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Analysis Of The Relationship Between Hand Washing Knowledge, Facilities And Infrastructure, Work Motivation, And Workload On Hand Hygiene Compliance Among Healthcare Workers At *Mitra Medika Batanghari* Hospital

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Abstract

This study aims to analyze the relationship between handwashing knowledge, facilities and infrastructure, work motivation, and workload on the hand hygiene compliance of medical personnel at Mitra Medika Batanghari Hospital. This research employs a quantitative design with a cross-sectional survey method. The study sample consists of 98 medical personnel selected through purposive sampling. The instruments used in this study include: a hand hygiene knowledge questionnaire developed by Sego Soy (2019) and replicated by Bestari et al. (2024) and J et al. (2022); a motivation questionnaire based on Herzberg's theory, compiled by Suseno Miftahun Ni'mah (2019); the modified NASA-TLX (National Aeronautics and Space Administration Task Load Index) by Ariyaya (2021) to measure workload; the Hand Hygiene Self-Assessment Framework 2010 from the World Health Organization (2010) to assess facilities and infrastructure; and a hand hygiene compliance questionnaire developed by Rofiani (2019). The analysis results show that all studied variables have a significant relationship with the hand hygiene compliance of medical personnel. This study concludes that increasing knowledge, providing adequate facilities and infrastructure, and enhancing motivation can improve medical personnel's compliance with hand hygiene.

Keywords: Hand Hygiene Compliance, Handwashing Knowledge, Facilities and Infrastructure, Work Motivation, Workload, Medical Personnel

Abstrak

Penelitian ini bertujuan untuk menganalisis hubungan antara pengetahuan cuci tangan, sarana dan prasarana, motivasi kerja, serta beban kerja terhadap kepatuhan hand hygiene tenaga kesehatan di Rumah Sakit Mitra Medika Batanghari. Penelitian ini menggunakan desain kuantitatif dengan metode survei *cross-sectional*. Sampel penelitian sebanyak 98 tenaga kesehatan yang dipilih secara *purposive* sampling. Instrumen yang digunakan dalam penelitian ini meliputi: soal pengetahuan hand hygiene yang dikembangkan oleh Sego Soy (2019) dan direplikasi oleh Bestari et al. (2024) serta J et al. (2022); kuesioner motivasi yang disusun berdasarkan teori Herzberg oleh Suseno Miftahun Ni'mah (2019); NASA-TLX (National Aeronautics and Space Administration Task Load Index) yang telah dimodifikasi oleh Ariyaya (2021) untuk mengukur beban kerja; Hand Hygiene Self-Assessment Framework 2010 dari World Health Organization (2010) untuk menilai sarana dan prasarana; serta kuesioner kepatuhan hand hygiene yang dikembangkan oleh Rofiani (2019). Hasil analisis menunjukkan bahwa semua variabel yang diteliti memiliki hubungan signifikan terhadap kepatuhan *hand hygiene* tenaga kesehatan. Kesimpulan dari penelitian ini menegaskan bahwa peningkatan pengetahuan, penyediaan sarana dan prasarana yang memadai, serta peningkatan motivasi dapat meningkatkan kepatuhan tenaga kesehatan dalam melakukan *hand hygiene*.

Kata kunci: Kepatuhan Hand Hygiene, Pengetahuan Cuci Tangan, Sarana dan Prasarana, Motivasi Kerja, Beban Kerja, Tenaga kesehatan

INTRODUCTION

Hospitals, as primary healthcare facilities, play an important role in improving public health. Therefore, hospitals are required to provide high-quality, effective, and efficient services to ensure patient safety in accordance with established standards. One indicator of patient safety is the reduction of healthcare-associated infection (HAI) risks (1). Infections, now referred to as healthcare-associated infections (HAIs), are a significant global issue that is on the rise (2).

A study found that the range of HAIs in Indonesia stands at 17.9%, with a higher risk of HAIs due to the uneven distribution of healthcare facilities in Indonesia (3). High rates of nosocomial infections in developing countries are attributed to inadequate monitoring, poor preventive measures, limited resource utilization, and overcrowded hospitals (4).

