Nurses' Performance toward Patients with Fever at Intensive Care Unit: Recommended Guidelines

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Abstract

Background: Fever is a common problem in ICU patients; it is a medical condition when there is an uncontrolled rise in the body temperature, measured as above 37.5 degrees Celsius**. Aim of the study:** This study aimed to assess nurse's performance regarding patients with fever at intensive care units. **Study design** A descriptive exploratory design was used in this study. **Setting** intensive care units at Nasser General Hospital, affiliated to Ministry of Health. **Study subject: A** convenience subject of all available nurse's **Tools: I** Self – administration questionnaire, **II** nurses' practice observational checklist, **III**- Nurses' attitude rating scale**. Results:** revealed that the mean age of the studied nurses were 26.1±4.4, 62.9% of the studied nurse's had satisfactory level of knowledge, there was 75% of them had satisfactory level of practices and 55.7% of nurses under study had positive attitude toward patients with fever at intensive care units. Furthermore, there was a positive correlation between attitude and their practices, there is a statistically negative correlation between knowledge and attitude of studied nurses regarding patient with fever at intensive care units. **Conclusion**: More than two thirds of the studied nurses had satisfactory level of knowledge, three quarter of them had satisfactory level of practices regarding patients with fever at intensive care units, and more than half of the studied nurses had positive attitude toward patients with fever at intensive care units. Also, there is high significant relation between nurses' knowledge, practice & their demographic characteristics. **Recommendations:** in service training program must be developed based on nurses' need assessment regarding care of patients with fever.

Keywords: Nurses performance, fever, intensive Care Unit, Recommended guidelines.

Introduction

Fever is part of the body's normal reaction to inflammatory or immunological disorders and infections. Since health care providers are still a source of great concern, attempts have been made to include guidance for their management worldwide, there misconception that fever is a disease rather than a symptom has been most commonly reported **(Badr et al., 2021).**

Fever can be caused by many medical conditions ranging from non-serious to life threatening. This includes viral, bacterial, parasitic infections such as (common cold, urinary tract infections, meningitis, malaria and others). Noninfectious causes include (vacuities, deep venous thrombosis, side effects of medication and cancer among others) **(Young, et al., 2019**).

Although, the disease process that leads to fever may be harmful, there is no evidence to demonstrate that fever itself is harmful. In fact, the presence of fever inhibits bacterial growth and the replication of viruses. Many patients tolerate mild to moderate fever with remarkable ease. Fever has many immunological benefits, however, it is often viewed negatively by caregivers and nurses and treated aggressively **(Elseady et al., 2021).**

Most episodes of fever in ICU are due to infections. It was found that 63% of the critically ill patients who had a fever had sepsis. The common infectious causes include ventilator-associated pneumonia, catheter-related bloodstream infections, surgical site infections, urinary tract infections related to catheters, and bacteremia of various origins inclusive of the above causes **(Sundén-Cullberg et al., 2017).**

Persistent high fevers are also known to cause rhabdomyolysis and acute kidney injury,

necessitating renal replacement therapy. Fever could have significant indirect impacts too. Apart from the cost implication of any fever evaluation and treatment, unexplained fevers often prompt misuse or overuse of antibiotics (empiric use even in non-infectious causes), which could result in economic burden and promote the development of multidrug resistance **(Achaiah, & AK, 2021).**

The aim of fever management is to protect and comfort the patient until a diagnosis of the underlying condition is made. Antipyretics should not be used with the purpose of lowering temperature but merely to comfort a patient with pain associated with fever. Fever management is nursing responsibility, nurses must have background about physiology of the fever to be able to use them cognitive and practical skills for managing patient with fever safely (**Allo et al., 2020).**

Critical care nurses are the health care professionals who have the obligation to protect critically ill patients against infection especially those who are immune compromised, in order to enhance their recovery, prevent deterioration in their health, and achieve high quality nursing care **(Arrar, & Mohammed, 2020).**

guidelines are available outlining how to correctly manage patient's fever. Adherence of healthcare providers to new guidelines could make a huge impact in dissemination of up-to-date evidence-based information. However, identifying and overcoming local barriers is essential in changing healthcare provider's behaviors to adopt and implement such guidelines **(Arias et al., 2019).**

