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Submission date: 18-Nov-2020 10:11AM (UTC+0700)

Submission ID: 1449621633

File name: Revisi-Fullpaper__ABS_873_SARI_CANDRA_DEWI.doc (139K)

Word count: 3064

Character count: 17054

Relationship of The Emergency Department Density Level With Nursing Work Stress

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Abstract

BACKGROUND: The imbalance between the increasing number of patients in the emergency department and the capacity of the hospital bed can lead to overcrowded conditions in the emergency department. Factors that cause emergency department density include lack of beds for inpatients, increased overall patient volume, increased non-emergency patient visits, lack of nursing staff, lack of administrative support. Overcrowded at the emergency department can cause work stress on nurses. Nurses in the emergency department tend to experience more stress than nurses on the ward due to workload and work fatigue.

AIM: This study aimed to determine the correlation between the emergency department density with nursing work stress.

METHODS: This study was conducted a correlational study in a hospital at Central Java in 2020. Total sampling with the criteria of nurses in the emergency department was the method employed to the respondents. The data analysis used descriptive statistics and rank-spearman, with a significant level of $p < 0.05$.

RESULTS: The most frequent occurred in the emergency department was overcrowded, while nursing work stress was moderate stress. The result of the rank-spearman test obtained a p-value of 0.000 with a correlation coefficient of 0.725.

CONCLUSION: There was a significant correlation between the emergency department density level with nursing work stress.

Keywords: density level, emergency department, nurses, work stress.

INTRODUCTION

Overcrowding is a condition when all beds in the emergency department (ED) are full, the patient is placed in the ED corridor because the inpatient installation is full, the ED does not accept new patients or divert incoming ambulances, the ED waiting department is full, the health personnel in the ED are very busy and waiting time for a doctor's examination more than an hour [1]. Overcrowding at the emergency department due to lack of beds for inpatients, increasing complexity of cases of patients attending the ED, increased overall patient volume, increased visits of non-emergency patients in the ED, lack of nursing staff, lack of specialists as consultants, lack of administrative support [2].

The impact of overcrowded at ED was increased mortality in hospitals, reduced clinical care in patients, increased medical errors, increased length of stay (LOS), adverse effects on education and research, inability to evacuate in emergencies situations such as fire, and patient waiting time [3,4,5]. Overcrowded causes delays in treatment for patients [6].

Overcrowding in the ED can cause work stress for nurses, which results in increased medical errors and less optimal services, which affects patient satisfaction [7]. Nurse's work stress factors include multiple role conflicts, lack of social support, diverse task demands and not in accordance with competence, excessive workload, inadequate nursing staff than patients [8,9]. Nurses' work stress reduces nurse productivity [10], reduces caring nurse behaviour [13], increases the incidence of errors in patient care and endangers patient safety [12].

Nurses in the emergency department tend to experience more stress than nurses inwards; 87.9% of emergency department nurses experienced moderate stress, while 62.1% of ward nurses [13]. Research on the emergency department at Semarang showed that the workload emergency nurses was mostly high by 93.1% of respondents and causes work stress of nurses. The high workload in the emergency department causes nursing work stress [14]. To anticipate the impact of overcrowded for nurses, it is necessary to conduct research on the relationship between the emergency department density level with nursing work stress.

METHODS

A correlational study with the cross-sectional method was performed in a hospital at Central Java. Data collection of emergency department density and nurse's work stress was carried out for one week, each day consisting of 3 work shifts in January 2020. Respondents of this study were nurses who worked in ED RS X at Central Java, with the exclusion criteria for off-duty nurses.

Total sampling with the inclusion criteria of nurses in the ED and the exclusion criteria the off-duty nurse was the sampling method used for respondents because the population was less

than 100 [15]. The total number of ED nurses in X Hospital was 23 nurses, while 20 nurses could be respondents.

The research instrument consisted of three parts. First part: a characteristic of respondents consist of gender, age, the highest level of education, and working experience. Second part: nurses' work stress assessment was adopted from the National Institute for Occupational Safety and Health (NIOSH) Generic Job Questionnaire instrument [16]. The instrument consists of 30 items using a five-point Likert scale to indicate nurse work stress. Score stress is divided into three levels mild, moderate, and severe stress. The NIOSH questionnaire is filled out every shift change for one week. Part three: assessment of emergency unit density used the National Department of Emergency Density Scale (NEDOCS) score [17]. NEDOCS consists of the number of emergency departments (ED) beds, number of hospital beds, total patients in the ED, patients on ventilators in the ED, number of admits in the ED, waiting time of the longest admitted patient, waiting time of longest waiting department patient. The NEDOCS assessment was carried out three times a day for each shift change. The interpretation of the NEDOCS score was divided into six levels: level 1 score 0 – 20 not busy, level 2 score 21 – 60 busy, level 3 score 61 – 100 extremely busy but not overcrowded, level 4 score 101 – 140 overcrowded, level 5 score 141 – 180 severely overcrowded, level 6 score 181-200 dangerously over-crowded [18].

