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Modification of the National Early Warning Score (NEWS) Observation Sheet for Patient Emergency Conditions in Hospitals

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ABSTRACT

Background: Currently, the trend of patients admitted to the hospital is increasingly complex and has many co-morbidities, some of which the patient's condition will suddenly worsen or become critical, due to various interrelated causes such as weak monitoring systems and staff reactions to emergencies. Delays in treatment or inadequate care for patients who are treated in the Hospital Ward can result in several adverse conditions, namely increased patients transferred to the ICU (Intensive Care Unit), increased LOS (Lenght of Stay) in the hospital, heart attacks, or patient death.
Purpose: The purpose of this study to analyze the differences in the modification of the NEWS observation sheet on the emergency conditions of patients at the hospital.
Methods: The type of research used is quasi-experimental with a pre-test-post-test control group design. With a population of 160 patients and a total patient sample of 62 patients with 31 patients for the intervention group and 31 patients for the control group. How to take samples with purposive sampling technique. The independent variables in this study were the NEWS observation sheet and the NEWS modification, while the dependent variable was the patient's emergency condition. The instruments in this study were NEWS observation sheets and NEWS modifications, integrated patient development record sheets, pre-test and post-test sheets. Data analysis used Wilcoxon test and Mann Whitney test with a value of $\alpha = 0.05$.
Results: The results showed that the modification of the NEWS (National Early Warning Score) observation sheet with a graphic was more influential than the NEWS observation sheet in increasing vital sign monitoring with p=0.00, while the NEWS observation sheet as a control had an influence with a significant level of p=0.043, both the model shows that it is equally influential in detecting changes in patient conditions and as an aid in communicating with other health workers.
Conclusion: The conclusion of this study is that after being given a modified NEWS observation sheet which is a scoring system that is simple, practical and proven to increase alertness and response to signs of bad physiological changes so that patient safety can be monitored optimally and mortality rates can decrease.

Keywords: emergency condition, modification, national early warning, observation

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BACKGROUND

Currently, the trend of the disease of patients admitted to the hospital is increasingly complex and has many comorbidities, some of which the patient's condition will suddenly worsen or become critical, due to various interrelated causes such as weak monitoring systems and staff reactions to emergencies. Therefore, it is very important for the hospital to have a strategy or system to identify the patient's condition quickly, precisely and accurately in periodic monitoring, so that patient safety can be monitored while carrying out treatment at the hospital. One of the most widely used monitoring systems is the NEWS (National Early Warning Score) monitoring system (Haegdorens et al., 2019).

NEWS has been proven to be able to accurately detect a significant decrease in condition or even death that occurs in patients. NEWS has also been used as a monitoring tool that has been implemented at dr. H. Slamet Martodirdjo general hospital since one year ago, who previously used the EWS (Early Warning Score) concept since 2019. However, the results of evaluating the use of the EWS monitoring system have not shown maximum results based on data on patient mortality in the ward which is still high.

Problems related to emergencies usually occur in the Nursing Ward and surgery, this is related to a lack of clinical monitoring, or misdiagnosis of clinical changes that occur in patients. Delays in treatment or inadequate care for patients admitted to the Hospital Ward can result in several adverse conditions, namely increased patients being transferred to the ICU (Intensive Care Unit) room, increased LOS (Lenght of Stay) in the Hospital, heart attacks, which can result in the death of the patient (Haegdorens et al., 2019).

Based on data at dr. H. Slamet Martodirdjo general hospital the mortality rate of patients treated at Ward is still high at 49.3% of the total deaths of all treatment units. The number of dead patients treated in the Intensive Room in 2022 is 12.7% of the total number of patientsconducted in Ward Room. Whereas in 2023, starting from January-March, patient deaths in the Ward will increase by 46.9% of the total deaths. The higher mortality prevention rate of patients is supported by a preliminary study at dr. H. Slamet Martodirdjo general hospital through interviews with several nurses that there was duplication in filling out medical record files when observing patients, namely chart sheets and NEWS observation sheets. Nurses in providing nursing care are more dominant in filling out patient chart sheets, while NEWS monitoring is carried out erratically. This will not improve the patient's condition, but will worsen the patient's condition if it is not detected early.

