The Relationship of Workload, Knowledge, and Supervision with Nurse Adherence to Infection Prevention Protocols

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Article Information	ABSTRACT
	Nurse adherence to infection prevention protocols is crucial for reducing Healthcare-Associated Infections (HAIs). Yet, compliance remains suboptimal in many facilities due to high workload, varying knowledge levels, and inconsistent supervision. Purpose: This study analyzes the relationship between workload, knowledge, supervision, and nurse compliance with infection prevention protocols at RSUD dr. Rasyidin Padang. Methods: A quantitative correlational design was employed with 65 nurses selected via total sampling. Questionnaires assessed workload, knowledge, supervision, and compliance. Data were analyzed using Pearson correlation. Results: Workload showed a significant negative correlation with compliance ($r = -0.41; p = 0.001$). Knowledge ($r = 0.46; p < 0.001$) and supervision ($r = 0.52; p < 0.001$) had significant positive correlations. Supervision emerged as the strongest factor. Implications: Findings highlight the need for balanced workloads, ongoing training to boost knowledge, and structured supervision to enhance protocol adherence. Conclusion: Workload, knowledge, and supervision significantly influence nurse compliance. Sustainable interventions targeting these factors are essential for improving service quality.

INTRODUCTION

Infection prevention is one of the fundamental elements in maintaining the quality of health services because health service-related infections (HAIs) are still a serious global challenge. WHO (2023) reports that HAIs contributes greatly to the increasing morbidity and mortality rates in hospitals. The situation is aggravated by the low level of compliance of health workers in the implementation of infection prevention protocols. Therefore, understanding the factors that affect compliance is very important.

In the health care system, nurses are the personnel who most often interact with patients, thus spearheading the implementation of infection prevention protocols. Nurse compliance largely determines the success of infection control efforts in hospitals. However, Suryani (2022) states that the level of nurse compliance is still diverse and influenced by many internal and external factors. This indicates the need for in-depth research to identify the dominant factor.

One factor that is often associated with low compliance is the high workload of nurses. An unbalanced workload can lead to physical and mental fatigue, reducing the ability of nurses to follow procedures consistently. Rahmadani (2023) revealed that excessive workload has a direct impact on the quality of nurse performance, including in the implementation of patient safety standards. This condition reflects the importance of setting a proportional workload.

In addition to workload, knowledge is an important part that influences nurses ' adherence to infection prevention protocols. Lestari (2023) states that increasing knowledge through training and continuing education can improve nurses ' understanding of the risk of infection. Nurses with good knowledge tend to be more consistent in applying standard procedures. This shows that the educational aspect cannot be ignored.

Supervision also plays an important role as an external factor in improving nurse compliance. Effective supervision provides guidance, monitoring, and constructive feedback for nurses. Putra (2022) asserts that strong supervision is able to improve compliance behavior and ensure nurses carry out procedures according to standards. Lack of supervision often leads to inconsistent practices.

Recent research has shown that all three factors-workload, knowledge and supervision—interact in a complex way. Marzuki (2023) reports that all three variables simultaneously have a significant relationship to the level of nurse compliance in implementing infection prevention protocols. These findings suggest that a multidimensional approach is needed in the development of interventions. Therefore, research that examines the relationship of the three is very important.

HAIs has an impact not only on patients but also on hospital staff and the health care system as a whole. According to Abdullah (2023), the incidence of HAIs can lengthen the length of hospitalizations, increase costs, and decrease the quality of care. This will certainly increase the burden on health facilities, especially in regional public hospitals. Therefore, adherence to infection prevention protocols should not be neglected.

In Indonesia, the issue of nurse compliance with infection prevention protocols is still an issue that is often found in the evaluation of service quality. The Ministry of Health (2023) states

that many hospitals face challenges in maintaining consistency in the implementation of infection prevention standards. This inconsistency is influenced by various organizational and individual factors. This indicates that the problem is quite complex.

