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The Relationship Between Health Workers' Perceptions of OSH and Compliance with OSH Protocols in Community Health Centers

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ABSTRACT

Community health centers in Indonesia face high occupational risks as the frontline of health care. From January through May 2024, there were 162,327 reported cases of workplace accidents, while work-related illnesses were fewer but continue to rise. In Lumajang Regency, more than 50% of potential occupational safety and health hazards at the Sukodono Community Health Center are classified as high to very high risk, and at the Rogotrunan Community Health Center, patient safety incidents such as medical record errors and near misses involving needle sticks were identified. This study analyzed health workers' perceptions of Occupational Safety and Health (OSH) knowledge, attitudes, and support, and their influence on compliance with OSH (Occupational Safety and Health) protocols in Lumajang Regency. A quantitative study with a cross-sectional design was conducted at the Sukodono and Rogotrunan Community Health Centers with 84 respondents using simple random sampling. The research instruments consisted of questionnaires and interviews. Univariate and bivariate analyses using the chi-square test showed no significant association between knowledge and compliance ($p=0.501$); however, there were significant associations between attitude ($p=0.000$) and institutional support ($p=0.000$) and compliance with the occupational safety and health (K3) protocol. These findings confirm that compliance is more strongly influenced by attitude and institutional support than by knowledge alone.

Keywords : Occupational safety; Compliance; Health workers

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INTRODUCTION

The Occupational Safety and Health Management System (SMK3) in Health Care Facilities is part of the overall management system in Health Care Facilities that aims to control risks related to work activities, in order to create a healthy, safe, and comfortable working environment (1). Internationally, healthcare workers face a high risk of workplace accidents and occupational diseases. The WHO emphasizes that healthcare workers in developing countries are more vulnerable due to limited resources, a lack of training, and weak occupational safety and health management systems (2). Studies in Ghana and India show that although healthcare workers' knowledge of occupational safety and health is quite high, compliance with the use of Personal Protective Equipment (PPE) remains low due to attitudinal factors and limited institutional support (3,4). This underscores that compliance is determined not only by knowledge but also by behavioral factors and systemic support.

Indonesia has 116,818 health facilities, with community health centers far outnumbering hospitals (5). As the pillar of primary care, Puskesmas face various Occupational Health and Safety (OHS) risks, physical, biological, chemical, ergonomic, and psychological, that can cause work accidents and occupational diseases. From January through December 2024, there were 462,241 reported cases of workplace accidents in Indonesia (6). The results of the recapitulation of occupational disease data are not as numerous as reported work accidents. There were 93 cases of occupational diseases recorded between 2019 and 2023, with a significant increase from 2019 to 2020 (1).

In Lumajang Regency, incidents at the Sukodono and Rogotruman Puskesmas show the high potential for danger and low compliance with SOPs, exacerbated by a lack of OSH training and certification. National data recorded 162,327 work accidents from January to May 2024, with East Java as one of the provinces with the highest number (3). Lumajang also recorded high rates of tuberculosis, HIV/AIDS, and dengue fever, which have the potential to become occupational diseases. The high incidence of tuberculosis, HIV/AIDS, and dengue fever in this region also poses a potential risk of work-related illnesses for healthcare workers. The high incidence of tuberculosis (84.95%), HIV/AIDS (480 cases), and the Case Fatality Rate (CFR) for dengue fever in this region (1.6%) also pose a potential risk of work-related illnesses for healthcare workers (7). Research shows that healthcare workers generally have a positive attitude toward the use of PPE, but compliance is influenced by limited facilities and working conditions (4). Another study found that personal factors such as fatigue and low knowledge are associated with unsafe behaviors, including neglecting safety procedures and PPE use (8). Previous studies have shown that although health workers' knowledge of OSH is quite high, compliance practices remain low, influenced by attitudes and workplace support.

This study focuses on the perceptions of healthcare workers at community health centers, which have received less attention than hospitals. By analyzing the relationship between knowledge, attitudes, and support for compliance with Occupational Safety and Health (OSH) protocols, this study offers a new contribution toward strengthening the implementation of OSH in primary healthcare services.