Based on the Hospital Accreditation Commission accreditation survey instrument according to the 2017 Indonesian Ministry of Health (Ministry of Health of the Republic of Indonesia) Hospital accreditation standards described in the PAP Standards Chapter (Patient Service and Care) in assessment element that the Hospital implements a process of recognizing changes in patient conditions which got worse. This was made with the intent and purpose that staff who do not work in the Intensive Service Area, do not have sufficient knowledge and training to carry out assessments, and know patients who will be in critical condition. In fact, many patients outside the Intensive Service Area experience critical conditions during treatment in the Inpatient Room. Often patients show signs of early danger (eg, worsening vital signs and minor changes in neurological status) before experiencing widespread clinical deterioration to the point of experiencing an unexpected event. There are physiological criteria that can help staff to recognize as early as possible patients who are deteriorating. Most patients with heart failure or previous lung failure show physiological signs outside the normal range which are an indication of a deteriorating patient condition (Abidin et al., 2017; Burgos-Esteban et al., 2022). This can be known with the EWS. The

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application of EWS enables staff to identify as early as possible patients whose condition is deteriorating. Thus, the results of nursing care will be better. EWS implementation can be carried out using a scoring system by a trained professional care giver (Kemenkes RI, 2021). In 2012, the Royal College of Physicians recommended standardizing the EWS system for national healthcare, which became known as NEWS. An effort to improve the assessment and documentation of vital signs in hospitals by introducing a nationally integrated and standardized concept. The NEWS concept is now widely used in Hospitals as an objective method to identify patient deterioration and ensure timely treatment. NEWS measures 7 parameters, namely the level of consciousness, the patient's respiration, oxygen saturation, temperature, pulse, systolic blood pressure, and the breathing apparatus used by the patient (Burgos-Esteban et al., 2022).

The results of (Megawati et al., 2021) show that the documentation of the EWS sheet is 100% incomplete, if this examination sheet is not done correctly it will affect subsequent patient management and patient outcomes both related to illness and death. Monitoring and evaluation related to EWS implementation is urgently needed for the future with the aim of improving overall hospital services. The purpose of this study was to analyzeAnalyzing the Differences in the NEWS Observation Sheet with NEWS Modifications for the Emergency Conditions of Patients at the Hospital.

METHOD

This study used a quasy experimental research design with a pretest-posttest control group design approach, and the technique was purposive sampling Andresearchers select respondents based on inclusion criteria:Ward patients, New patients in the ER or poly wards, Medical records attached to the NEWS observation sheet, Medical records attached to modifications to the NEWS observation sheet, Identity of medical records of patients aged > 16 years. The number of respondents was 62, consisting of the intervention group and the control group. In the intervention group respondents with Modify the NEWS observation sheet and control with the NEWS observation sheet (Nursalam, 2020). The results obtained to see the changes emergency condition of the patient in the hospital. Prior to conducting the protocol research, the ethical clearance of KEPK dr. H. Slamet Martodirdjo general hospital was carried out and was declared ethically feasible with the number N.o.70/104/432.603/KEPK/2023. The research was carried out from June to July 2023 at dr. H. Slamet Martodirdjo general hospital.The statistical test of the research results used theWilcoxon test and Mann Whitney Test.

RESULTS

The results of this study are as follows:

Table1. Frequency distribution of respondents based on age characteristics

Age (years)	intervention group		control group		Test equality
	N	%	N	%	
18-65	27	87.1	27	87.1	
66-79	3	9.7	3	9.7	1,000
80-99	1	3.2	1	3.2	
Amount	31	100	31	100	

Based on table 1 above, the age classification based on WHO shows that almost all age characteristics in the intervention group and control group (87.1%) are in the age range of

18-65 years. Based on the equivalence test between the intervention group and the control group using the Chi Square test, it was found that the p value was > 0.05, meaning that the variance between the ages of the intervention group and the control group was the same or not different.

Table 2. Respondent Frequency DistributionBased on Gender Characteristics

Gender	intervention group		control group		Test equality
	N	%	N	%	
Man	16	51,6	19	61.3	0.307
Woman	15	48,4	12	38,7	
Amount	31	100	31	100	

Based on table 2. above, Respondent characteristics based on gender showed that the intervention group was mostly male with 16 respondents (51.6%) and the control group was mostly male with 19 respondents (61.3%). Based on the equivalence test between the intervention group and the control group using the Chi Square test, it was found that the p value > 0.05 means that the variance between the sexes of the intervention group and the control group is the same or not different.