In Padang City, the phenomenon of inconsistency in nurse compliance is also still seen in some hospitals. Hidayat (2022) states that such compliance variations can increase the risk of nosocomial infections, which can actually be prevented. This condition requires a thorough evaluation of the factors that cause it. Therefore, it is important to carry out a more targeted study in the region.

Hospital dr. Rasyidin Padang as a referral hospital has a high level of patient mobility, so the potential for HAIs is also greater. Arif (2023) explained that environments with high service loads require the implementation of stricter infection prevention protocols. However, implementation in the field often faces obstacles such as limited time and high work demands. This makes research related to compliance factors even more relevant.

The high workload in the referral hospital can cause physical and emotional stress on the nurse. The pressure can affect work priorities so that some infection prevention procedures may not be performed optimally. According to Karina (2023), uncontrolled workload can lead to a decrease in focus and accuracy in performing actions. This situation needs to get the attention of hospital management.

The knowledge of nurses in regional hospitals also often varies depending on the frequency of training provided. Vera (2022) states that non-routine training can lead to knowledge gaps between new nurses and senior nurses. This can affect the harmonization of infection prevention practices in the field. Therefore, increasing competence should be a priority.

Supervision in hospitals often faces obstacles such as the limited number of Supervisors and the density of service activities. Yuliana (2023) asserts that non-optimal supervision can lead to weakened supervision of the implementation of infection prevention procedures. In these conditions, nurses tend to develop work habits that are not up to standard. These conditions are one of the biggest challenges in maintaining compliance.

From a patient safety perspective, non-compliance with infection prevention protocols can have far-reaching effects. Sari (2024) states that non-compliance not only increases the risk of infection but also affects patients ' confidence in health services. This makes compliance an important indicator in a hospital's quality system. Therefore, the factors affecting compliance must be comprehensively reviewed.

Research on nurses ' adherence to infection prevention protocols in Padang is still limited, especially those that examine the relationship of workload, knowledge, and supervision simultaneously. Previous studies have tended to highlight only one factor. According to Farida (2023), multidimensional research is needed to produce a more comprehensive understanding. The emptiness of this research is an important reason for further study.

The interest of researchers to raise this topic arose due to the urgency and complexity of issues directly related to patient safety. In addition, this research has the potential to make a

practical contribution to RSUD dr. Rasyidin Padang in developing strategies to improve nurse compliance. Therefore, this study is considered relevant and important to do.

METHODS

This study uses a quantitative design with a correlational approach that aims to analyze the relationship between workload, knowledge, and supervision with nurse compliance with infection prevention protocols. The correlational approach was chosen because it was able to describe the strength and direction of the relationship between variables without manipulating the research conditions. This design also allows researchers to obtain an empirical picture of the patterns of interrelation of these factors in the context of Nursing Service practice. Thus, the results of the study can provide a basis for data-driven decision-making in efforts to improve patient safety.

The sample of 65 nurses who work in the hospital dr. Rasyidin Padang, and all participated through total sampling technique. This technique is used because the number of populations is relatively small and all members of the population are considered to have characteristics that are relevant to the focus of the study. Data collection was conducted using a structured questionnaire consisting of four main components, namely workload, knowledge, supervision, and nurse compliance with infection prevention protocols. Each instrument has gone through a process of content validation by experts and reliability tests to ensure its level of internal consistency.

Data analysis was conducted using Pearson correlation test to assess the relationship between variables in this study. Before the test is carried out, the data is tested first to ensure the fulfillment of the assumption of normality and linearity as a prerequisite for the use of parametric correlation test. Pearson's test was chosen because it can provide information about the strength of the relationship, the direction of the relationship, as well as the statistical significance between the variables studied. The results of this analysis are the basis for interpreting the relationship between workload, knowledge, supervision, and the level of nurse compliance in the implementation of infection prevention protocols.

