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Simultaneous Relationship Between Competence and Burn Out to Patient Safety Culture with System Thinking as Intervening Variabel

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Abstract:
Patient safety is currently a global concern in health services. The provision of high-quality essential health services depends on patient safety. The goal of patient safety is to establish a culture of safety in the hospital, increase the level of accountability the hospital has to patients and the public, reduce the number of incidents that occur in the hospital, and implement prevention programs to stop incidents from happening again. This study aims to determine the factors related to the application of patient safety culture, especially in the influence of competence, burn out on patient safety culture with system thinking as an intervening variable at Karya Medika I Hospital located in West Java. This research was conducted at Karya Medika I Hospital, with research time from October 2022 to March 2023, involving 87 functional nurses from treatment rooms to polyclinics, with data collection methods in the form of questionnaires about patient safety culture, competence, burn out and system thinking and using SPSS as statistical tools in processing the research data. For the result data; The Pearson test results obtained p value of 0.005 where the value is significant if the p value <0.05 this means that there is a relationship between competence and patient safety culture. In this study, it was found that the relationship between Competence and Burn Out variables had an effect on Patient Safety Culture through the intervening system thinking variable and this research was also in accordance with previous studies. It can be seen in this study that there is a correlation between effective communication between medical personnel, the level of work fatigue and communication within the unit when there is a problem regarding patient safety culture through identifying patterns of thinking systems from nurses.

Keywords: Patient Safety Culture, Competency, Burn Out, System Thinking

INTRODUCTION

According to the Institute of Medicine (IOM) report, “To Err is Human” brought world attention to patient safety issues in the late 1990s. This report estimates that nearly 44,000-98,000 patients die from preventable errors in American hospitals each year. This triggers response and activity among healthcare stakeholders at the national and institutional levels. Substantial efforts have been

made to identify sources of error, develop safety metrics, and create impactful policy initiatives to improve safety in hospitals nationwide. (Ismainar, 2015)

Based on patient safety incident reports in Indonesia by province, DKI Jakarta ranks highest with an increase of 37.9% compared to eight other provinces (Central Java 15.9%, DI Yogyakarta 13.8%, East Java 11.7%, South Sumatra 6.9%, West Java 2.8%, Bali 1.4%, Aceh 10.7%, and South Sulawesi 0.7%). Meanwhile, a Near-Injury (KNC) rate of 47.6% was observed when the type of incident was considered; more than 46.2% for Unexpected Events (KTD). (Lestari, Dwiantoro and Denny, 2019)

Patient safety culture is very important for patient safety. One way to ensure overall patient safety is to build a patient safety culture. Instead of focusing solely on safety programs, a focus on patient safety culture will be more effective (Fleming, 2006; Reason 2000). Work teams, learning organizations, stress levels and workload of nurses, and communication are the four main influences on the acquisition and adoption of a patient safety culture (Yonghee Han et al., 2020). In terms of Burnout in the research of Jiali Liu, et al, 2019 it is said that nurse fatigue is directly associated with lower patient safety and more side effects (Jiali Liu, et al, 2019). For research related to system thinking which was presented by Mahsoon AN, et al, 2021 it was found that more and more nurses who have system thinking have better patient safety. (Mahsoon and Dolansky, 2021)

Karya Medika I Hospital was established on April 1, 1995 supported by medical and non-medical personnel. Where almost more than 200 staff at Karya Medika I Hospital are nurses with most of the nurses graduating from D3 Nursing. Karya Medika I Hospital is a Type C Hospital with a capacity of 135 occupancy beds, with complete and adequate facilities. Starting from the Class III Room to the VVIP Room. Karya Medika I Hospital, West Cikarang, is a reliable referral hospital, especially in emergency and emergency cases. Karya Medika Hospital has also implemented patient safety in terms of its services, with the existence of a quality committee that oversees patient safety at Karya Medika I Hospital. And there is already a scheme for reporting patient incidents. The quality committee of Kaya Medika I Hospital has also carried out measurements of patient safety culture where this survey was previously conducted in June 2022 with a total sample of 186 nurses, doctors, specialists and management where 89% were women, 71.9% were nurses, 36.7 % had worked 1-5 years, and 14.3% were emergency room nurses, and from the questionnaire the average result of the 12 dimensions of patient safety culture was 61.3%, which can be categorized as a safety culture survey at Karya Medika I Hospital. enough, and these results still need to be improved again. Of the 12 dimensions measured, the lowest 3 dimensions were staffing 34.8%, non-punitive response 43.6% and overall perception of patient safety 56%. For other data obtained in 2022, where the number of cases of reporting incidents of patient safety within the scope of nurses found that there were only 4 incidents reported from the period January to June 2022, where there were 4 incident reports reported where there was 1 KNC (Near Injury) reported in March 2022, 1 KTC (Uninjured Event) reported in June 2022, and 2 KPC (Potential Injury Events) reported in March and April 2022. It can be concluded that there is still a lack of awareness of nurses in terms of reporting these incidents .