Strategies to keep hands clean are always the most important in healthcare and avoiding HAIs. A systematic review of data from 1980 to 2013 reported that increased hand hygiene compliance was associated with a reduction in HAIs overall. In the field, HAIs are primarily transmitted through the contaminated hands of healthcare workers (2).

On a daily basis, healthcare workers have a major responsibility in implementing hand hygiene and improving it (5). Therefore, healthcare workers are required to wash their hands regularly before and after interacting with patients. However, there have been problems with the implementation of suboptimal hand hygiene by healthcare workers. Previous studies have shown fluctuating and sometimes low hand hygiene compliance rates ranging from 12% to 41% (5). At Mitra Medika Batanghari Hospital, where this study was conducted, the average hand hygiene compliance rate was still around 70%, not yet reaching the national standard of 80%.

Table 1. Hand Hygiene Compliance Data at Mitra Medika Batanghari Hospital (6)

No	Month	*Hand Hygiene Compliance Level (%)*
1	January	74
2	February	74
3	March	71
4	April	70
5	May	73
6	June	73
7	July	73.61
8	August	82.03
9	September	78
10	October	85

From the results of interviews and observations, the majority of health workers at Mitra Medika Batanghari Hospital comply with the Standard Operational Procedure (SOP) for hand hygiene. However, occasionally they are less compliant with hand hygiene by not washing their hands after treating one patient and then moving on to the next patient. Evidence of this is the use of disposable gloves on several patients. Additionally, some healthcare workers handle contaminated examination tools without washing their hands, fail to perform hand hygiene before administering medication, and forget to perform hand hygiene before returning home. During hand hygiene, some healthcare workers occasionally wash their hands under running water but do not follow the correct steps

because they are in a hurry to observe patients and complete other tasks.

After investigation, several issues were identified in the implementation of hand hygiene compliance. First, many new healthcare workers admitted that they were not yet fully familiar with hand washing procedures and SOPs. Second, some healthcare workers responded that they were overwhelmed by their many tasks. Physical and time constraints required them to move quickly from one patient to another. This discouraged them from washing their hands or led them to decide to postpone hand washing. Finally, access to hand washing facilities is sometimes difficult to find. A nurse failed to wash her hands because she could not find the nearest hand washing facility.

From these issues, the researchers identified four theories that could scientifically explain the problem. The first is healthcare workers' knowledge about hand washing. Knowledge is one of the most important indicators in implementing hand washing compliance (7). Healthcare workers must have competent knowledge and skills in carrying out their roles. This requirement must be taken into account because healthcare workers are one of the groups that often come into direct contact with patients.

Then, reluctance to comply with hand hygiene was identified as being due to a lack of motivation. Proper and correct hand washing needs to be carried out with the willingness of the health workers themselves, which is often referred to as motivation. Motivation can increase compliance in carrying out proper and correct hand hygiene.

Third, the high physical and time demands can be identified as workload theory. In the hospital context, workload is defined as “all nursing tasks that must be performed within a specific timeframe” and expanded to include "the amount of time and effort healthcare workers devote, both directly and indirectly, to patients, the workplace, and professional development (8).

This workload results in fatigue and high stress levels. There is evidence that high workload leads to staff shortages (higher patient-to-healthcare worker ratios) and increases job dissatisfaction, which in turn leads to reduced patient safety, lower quality of care, and a higher likelihood of errors (9). One such error is healthcare workers failing to adhere to hand hygiene protocols.

Lastly, the unavailability of hand washing facilities is related to nurses' perceptions of the adequacy of hand hygiene facilities and infrastructure in the hospital. Another factor influencing compliance with hand washing is the availability of supportive facilities for hand hygiene implementation. When someone is about to wash their hands, supporting tools such as a hand washing sink, a smoothly flowing faucet, complete personal protective equipment (PPE), and hand rub that is always stocked are required (10).

Healthcare workers' failure to perform hand hygiene can have serious consequences. Failure to perform proper hand hygiene is considered the primary cause of hospital-acquired infections (11). Patients may also perceive hospital services as unhygienic, forming negative impressions that could lead to distrust or dissatisfaction (12).