RESULTS

In this section, the results of the study are presented which include the characteristics of respondents, univariate analysis to describe the distribution of each variable, and bivariate analysis to see the relationship between workload, knowledge, and supervision with nurse compliance with infection prevention protocols. The presentation of the results is carried out systematically to provide a clear picture of the condition of the respondents and the pattern of relationships between the variables studied. The data obtained are then displayed in Tabular Form to facilitate understanding and interpretation of research findings. The results of this study became the basis in drawing conclusions related to factors that affect the compliance of nurses in hospitals dr. Rasyidin Padang.

1. Characteristics of Respondents

Table 1. Characteristics of Respondents

Characteristics	Categories	n	%
Gender	Girls	48	73.8
	Men	17	26.2
Age (years)	20–30	28	43.1
	31–40	25	38.5
	>40	12	18.4
Long Time Working Characteristics	<5 years	22	33.8
	5-10 years	30	46.2
	>10 years	13	20.0

Most of the respondents in the study were women (73.8%), according to the general characteristics of the nursing profession. The majority of respondents are in the age group of 20-40 years (81.6%), which reflects that most nurses are at a productive age. In addition, almost half of the nurses have a service life of 5-10 years (46.2%), indicating that some respondents already have sufficient clinical experience to consistently implement infection prevention protocols. This gives an idea that the characteristics of respondents are relatively homogeneous in the context of age and work experience.

2. Distribution of Research Variables

Table 2. Distribution of Research Variables

Variable	Mean	SD	Min–Max	Categories	n (%)
Working Load	62.4	7.8	45–78	Height	37 (56.9)
Knowledge	78.6	6.2	60–90	Good	41 (63.1)
Supervision	74.1	8.1	55–89	Good	43 (66.2)
Compliance	80.7	7.4	62–95	Obedient	46 (70.8)

The results of the univariate analysis showed that more than half of the respondents had a high workload (56.9%), which indicates that there are quite heavy work demands on hospital service units. Most nurses have good knowledge (63.1%) and good perception of supervision (66.2%), which shows that the aspects of education and supervision are relatively adequate. The nurse compliance rate is also good (70.8%), but this proportion can still be increased through more optimal managerial interventions. In general, the distribution of variables shows relevant patterns for further analysis through correlation tests.

3. Bivariate Analysis (Pearson Correlation Test)

Table 3. The Relationship of Workload, Knowledge, and Supervision with Nurse Compliance

Variable	r	p-value	Description
Workload ↔ Compliance	–0.41	0.001	Significant (negative relationship)
Knowledge ↔ Compliance	0.46	<0.001	Significant (positive relationship)
Supervision ↔ Compliance	0.52	<0.001	Significant (positive relationship)

Correlation analysis showed that workload had a significant negative relationship with nurse compliance ($r = -0.41$; $p = 0.001$). That is, the higher the workload, the lower the level of compliance with infection prevention protocols. In contrast, there is a significant positive relationship between knowledge and compliance ($r = 0.46$; $p < 0.001$), which indicates that nurses with better knowledge tend to be more compliant in implementing infection prevention standards. The variable that has the strongest relationship with compliance is supervision ($r = 0.52$; $p < 0.001$), which confirms that effective supervision plays a major role in ensuring consistency in compliance behavior. These findings reinforce the need for a combinative approach in efforts to improve service quality.

DISCUSSION

1. Univariate Analysis

Description of the characteristics of respondents who showed that the majority of nurses are female. The predominance of women in the nursing profession is a common phenomenon found in many countries, as explained by Lestari (2023) that this profession is synonymous with high empathy and caring traits that more women have. This finding is in line with the results of a current study showing that 73.8% of respondents are women, so the tendency for compliance behavior can be influenced by these characteristics.

The age distribution of respondents showed that most were in the range of 20-40 years. According to Putri (2022), the productive age has better adaptability to standard procedures and service policy updates. The findings of this study are relevant considering that the majority of respondents are at an age that allows them to absorb knowledge quickly and run clinical practice optimally.