Rank Spearman was used to analyzing the correlation between the emergency department density level and nursing work stress, with a significant level of p-value set at 0.05.

Ethical approval was obtained from the ethics committee of Yogyakarta Health Polytechnic, Ministry of Health of the Republic of Indonesia. Research permission was obtained from the hospital where the research was carried out. Informed consent was given to each respondent. Data anonymity and confidentiality were maintained. Respondents have the freedom to decide whether to participate or not and the freedom to withdraw from the research.

RESULTS

Table 1 showed that the characteristics of respondents were mostly men (65%), age more than 36 years (60%), the majority have diploma education (80%) and work experience of more than ten years (65%).

Table 1: Frequency distribution of respondent characteristics at ED Hospital X 2020 (n = 20)

Characteristics	
Gender, n (%)	
Male	13 (65.0)
Female	7 (35.0)
Age, n (%)	
< 35 years	8 (40.0)
≥ 36 years	12 (60.0)
Highest level of education, n (%)	
Bachelor's degree	4 (20.0)
Vocational school	16 (80.0)
Working experience, n (%)	
1-5 years	2 (10.0)
6-10 years	5 (25.0)
More than 10 years	13 (65.0)

Assessment of ED density level was carried out three times a day for each shift change during a week. Table 2 showed the emergency department density level most often occurs at level 4 (overcrowded) as many as 13 events (61.91%). The least frequent ED density level occurs at busy, extremely busy but not overcrowded and dangerous overcrowded each occurred one event (4.76%). The highest level is at level 6 (dangerously overcrowded) in the morning work shift, and the lowest level of density is at level 2 (busy) on the evening work shift.

Table 2: Density Level at ED Hospital X (n=21)

Level	Density Level		Work shift
1	Not busy, (n, %)	0 (0)	-
2	Busy (n, %)	1 (4.76)	1x evening
3	Extremely busy but not overcrowded (n, %)	1 (4.76)	1x afternoon
4	Overcrowded (n, %)	13 (61.91)	4x morning 4x afternoon 5x evening
5	Severely overcrowded (n, %)	5 (23.81)	2x morning 2x afternoon 1x evening
6	Dangerously overcrowded (n, %)	1 (4.76)	1x morning
Total		21	

Nurses in the ED are more likely to experience moderate stress (62.3%) (See Table 3). Both male and female nurses experienced moderate stress, 67.9% for men and 50% for women, nurse < 35 years of age experience moderate stress more often (69.4%). Based on level education, the nurse with a bachelor degree experienced moderate stress (63%). Nurse with working experience 6 – 10 years most experienced moderate stress (78,3) (See Table 4).

Table 3: Nursing work stress at ED Hospital X (n=90)

No.	Nursing Work stress (NIOSH)	
1	Mild, (n, %)	15 (16.6)
2	Moderate, (n, %)	56 (62.3)
3	Severe, (n, %)	19 (21.1)
Total		90

Table 4: Frequency distribution of nursing work stress based on nurse characteristics at ED Hospital X

N	Characteristic	Nursing Work Stress		
		Mild	Moderate	Severe
1	Gender			
	Male	9 (14.6)	42 (67.9)	11 (17.5)
	Female	6 (21.4)	14 (50.0)	8 (28.6)
2	Age			
	< 35 years	4 (11.2)	25 (69.4)	7 (19.4)
	≥ 36 years	9 (16.7)	32 (59.3)	13 (24.0)
3	Highest level of education			
	Bachelor's degree	12 (16.4)	46 (63.0)	15 (20.6)
	Vocational school	3 (17.7)	10 (58.8)	4 (23.5)
4	Working experience			
	1-5 years	4 (40.0)	4 (40.0)	2 (20.0)
	6-10 years	2 (8.7)	18 (78.3)	3 (13.0)
	More than 10 years	10 (16.4)	34 (55.7)	17 (27.9)

Increased levels of ED density caused increased work stress for nurses. When the density level in the ED level 2 (busy), the measurement of the work stress on nurses was 100% experiencing mild stress. While the level of ED density level 3 (Extremely busy but not overcrowded), it can be seen that the measurement of work stress for nurses experienced mild stress as much as 50% and moderate stress by 50%. When ED density level was level 4, the measurement of nursing work stress showed that nurses experience mild, moderate and severe stress.