Therefore, the researcher aims to analyze the relationship between knowledge of hand hygiene, facilities and infrastructure, work motivation, and workload with hand hygiene compliance at *Mitra Medika Batanghari* Hospital.

METHODOLOGY

This study was conducted at *Mitra Medika Batanghari* Hospital from December 2024 to January 2025. The researcher also used a cross-sectional method. Data was obtained from questionnaires and field monitoring. The sampling method used was purposive sampling (13). The population consisted of 130 people, and the sample size was 98 people. Data analysis in this study used regression analysis with the assistance of SPSS for Windows.

RESULTS

Bivariate Analysis:

Relationship between Hand Hygiene Knowledge and Hand Hygiene Compliance

The results of the analysis of the relationship between hand hygiene knowledge and hand hygiene compliance found that 5 respondents (5%) had low knowledge and high hand hygiene compliance; 65 subjects (66%) had high knowledge and high hand hygiene compliance. Additionally, 29 (29%) had low knowledge and high hand hygiene compliance. The statistical test yielded a p-value of 0.00. Therefore, it can be concluded that there is a significant relationship between hand hygiene knowledge and hand hygiene compliance. The analysis also yielded an OR value of 18.800, meaning that the variable of hand hygiene knowledge is associated with a 14-fold increase in hand hygiene compliance.

Relationship Between Perception of Facilities and Infrastructure and Hand Hygiene Compliance

The analysis of the relationship between perception of facilities and infrastructure and hand hygiene compliance found that 2 respondents (2%) had high satisfaction with facilities and infrastructure but low hand hygiene compliance; 3 subjects (3%) had low perception of facilities and infrastructure and low hand hygiene compliance. Additionally, 91 (29%) individuals perceived facilities and infrastructure as adequate and had high hand hygiene compliance. The statistical test yielded a p-value of 0.0006. Therefore, it can be concluded that there is a significant relationship between perceptions of facilities and infrastructure and hand hygiene compliance. The analysis also yielded an OR value of 20.222, meaning that the facilities and infrastructure variable has a tendency to increase hand hygiene compliance by 20 times.

Relationship between Work Motivation and Hand Hygiene Compliance

The results of the analysis of the relationship between work motivation and hand hygiene compliance found that 5 subjects (3%) had low motivation and low hand hygiene compliance. Then, 91 (91%) people felt highly motivated and had high hand hygiene compliance. The statistical test yielded a p-value of 0.000. Therefore, it can be concluded that there is a significant relationship between motivation and hand hygiene compliance. The analysis also yielded an OR value of 13.420, meaning that the motivation variable has a tendency to increase hand hygiene compliance by 13 times.

Relationship between Workload and Hand Hygiene Compliance

The analysis of the relationship between workload and hand hygiene compliance found that 5 subjects (4%) had low motivation and low hand hygiene compliance. There were 5 respondents (5%) with low workload and low compliance. Then, 90 (91%) people felt they had a high workload and high hand hygiene compliance. The statistical test yielded a p-value of 0.012. Therefore, it can be concluded that there is a significant relationship between workload and hand hygiene compliance. The analysis also yielded an OR value of 7.213, meaning that the motivation variable has a tendency to increase hand hygiene compliance by 7 times.

Multivariate Analysis

The results of the multivariate analysis showed that the workload aspect variable had a p-value of 0.092, the hand hygiene knowledge variable had a p-value of 0.007, the facilities and infrastructure variable had a p-value of 0.091, and the motivation variable had a p-value of 0.082. From the results of the multivariate analysis, it can be concluded that the independent variable that has the most dominant influence on hand hygiene compliance is hand hygiene knowledge.

DISCUSSION

The Relationship between Hand Hygiene Knowledge and Hand Hygiene Compliance among Healthcare Workers at *Mitra Medika* Hospital

The analysis also yielded an OR value of 18.800, meaning that hand hygiene knowledge can increase hand hygiene compliance by 18 times. The statistical test resulted in a p-value of 0.00.

This finding reinforces previous research that found an increase in hand hygiene compliance occurs alongside a statistically significant increase in knowledge scores. Therefore, we conclude that role model training has the greatest impact on improving hand hygiene (14).