In addition, the researchers also took 10 nurses to be asked about patient safety culture, competence regarding patient safety culture, workload (Burnout), and job satisfaction and from the questionnaire that had been carried out, the results were; Patient safety culture from 10 nurses obtained safety culture sufficient and lacking dimensions, namely Staffing, Non-punitive Response, and Frequency of incident reporting; Patient safety culture competence of 10 nurses found that 40% had less competence, 60% had good competence, where the problem was effective communication, managing safety risks, and knowing the influential environmental and HR factors; Burnout from 10 nurses found 100% experiencing Burnout, where the main problem is low self-achievement; System thinking from 10 nurses found that 40% did not have a good thinking system, 60% had a good thinking system, where the problem was the low overall perception of a system. So from this, the researcher wants to conduct research on the relationship between competence

and Burn Out on patient safety culture with an intervening variable in the form of a nurse's system thinking at Karya Medika I Hospital.

LITERATURE REVIEW

Relationship of Competence with Patient Safety Culture

In terms of competence, according to research by Yonghee Han, et al., 2020 where in his research it was stated that a higher average score for "safety culture" in patient safety competencies was significantly associated with a decrease in the incidence of medication errors and surgical site infections, indicating that the competence of nurses can reduce adverse events by strengthening patient safety culture. (Han, Kim and Seo, 2020)

In the research of Mansour J, 2018 where in his research there was evidence from the literature emphasizing the significant impact of undergraduate students' initial exposure to basic concepts in patient safety and error reduction strategies. It is important to change the mindset of safe care delivery for the future nursing workforce, where they are well prepared for inter-professional collaboration and teamwork, and who are able to adapt to local and cultural needs. (Mansour *et al.*, 2018)

H1: There is a relationship between nurse competence and patient safety culture at Karya Medika I Hospital

Burnout's Relationship with Patient Safety Culture

Research by Ida Yanriatuti et al. mentioned, In 2020 it was found that teamwork, learning organization, stress levels and workload of nurses, and communication dominated the implementation of patient safety culture. To ensure that healthcare professionals are empowered to implement patient safety culture to the fullest in hospitals, the above mentioned elements should be evaluated and encouraged. (Yanriatuti, 2020)

In the study of Cintia de Lima Garcia, et al, 2019 where in his research a relationship was found between fatigue and patient safety permeating work processes, personal characteristics, and teamwork, in units with higher Burnout scores, there was a decrease in teamwork climate, safety, and satisfaction work, professional burnout. One of the fatigue criteria, implies a lower ability for effective teamwork, which negatively impacts patient safety. A positive safety culture towards patients is associated with an absence of fatigue and a high capacity to deal with stressful situations. (Garcia, Bezerra and Ramos, 2019)

H2: There is a relationship between Burn Out and patient safety culture at Karya Medika I Hospital

The Relationship between System Thinking and Patient Safety Culture

In the research of Alaa Nabil M, et al, 2021 where the research found the results of this study add to more and more evidence that nurses who are 'system thinking' have more knowledge about safety and nurses who have graduated as well as those who attend safety training and work in a safety culture that support having better safety competence. (Mahsoon and Dolansky, 2021)

In the research of Yang Miang Goh, et al, 2010 where in his research a better understanding of the systemic structure was obtained, then it could facilitate the design of more effective safety culture interventions. The use of a causal pie chart can facilitate early identification of problems that arise in a company so as to introduce interventions that increase risk management capacity rather than incident-level interventions. (Goh, Brown and Spickett, 2010)

H3: There is a relationship between system thinking and patient safety culture at Karya Medika I Hospital

Relationship Competency and System Thinking

In Edris Kakemam's research, et al, 2022 where in his research a correlation was found between nurse professionalism and system thinking with patient safety competencies, where

training and leadership guidance are needed to assist nurses in their perceptions of professionalism and systems thinking. (Kakemam, Ghafari and Rouzbahani, 2022)