The findings are expected to be relevant not only to Indonesia but also to provide insights for other countries with similar conditions, where limited resources and institutional support are key factors influencing healthcare workers' compliance with occupational safety protocols (9,10).

METHOD

This analytical observational study used a cross-sectional design. Data were collected from Sukodono and Rogotrunan puskesmas (July-August 2025) with 84 respondents selected by simple random sampling. The research instruments consisted of questionnaires, interviews, and observations. The questionnaire was developed based on national Occupational Safety and Health (OSH) guidelines and WHO guidelines, pilot-tested to ensure validity and reliability, and covered the variables of knowledge, attitudes, support, and compliance. Respondents were recruited based on the following inclusion criteria; active healthcare workers for at least 6 months, willing to participate, and having signed an informed consent form. Data were collected through assisted questionnaire completion, semi-structured interviews, and direct observation of OSH practices. Analyses were performed using univariate and bivariate methods with the Chi-square test at a 95% significance level. Ethical clearance was obtained from the Ethics Committee of the Surabaya Ministry of Health Polytechnic (Poltekkes Kemenkes Surabaya) with Number EA/3837/KEPK-Poltekkes_Sby/V/2025.

RESULTS

Based on the data processing results, most respondents were over 40 years old, namely 42 people (48.8%) indicates a sufficiently long work history that could influence perceptions of occupational safety and health. Productive age is considered to have a positive contribution to performance, although maturity in the implementation of OSH tends to increase with age (11). As they age, workers tend to accumulate more work experience and skills. This condition indicates that age is a potentially significant variable in influencing research results, especially those related to competence and work performance. The majority of respondents were women (84.5%), with midwives being the most common profession (34.5%). Female health workers bear a double burden as medical professionals and mothers and wives, requiring them to be multitasking in managing their careers and households. Research by (12) shows that women are more alert to risks and tend to be more anxious, while men are more likely to experience workplace accidents because they assess risks as lower and are more confident in facing danger. Women have better cognitive abilities and accuracy than men, especially in processing information and responding to work situations (11). The majority hold a diploma (63.1%). A study by (13) assessed the perception of occupational safety risks among 45 construction workers, who were generally aged 20-29 years old and had a high school/vocational school education background. The findings showed that accident experience and age significantly influenced risk perception, with workers who had experienced accidents tending to be more vigilant.

Research (9) reveals that workers' perceptions of safety are greatly influenced by work experience, involvement in training, and internal communication. Nearly all respondents (98.8%) had

never participated in Occupational Safety and Health (OSH) training; as a result, their knowledge tends to be theoretical and has not yet been integrated into their daily work practices, indicating the need for capacity building through training in this area. Healthcare workers' perceptions regarding knowledge, attitudes, support, and compliance related to Occupational Safety and Health (OSH) are outlined in the following table of research findings.

Table 1. Distribution of Knowledge Levels Among Health Workers

Knowledge	Frequency (n)	Percentage (%)
Good	42	50.00
Sufficient	39	46.40
Insufficient	3	3.6
Total	84	100.00

The majority of respondents had good (50%) or adequate (46.4%) knowledge; only 3.6% had insufficient knowledge.

Table 2. Distribution of Attitude Levels Among Health Workers

Attitude	Frequency (n)	Percentage (%)
Positive	37	44.00
Negative	47	56.00
Total	84	100.00

Respondents' attitudes were more negative (56%) than positive (44%).

Table 3. Distribution of support for OSH (Occupational Safety and Health) management system

Support	Frequency (n)	Percentage (%)
Positive	22	26.20
Negative	62	73.80
Total	84	100.00

Most respondents rated management's support for occupational safety and health as still negative (73.8%).

Table 4. Compliance with OSH (Occupational Safety and Health) protocols

Compliance	Frequency (n)	Percentage (%)
Good	31	36.90
Insufficient	53	63.10
Total	84	100.00

The majority of healthcare workers do not comply with Occupational Safety and Health (OSH) protocols (63.1%), while only 36.9% do comply. Compliance indicators include the frequency of Personal Protective Equipment (PPE) use, handwashing practices, implementation of OSH programs, and reporting of OSH violations.