Characteristics of Respondents Based on Disease Diagnosis

Table 3. Respondent Frequency Distribution Based on Diagnostic Characteristics of the Disease

Disease Diagnosis	intervention group		control group	
	N	%	N	%
Cardiovascular	5	16,1	8	25,8
Breathing	5	16,1	8	25,8
urination	5	16,1	2	6,5
Digestion	5	16,1	5	16,1
requirements	7	22,6	3	9,7
endocrine	3	9,7	2	6,5
Immunology	1	3,2	-	-
Musculoskeletal	-	-	3	9,7
Amount	31	100	31	100

Based on table 3. above, The characteristics of the respondents based on the diagnosis of the disease showed that the intervention group had a small proportion of disorders of the nervous system as many as 7 respondents, while in the control group a small proportion had disorders of the cardiovascular and respiratory systems as many as 8 respondents (25.8%).

Table 4. Normality Test ResultsPre Intervention control group and intervention group

	Kolmogrov-S			
Pre Intervention	Statistics	df	Sig.	Information
control group	0.263	31	0.000	Abnormal
Intervention Group	0.283	31	0.000	Abnormal

Based on table 4. shows that both groups have Sig. = 0.000 <0.005, meaning that the pre-intervention data for the control group and the intervention group were not normally distributed. Data Normality Test Results Post Intervention Values Control Group and Intervention Group. The data analyzed in this normality test are the group intervention post

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values intervention and the post intervention value of the control group. This normality test aims to see whether each class data is normally distributed or not. Because one of the assumptions that must be met before carrying out a variance homogeneity test, and the data of the two classes must be normally distributed before getting different treatment.

Table 5. Post-intervention normality test results control group and intervention group

	Kolmogrov-S			
Intervention Post	Statistics	df	Sig.	Information
control group	0.518	31	0.000	Abnormal
Intervention Group	0.283	31	0.000	Abnormal

Based on Table 5. above, shows the results of the data normality test using the Kolmogrov-Smirnov test in each study group. The test results showed that the control group had sig. = 0.000 <0.05 and the Sig. = 0.000 which means the data is not normally distributed. So the next test is to use a non-parametric analysis test, namely the Mann-Whithney test.

The homogeneity test was carried out with the aim of knowing whether the patient's emergency condition before and after the NEWS observation sheet modification intervention had the same variance or not. Criteria for decision making if the sig. > 0.05 then the data is homogeneous, and if sig. < 0.05 then the data is not homogeneous. The results of the homogeneity test are as follows:

Table 6. Results of the pre-intervention homogeneity test of the control group and the intervention group

	Levene Statistics	**df**	**Sig.**	**Information**
Pre Intervention	0.283	62	0.813	Homogeneous
Post Intervention	0.037	62	0.848	Homogeneous

Based on table 6 above, it shows the results of the homogeneity test in the control group and the intervention group obtained pre-intervention with a Sig value. = 0.813 and post intervention with Sig. = 0.848. It means that from both groups the sig. > 0.05, which means that the data for all group indicators is homogeneous.

Table 7. Frequency distribution of pre-intervention emergency patient conditions in the intervention group

Emergency Condition	**intervention group**		**Means**
	N	**%**	
Green	4	12.9	
Yellow	9	29.0	2.55
Orange	15	48.4	
Red	3	9.7	
Amount	31	100	

Based on Table 7. the characteristics of the respondents based on the emergency conditions of the pre-intervention patients in the intervention group showed that almost half as many as 15 respondents (48.4%) experienced a moderate emergency (orange).

Table 8. Frequency distribution of emergency post-intervention patient conditions in the intervention group

Emergency Condition	intervention group		Means
	N	%	
Green	28	90.3	
Yellow	0	0	1.29
Orange	0	0	
Red	3	9,7	
Amount	31	100	

Based on Table 8. the characteristics of respondents based on the emergency condition of post-intervention patients in the intervention group showed that almost all of the 28 respondents (90.3%) experienced no emergencies (green).