In addition, the length of service of respondents, most of which is in the range of 5-10 years, indicates that the nurse has sufficient clinical experience. Suryawan (2023) explained that work experience is positively related to understanding patient safety protocols. The results reinforce this view because experienced nurses tend to have a better interpretation of infection prevention procedures.

On workload variables, the study found that more than half of nurses experienced high workload. This result is in line with Rahmadani's (2023) research which states that increasing service demands cause high workloads on hospital nurses. Researchers see that this reflects the high operational pressure in the hospital dr. Rasyidin Padang.

Knowledge of nurses who dominated the good category showed that most respondents have adequate understanding of infection prevention. According to Arifin (2024), a good level of knowledge can improve the ability of nurses to make safe clinical decisions. The findings of this study support the theory because nurses with good knowledge are more likely to adhere to protocol.

Supervision that is assessed well by the majority of respondents indicates that the supervision process is running effectively. Yuliana (2023) emphasized that supervision plays an important role in the formation of a safety culture in the hospital environment. Based on research data, the perception of good supervision contributes positively to the consistency of nurse compliance behavior.

Nurse adherence to infection prevention protocols was in the compliant category at 70.8%. This is in accordance with the findings of Marzuki (2023) which states that a supportive work environment can improve health worker compliance. The researchers considered that this achievement shows the relatively good implementation of procedures in Dr. Rasyidin Padang.

In the results of bivariate analysis, found a significant negative relationship between workload and compliance ($r = -0.41$). The study by Hasanah (2023) also mentions that excessive workload can decrease attention to patient safety procedures. These findings suggest that the higher the work pressure, the greater the potential for nurse inconsistency in following protocol.

Knowledge has a significant positive relationship with compliance ($r = 0.46$). These results are consistent with sustainable research (2023) which states that knowledge is a major factor in the ability of nurses to apply infection prevention standards. Based on the researchers ' analysis, the higher the clinical literacy of nurses, the greater their commitment in carrying out procedures correctly.

Supervision is the factor with the strongest relationship to compliance ($r = 0.52$). The theory of effective supervision according to Gibson (2022) explains that supervision can build motivation and awareness of compliance through direct coaching. The findings of this study reinforce this theory because the quality of supervision has been shown to have a major effect on Nurse behavior.

The results of this study also support the Health Worker Performance Model theory proposed by Dieleman (2022), which states that the performance of health workers is influenced by individual factors, workload, and organizational support. In the context of this study, the combination of knowledge, supervision, and workload pressure was shown to form a pattern of compliance. This shows that a comprehensive approach is needed to improve the quality of nurse performance.

When viewed holistically, the characteristics of respondents such as productive age and adequate length of Service are supporting factors in the implementation of the protocol. According to Herman (2024), strong demographic characteristics are able to influence positive work attitudes. Researchers assess that this can be seen from the high level of compliance even though the workload is still relatively high.

Nevertheless, the high workload remains a major obstacle that deserves attention. A study by Widyasari (2023) shows that a large workload can decrease the effectiveness of implementing infection prevention protocols. Based on the analysis of researchers, improved workload management is needed to maintain the consistency of nurse compliance.

Good knowledge also proves to be an important capital in ensuring nurses implement the protocol appropriately. As per Andriani's statement (2022), clinical knowledge can strengthen risk perception and increase awareness. Researchers see that continuing education needs to be maintained as a quality improvement strategy.

Good supervision is a strong foundation in shaping compliance behavior. Nugroho (2024) emphasized that supervision is a very effective quality control instrument in ensuring work discipline. Researchers consider that this is the reason why supervision has the strongest correlation with compliance.

Overall, the research findings suggest that nurse compliance is the result of a complex interaction between individual and organizational factors. This is in line with the nursing system theory proposed by Orem (2023), which states that work behavior is influenced by the work environment and supervisory support. Based on the researchers ' analysis, increasing compliance requires attention to all interrelated factors.