The development of practice guidelines for evaluating adult patients who develop fever in the intensive care units important for clinical guidelines to provide therapeutic recommendations, evidence suggests they are not always followed. Given that health education is one of the most frequently accessed primary healthcare services, it is important to understand the views and practices of fever **(Heinz, et al, 2017).**

Significance of the Study:

The care of patients with fever occupies a considerable amount of time for many nurses. But despite this extensive experience with fever, there are even healthcare professionals have misconceptions about the adverse effects of a fever and about when and how a fever should treat (**Gouda et al., 2019)**. Fever can be a diagnostic challenge for health care professionals in patient at intensive care unit because it is often difficult to identify the cause **(National Institute of Health, 2020).** Fever, can last for several days, can have a significant impact on society, including a rise in heat-related deaths. From 1998-2017, more than 16000 people died due to fever ***(WHO, 2017).***

From the clinical experience and observation for the actual situation, it is obvious that, patients in intensive care units always acquired fever with or without infection. Moreover, patients with fever may suffer from catastrophic effects cause low outcomes and low satisfaction that contribute to diminished quality of life**.** Therefore, assessing nurses' performance and developing nurses 'guidelines toward patients with fever are consider important for improving quality of care and decrease cost of treatment.

Aim of the Study

This study aims to assess nurses' performance toward patients with fever at intensive care units through the followings:

1. Assess nurses' knowledge toward patients with fever at intensive care units.
2. Assess nurses' practice towards patients with fever at intensive care units.
3. Assess nurses' attitude toward patients with fever at intensive care units.

Research Questions:

The current study answered the following questions:

1. What is the nurses' knowledge toward patients with fever at intensive care units?
2. What is the nurses' practice toward patients with fever at intensive care units?
3. What is the nurses' attitude toward patients with fever at intensive care units?

The present study was designed through:

I. Technical Design

II. Operational Design
III. Administrative Design
IV. Statistical Design

I. Technical design

It Included study design, settings, subject and tools used for data collection.

Study design:

A descriptive exploratory design was used to meet the aim of the study.

Descriptive exploratory design, usually the field studies in natural setting, provide the least control over variables and the data collected either contribute to the development of theory or explain phenomena from the prescriptive of the persons being studied.

Setting:

This study was carried out at intensive care units at Nasser General Hospital, affiliated to Ministry of Health, at 3rd floor and consists of three rooms for males and females; 1st room included 8 beds, and 2nd room included 10 beds and 3rd room included 10 beds for Covid 19 isolation.

Subjects

A convenient sample of all available nurses working at the intensive care units in the previously mentioned units and agreed to participate in the study, (70) nurses were recruited in this study.

Tools of the study:

Three tools were used to achieve the purpose of this study: -

Tool I: Nurse's self-administered questionnaire:

It was developed by the investigator in simple Arabic language based on extensive review of relevant and recent literatures **(Kahya, 2018, Zubedeh et al., 2016 and Green smith, 2013)** to assess nurses' knowledge toward patients with fever at intensive care units. It includes the followings parts:

Part 1: Concerned with **demographic characteristics** of the nurses under study. It was consisting of 8 closed questions as regards (age, gender, marital status, job degree, qualifications, nursing ratio for patient in ICU, clinical years of experiences and training courses).

Part 2: concerned with **Nurses' knowledge toward patients with fever** that included 32 questions (20 MCQs and 12 closed ended questions in form of (Yes/ No); physiology of body temperature regulation (5 questions) causes and types of severe fevers (5 questions) signs & stages of fever (5 questions) complications and treatment of fever (5 questions) nursing care for patient with fever (6 questions) guidelines of patients with fever (6 questions).

❖ **Scoring system regarding nurse's knowledge:**

These parts consisted of 32 questions, the correct answer was scored as two point and the incorrect answer was scored as a one point. The total score of nurse's knowledge at intensive care units was categorized into:

- **Satisfactory knowledge** if score ≥80%.
- **Unsatisfactory knowledge** if score < 80%.

Tool II: Nurse's practice observational checklist:

It was adapted from recent and relevant literatures **(Shereen et al., 2019, Kahya, 2018)** to assess nurses' practices toward patients with fever at intensive care units. It consists of 74 practical steps including nursing care before procedure (12 steps), Assess patients with fever (57 steps), nurses practice after providing care to those patients (5 steps).