H4: There is a relationship between Burnout and system thinking at Karya Medika I Hospital

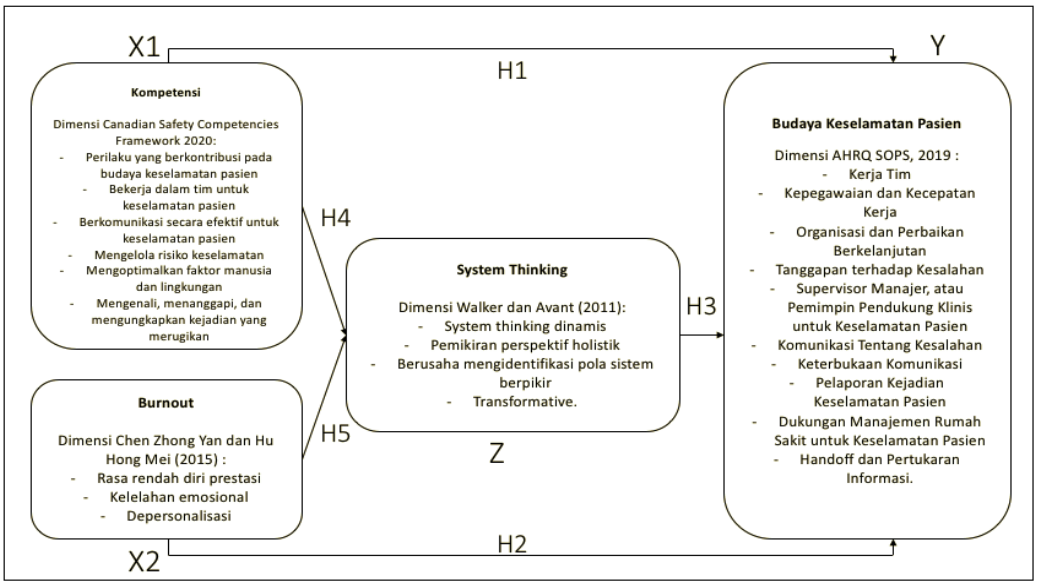

Figure 1. The study conceptual framework

The Relationship of Burn Out and System Thinking

According to Mary Jo Kreitzer, et al, system thinking recognizes that there are often many stakeholders or decision makers with potentially conflicting goals and differences of opinion about what a problem is and how to solve it. (Kreitzer, Carter and Coffey, 2019)

H5: There is a relationship between Burnout and system thinking at Karya Medika I Hospital

The Relationship Between Nurse Competence and Burn Out with Safety Culture Through the System Thinking Variable

Based on design thinking integrated with system thinking will improve worker welfare (solution to stress and burnout). The authors believe that design thinking integrated with systems thinking is the most promising way to create an intervention organization. And based on the research of Yang Miang Goh, et al where a better understanding of the systemic structure can then facilitate the design of more effective safety culture interventions. The use of a causal pie chart can facilitate early identification of problems that arise in a company so as to introduce interventions that increase risk management capacity rather than incident-level interventions. (Goh, Brown and Spickett, 2010)

H6: There is a relationship between nurse competence and burn out with safety culture through the system thinking variable (Figure 1)

RESEARCH

This study involved variables, namely one independent variable, namely Patient Safety Culture; two dependent variables, namely patient safety competency and burnout, and one intervening variable, namely system thinking. The instrument to be used is a questionnaire, for patient safety culture using a questionnaire from the Hospital Survey on Patient Safety Culture from AHRQ (SOPS 2019); Patient safety competence using a modification of H-Pepps; Burn Out using the Maslach Burnout Inventory (MBI) questionnaire; and System thinking using the System Thinking

Scale (STS) questionnaire. The research sample was functional nurses at Karya Medika I Hospital as many as 87 nurses. After the questionnaires were collected, the data were grouped, processed and analyzed using SPSS. Data analysis from Univariate (distribution data), Bivariate (with the Pearson test method) and Multivariate (with the Path Analysis test method).