Thus, this study provides a comprehensive overview that efforts to improve compliance need to be focused on managing workload, increasing knowledge, and strengthening supervision. This is supported by various recent studies that emphasize the importance of a multidimensional approach in Infection Prevention (Sari, 2024). The researchers concluded that an integrated intervention would have a significant impact in reducing the risk of infection in hospitals.

2. The Relationship of Workload, Knowledge, and Supervision with Nurse Compliance

The results of the bivariate analysis showed that workload had a significant negative relationship with nurse compliance with infection prevention protocols ($r = -0.41$; $p = 0.001$). This shows that the higher the workload faced by nurses, the lower their level of compliance in carrying out the protocol. This finding is in line with Rahmadani's (2023) research which states that excessive workload can cause physical and mental fatigue, reducing the concentration of nurses ' work.

The negative correlation between workload and compliance is also reinforced by the Job Demand-Resources theory proposed by Bakker & Demerouti (2022). This theory states that high job demands without adequate support will decrease worker motivation and performance. In the

context of this study, high workload without organizational supervision and support adjustments could potentially decrease compliance with protocols.

In addition, the analysis showed that nurses who have a high workload tend to have less focus on patient safety procedures. According to Hasanah (2023), high work pressure causes nurses to emphasize quick task completion more than the quality of procedures. The researchers consider that this finding is evidence that workload management needs to be considered so that compliance is maintained.

However, this negative relationship does not mean that all nurses with a high workload are always disobedient. Some nurses show high adherence due to good supervision and knowledge support. This is in accordance with Nugroho's (2024) research which emphasizes the importance of a combination of individual and organizational factors in moderating the effect of workload on performance.

Bivariate analysis also showed a significant positive relationship between knowledge and nurse compliance ($r = 0.46$; $p < 0.001$). That is, the higher the nurses ' knowledge of infection prevention protocols, the higher their level of compliance. Lestari (2023) also found that nurses with good clinical knowledge were able to apply procedures more accurately and consistently.

Knowledge acts as cognitive capital that allows nurses to understand the risk of infection and the importance of correct procedures. The Health Belief Model theory proposed by Rosenstock (2022) explains that individuals with a high understanding of risk tend to perform better preventive behaviors. Researchers see that increasing the knowledge of nurses can be a strategic intervention to improve compliance.

In addition, good knowledge also affects the perception of nurses on the effectiveness of supervision. According to Arifin (2024), nurses who understand the protocol thoroughly will be more receptive to direction and input from supervisors. This can be seen from the high level of compliance in the group of nurses with good knowledge.

In this study, supervision had the strongest positive correlation to nurse compliance ($r = 0.52$; $p < 0.001$). Effective supervision helps ensure that procedures are carried out to standard and provides feedback for improvement. Yuliana (2023) asserts that continuous and constructive supervision can increase the motivation and consistency of nurses ' work.

Supervision not only monitors but also guides and supports nurses in clinical practice. According to Gibson (2022), good supervision can create a safety culture and improve procedure compliance. Researchers see that the role of supervision is very strategic in maintaining compliance, especially in nurses with high workloads.

The interaction between workload, knowledge, and supervision becomes important to understand. Marzuki (2023) states that supervision and knowledge can moderate the negative effects of workload on compliance. The researchers assessed that strengthening supervision and increasing knowledge can reduce the impact of high workload on compliance.

In the group of nurses with a high workload, a relatively good level of compliance showed a moderating effect of supervision. Nugroho (2024) emphasized that active supervision and

adequate knowledge can withstand performance degradation due to work pressure. This indicates the need for a multidimensional strategy in staff management.

In addition, supervision also serves as a medium of knowledge transfer that is not only formal but also practical. Sari (2024) explains that mentoring and direct monitoring improve nurses ' ability to implement procedures. Researchers assess that good supervisory quality reinforces the positive impact of knowledge on compliance.