Table 5. Chi-square analysis of knowledge, attitudes, and support vs compliance

Independent Variable	Dependent Variable	χ^2 Value	Df	p-value	Description
Knowledge	Compliance	1.380	2	0.501	Not significant
Attitude	Compliance	36.945	1	0.000	Significant
Support	Compliance	31.313	1	0.000	Significant

The chi-square test results show that there is no significant relationship between healthcare workers' perception of OSH (Occupational Safety and Health) knowledge and compliance with OSH (Occupational Safety and Health) protocols ($p = 0.501$). Conversely, there is a significant relationship between perception of attitude ($p = 0.000$) and support for Occupational Safety and Health Management System ($p = 0.000$) and compliance with OSH (Occupational Safety and Health) protocols. Although 50% of respondents had a good level of knowledge, compliance remained low. This confirms that the lack of occupational safety and health (OSH) training (98.8% had never participated) means that knowledge does not automatically translate into compliance. Instead, negative attitudes and low management support proved to be the dominant factors reducing compliance.

DISCUSSION

Health workers' knowledge of OSH (Occupational Safety and Health)

Most health workers have good knowledge of OSH, however, the results of the statistical test showed no significant association with compliance ($p=0.501$). Knowledge is an important foundation for implementing OSH in hospitals (14). At the community health center level, OSH knowledge also plays an important role, particularly in supporting promotional and preventive activities, given that community health centers function as primary health care facilities before patients are referred to hospitals for secondary care. This differs from several previous studies that reported a positive correlation between knowledge and OSH behavior.

The results of a study by (15) show a positive relationship between the knowledge and OSH (Occupational Safety and Health) behavior of health workers, where good knowledge is usually followed by appropriate behavior. The majority of workers have high knowledge due to a minimum education level of a three-year diploma and mature age, which influences their experience and understanding. This is in line with research results showing the relevance between respondents' knowledge, which is mostly good, and those over 40 years of age and with a diploma.

In addition, nearly all respondents (98.8%) had never participated in occupational safety and health (OSH) training, meaning that their knowledge was theoretical and had not been internalized into their work practices. Knowledge without practical training is insufficient to improve compliance; ongoing training is key to transforming knowledge into behavior that manifests as OSH compliance.

Health workers' attitudes towards OSH (Occupational Safety and Health)

Factors that influence OSH behavior include attitude and perception. Attitude was found to be significantly associated with compliance ($p=0.000$). Attitudes toward OSH reflect an individual's mental and emotional readiness to act in accordance with safety protocols (16). Attitude is a key factor in preventing workplace accidents and improving compliance with safety standards. Attitude itself is a form of behavioural tendency that can be learned and shaped through experience and social interaction (17). During the pandemic, research conducted in the biosafety level-2 laboratory at Dr. Slamet Garut Regional General Hospital showed that 57.9% of medical laboratory personnel (ATLM) did not comply with PPE use. Forms of non-compliance included not wearing face shields, not changing respiratory protection, and not disposing of gloves according to procedure. This non-compliance was influenced by factors such as comfort, the change in pandemic status to endemic, and a decrease in the number of specimens examined (18).

However, research findings indicate that most healthcare workers do not yet have a positive attitude toward OSH (Occupational Safety and Health). These findings confirm that a positive attitude is a stronger predictor of safe behavior than knowledge alone. Previous research in hospitals has shown similar results; however, in community health centers, negative attitudes are more prevalent (56%). Primary care characterized by high stress, heavy workloads, and a lack of occupational safety and health monitoring and supervision is a key factor contributing to the prevalence of negative attitudes. In addition, the lack of direct experience and limited social interaction related to the implementation of OSH in community health centers (puskesmas) are factors that hinder the development of attitudes that support OSH (Occupational Safety and Health). Changing the attitudes of healthcare workers through education, role modeling, and ongoing supervision is a key strategy for fostering a culture of safety in community health centers.