❖ **Scoring system:**

The checklist was contained of 74 steps, the total scores were 74 grades, the response was scored as (2) point for done, (1) point for not done and the total score were divided into 2 categories:

- **Satisfactory practice** if score ≥ 85%.
- **Unsatisfactory practice** if score < 85%.

Tool III: Likert scale: it was used to assess nurses ' attitude toward patients with fever at intensive care units. It was adapted from **(Kiekkas, 2014)**. It includes 18 items, attitude

toward fever (8 items), attitude towards antipyretics evaluating scale (10 items).

❖ **Scoring system:**

The response was on a point Likert scale ranged from (0) disagree, (1) sometimes & (2) agree. The total score was 54 and divided into two categories:

- **Positive attitude** ≥ 85 %
- **Negative attitude** < 85%

Ethical Considerations

The research approval was obtained from the Faculty Ethical Committee before starting the study.

The ethical considerations include the following:

- The investigator was clarified the objectives and aim of the study to nurses included in the study before starting and a Verbal approval was obtained from them before inclusion in the study.
- The investigator was assuring maintaining anonymity and confidentiality of subjects' data included in the study.
- The nurses were informed that they are allowed to choose to participate or not in the study and they have the right to withdrawal from the study at any time

II. Operational Designed

Operational design for this study consisted of preparatory phase, testing validity and reliability, pilot study and fieldwork.

1.Preparatory Phase:

This phase included reviewing of the current, more recent national and international literature review concerning caring for patients with fever at intensive care units using articles, periodicals, magazines and internet. This served to develop the study tools for data collection. During this phase, the researcher also visited the selected places to get acquainted with the personnel and the study settings. Development of the tools was under supervisors' guidance and experts' opinions were considered.

2.Testing Validity and Reliability:

Testing validity of the proposed tools by using face and content validity. Face validity aimed to inspecting the items to determine whether the tools measure what supposed to measure. Content validity was conducted to determine whether the tools cover the aim of the study **(Lundahl et al., 2019).** Validity was tested through a jury of (7) experts from medical surgical and critical care nursing department at faculty of nursing, Ain Shams University. The experts reviewed tools for clarity, relevance, comprehensiveness, simplicity and applicability, minor modifications done.

Reliability analysis by measuring of internal consistency of the proposed tools was done by Cronbach Alpha test. The reliability score of tool reached (0.902, 0.817,0.806 and 0.799) for demographic data, knowledge, practice and attitude.

3.Pilot Study

Was Carried out on 7 nurses those represent 10% of study sample. In order to test the applicability of the study tools and the clarity of the included questions as well as estimation of the average time needed to complete tools. The result obtained were studied and analyzed accordingly. Modifications were made for the final development of the study tools. Then nurses selected for the pilot study were excluded from the study sample.

4.Fieldwork

A) Interviewing with (70) nurse caring for patient with fever at intensive care unit in the previously mentioned clinical setting to explain the aim of study and effect of the study on their performance as well as patient quality of care and take their approval to participate in the study prior to any data collection orally.

B) Assessing nurse's knowledge, attitude and practice regarding caring for patient with fever by using self- administered questionnaire tool, an observational checklist and Likert scale as follows:

- The self-administered questionnaire tool was filled by the nurses. It takes about 20-25 minutes for every nurse personal to be fulfilled about 10 nurses at morning and afternoon shift.
- Observational checklist was used to indirect observation to assess nurses' practices. It takes

about 30-45 minutes for every nurse to fulfill by the investigator at morning and afternoon shift.

- The Likert scale was filled by the nurse; it takes about 10-15 minutes for every nurse personal to be fulfilled.
- Data collection took about 5 months start from may (2020) until September (2020), the data were collected by the investigator through 3 days/ week (Sunday, Tuesday and Wednesday) during the morning and afternoon shift.

III. Administrative Designed

An official letter was issued from Faculty of Nursing, Ain Shams University to get permission from the director of study setting explaining the purpose of the study to obtain the permission for conducting this study.

