	Max	Min	Mean	Median	SD	Max	Min	
Inclusivity score	25	26	5	14	32	24	24	3	14	31	0.250
Learning safety score	20	21	2	14	23	20	20	2	14	28	0.695
Contribution safety score	16	16	3	9	19	16	15	2	9	22	0.680
Challenger safety score	14	15	3	7	20	15	15	3	5	20	0.915
Total behavior score	88	94	15	54	105	87	87	11	55	106	0.648

[Table 3A-3B] There were no significant differences between seniors and juniors within each job category across all stages. The mean and median values were very close indicating symmetrical distribution except for the *total behavior score* of junior nurses which was slightly left-skewed. The standard deviation (SD) for each domain under junior and senior category of doctors and nurses showed very low variation except for the *inclusivity score* under junior nurses' category.

Table 3C: Comparison across all junior staffs in different category of professions

Stages	Doctor					Nurses					p-value
	Junior N=53					Junior N=14					
	Mean	Median	SD	Max	Min	Mean	Median	SD	Max	Min	
Inclusivity score	30	30	3	23	40	25	26	5	14	32	< 0.001
Learning safety score	23	22	2	17	30	20	21	2	14	23	< 0.001
Contribution safety score	18	18	2	13	25	16	16	3	9	19	0.003
Challenger safety score	17	17	2	13	24	14	15	3	7	20	0.007
Total behavior score	104	104	11	80	135	88	94	15	54	105	< 0.001

Table 3D: Comparison across all senior staffs in different category of professions

Stages	Doctor					Nurses					p-value
	Senior N=16					Senior N= 67					
	Mean	Median	SD	Max	Min	Mean	Median	SD	Max	Min	
Inclusivity score	30	31	4	23	36	24	24	3	14	31	< 0.001
Learning safety score	23	23	3	17	26	20	20	2	14	28	< 0.001
Contribution safety score	18	18	3	13	23	16	15	2	9	22	< 0.001
Challenger safety score	17	18	3	12	22	15	15	3	5	20	0.002
Total behavior score	97	100	13	66	113	87	87	11	55	106	0.002

no significant differences between males and female respondents. There were significantly more male doctors and female nurses therefore it is not fair to compare purely by genders of all respondents.

### C) Psychological Safety in relation to senioritis within each occupations

[Figure 2] For *inclusivity, learning safety and challenger score*, senior doctors have slightly more positive responses in comparison to junior doctors, the reverse was true for behavior safety. *Inclusivity, learning, contribution and behavior safety score* have slightly more positive responses for junior nurses as opposed to senior nurses. The mean scores

for all domains are higher for doctors compared to nurses, independent of seniority. Within each occupation, the mean domain scores are similar between junior and senior staff ( $p > 0.05$  for all).

[Table 3C-3D] There were significant differences between doctors and nurses within each seniority category across all stages with  $p < 0.05$ , which correlated well with previous findings in Table 2. For the junior category, *inclusivity, learning and behavior safety score* were most significantly different i.e. higher among doctors; while for the senior category, *inclusivity, learning and contribution safety* were the most significantly different i.e. higher among doctors.

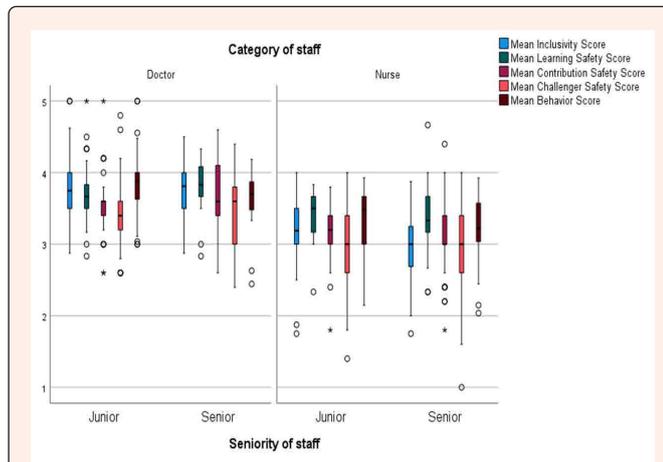


Figure 2: Box and Whisker Plot for average domain scores by seniority, within each occupation, with higher score indicating responses that are more favourable.

**Discussion**

Various research methods have been utilized to measure psychological safety in healthcare with lack of consistency: quantitative surveys, focus groups and semi-structured interviews, pre/post interventional observation and simulation [13]. To the best of the authors’ knowledge, this is the first study which attempted to quantify the level of psychological safety based on stages among ED staff working during the COVID-19 pandemic within the realm of additional physical and mental exhaustion. Such surveys can be useful in identifying subset of frontline workers who have scored low on psychological safety or who were unable to complete the survey, garnering particular support across the whole organization as necessary. It also acts as a pivot to identifying modifiable factors that can transform targeted programs which can improve the current state of psychological safety within our workforce. From our survey results, we have identified that doctors have a higher sense of psychological safety across all five stages as compared to the nurses, with the majority of the responses having a score of 4 or more. It also highlighted that within each occupation, there were no major differences among the junior and senior groups throughout all stages of psychological safety. Unfortunately, this result is not far-fetched as compared to known literature. Healthcare professionals with a higher status tend to have higher levels of psychological safety [14]. Many more nurses tend to work in environments within the ED where they do not feel psychologically safe [15]. Nurses who work in such environments can lead to disengagement, lower job satisfaction, increased absenteeism, and poorer retention rates which are all known to endanger patient care as well as affect staff morale [15]. The lack of psychological safety, openness and free exchange of crucial medical information among healthcare providers can ultimately translate to unfortunate outcomes of patients. When working in a psychologically safe environment, nurses feel comfortable and encouraged to ask questions, voice potential concerns, and brainstorm new ideas with the team, so as to contribute their unique set of professional skills and ideas [15]. Based on our results for instance, some nurses particularly felt a lack of inclusivity safety stating that, “if I make a mistake in the department, it is often held against me”, “people sometimes reject others for being different” and “I have difficulty asking others for help in the department”. They also quoted lack of behavior safety in regards to unsupportive and defensive voice behaviors experienced at work. One recommendation is to develop shared mental models which enable the team to share and agree on a mutual understanding of the urgency of the task at hand in particular, acknowledging the complexity of the issue/task and incorporating the views of all team members [14]. Shared mental model also include fostering of unbiased concept which empowers everyone to actively listen, showing gratitude and support, asking thought-provoking questions and learn from feedbacks through a no-blame or just culture. In addition, teams should focus on role clarity to ensure all team members are aware of the valuable contribution they make to effective team function, as well as the contributions made by others [14]. In the clinical environments, nurse managers serve a particularly important role in cultivating a constructive, open and ‘novice-supported’ work environment[16]. Nurse managers can build a unit with psychological safety through a set of procedures and they can build interpersonal relationships with high psychological safety through leadership behaviors consisting of inclusiveness and/or high-quality communication which foster collegiality, civility and accountability [16-19].