Health Worker Support for Occupational Safety and Health Management Systems

Management support was found to have a significant impact on compliance ($p=0.000$). The majority of respondents rated the support as still negative (73.8%), particularly regarding the provision of PPE, training, and supervision. These findings reinforce the understanding that, at the community health center level, support factors are more decisive for compliance than individual factors. In line with the research by (19), factors that hinder OSH (Occupational Safety and Health) practices include limited resources, lack of continuous training, and high workloads. Resources and continuous training support the achievement of the Occupational Safety and Health Management System in health centers.

The study by (20) shows that nurses face various occupational health risks, including biological exposure (tetanus, TB, gonorrhea, hepatitis, HIV, COVID-19), physical and mechanical hazards (sharp injuries, falls, wounds, MSDs), and psychosocial factors. Sharp injuries increase the risk of hepatitis B, C, and HIV infection. In developing regions, limited resources hinder the implementation of occupational safety and health practices. In addition, heavy workloads, long working hours, and lack of rest time cause stress among nurses. Support from management and coworkers, as a form of subjective

norms, plays an important role in shaping commitment to OSH (Occupational Safety and Health) policies. The active participation of OSH (Occupational Safety and Health) representatives in the policy formulation process also strengthens a sense of ownership and increases the effectiveness of its implementation. Their perceptions of policies are greatly influenced by individual attitudes, social pressure, and perceptions of behavioral control (3). Compliance among healthcare workers cannot be achieved without management support, as occupational safety and health policies must be accompanied by the provision of resources, training, and supervision.

Health workers' compliance with OSH (Occupational Safety and Health) protocols

Health workers' compliance with OSH (Occupational Safety and Health) protocols was assessed based on several indicators, including the frequency of personal protective equipment (PPE) use, hand washing, implementation of OSH (Occupational Safety and Health) programs, and reporting of OSH (Occupational Safety and Health) violations. The results showed that the majority of health workers were not compliant. In line with the research by (21), three main factors influence nurses' compliance in using Personal Protective Equipment (PPE), namely length of service, attitude, and training. Research by (22) shows that healthcare workers' compliance with 3M protocols and PPE use is quite high, but there are still cases of COVID-19 infection. Non-compliance with hand washing has been proven to directly increase risk, while mask use and physical distancing also have a significant but inconsistent effect. External factors such as the number of patients also affect compliance. Overall, adherence to 3M and PPE significantly affects the history of COVID-19 infection.

During the pandemic, research in the biosafety level-2 laboratory at Dr. Slamet Garut Regional General Hospital showed that 57.9% of medical laboratory personnel (ATLM) did not comply with PPE use. Forms of non-compliance included not wearing a face shield, not changing respiratory protection, and not disposing of gloves according to procedure. This non-compliance was influenced by factors such as comfort, the change in pandemic status to endemic, and a decrease in the number of specimens examined (18).

In this study, the low compliance among health workers at community health centers can be attributed to many factors, such as knowledge and attitudes toward OSH (Occupational Safety and Health) and support for OSH (Occupational Safety and Health) management systems. (19) mention that OSH (Occupational Safety and Health) practices are still not optimal even though many are aware of and agree on the importance of OSH (Occupational Safety and Health). The implementation of practices such as the use of PPE, incident reporting, and compliance with protocols is still inconsistent.

The relationship between healthcare workers' perceptions (knowledge) of OSH (Occupational Safety and Health) and their compliance with OSH (Occupational Safety and Health) protocols

The results of bivariate analysis using the chi-square test concluded that there was no relationship between healthcare workers' perception of OSH (Occupational Safety and Health) knowledge and their compliance with OSH (Occupational Safety and Health) protocols (p value 0.501). Safety behavior does not always correlate with the level of knowledge or risk awareness. Many workers continue to engage

in risky behavior even though they are aware of the dangers (23). Research by (19) in Ghana shows that even though health workers have good knowledge about OSH (Occupational Safety and Health), the practice of using PPE is still low. This confirms that knowledge is not always directly proportional to compliance.

(21) stated that training is an important means of transforming knowledge into practical skills. Without training, knowledge tends to be passive and does not have a direct impact on compliance. This is in line with the research results that the characteristics of respondents based on their OSH (Occupational Safety and Health) training history are still very minimal, reinforcing the insignificant relationship between knowledge about OSH (Occupational Safety and Health) and health workers' compliance with OSH (Occupational Safety and Health) protocols.