IV. Statistical Analysis

Data collected from the studied sample was revised, coded and entered using Personal Computer (PC). Computerized data entry and statistical analysis were fulfilled using SPSS (Statistical Program for Social Science). Data were presented using descriptive statistics in the form of frequencies, percentages and Mean SD. A chi-squared test is used to determine whether there is a statistically significant difference between the expected frequencies and the observed frequencies in one or more categories of a contingency table. A correlation coefficient is a numerical measure of some type of correlation, meaning a statistical relationship between two variables. Linear regression is a linear approach to modeling the relationship between a scalar response and one or more explanatory variables.

Significance of the results:

1.Non-significant at p-value>0.05
2.Significant at p-value ≤ 0.05.
3.Highly significant at p-value ≤ 0.001.

Result:

Table (1): reveals that, the mean age of nurses under study were 26.1 ± 4.4 years of them 74.3% were aged between 20<30 years old, and 62.9% females. Concerning level of education 74.3% of nurses under study had diploma of the technical institute of nursing and revealed that 74.3% of them working as staff nurses. Also, 51.4% of them had lower than three years of experience in intensive care unit and 85.7% of them attended training courses.

Figure (1): This figure showed that 62.90% of the nurses under study had satisfactory level of knowledge toward patients with fever at intensive care units and 37.10% of them had unsatisfactory level of knowledge.

Figure (2): revealed that 75% of nurses under study had satisfactory level of practices toward patient with fever at intensive care units and 25% of them had unsatisfactory level of practice.

Figure (3): shows that 55.70% of nurses under study had positive attitude and 44.30% of them had negative attitude toward patients with fever at intensive care units.

Table (2): reveals that there was highly statistically relation between nurses' practices with their demographic characteristics (age, qualifications, years of experience, job degree and nursing ratio for patients in the ICU at p-value (0.000, 0.000, 0.000, 0.000 & 0.000) respectively. While there is no statistical relation between nurses practice and their gender, marital status and training course at p - value (0.583, 0.182 & 0.085) respectively.

Table (3): Correlation between knowledge, practices, and attitude of the studied nurses regarding patient with fever at intensive care units with p-value < 0.001. reveals that there was a statistically significant positive correlation between attitude and practices. On the other hand, there was a statistically negative correlation between knowledge and attitude.

Table (4): indicates that the multivariate analysis identified that gender and nursing ratio for patients in the ICU were statistically significant independent negative predictors of knowledge score.

Table (1): Frequency & percentage distribution of demographic characteristics of studied nurses (n=70).

Items	No	%
Age:		
Under 20 Years	6	8.6
From 20 < 30 Years	52	74.3
From 30 ≤ 40 Years	9	12.9
Over 40 Years	3	4.3
Range	**18 – 44**	
Mean ±SD	**26.1 ± 4.4**	
Gender:		
Male	26	37.1
Female	44	62.9
Marital status:		
Single	36	51.4
Married	30	42.9
Other; divorced & widow	4	5.7
Level of education:		
Diploma of the Technical Institute of Nursing	52	74.3
Bachelor of Nursing	12	17.1
Graduate Studies/ post graduate	6	8.6
Number of Experience years in Intensive Care		
From < 3 years	36	51.4
from 3 < 5 years	12	17.2
> 5 years	22	31.4
Job degree:		
Staff nurse	52	74.3
ICU head nurse/ supervisor	18	25.7
Nursing ratio for patients in the ICU:		
1 to 1	3	4.3
1 to 2	45	64.3
1 to 3	22	31.4
Training courses:		
Yes	60	85.7
No	10	14.3

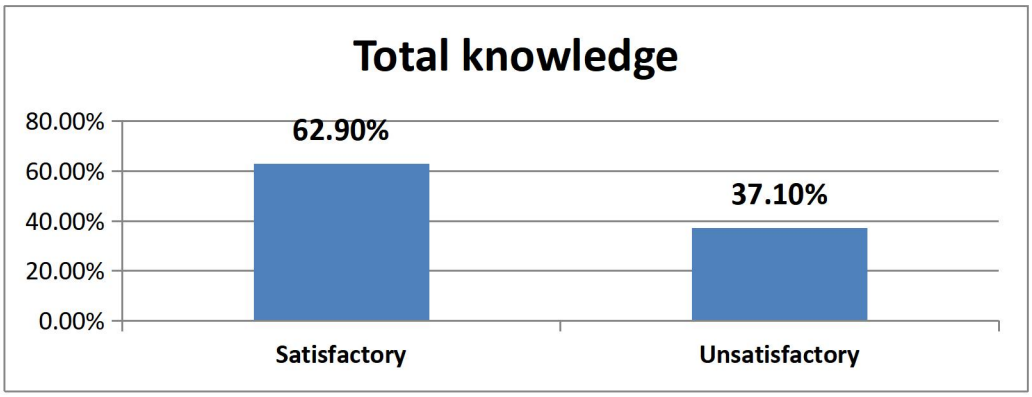

Figure (1): Total Nurses' level of knowledge toward patient with fever at intensive care units (n=70).