Specially, we recommend for nursing leaders together with organizational leaders to not only encourage but recognize nursing contributions in their respective departments, such as the ED, in manners that are most feasible.

Based on our results, challenger safety score is the lowest among all healthcare staff whereas inclusion safety and behavior safety are the highest. According to Clark TR’s diagnostic theory on assessing the stage of psychological safety in any organization or social unit, at increasing stages of psychological safety, team members become more and more happy. Challenger safety means being able to challenge the way the team works, come up with new ways of working, change behavior, and challenge the ideas of others – even the ideas of senior members[9,18]. This is the most powerful “stage” of psychological safety, as it not only allows new ideas to surface and learning from mistakes to occur, but it can prevent potentially bad ideas from getting to actualization [9,17,18]. This is exceptionally important during the COVID-19 pandemic in the ED whereby new information and ideas are supposed to translate into dynamic protocols swiftly at regular intervals. On the other hand, the high level of inclusion safety within the department reflect that the majority of the healthcare staff feels a sense of belonging, feel included and welcomed without discrimination. Lastly, a high degree of behavior safety ties in with inclusion safety such that everyone observes as well as behaves in such a familiar culture that an individual will feel confident that the organization listens to and acts upon concerns, irrespective of who within the “hierarchy” raises it[1,13,18]. Most importantly for junior staff who are close witnesses of potential safety issues or have personal experiences, these can be communicated to the management and the potential ideas for resolution and creative solutions can be brought up to those higher up within the organization is crucial. Everyone and every staff has a role to play and contribute. This also correlates to the potential for organizational learning [17].

Based on known literature, psychological safety is consistently shown to be present (often to high levels) within the populations of healthcare workers studied even though analysis did demonstrate that there is a number of individuals who report feelings and behaviors consistent with low psychological safety [11-15]. Several studies indicated that psychological safety had a significant benefit on the work environment, particularly when applied to teamwork, team creativity and quality improvement[13]. In order to enhance psychological safety, active, inclusive behavior on the part of physician leaders may be an essential to facilitate others’ meaningful engagement in team-based quality improvement work [18]. This is because physicians, including emergency physicians, often lead the teams. Team-based simulation models based on serious reportable events with holistic facilitation by nursing and physician leaders as well as post-simulation debriefing have also been utilized with some degree of success reported. Simulation allows for interprofessional and even interdisciplinary participation to develop a shared mental model without jeopardizing the health of real patients. It allows participants to “challenge” each other in a safe, non-judgemental forum under real clinical contexts with varying degree of complexity [17-20]. Our survey attempt has implications for further research. First, we suggest further research on a validated measurement including domains targeting specifically the healthcare context. New objective measurements could assess psychological safety revolving around interpersonal dynamics geared more towards nursing teams which aids in the development of interventions to improve psychological safety among nurses. For example, observational frameworks relating to the verbal and non-verbal indicators of psychologically safe and unsafe practices might be particularly helpful in simulation interventions around speaking up and decision making[3,18,19]. When common and accepted behaviors of psychological safety are agreed upon, behavioral markers provide ways to measure what is good or poor practice in healthcare which ultimately improves professionals’ and patients’ satisfaction [3]. Secondly, we also suggest further research into the impact of cultural norms on psychological safety within the healthcare context. Newman et al. stated that national culture influences psychological safety, however, little is known [8]. Additional studies will determine if proposed interventions from the Western literature are applicable and generalizable to the Eastern society.

**Limitations**

There are several limitations in our analysis in addition to the usual limitations associated with survey studies (e.g. sampling bias, demand characteristic bias, desirability bias, self-reporting and non-response bias). The steps taken to mitigate bias were to ensure anonymity, multiple reminders to enhance response and adequate time frame for respondents was crucial, taking into account the heavy workload during the pandemic. Including only one ED in our study may result in sampling bias limiting generalizability. Moreover, our set of questionnaires have not been tested for validity and reliability in the Asian healthcare context even though some of the questions have been utilized in the Western publications. Thus, these are valuable lessons to be considered.



## Conclusion

Our pilot survey results pertaining to the stages of psychological safety in the emergency department showed doctors having higher psychological safety among all 5 stages as compared to nurses, with inclusion safety, learning safety and behaviour safety being the highest while challenger safety being the lowest. In addition, there were no significant differences during subgroup analysis on genders and seniorities.

## Declaration

Authors have nothing to declare. Institutional Review Board waiver has been obtained through Singapore Health Service (CIRB Ref 2021/2503).

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