RESULT AND DISCUSSION

Respondents who took part in this study were mostly in the age group of 25-34 years (46.0%), followed by the age group of 35-44 years (20.7%), the age group of 45-54 years (18.4%), the age group of 55-64 years (9.2%) and lastly is the age group of 15-24 years (5.7). Gender, where the majority of respondents who took part in this research were female, amounting to 80 (92.0%) while men were only 7 (8.0%). In education, most of the respondents in education were D3 graduates with 76 respondents (87.4%), the education group with S1 graduates were 9 respondents (10.3%), and the Education group with NERS graduates were 2 respondents (2.3%). Work units, the most participating units were inpatient units with 39 respondents (44.9%), followed by intensive units with 15 respondents (17.2%), outpatient units with 15 respondents (17.2%), emergency department units with 12 respondents (13.8%)), and operating room unit 6 respondents (6.9%). Years of Services, at most 1-5 years with 51 respondents (58.6%), then 6-10 years with 23 respondents (26.4%), 11-15 years with 6 respondents (6.9%), 16-20 years with 4 respondents (4.6%) and >21 years as many as 3 respondents (3.4%).

The Cronbach α value of patient safety culture is .815, nurse competency is .630, burn out is .783, and system thinking is .783. from the data above it is said to be reliable because Cronbach α > 0.60. For the dimensions of each variable; patient safety culture variables, consisting of 10 dimensions, including teamwork, staffing and work pace, safety improvement, non-punitive response, superiors' expectations and actions, communication about problems, open communication, management support for patient safety efforts, frequency of reports, and handsoff and patient transition. Competency variables consist of 6 dimensions, including behavior that contributes to patient safety culture, working in teams for patient safety, communicating effectively for patient safety, managing safety risks, optimizing human and environmental factors, recognizing, responding to and disclosing adverse events. The burn out variable consists of 3 dimensions, including fatigue, depersonalization, and personal achievement. System thinking variable, consists of 4 dimensions, including dynamic, holistic perspective thinking, identifying patterns of system thinking, and transformative. From the questionnaire to the 4 variables above, a validity test was then carried out where it was obtained that r count > r table and the questionnaire for each variable was declared valid. (Figure 2)

Age Group (year)	Total Respondents	Percentage (%)
15-24	5	5.7%
25-34	40	46.0%
35-44	18	20.7%
45-54	16	18.4%
55-64	8	9.2%
Total	87	100%
Gender	Total Respondents	Percentage (%)
Male	7	8.0
Female	80	92.0
Total	87	100%
Education	Total Respondents	Percentage (%)
D3	76	87.4
S1	9	10.3
NERS	2	2.3
Total	87	100%
Work Unit	Total Respondents	Percentage (%)
Emergency Unit	12	13.8
Outpatient	15	17.2
Inpatient	39	44.9
Intensive Room	15	17.2
Operating Room	6	6.9
Total	87	100%
Years of Services	Total Respondents	Percentage (%)
1-5	51	58.6
6-10	23	26.4
11-15	6	6.9
16-20	4	4.6
>21	3	3.4
Total	87	100%

Figure 2. Demographic Data

From the patient safety culture variable questionnaire, the measurement of 87 respondents was as follows; Of the 10 dimensions measured in Patient Safety Culture, the results of measuring patient safety culture at Karya Medika I Hospital were included in the moderate category where the index value was 60.46 with the index value of the 10 dimensions; The range of Patient Safety Culture at Karya Medika I Hospital can be measured, which ranges from the lowest score of 56.13 on the Non Punitive Response dimension to the highest score of 63.92 on the Problem Communication dimension. On the dimension with the lowest score, namely Non Punitive Response, the indicator with the lowest index score is found in the question "when an incident is reported in this unit, it feels like the person is focused, not the problem" with an index value of 52.5 included in the medium category. While the dimension with the highest number is Communication About Problems, the indicator with the highest index score is found in the question "In this unit, we are informed about changes made based on incident reports" with an index value of 64.75 included in the medium category. Competency variable measurements carried out on 87 respondents are as follows; From the 6 dimensions measured on patient safety culture competency, the results obtained from the measurement of nurse competence at Karya Medika I Hospital included in the high category with an index value of 66.18 where the measurement was from 6 dimensions; The dimension of communicating effectively for patient safety has the lowest score with a score of 65.42 in the high category, while the dimension of managing safety risks has the highest score with a score of 67.38 in the high category. On the dimension of Communicating effectively for patient safety where the indicator with the lowest score is in the question "Being able to improve patient safety through effective communication with other medical personnel" with an index score of 64.5 in the moderate category. Whereas on the dimension of managing safety risks where the indicator with the highest score is found in the question "Being able to identify and implement patient safety solutions" with an index score of 68 in the high category. The measurement of the Burn Out variable where it was concluded that the Burn Out measurements were carried out on 87 respondents in the Moderate category where the index value was 29.66, and the dimensions were described as follows; From the 3 dimensions measured on Burn Out, the results of the Burn Out measurement at Karya Medika I Hospital were from the Fatigue dimension in the low category with an index value of 27.44,