Figure (2): Total Nurses' level of practice toward patient with fever at intensive care units (n=70)

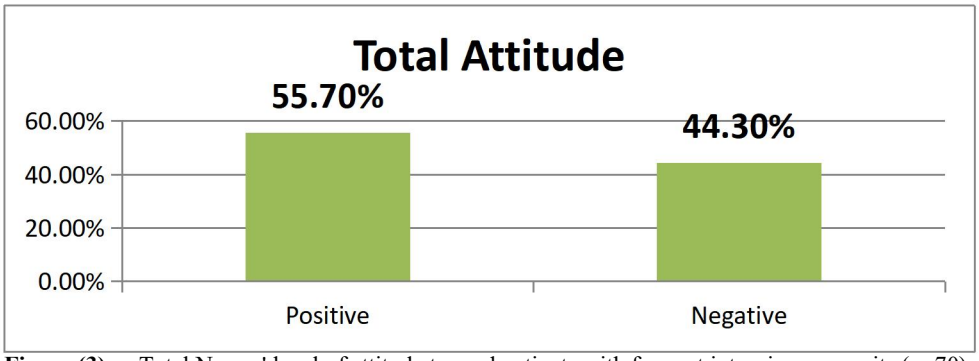

Figure (3): Total Nurses' level of attitude toward patients with fever at intensive care units (n=70).

Table (2): Relation between nurses' practices and their demographic characteristics (n=70).

Demographic characteristics	Practices				X^2 test	p-value
	unsatisfactory (n=28)		satisfactory (n=42)			
	No.	%	No.	%		
Age:						
Under 20 Years	6	21.4	0	0.0		
From 20 < 30 Years	22	78.6	30	71.4	17.763	**0.000****
From 30 ≤ 40 Years	0	0.0	9	21.4		
Over 40 Years	0	0.0	3	7.2		
Gender:						
Male	9	32.1	17	40.5	Fisher	0.583
Female	19	67.9	25	59.5		
Marital status:						
Single	18	64.3	18	42.9		
Married	10	35.7	20	47.6	Fisher	0.182
Other; Divorced & widow	0	0.0	4	9.5		
Qualifications:						
Diploma of technical institute	24	85.7	27	64.3		
Bachelor of nursing	4	14.3	9	21.4	18.306	**0.000****
Postgraduates studies	0	0	6	14.3		
Number of Experience years in Intensive Care						
From < 3 years	24	83.3	12	28.6		
From 3 < 5 years	0	0.0	12	28.6	16.022	**0.000****
> 5 years	4	16.7	18	42.8		
Job degree:						
Staff nurse	28	100.0	23	54.8	Fisher	**0.000****
ICU head nurse/ supervisor	0	0.0	19	45.2		
Nursing ratio for patients in the ICU:						
1 to 1	0	0.0	5	11.9	26.602	**0.000****
1 to 2	12	42.9	33	78.6		
1 to 3	16	57.1	4	9.5		
Training courses:						
Yes	23	82.1	39	92.9	Fisher	0.085
No	5	17.9	3	7.1		

(**) high significant at p<0.001

Table (3): Correlation between nurses' knowledge, practices, and attitude.