The number of nurses with moderate stress measurement was 72.8%. When the density level of the ED level 5 (Severely overcrowded), nurses showed that the results of the measurement of work stress were 4.7% mild stress, 66.7% moderate stress and 28.6% severe stress. At the level of ED density level 6 (dangerously overcrowded), it shows that all of the nurses' work stress measurement results experience severe stress (100%) as can be seen in Table 5.

Spearman's non-parametric statistical test obtained the Sig. (2-tailed) 0.000. The correlation value was 0.725. It can be known that there was a

significant relationship between the density level with nursing work stress in the emergency department (See Table 6).

Table 5: Correlation between ED density level and nurse work stress (n=90)

Density level (NEDOCS)	Nurse work stress level			Total
	Mild (n, %)	Moderate (n, %)	Severe (n, %)	
1 Level 1. Not busy	0	0	0	0
Level 2. Busy	4 (100)	0	0	4
Level 3. Extremely busy but not overcrowded	2 (50)	2(50)	0	4
Level 4. Overcrowded	8 (14.5)	40 (72.8)	7 (12,7)	55
Level 5. Severely overcrowded	1 (4.7)	14 (66.7)	6 (28.6)	21
Level 6. Dangerously overcrowded	0	0	6 (100)	6
Total	15	56	19	90

Table 6: Spearman non-parametric statistical test results

		NEDOCS	NIOSH
Spearman's rho	Correlation Coefficient	1.000	.725**
	Sig. (2-tailed)		.000
	N	21	21
NIOSH	Correlation Coefficient	.725**	1.000
	Sig. (2-tailed)	.000	
	N	21	21

DISCUSSION

The results of this study indicated that when the overcrowded occurred at ED, nurse experienced moderate stress. The results of other studies stated that the density of the ED in the overcrowded category was 70.0% [19], work stress at ED as much as 82.8% experienced moderate work stress [14].

Garcia (2017) stated that between working days and holidays, a significant result was observed in the NEDOCS scale, with less density on holidays [20]. However, in this study, there was no decrease in the NEDOCS scale on holidays. The average density level occurs at level 4. The lowest density occurs only twice during the measurement, level 2 in the evening work shift and level 3 in day work shifts, and both shifts do not occur on holidays.

Respondents in this study stated that the stress conditions they experienced came from several things, including job disparities or responsibilities between nurses, lack of coordination among nurses, lack of coordination with other health staff, less rapid response from other health workers and the condition in the emergency department suddenly became tight because of the large number of referral patients who came. The work stress of nurses also comes from the service department that has not planned to add more nurses to the ED. The overcrowded emergency department was not balanced with adequate nursing staff, causing excessive work stress on the nurses on duty. The emergency department nurse considered that the service department needed to add more nurses in the ED because too many patients came to the ED, and the nurses could not handle it all at once.

Conditions that can increase work stress include the work factors themselves, in the form of the amount of workload, variations in workload, job uncertainty, work shifts, role conflicts, lack of control and interpersonal conflicts [21]. Other factors include the physical environment, lack of job opportunities, responsibility towards others and mental demands [22].

Conditions that can affect work stress are in line with the theory, which states that stress factors experienced by individuals as a result of specific organizational and job factors are followed by existing demands and constraints placed on them. The source of stress consists of four constructs, including the redundant role, ambiguity; Physical environment, social support (superiors support and co-worker support). High-stress conditions that are not accompanied by social support can decrease job satisfaction. High social support is useful for controlling work stress compared to other conditions [23].

The work stress of nurses is directly proportional to the density of the emergency unit. The increased level ED density level would increase nurses' work stress. Nurses in the emergency department tend to experience more stress than nurses inwards, 87.9% of emergency department nurses experienced moderate stress, while 62.1% of ward nurses [13]. Research at the emergency department in Semarang shows that the results of the workload of emergency nurses are mostly high in 93.1% of respondents. Most of the emergency department nurses felt mild stress as much as 82.8% [14]. Stressor at ED nurse caused by an excessive workload [24]. The increasing workload of nurses causes work stress on nurses [14].

CONCLUSION

Increased levels of ED density caused increased work stress for nurses. There was a strong association between the emergency department density level with nursing work stress. Nurses are expected to be more concerned about stress management and take the necessary actions when there is overcrowded in the emergency room. Hospital management can use NEDOCS as an early warning system to make decisions to overcome overcrowded condition in the ED

Acknowledgment

The gratefully acknowledge to the nurse who has given their time and energy enrolled in this research and to the nursing department of Yogyakarta Health Polytechnic, Ministry of Health of the Republic of Indonesia.

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