Furthermore, in the Theory of Planned Behaviour (TPB), attitudes and subjective norms have been proven to be more influential in shaping OSH (Occupational Safety and Health) intentions and behaviours than knowledge alone (3). SEM-based research shows that the physical environment and facility management act as mediators between knowledge and OSH (Occupational Safety and Health) behaviour. Without systemic support, knowledge alone is insufficient to drive compliance (9).

Safety behaviour does not always correlate with the level of knowledge or risk awareness. Many workers continue to engage in risky behaviour even though they are aware of the dangers (23). This study supports the findings of this study that knowledge alone is not sufficient to determine the compliance of health workers with OSH (Occupational Safety and Health) protocols. Without training and workplace support, knowledge tends to be passive and is not always translated into concrete actions (24).

The relationship between healthcare workers' perceptions (attitudes) of OSH (Occupational Safety and Health) and their compliance with OSH (Occupational Safety and Health) protocols

Contrary to the perception of knowledge, bivariate analysis with the chi-square test showed a relationship between healthcare workers' perceptions of OSH (Occupational Safety and Health) and their compliance with OSH (Occupational Safety and Health) protocols (p value 0.000). In line with the study (17), nurses who showed a positive attitude towards occupational safety tended to be more consistent in implementing OSH (Occupational Safety and Health) procedures than those who had a negative attitude. In the hospital context, a positive attitude towards occupational safety reflects a commitment to professionalism and self-protection as well as patient protection.

The attitude of nurses has also been proven to play an important role in the implementation of OSH (Occupational Safety and Health). Respondents who had a positive attitude toward occupational safety showed a higher level of OSH implementation (65.8%) compared to those who had a negative attitude (15.8%). A positive attitude reflects mental and emotional readiness to act in accordance with safety standards, even though the attitude itself is a form of internal reaction that is not necessarily immediately visible in overt behaviour (14). Research by (25) in the radiology unit of Dr. Saiful Anwar Regional General Hospital shows that radiographers comply with wearing PPE to protect themselves

from radiation exposure, despite facing obstacles in terms of comfort and efficiency. Awareness of long-term risks encourages compliance, while regular training, safety SOPs, and radiation protection policies have proven effective in improving discipline and work safety. Other studies have also revealed that nurses' attitudes toward occupational safety have a significant influence on PPE compliance. Nurses with positive attitudes are more likely to comply with safety protocols. Research by Handayani et al. and Susilawati et al. supports these findings, showing that good attitudes reflect a commitment to safe service (21).

(5) explain that the better the knowledge and positive attitude towards the importance of using PPE, the more disciplined and compliant health workers are in wearing it for their own safety. However, the findings in this study indicate that the attitudes of health workers in community health centers tend to be negative about OSH (Occupational Safety and Health), and this has a significant relationship with compliance with OSH (Occupational Safety and Health) protocols. One relevant indicator of this compliance is the frequency of PPE use, which shows a correlation between attitude and behaviour as described in previous studies. Research in South India (2012–2022) recorded 163 cases of needle stick injuries among healthcare workers, mainly doctors and nurses, with the majority of victims aged 20–30 years. Most incidents occurred in wards and were caused by hollow needles. The trend shows a peak in cases in 2013 and 2017, which declined after training but then increased again. The findings emphasize the importance of ongoing training and the use of PPE at all levels of healthcare (26).

The attitudes of health workers towards OSH (Occupational Safety and Health) at health centers reflect their commitment to the implementation of OSH policies and are a tangible manifestation of professional ethics that guarantee the safety and sustainability of services. When perceptions of OSH (Occupational Safety and Health) are negative, this can reduce the level of compliance with safety protocols that should be implemented. As a result, OSH (Occupational Safety and Health) policies are not implemented optimally, so that various OSH (Occupational Safety and Health) programs are not running effectively. This condition increases the risk of occupational accidents and work-related illnesses, and hinders the achievement of patient safety principles, considering that OSH (Occupational Safety and Health) and patient safety are two interrelated and inseparable aspects in healthcare practice.