The higher the knowledge level, the more healthcare workers will be aware of the need to prevent and control nosocomial infections. Factors influencing healthcare workers' knowledge include age, gender, educational level, and years of experience (15).

In essence, healthcare workers must have sufficient education and knowledge, as this is important in shaping their actions when providing patient care, particularly in terms of nosocomial infection prevention. Since healthcare workers play a crucial role in infection prevention, it is known that they spend hours interacting with patients, who can be the primary source of nosocomial infection exposure (16)

The Relationship between Facilities and Infrastructure and Hand Hygiene Compliance among Healthcare Workers at *Mitra Medika* Hospital

The analysis yielded an OR value of 20.222, indicating that the facilities and infrastructure variable has a tendency to increase hand hygiene compliance by 20 times. The statistical test yielded a p-value of 0.0006. Therefore, it can be concluded that there is a significant relationship between perceptions of facilities and infrastructure and hand hygiene compliance.

These findings are consistent with previous studies that indicate a significant relationship between hand washing facilities and hand washing compliance. Easy access to hand hygiene facilities and infrastructure is very important because it can optimally increase compliance and achieve the established standards (17).

Hand hygiene facilities and infrastructure begin with the system. The availability of adequate resources will influence employees to perform hand washing at the five key moments for hand washing, as these resources can be utilized effectively and will contribute to better health outcomes. This will make individuals feel responsible for their health and utilize the facilities appropriately (18).

Training and education are also necessary. Hand washing training for healthcare workers differs from hand washing training for the general public in terms of emphasizing the importance of breaking the chain of infection transmission and following hand washing procedures in accordance with WHO standards (19)

The Relationship between Work Motivation and Hand Hygiene Compliance among Healthcare Workers at *Mitra Medika* Hospital

The statistical test yielded a p-value of 0.000. Therefore, it can be concluded that there is a significant relationship between motivation and hand hygiene compliance. The analysis also yielded an OR value of 13.420, meaning that the motivation variable has a tendency to increase hand hygiene compliance by 13 times.

The above results are consistent with previous studies, both in Indonesia and abroad (20,21). Motivation is a significant predictor of hand hygiene behavior, consistent with previous findings. Many social cognition theories suggest that effective behavioral change is primarily driven by motivated individuals. Hand hygiene scores improved after the

motivational interview intervention. Motivation not only directly influences hand hygiene behavior but also mediates the relationship between capacity and hand hygiene behavior, as well as opportunity and hand hygiene behavior (22).

The Relationship between Workload and Hand Hygiene Compliance among Healthcare Workers at *Mitra Medika* Hospital

The statistical test yielded a p-value of 0.012. Therefore, it can be concluded that there is a significant relationship between workload and hand hygiene compliance. Furthermore, the analysis yielded an OR value of 7.213, indicating that the motivation variable has a tendency to increase hand hygiene compliance by 7 times.

There are differences in the results of studies examining the relationship between workload and hand hygiene compliance. Theoretically and according to some findings, the higher the workload, the lower the hand hygiene compliance. Hand hygiene compliance decreases significantly when indications exceed 30 per hour. At higher workloads, the number of healthcare worker types involved and the proportion of hand hygiene indications that are the responsibility of doctors and other healthcare workers increase. Thus, the complexity of care and risks to patients may increase with workload (23).

However, some other studies have found that workload and hand hygiene compliance are positively correlated. The higher the workload, the higher the hand hygiene compliance (24,25). The assumption is that hand hygiene compliance is part of the workload that requires physical effort through hand washing, mental effort through planning and control, time constraints, and frustration from work-related stress. High workload also means a high number of indications, so at first glance, it may appear that hand hygiene compliance is high. Additionally, the hand hygiene compliance questionnaire in this study is self-reported, so the perception of staff who have complied must be compared with field observation data through detailed individual reports.