Scores	Spearman's rank correlation coefficient		
	Knowledge	Practices	Attitude
Knowledge		**0.211**	**-0.201**
Practices	**0.211**		**0.265***
Attitude	**-0.201**	**0.265***	

(*) Statistically significant at p<0.001

Table (4): Best fitting multiple linear regression model for nurses' knowledge score

Items	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
(Constant)	2.000	0.336		5.960	**0.000**	1.329	2.671
Age	-0.078	0.112	-0.119	-0.699	0.487	-0.303	0.146
Gender	-0.358	0.106	-0.432	-3.377	**0.001**	-0.570	-0.146
Marital status	-0.073	0.106	-0.090	-0.687	0.495	-0.285	0.139
Qualification	0.075	0.085	0.118	0.878	0.383	-0.096	0.245
Number of Experience years	-0.003	0.064	-0.007	-0.048	0.962	-0.131	0.125
Job degree	0.085	0.163	0.094	0.519	0.606	-0.241	0.411
Nursing ratio for patients in the ICU	-0.207	0.084	-0.289	-2.468	**0.016**	-0.375	-0.039
Training courses	0.263	0.141	0.210	1.866	0.067	-0.019	0.546

R-square=0.42 Model ANOVA: F=5.47, p<0.05

Discussion

The present study was a descriptive exploratory study aimed to assess nurses' performance toward patients with fever at intensive care units through the followings:

1. Assess nurses' knowledge toward patients with fever at intensive care units.
2. Assess nurses' practice towards patients with fever at intensive care units.
3. Assess nurses' attitude toward patients with fever at intensive care units.
4. Develop recommended guidelines toward patients with fever at intensive care units.

Part I: Demographic characteristics of the studied nurses.

Regarding the demographic characteristics of the studied nurses, the current finding revealed that more than two third of nurses under study were females with mean age of 26.1 ± 4.4 years. From researcher point of view, it was expected that females who join nursing careers are usually exceeding males. This finding is consistent with **Allo, Hussein& Ibrahim (2020)** study which entitled "Assessment of nurses' knowledge about fever management in Mosul Hospitals" who found that about 122 nurses were female which constitute as more than half of sample.

Regarding the educational level of the nurse under the study. The current study revealed that almost three quarter of studied nurses had Diploma degree secondary to Technical Institute of Nursing. This finding is on the same line with **Abd El-Ghany & Mahmoud (2018)** study which entitled "Effect of educational sessions about dengue fever on nurse's knowledge and attitude at Zagazig Fever Hospital" who found that more than half of studied sample had nursing diploma qualification.

Moreover, the finding of the current study revealed that, the nurses under study had satisfactory level of knowledge about causes, diagnosis and symptoms of fever. This study is matched with **Allo Hussein & Ibrahim (2020)** study entitled ″ Assessment of Nurses, Knowledge about Fever Management in Mosul Hospitals ″ who stated that about half of the study samples had satisfactory level of knowledge toward patient with fever at ICU.

This finding is on the same line which agreement with an Egyptian study done by **Fathy, Salah & Hassan (2017)** which entitled "Impact of intervention program on nursing performance provided for patients with sepsis at ICU" who reported that the nurses' performance about measuring vital signs as axillary temperature had satisfactory level of performance pre- program implementation.

This finding is matched with **Egi, Makino, & Mizobuchi (2018).** Study which entitled ″ management of fever in critically ill patients with infection ″ who reported that all nurses correctly believed that regular administration of paracetamol could mask a fever indicative of a progressive infection. As well, nearly two thirds of them felt that the fever below 41C might be harmful.

The present study revealed that there was high significant relation between nurses' practices and their age, educational level, and years of experience, job degree. While there is no significant relation between nurses practice and their gender, marital status and training courses. This finding is agreement with **Gouda et al. (2019)** who showed that there was highly statistically significant relation between nurses' practice and age, years of experience and educational level.

Conclusions

In the light of the current study findings, it was concluded that:

More than two thirds of the studied nurses had satisfactory level of knowledge, three quarter of them had satisfactory level of practices regarding patients with fever at intensive care units, and more than half of the studied nurses had positive attitude toward patients with fever at intensive care units. Also, there is high significant relation between nurses' knowledge, practice & their demographic characteristics (qualifications and nursing ratio for patients in the ICU), while there is no statistical relation between nurses, knowledge & their age. there is a statistically significant positive correlation between attitude and practices. On the other hand, there is a statistically negative correlation between knowledge and attitude.

Recommendations

Based on the results of the present study, the researcher, the following recommendations are suggested:

1. Study and implement preservice and In service training program based on nurses' need assessment regarding care of patients with fever.
2. Design and implement monitoring system to evaluate nurses' practice at intensive care units.
3. Further research need to investigate barriers that prevent nurses' compliance at intensive care unit for patients with fever.

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