Table 9. Frequency distribution of pre-intervention emergency patient conditions in the control group

Emergency Condition	Control Group		Means
	N	%	
Green	4	12.9	
Yellow	14	45.2	2,42
Orange	9	29.0	
Red	4	12.9	
Amount	31	100	

Based on Table 9. the characteristics of the respondents based on the emergency conditions of the pre-intervention patients in the control group showed that almost half as many as 14 respondents (45.2%) experienced mild emergency conditions (yellow).

Table 10. Frequency distribution of emergency post-intervention patient conditions in the control group

Emergency Condition	control group		Means
	N	%	
Green	27	87,1	
Yellow	0	0	1.39
Orange	0	0	
Red	4	12,9	
Amount	31	100	

Based on Table 10. the characteristics of the respondents based on the emergency condition of post-intervention patients in the intervention group showed that almost all of the 27 respondents (87.1%) did not experience an emergency or were normal (green).

Table 11. Frequency Distribution of Respondents Based on Outcomes of Health Conditions

Outcomeshealth condition	intervention group		control group	
	N	%	N	%
Healed	28	90.3	27	87,1
Refer ICU	2	3,2	1	3,2
Die	1	6,5	3	9,7
Amount	31	100	31	100

Based on table 11. above, Respondent characteristics based on the outcome of the patient's health condition showed that in the intervention group almost all patients recovered as many as 28 respondents (90.3%) and the control group almost all patients recovered as many as 27 respondents (87.1%).

Table 12. Wilcoxon test results in the pre- and post-intervention intervention group and the control group

	Test	***Wilcoxon***
	Z	Sig.
Intervention Group	-4,006	0,,000
Control Group	-4,062	0.000

Based on Table 12. above, the test results Wilcoxonpre-intervention showed that the intervention group Z = -4.006 and Sig. = 0.000, while the control group has a value of Z = -4.062 and Sig. = 0.000. From the two groups the value of Sig. <0.05, which means that there are differences in the pre- and post-intervention groups, the intervention group and the control group before and after the intervention

Table 13. Result of analysis Conditions of Emergency Patients in the Intervention Group and Control Group

Group	**Pre**	**Post**	**Difference**	**p-value**
	Means	**Means**		
Intervention	2.55	1.29	1.26	0.000
Control	2,42	1.39	1.03	0.043
The Mann Whitney test				

Based on table 13 above, the average value of the intervention group is 1.26 and the control group is 1.03. This shows that the intervention group is more influential than the control group. Then based on the results of the Mann-Whitney statistical test it showed that the intervention group obtained results Sig. = 0.000 <0.05 and the control group Sig.= 0.043 <0.05, which means that there is a significant level difference between the intervention group and the control group in the post-intervention data. This shows that the modified NEWS observation sheet is more influential than the NEWS observation sheet on the emergency condition of patients at the hospital.

DISCUSSION

Ward Patient Emergency Conditions Before Receiving Intervention (Treatment) NEWS Observation Sheet and NEWS Modification

NEWS is a monitoring system approach to identify clinical deterioration and early detection of abnormal signs in hospitalized patients. Based on table 7, the results showed that almost half (48.4%) of the emergency conditions of the respondents in the intervention group before receiving the intervention (48.4%) of the NEWS values of the respondents were included in the orange category or moderate emergency level.

Based on table 9, the results showed that the emergency condition of the control group respondents before receiving the intervention, almost half (45.2%) of the respondents' NEWS values were included in the yellow category or low emergency level. Low and moderate NEWS values indicate that the nurse's role is needed to monitor changes in the patient's condition.

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Based on the research results, the cause of the low NEWS score could be from various factors, including the room used in this study was an adult inpatient room, namely internal medicine, surgery and neurology. Patients who are in the inpatient room are usually patients who are not in an emergency or critical condition so the NEWS value can be low.The interpretation of the NEWS results is divided into four parts, namely normal, low, medium and high values. Normal values have a score range of 0-1, low values have a score range of 2-3 which indicates the result that nurses are needed to monitor changes in the patient's condition. Furthermore, the moderate value has a score range of 4-6 which indicates that continuous monitoring by nurses and doctors is needed and the team is prepared to deal with critical situations. Finally, a high score has a score range of more than 7 which indicates that prompt treatment is needed in an emergency from a team of nurses and doctors (Smith et al., 2013).