The relationship between healthcare workers' perceptions (support) of the Occupational Safety and Health Management System and their compliance with OSH (Occupational Safety and Health) protocols

The results of bivariate analysis using the chi-square test showed a relationship between healthcare workers' perceptions of the Occupational Safety and Health Management System and their compliance with OSH (Occupational Safety and Health) protocols (p value 0.000). This is in line with the research by (27), which explains that good OSH (Occupational Safety and Health) implementation, such as providing PPE and training, has been proven to reduce accident rates and increase motivation and job satisfaction. This is part of healthcare workers' support for the Occupational Safety and Health Management System and supports the research findings on the relationship between healthcare workers'

support for the Occupational Safety and Health Management System and compliance with OSH protocols.

The study by (28) found that the level of occupational safety at Razi Teaching Hospital and Mehr Private Hospital in Ahvaz, Iran, is still unacceptable and needs to be improved immediately. The highest risk in both hospitals is biological hazards, with additional ergonomic risks at Mehr Hospital. This study emphasizes the importance of risk management, educational strategies, and managerial attention to improve service quality and safety indices, where Razi Hospital's HOSHRA score is slightly higher than Mehr Hospital's. Other studies have highlighted the implementation of OSH (Occupational Safety and Health) programs in various hospitals, showing success in several aspects, but there are still shortcomings, such as a lack of facilities, human resources, and training. Innovations and different approaches have been applied to improve occupational safety, including risk management, socialization, and the use of information technology. Evaluations show that even though the program is running, many hospitals face challenges in optimizing its implementation, such as a lack of equipment, capital, and supervision (29).

In this study, healthcare workers' perceptions of the Occupational Safety and Health Management System were examined from the managerial and OSH (Occupational Safety and Health) policy aspects implemented in community health centers. These two aspects cover the entire of the Occupational Safety and Health Management System cycle, from policy formulation, planning, implementation, monitoring and evaluation, to review and performance improvement. In line with the research by (23), it is explained that good OSH (Occupational Safety and Health) implementation, such as providing PPE and training, has been proven to reduce accident rates and increase motivation and job satisfaction. The OSH (Occupational Safety and Health) program in hospitals has shown positive results thanks to support in the form of risk management innovations, socialization, and the use of information technology. However, optimization of implementation still faces challenges due to limitations in facilities, human resources, capital, and supervision, so these supporting factors need to be continuously strengthened in order to achieve more equitable program success (29)

Research by (29) shows that the implementation of K3 programs in hospitals has brought some success, but is still hampered by limitations in facilities, human resources, and training. Efforts to improve have been made through innovations such as risk management, socialization, and the use of information technology. Although the program is running, optimization is still hampered by a lack of equipment, capital, and supervision. Thus, the results of this study are in line with previous studies which show that health workers' support for the Occupational Safety and Health Management System is significantly related to health workers' compliance with OSH (Occupational Safety and Health) protocols.

CONCLUSIONS AND RECOMMENDATIONS

This study concludes that healthcare workers' compliance with occupational safety and health (OSH) protocols at community health centers is influenced more by attitudes and institutional support

than by knowledge. Although most respondents had good knowledge, compliance remained low because nearly all of them had never attended OSH training, meaning that their knowledge had not been internalized into their work practices. Conversely, negative attitudes and a lack of managerial support proved to be the dominant factors reducing compliance. These findings offer a new perspective in the context of primary care, expanding the literature which previously focused primarily on hospitals and affirming that strategies to improve OSH compliance at community health centers must be directed toward changing attitudes and strengthening managerial support. Therefore, it is recommended that community health centers conduct regular and ongoing occupational safety and health (OSH) training, reinforce positive attitudes among health workers through outreach and supervision, and enhance management support by providing Personal Protective Equipment (PPE), implementing OSH policies, and establishing a consistent monitoring system. Community health center directors must also lead by example in implementing OSH measures, so that a culture of safety can be sustainably fostered. The results of this study can serve as a basis for the Department of Health to strengthen OSH regulations in primary care, so that workplace safety truly becomes an integral part of community health center governance and not merely an administrative obligation.

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