from the Depersonalization dimension in the medium category with an index value of 32.2 and the Personal Achievement Dimension included in the medium category with an index value of 29.33 . On the Fatigue dimension where the indicator with the highest score for a negative question is found in the question "Working with people all day long requires a lot of effort". On the highest dimension, namely the Depersonalization dimension where the indicator with the highest score is found in the negative question "I feel that I work too hard at my job". The measurement of the System Thinking variable which was carried out on 87 respondents was included in the Moderate category with an index value of 58.7; From the 4 dimensions of System Thinking, the results of System Thinking measurements were obtained at Karya Medika I Hospital where the lowest dimension was found in the Dynamic dimension with a medium category with an index value of 58.0, the highest dimension was in the Identifying pattern of systems thinking in the medium category with an index value of 60.7. On the Dynamic dimension where the indicator with the lowest index value is found in the question "I think a recurring pattern is more important than one particular event". On the dimension Identifying systems thinking patterns where the highest index value is found in the question "I think small changes can produce important results".

Variable	Pearson	Competence
Patient safety culture	Pearson Correlation	0.301
	Sig. (2-tailed)	0.005

Figure 3. Correlation between Competence and Patient Safety Culture

The Pearson test results obtained a p value of 0.005 where the value is significant if the p value <0.05 this means that there is a relationship between competence and patient safety culture, and for the Pearson Correlation value it is at a value of 0.301 which if multiplied by 100 will get a value of 30.1%, then reduced by 100, a value of 69.9% will be obtained. It can be concluded that the relationship between competence and patient safety culture is 30.1% and the remaining 69.9% is influenced by other variables. (Figure 3)

Variable	Pearson	Burn Out
Patient safety culture	Pearson Correlation	-0.163
	Sig. (2-tailed)	0.131

Figure 4. Correlation between Burn Out and Patient Safety Culture

The Pearson test results obtained a p value of 0.131 where the value is significant if the p value <0.05 this means that there is no relationship between competence and patient safety culture, and for the Pearson Correlation value it is at -0.163 where if multiplied by 100 it will get a value of 16.3%. then reduced by 100, a value of 83.7% will be obtained. It can be concluded that the relationship between burn out and patient safety culture is 16.3% and the remaining 83.7% is influenced by other variables. (Figure 4)

Variable	Pearson	System thinking

Patient safety culture	Pearson Correlation	0.239
	Sig. (2-tailed)	0.026

Figure 5. Correlation between System Thinking and Patient Safety Culture

The Pearson test results obtained a p value of 0.026 where the value is significant if the p value <0.05 this means that there is a relationship between system thinking and patient safety culture, and for the Pearson Correlation value it is at a value of 0.239 which if multiplied by 100 will get a value of 23.9%. then reduced by 100, a value of 76.1% will be obtained. It can be concluded that the relationship between system thinking and patient safety culture is 23.9% and the remaining 76.1% is influenced by other variables. (Figure 5)

Variable	Pearson	System Thinking
Competence	Pearson Correlation	0.266
	Sig. (2-tailed)	0.013

Figure 6. Correlation between Competence and System Thinking

The Pearson test results obtained a p value of 0.013 where the value is significant if the p value <0.05 this means that there is a relationship between competence and system thinking, and for the Pearson Correlation value it is at a value of 0.266 which if multiplied by 100 will get a value of 26.6%, then subtracted with 100, a value of 73.4% will be obtained. It can be concluded that the relationship between competence and system thinking is 26.6% and the remaining 73.4% is influenced by other variables. (Figure 6)

Variable	Pearson	System Thinking
Burn Out	Pearson Correlation	0.242
	Sig. (2-tailed)	0.024

Figure 7. Correlation between Burn Out and System Thinking

In the Pearson test results obtained a p value of 0.024 where the value is significant if the p value <0.05 this means that there is a relationship between competence and system thinking, and for the Pearson Correlation value it is at a value of 0.242 where if multiplied by 100 it will get a value of 24.2%, then subtracted with 100, a value of 75.8% will be obtained. It can be concluded that the relationship between burn out and system thinking is 24.2% and the remaining 75.8% is influenced by other variables. (Figure 7)

Model	R	R Square	Adjusted R Square	Std. Error of the Esrimate
1	0.327	0.107	0.086	7.85233

Predictors: (Constant), Competence, Burn Out

Variable	Coefficients Std. Error	Standardized Coefficients Beta	Sig.

