Environment, Self-Situation Awareness and Performance in Emergency Department

Herlina A. Hamzah[a*], M. Alimin Maidin[b], Indrianty Sudirman[c], Syahrir A. Pasinringi[d]

[a]*Medical Science of Postgraduate Program, Faculty of Medicine, Hasanuddin University, Makassar, Indonesia*
[b,d]*Faculty of Public Health, Hasanuddin University, Makassar, Indonesia*
[c]*Faculty of Economy, Hasanuddin University, Makassar, Indonesia*
[a]*Email: herlinahamzah@yahoo.com*

Abstract

The aim of this research was to analyzing correlation among physical environment and human environment to self-situation awareness and performance both directly and indirectly for medical staff in Emergency Department The research method used was a multi-stage analysis. Descriptive data analyzed by using SPSS program version 16, then correlation data among variables analyzed by using Covariance Based Structural Equation Modelling (VBSEM) AMOS technique to get fit model with actual research data. This research was a quantitative with total sampling method. The population or sampling were all medical staff in emergency department, who keen to be involved in research from two academic hospitals,One district General Hospital and two private hospitals with total sampling 219 people. The results of research indicated that there was a directly correlation between physical environment to self situation awareness and an indirectly correlation between physical environment and performance through self-situation awareness. Moreover, there was a directly correlation among human environment to self-situation awareness and a directly correlation between human environment and performance through self-situation awareness of medical staff in Emergency Department. Therefore, of course, there was a directly correlation between self-situation awareness and performance.

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* Corresponding author.

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Keywords: physical environment; human environment; self-situation awareness; performance.

1. Introduction

Paradigm shifting in quality of health care was just the beginning of patient safety issue, such as paradigm of equity focused on access of care (physically, ecnomically and sociallyaccess), then changed to partnership paradigm which focused on mutualism relationship between doctor and patient. Then, in 1990s quality of care focused on patient satisfaction through reliability, assurance, tangible, empathy and responsiveness (RATER) indicators [1].

This paradigm then changed in 2000s which was focused on patient-centered care, that patient safety values need and want of patient became a priority in integrated care with blaming-free culture [2,3]. Then, in 2005, the issues started with patient and family centered care which focused on dignity or respect, information sharing, participation and collaboration [4].

Patient safety issue was booming in 2000s since institute of Medicine (IOM) reported in White house Congress reported medical error incidents in USA hospitals was about 44,000-98,000/year or the eighth rank determinant for patient death in hospital in USA, which was over than AIDS cases, breast cancer and traffic accidents [5]. Based on WHO research in Europe, USA, Asia and Australia hospitals, it was found that impact of medical error would resulted to permanent disability (13,7%), death (4,9%), increase of length of stay (3,7%) and increase of claims in court which was about \$17-29 billion/year. The medical error was like iceberg phenomenon, as medical error was more likely unreported. Even, the real rate of incident was ten times higher than reported [3]. It was suprised that more than 50% of medical error cases could be able to be prevented [6,7].

Moreover, learning of medical error incidents were more likely ineffective as blaming culture in hospital which resulted to reluctant of medical staff to talk about. Even, Indonesian Government has a policy on patient safety through accreditation standards, the medical errors were not significantly decreased, as solution of the root cause of cases was not followed effectively.

Based on previous research, the causes of medical errors were organization culture, human resource, ergonomics, unprioritized patient safety program and unintegrated incident reporting [8]. It was found that human resource was the dominant cause of the incidents [8,9], especially it was related with complexity of decision professionally [8,10,11,12,13,14]. Decision making mistakes were more likely resulted from poor non technical skills such as capability in situation awareness. Poor non technical skill was not considered as a necessity training for human resource in hospital. Therefore, the root cause of medical error which poor human behavior in non technical skills was never resolved [15,16].

Poor non technical skills especialli in assessing situation awareness was resulted from poor perception in

information process [17,18]. Moreover, the quality indicator of in hospital was focused on output/outcome indicator, the process indicator was not determined yet in assessing safety and qualified medical service delivery. Therefore, the purpose of this research is to analyze relationship between Self-Situation Awareness and Performance in Emergency Department. The reason of choosing Emergency department as the research analysis unit as emergency department was one of the main gates receiving critical and life threatening patients, so accurate decision making was a vital process.

2. Material and Methods

The research used quantitative with total sampling method. Sampling was medical staff from five big hospitals in Makassar, South Sulawesi Indonesia, which were two academic hospitals, two private hospitals and one district general hospital. Those five hospitals were choosed because they woud be representative of hospital characteristics in Indonesia.The total sampling was 219 respondents. The unit analysis was medical staff included fulltime doctors and nurses/midwives as they were determinant factors in delivering health care process. The quantitative methods used questionnaires, in-depth interview and observation through multi-stage analysis, which were descriptive analysis with SPSS program and correlation analysis with Structural Equation Modelling (SEM) with AMOS program.