Culture is also assumed to play a role in the relationship between workload and hand hygiene compliance. The workload of healthcare workers is influenced by cultural factors that are largely unmeasurable in a hospital setting. These factors indicate ‘how we do things here’. Organizational climate affects nurses' workload due to inter-professional relationships, clinical governance, workplace support, non-care tasks, organizational structure and organization, job redesign, workflow, and diversity in healthcare worker roles. Healthcare workers report that they bear the burden of constant pressure to complete certain tasks within a specific timeframe, thereby increasing role burden. One example is hand hygiene compliance. In short, the high workload and hand hygiene compliance are due to healthcare workers' perception that hand hygiene is burdensome, yet they continue to perform it because they understand its importance for themselves and patients (26), especially given the high level of knowledge found in this study.

Multivariate Analysis

From the results of the multivariate analysis, it can be concluded that the most dominant independent variable influencing hand hygiene compliance is knowledge of hand hygiene.

Knowledge is one of the most important indicators in implementing hand washing compliance (7). Healthcare workers must have competent knowledge and skills in performing their roles. Previous research found that universal hand washing awareness begins with understanding and improving knowledge about hand washing guidelines. The presence of infection prevention and control guidelines in hospitals, developed in accordance with applicable Standard Operating Procedures (SOPs), is expected to enhance understanding, as understanding influences attitudes, and attitudes determine actual behavior (27).

The availability of facilities and infrastructure is crucial. The WHO has established minimum standards for facilities that must be available in hospitals through the guidelines they have developed ((1)). In Indonesia, several studies have noted a lack of facilities for hand hygiene. However, hand hygiene practices can only be implemented if adequate facilities are available (20).

Motivation is a highly dynamic mental construct with many facets encompassing a range of bio-psycho-social dimensions (emotions, life experiences, and personal relationships) that activate, direct, and support human behavior. As an integral part of the relationship between the individual and the organization, workplace motivation can be seen as a driving force that encourages individuals to engage diligently in their work, arising from the manifestation of a need or a problem, which generates the urge to resolve it (28).

Hospital professions fall into the category of mentally demanding jobs due to high workloads and varying job requirements that may be caused by large numbers of clients, high workloads, shift work, and a shortage of healthcare workers. Workers' health improves by preventing and reducing stressors in the hospital workplace, and as a result, their efficiency and effectiveness in providing services increases (29).

CONCLUSION

The conclusions of this study are as follows:

a. The majority of healthcare workers at *Mitra Medika* Batanghari Hospital have high levels of knowledge, perception of facilities and infrastructure, workload, and hand hygiene compliance, as well as relatively high work motivation.

b. There is a significant relationship between knowledge of hand hygiene, facilities and infrastructure, work motivation, and workload with hand hygiene compliance among healthcare workers at *Mitra Medika Batanghari* Hospital.

RECOMMENDATIONS

Based on the research findings and conclusions, the following recommendations are made to improve knowledge of hand hygiene, hand hygiene facilities and infrastructure, work motivation, workload, and hand hygiene compliance among healthcare workers at *Mitra Medika Batanghari* Hospital.

a. Management of *Mitra Medika Batanghari* Hospital

1. The need to enhance and update knowledge through hand hygiene training covering topics such as nosocomial infections, the benefits of hand washing, and the five moments of hand hygiene.

2. The hospital administration should provide adequate hand hygiene facilities and infrastructure at *Mitra Medika Batanghari* Hospital.

3. Conduct an annual workload analysis to evaluate the workload at *Mitra Medika Batanghari* Hospital.

4. The hospital management should enhance motivation by organizing hand hygiene compliance competitions, then providing incentives for high compliance and penalties for low compliance.

b. Hospital Staff and Personnel at *Mitra Medika Batanghari* Hospital

1. Participate in hand hygiene training to enhance knowledge.

2. Provide input on perceived workload during workload analysis.

3. Actively participate in hand hygiene competitions to receive incentives.

c. Other Researchers

1. Further research is needed on other factors that may be related to hand hygiene compliance.

2. Conduct research on other variables that may influence hand hygiene compliance, such as organizational culture or work culture.

3. Implement a pilot project to help improve hand hygiene knowledge, hand hygiene facilities and infrastructure, work motivation, workload, and hand hygiene compliance among healthcare workers at *Mitra Medika Batanghari* Hospital.

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