Competence	0.263	0.224	0.036
Burn Out	0.050	0.194	0.070

Figure 8. Path Coefficient I

The significance value of the Competency variable is 0.036 which is less than 0.05 and the Burn Out variable is 0.07 which is greater than 0.05, this means that for Regresu Model I where the Competency variable has a significant effect on the System Thinking variable but for the Burn Out variable it does not have a significant effect on System Thinking variable. The value of R square is 0.107. This shows that the contribution of Competency and Burn Out variables to System Thinking is 10.7%, while 89.3% is influenced by other variables not included in the study. (Figure 8)

Model	R	R Square	Adjusted R Square	Std. Error of the Esrimate
1	0.437	0.191	0.162	8.26160

Predictors: (Constant), System Thinking, Burn Out, Competence

Variable	Coefficients Std. Error	Standardized Coefficients Beta	Sig.
Competence	0.284	0.302	0.005
Burn Out	0.054	-0.283	0.007
System Thinking	0.115	0.277	0.032

Figure 9. Path Coefficient II

The significance values of the three variables are Competency variable 0.005, Burn Out variable 0.007 and System Thinking variable 0.032 where the value is less than 0.05. These results conclude that Regression, namely the Competency, Burn Out and System Thinking variables have a significant effect on Patient Safety Culture. The value of R square is 0.191, this shows that the contribution of Competence, Burn Out and System Thinking to Patient Safety Culture is 19.1%, while 80.9% is influenced by other variables not included in the study. (Figure 9)

CONCLUSION

There is a significant relationship between Competence and Burn Out through System Thinking on Patient Safety Culture, but in this study the level of correlation was low. This can be interpreted where high competence, as well as low levels of work fatigue affect patient safety culture by having good system thinking. There is a significant relationship between competence and patient safety culture, but in this study the correlation level was low. This can be interpreted where the higher patient safety competence will affect the better the implementation of patient safety culture. There is no significant relationship between burn out and patient safety culture. This can be interpreted as the absence of work fatigue with a culture of patient safety which may be because nurses at Karya Medika 1 Hospital feel that through their work, they have a positive influence on people, have achieved many valuable things in their work, besides that they feel a bond with colleagues at work, so fatigue at work does not affect the implementation of patient safety culture. There is a significant relationship between system thinking and patient safety culture, but in this study the correlation level was low. This can be interpreted that the higher the system thinking will affect the implementation of a good patient safety culture. There is a significant relationship between competence and system thinking, but in this study the correlation level is low. This can be interpreted that the better patient safety competence will affect good system thinking as well. There is a significant relationship between burn out and system thinking, but in this study the correlation level is low. This can be interpreted that the lower the burn out, the better system thinking will be affected.

The results of this study support several previous studies for the variables of safety culture and competence and system thinking but for burn out, the results were different from previous studies. Can be used to look for factors that can improve patient safety culture in hospitals. The theory of the Canadian Council on Health Service Accreditation (CCHSA) also emphasizes the importance of a culture of safety in health care by stating that every health care provider must implement a culture of patient safety to achieve patient safety. The Human Factor in Patient Safety Review of Topics and Tools, WHO (2009) states that the factors that influence patient safety culture are as follows: Organizational and Management Factors, namely the condition of the work environment as measured in terms of health service organization including managerial leadership (Top Manager and Middle Manager) and communication; Team Work factors include team structure, team processes and team leadership; Individual factors, namely factors that tend to come from someone who works in an organization including situational awareness, decision making, stress and fatigue, knowledge, attitude, motivation, competence and personality; and Work Environment Factors including workplace risks, equipment, machine tools and cleanliness. In David Eka's research, 2021 where his research found that there was no effect of motivation on burn out, this supports this research where there is no relationship between burn out and patient safety culture where the possible factor is motivation where this is found in the questionnaire taken; where nurses at Karya Medika 1 Hospital feel that through their work, they have a positive influence on people, have achieved many valuable things in their work, besides that they feel a bond with colleagues at work, so fatigue at work does not affect the implementation of safety culture patient.

In this study the number of samples used is still limited because the number of nurses in the hospital is not too many, and this research is limited to one hospital, besides that the System Thinking research variable is still limited from previous research and still needs further research, and there is a possibility of bias in the process of respondents filling out answers.

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