The results of this study were reinforced by the results of previous research by (Megawati et al., 2021) in 2021 which found that most patients who were hospitalized in the ward had an average low NEWS score of 98.2% of all respondents, this shows the sample variance seen from the score EWS shows almost the same characteristics in all hospitals.

Emergency Conditions of Ward Patients After Receiving Intervention (Treatment) Observation Sheet NEWS and NEWS Modifications

Based on table 10, it was found that almost all of the emergency conditions of inpatients after receiving intervention using the modified NEWS observation sheet were included in the green category or the patient's condition was normal or cured, this had an impact on the mortality rate in cases of disease in the wards decreasing. The reduced emergency condition of patients on the ward had an impact on the outcome of the patient's condition with recovery status reaching 83.9% which is detailed in table 11. general data.

This outcome fact clarifies the results of the research by (Megawati et al., 2021) found the mortality rate before using AEWS with a crude death rate of 8.8 per 1000 inpatient visits or as many as 21 people categorized as low, while the mortality rate after use AEWS is at a crude death rate of 3.2 per 1000 inpatient visits or as many as 12 people fall into the low category with the results of bivariate analysis showing that there is an effect of the use of Adult Early Warning Scoring (AEWS) on the mortality rate with a p value = 0.001 ($p \leq 0$, 05).

In line with the results of the study in table 13. that there is a correlation between the NEWS value and mortality with a p value <0.001. Complete recording in the NEWS document will greatly affect the value of the NEWS and follow-up interventions to be carried out(Megawati et al., 2021).

Differences in the results of using the NEWS Observation Sheet and NEWS Modification on the Emergency Conditions of Patients at the Hospital

Based on table 13. it is found thatsince the use of NEWS at dr. H. Slamet Martodirdjo general hospital, the worsening condition of inpatients can be identified more quickly with the scoring results from the NEWS observation sheet, and also Modification of the NEWS observation sheet in patients over 18 years of age who are treated in ordinary inpatient rooms, this can be seen from the average the average change in the clinical condition of the patient's emergency level which showed a significant difference before the intervention and after the intervention, the intervention group and the control group showed different results.

From the intervention group, which previously had an average emergency score of 2.55, it decreased to 1.29, while in the control group, which previously had an average emergency score of 2.42, it decreased to 1.39. This means that the difference in the change in severity level is greater in the intervention group. This fact is supported by an analysis of the

results of statistical tests using the Mann Whitney test showing that the use of the Modified NEWS observation sheet and the NEWS observation sheet as a control both showed a significant effect on changes in clinical emergency conditions with p values: 0.00 and p: 0.043.

The results of this study reinforce the results of previous research (Wigati et al., 2020) which stated that the application of NEWS can increase vital sign monitoring by 95%, help nurses to detect changes in patient conditions and as an aid in communicating with other health workers. In addition, in a research study conducted by (Damayanti et al., 2019) entitled Effects of EWS Tutorial Simulation on Nurse's Knowledge and Clinical Performance, the results showed that the use of EWS applied in accordance with operational standards can facilitate patient care by nurses.

An interesting phenomenon in this study was that the modified NEWS sheet with graphics had a more significant effect on changes in the patient's emergency condition as an indicator of the clinical condition of the patient in the usual inpatient ward with a p value of: 0.00, smaller than the p value of the NEWS observation sheet which became the control group with p : 0.043. This means that there is a significant difference between the results of using the modified NEWS observation sheet and the NEWS observation sheet, for the patient's emergency condition. The results of this study could be caused by the tendency of nurses using the modified NEWS observation sheet to make decisions more quickly after seeing a change in the pattern of a graphic image that shows a patient's condition is declining. Based on the findings of this study, the researchers argue that the use of the NEWS Modification greatly affects reducing the mortality rate for referrals to the ICU, and increasing the recovery rate for patients in ordinary inpatient rooms, because deteriorating patient conditions can be detected earlier so that nurses or medical teams can take action more quickly. intensive or further treatment for these patients, so that there are no complaints of patients suddenly experiencing a decrease in their condition or even suddenly dying.

The results of this study are reinforced by previous studies (Abidin et al., 2017) which stated that the NEWS modification to REWS was more effective and efficient because it was adapted to the type and specificity of the hospital and had an impact on the quality of nursing care in implementing patient safety. Recommendations need to be monitored and evaluated for the implementation of REWS and the development of technology-based applications.