In this research, descriptive analysis included age, gender, recent education background, recent training, job position and working period in emergency department. While correlation analysis included independent variables were physical environment and human environment. Intervening variable was self-situation awareness and the dependent variable was performance of medical staff. Physical environment consisted of 18 measurement indicators or sub variables, which were divided into two categories, equipment and workplace layout. While, human categories, variables consisted of forty two measurement indicators or sub variables, which were divided into seven categories, such as practical knowledge, mental model, understanding of goal, hope, locus of control, experiencing critical cases and self-value.

Moreover, intervening variable was a self situation awareness consisted of twelve measurement indicators or sub variables, which were divided into three categories, namely environment planning capability, mental process monitoring capability and projection capability.

Then, the last, dependent variable consisted of ten measurement indicators or sub variables, which were divided into three categories, such as environment monitoring capability, self-mental monitoring capability and projection capability.

The researcher distributed questionnaires in spare-time of medical staff during working hours, then interview time arranged when collecting the questionnaires. Interview conducted both directly after collecting questionnaires or interviewed medical staff by phone in their day off.

3. Results and Discussion

Based on the patient safety incident reporting data in five hospitals, two hospitals were poor in identification of

patient safety incidents, a private hospital and a district general hospital.It was found from descriptive research on age of respondents were dominantly range from 25-30 years old (33.3%). It showed that productive age of respondents were mostly fresh gradutes of bachelor degree or profession degree in university then, directly working in emergency department. It meant that the respondents did not have long experiences in handling critical cases. Moreover, the respondents were adolescent age with ummatured emotional stability, so that working conflicts were more likely occured both with colleges or family of patient during health care delivery [14].

Based on the gender, it showed that female respondents were dominant (62.10%). It meant that mental chracteristics of female, such as melancholistic feeling used rather than logical thinking and ease to panic were more likely occured in care delivery [19,20].

However, based on recent education background, respondents were graduated from profession graduates (38.81%). It showed that respondents were competent working in emergency department. This was also supported that Basic Life Support (BLS) or Basic Training Cardiac Life Support (BTCLS) training had given to medical staff in emergency department. It meant that training competency as basic requirement for working in emergency department was sufficient (49.77%).

It was found that mostly medical staff who working in emergency department were nurses (73.06%) then physicians (16.44%). It showed that nursing care in emergency unit had a vital role especially in monitoring fragile and unpredictable change of patient condition. Nurse had the longest contact time with patient during medical care, therefore, sharing information from nurses to other professional health was most important before medical treatment started at the beginning of shift. However, based on observation and interview, nursing briefing prior treatment was seldom attended by other professional or medical students. This condition was a risk potential to endanger patient safety due to a gap in sharing information process [21].

Based on working period, respondents had been working in emergency department more than three years were dominant. It meant that medical staff in emergency department had understood characters of each other so that, communication and cooperation would be excellent.

Descriptive analysis on physical environment showed that generally, physical environment included equipment and workplace layout in emergency department was under average skor 3 (average 2.87). It meant that physical environment was generally insufficient, though some measurement variables such as Personal Protection Equipment (PPE), medicine, consumables and sanitation were sufficient. It found from interview and observation that number of equipment was scarce due to inappropriate maintenance, storing and reconstruction.Moreover, ergonomically workplace layout of emergency department and its accesories were poor as nurses could not cover monitoring all patient beds and moreover, concentration in working was disrupted by noisy and crowded conditions [22].

Descriptive analysis on human environment showed that practical knowledge, hope, locus of control and xperiencing critical cases were under average skor 3,04 (average 3.00). It meant that medical staff had difficulty

in practical knowledge (safety, effective and efficient service), poor reward (material, mental, performance), poor locus of control (emotional control, dependence degree, obeyance) and poor experiencing critical cases (adaptation level, mental capability and proactively anticipation).

Based on Confirmatory Factor Analisis (CFA) with Structural Equation Modelling (SEM), it was found that all measurement indicators or subvariables for physical environment had fitted with values of goodness of fit index, such as critical ratio values were more than absolute minimum value 2.00. Therefore, all 18 measurement indicators for physical environment were acceptable. It meant that the questionnaires were fit and applicable to other research.

The same condition was also occured in human environment. All 42 measurement indicators for human environment had fitted with values of goodness of fit index, such as critical ratio values were more than absolute minimum value 2.00. Therefore, all 42 measurement indicators for human environment were acceptable. It meants that the questionnaires were fit and applicable to other research.