Bivariate analysis also confirmed that nurse compliance is not only influenced by one factor, but is the result of complex interactions. Dieleman (2022) in Health Worker Performance Model emphasizes the importance of individual factors, workload, and organizational support in shaping performance. The findings of this study fit the model because all factors influence each other.

The results of this study are also in line with the findings of Farida (2023) which show that nurses with high workloads can still comply if supervision is adequate and knowledge is high. This confirms the need for a combination of managerial and educational strategies. Researchers assess that a single approach is not enough to improve compliance on an ongoing basis.

In the context of hospital management, these results emphasize the importance of regulating the number of patients per nurse. Widyasari (2023) mentions that the high nurse-patient ratio contributes to the decline in compliance. Researchers assess that management must balance the workload to maintain service quality.

In addition, the improvement of knowledge must be carried out on an ongoing basis through training and refreshment training. Lestari (2023) emphasized that regular education can increase nurses ' awareness of the risk of infection. Researchers consider that educational intervention to be one of the most effective solutions in the long run.

Consistent and systematic supervision should also be supported by hospital policies. Yuliana (2023) mentioned that formal and informal supervision can build a culture of compliance. Researchers assess that without good supervision, increased knowledge alone is not enough to ensure nurse compliance. The positive correlation of supervision and compliance also shows that organizational factors are more dominant than individual factors. Gibson (2022) explains that organizational support influences nurses ' commitment to implementing procedures. This finding confirms the importance of strengthening the supervision system in RSUD dr. Rasyidin Padang.

Overall, the bivariate analysis showed that nurse compliance is the result of the interaction between workload, knowledge, and supervision. These findings are in line with Orem's (2023) theory of nursing systems that emphasizes the interaction of individual factors and the work environment. The researcher concluded that the strategy of increasing compliance should consider all three variables simultaneously. The results of this study have practical implications for hospital management, namely the need to regulate workload, increase knowledge, and strengthen supervision. Sari (2024) asserts that integrated interventions will have a significant impact on patient safety. Researchers assessed that focusing on a combination of these three factors would be more effective than a partial intervention.
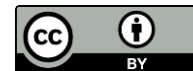
CONCLUSIONS

Based on the results of the study, the characteristics of the respondents were mostly female nurses (73.8%) with a productive age of 20-40 years (81.6%) and a working period of 5-10 years (46.2%). The distribution of research variables showed that 56.9% of nurses had a high workload, 63.1% had good knowledge, 66.2% rated the supervision received as good, and 70.8% were classified as compliant in implementing infection prevention protocols. These findings suggest that although some nurses face high workloads, compliance rates are still relatively high, likely influenced by good knowledge and quality of supervision.

Bivariate analysis using Pearson correlation test showed a significant relationship between the study variables with nurse compliance. Workload has a negative correlation with compliance ($r = -0.41$; $p = 0.001$), indicating that the higher the workload, the nurse's compliance rate tends to decrease. In contrast, knowledge ($r = 0.46$; $p < 0.001$) and supervision ($r = 0.52$; $p < 0.001$) had a positive relationship with compliance, which means that the higher the knowledge and quality of supervision, the higher the level of nurse compliance with infection prevention protocols.

These findings confirm that nurse compliance is influenced by a complex interaction between individual and organizational factors. High workload can decrease compliance, but this impact can be compensated for by good knowledge and effective supervision. Thus, improving compliance cannot rely on just one factor, but requires an integrated strategy that takes into account the balance of workload, increasing competence through education, and strengthening supervision.

Operationally, this study suggests that hospital management needs to manage the workload of nurses to remain proportional, organize regular training to improve knowledge, and implement systematic and constructive supervision. The implementation of this strategy is expected to maintain or increase the level of nurse compliance which is currently at 70.8%, so that the risk of nosocomial infection can be reduced and the quality of health services can be significantly improved.

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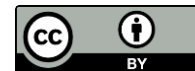
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