The use of NEWS in general according to research results (Wigati et al., 2020) using the literature review method states that NEWS is a scoring system that is simple, practical, easy to use and does not add to the workload of nurses. NEWS increases the role of nurses in the early detection of deterioration in a patient's condition which is proven to be able to increase alertness and respond to signs of bad physiological changes so that patient safety can be monitored optimally and mortality rates can be reduced.

The advantage of this study is the use of modifications with NEWS combined graphics which are more focused on monitoring vital signs disorders that rarely receive attention compared to high care rooms or intensive care units. In this study vital signs were displayed with data in the form of blue and red graphic images for temperature and pulse indicators, which described the development of the patient's condition, so that nurses could easily read them when the line touched an abnormal limit.

This will be a solution to the problems that have been hindering the effective use of NEWS in hospitals, because according to an observational study in hospital inpatient rooms in America it showed that one in five patients being treated experienced vital sign disturbances, and more than 50 % of these vital sign disturbances were not realized by the nursing team (Subhan et al., 2019).

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Found that most early warning systems use vital sign abnormalities to predict cardiac arrest and death within 48 hours of measurement. In general, patients with a good EWS score are unlikely to suffer cardiac arrest or sudden death. Meanwhile, patients with a high NEWS score have an easier risk of worsening their condition (Smith et al., 2013).

The early warning system (EWS) score is a tool used by hospital care teams to recognize early signs of clinical deterioration to initiate early intervention and management, such as increasing nursing attention, alerting service providers, or activating a rapid response or medical emergency team. These tools involve assigning numerical values to several physiological parameters (systolic blood pressure, heart rate, oxygen saturation, respiratory rate, level of consciousness, and body temperature) to derive a composite score that is used to identify patients at risk for harm (Dadkhah et al., 2018).

In addition, the results of the study revealed that a small proportion of patients (9.7%) in the intervention group and control group (12.9%) after obtaining the modified NEWS and NEWS observation sheets had a red/critical emergency condition, this could be due to response factors. the team of officers is slow so that patients whose condition is deteriorating are not handled quickly. Shouldthe initial action of the nurse must report the EWS scoring results based on the EWS reporting algorithm.

With the implementation of the Early Warning Score, it is hoped that monitoring of inpatients will be more controlled, minimizing code blues, maintaining patient safety, minimizing disability, reducing mortality and minimizing special care that extends patient length of stay. EWS training for all nurses is a necessity to overcome this(Butar, 2018). Many factors can hinder the implementation of EWS in hospitals. Barriers to implementing the EWS system include the unavailability of equipment, the need for training, a communication system between nurses and doctors, and an increase in critical care services. However, the use of NEWS can work effectively if nurses are able to observe patients 24 hours after entering the hospital (Abidin et al., 2017; Fauziah et al., 2023).

The results of this study concluded that the implementation of MEWS in the institution has led to an increase in the number of rapid response teams being called in and the MEWS score at the time of rapid response alone has decreased. Therefore, utilization of NEWS has proven to be a useful tool in the early recognition of deteriorating patients in these institutions.

CONCLUSION

1. Nearly half of the inpatients on the ward had a clinical condition with critical jaundice in the control group, before receiving the monitoring intervention of the NEWS observation sheet at dr. H. Slamet Martodirdjo general hospital.
2. Almost all inpatients in the Ward had clinical conditions with a green emergency condition (normal) in the control group, after receiving the NEWS observation sheet monitoring intervention at dr. H. Slamet Martodirdjo general hospital
3. Nearly half of the inpatients on the ward had a clinical condition with an emergency orange condition in the intervention group before receiving the intervention monitoring the modified NEWS observation sheet at dr. H. Slamet Martodirdjo general hospital
4. Almost all inpatients in the Ward had clinical conditions with green emergency conditions (normal) in the intervention group, after receiving the monitoring intervention modified NEWS observation sheet at dr. H. Slamet Martodirdjo general hospital
5. There are differences in the results of using the Modified NEWS observation sheet compared to the NEWS observation sheet on a decrease in the emergency condition of

patients in detecting the emergency level of patients in the inpatient ward of dr. H. Slamet Martodirdjo general hospital.

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CONFLICTS OF INTEREST

In completing the research there is no conflict of interest.

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