Moreover, It was described as figure 1 in coorrelation analysis with confirmatory factor analysis, showed that loading factor of workplace layout (0.81) was greater than equipment (0.66). It meant that workplace layout was more affected to physical environment. Then, critical ratio value for physical environment correlation with self-situation awareness was greater (2.920) than critical ratio value for physical environment correlation with performance (0.138). It meant that there was a positive significant correlation between physical environment correlation and self-situation awareness directly. It was supported by previous research [21,23,24] that equipment and ergonomic-related job influenced patient safety. While, there was unsignificant correlation between physical environment correlation and performance directly [24]. However, it showed also that there was a correlation a positive significant indirectly correlation between physical environment and perfomance through self-situation awareness (0.092) [25,26].
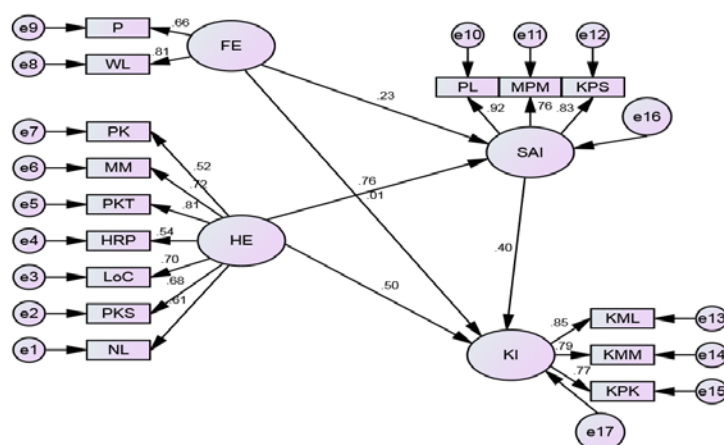

Figure 1

From total effect analysis, it showed that total effect value for correlation between physical environment and

self-situation awareness was 0.229. It meant that there was a strong total correlation between physical environment and self-situation awareness, which was interpreted if one percent physical environment increased, it would increased self-situation awareness 22.9%.

In addition, total effect value for correlation between physical environment and performance was 0.101. It meant that there was a strong total correlation between physical environment and performance, which was interpreted if one percent physical environment increased, it would increased performance as 10.1%. Therefore, it was concluded that there was a correlation between physical environment and situation awareness directly and a correlation between physical environment and performance indirectly thorough situation awareness. This was supported from previous research that staff could not working well without equipment and uncomfortable workingplace, although the reason of correlation was not explained [6,8,14].

It was also described as figure 1 in coorrelation analysis with confirmatory factor analysis, showed that loading factor of understanding the goal (0.81) was the highest score compred with other measurement indicators, such as practical knowledge, mental model, understanding of goal, hope, locus of control, experiencing critical cases and self-value. It meant that understanding the goal of working in emergency department was more affected to human environment. Then, critical ratio value for human environment correlation with self-situation awareness was greater (8.475) than critical ratio value for human environment correlation with performance (4.473). It meant that there was a positive significant correlation between physical environment and self-situation awareness correlation directly [19,27],. In addition, there was also a significant correlation between human environment correlation and performance indirectly through self-situation awareness capability, although the correlation was less than a correlation between human environment and self-situation awareness. This was supported by previous research [9,25,28] that self performance was formed by interaction among every performance of staff.

From total effect analysis, it showed that total effect value for correlation between human environment and self-situation awareness was 0.762. It meant that there was a strong total correlation between human environment and self-situation awareness, which was interpreted if one percent human environment increased, it would increased self-situation awareness 76.2%.

In addition, total effect value for correlation between human environment and performance was 0,807. It meant that there was a strong total correlation between human environment and performance, which was interpreted if one percent human environment increased, it would increased performance as 80.7%. Therefore, it was concluded that there was a directly correlation between human environment and situation awareness [29] and also both directly and indirectly correlations between human environment and performance through situation awareness capability [7,29,30].

The correlation between self-situation awareness and performance was 0.402 with critical ratio value was 3.839. It meant that there was a positive and significant correlation between self-situation awareness and performance in emergency department [31,32,33].

4. Conclusion

It was concluded that there was a directly positive and significant correlation between physical environment and situatation awareness, while there was a indirectly positive and significant correlation between physical environment and performance through self-situation awareness capability.

It was also a directly correlation between human environment and situation awareness and also both directly and indirectly correlations between human environment and performance through situation awareness.

It was also found that there was a directly correlation between self-situation awareness and performance.

It was recommended that self-situation awareness indicators used as ongoing clinical performance evaluation for medical staff in recrutment and placement process. This was one of risk management efforts for emergency patient safety program at human resource department in hospital.

Interaction among medical staff and the role of a teamwork were not considered in this research. Other variables would be need for futher research.

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