

## Knowledge and Attitude on Personal Protective Equipment (PPE) Compliance of Laboratory Staff among RSUD Bangil In 2025

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### ABSTRACT

Personal Protective Equipment (PPE) plays a vital role in protecting laboratory personnel from exposure to harmful substances and occupational hazards. Nevertheless, compliance with PPE usage among laboratory workers remains below the standard. This study aims to analyse the association between knowledge and attitudes toward adherence to PPE practices among laboratory staff at Bangil Regional General Hospital. A quantitative method with a cross-sectional approach was applied, involving all 24 laboratory staff members through total sampling. Data on knowledge and attitude were gathered via questionnaires, while compliance was assessed through direct observation. Univariate and bivariate analyses were conducted using the Chi-Square and Spearman correlation tests. Findings indicated that the majority of participants had good knowledge (75%), whereas only half of them (50%) consistently complied with PPE use. Moreover, most respondents exhibited negative attitudes toward PPE (54.2%). The bivariate analysis revealed significant relationships between knowledge and compliance ( $p = 0.018$ ) and between attitude and compliance ( $p = 0.004$ ). In summary, knowledge and attitude significantly influence PPE compliance. Enhanced knowledge and positive attitudes are associated with better adherence to safety practices, highlighting the importance of continuous education and awareness programs to strengthen occupational safety in laboratory settings.

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### INTRODUCTION

Occupational Safety and Health (OHS) represent a critical component of every workplace, particularly within health laboratories where employees face frequent exposure to infectious materials and chemical hazards. The consistent use of Personal Protective Equipment (PPE) serves as a fundamental preventive measure to minimize incidents such as contamination or contact with potentially infectious biological materials, which may pose health risks to laboratory personnel. Non-compliance in PPE use can increase the likelihood of occupational accidents and adversely affect both individual safety and institutional performance (Fairyo & Wahyuningsih, 2018).

Hospitals are among the most hazardous work environments due to their complex activities involving biological, physical, and chemical risks. The Hospital Occupational Safety and Health (K3RS) program is designed to ensure the safety of staff, patients, and visitors through accident prevention and control of occupational diseases (PERMENKES RI, 2016). Laboratories, as key operational units in hospitals, face higher exposure risks compared to other departments due to their daily interaction with hazardous substances (Emda, 2017). According to Law No. 09 of 2016, PPE refers to equipment designed to

protect individuals by isolating part or all of the body from potential workplace hazards. Therefore, strict adherence to PPE use is essential to maintaining a safe and healthy work environment.

Data from the International Labour Organization (ILO) reveal that approximately 2.78 million people die annually due to occupational injuries and work-related diseases. In Indonesia, the Ministry of Manpower recorded 157,313 occupational accident cases in 2022, with more than 15% occurring in healthcare facilities. Specifically, in East Java, the Provincial Health Office reported 1,254 cases in 2023, of which nearly 30% involved laboratory workers who failed to use PPE according to standard procedures. These findings emphasize the persistent issue of poor compliance with PPE use among healthcare workers.

Bangil Regional General Hospital (RSUD Bangil) is a type B hospital owned by the Pasuruan Regency Government and serves as a referral facility in the region. Based on occupational safety reports, PPE-related incidents are still recorded annually in the hospital's laboratory unit. Although the hospital has implemented PPE standards and established Standard Operating Procedures (SOPs) in accordance with Ministry of Health regulations, these guidelines are not consistently displayed or socialized among staff. In most cases, socialization only occurs before hospital accreditation, potentially reducing awareness and compliance.

Preliminary observations also revealed discrepancies between actual PPE use and existing SOPs. Several employees admitted to occasional non-compliance due to discomfort or underestimation of the importance of PPE. These behaviors are likely influenced by personal factors, such as the individual's level of knowledge and attitude toward occupational safety practices. Hence, this study seeks to examine the relationship between knowledge and attitudes of laboratory personnel and their compliance with PPE use at RSUD Bangil.

## METHODS

This study employed a quantitative non-experimental design using a cross-sectional approach to determine the relationship between laboratory personnel's knowledge and attitudes and their compliance with Personal Protective Equipment (PPE) use. The research was conducted at Bangil Regional General Hospital (RSUD Bangil). The population consisted of all laboratory staff working at the hospital, with a total sampling technique applied to include all 24 respondents. Primary data were collected through a structured questionnaire measuring two independent variables—knowledge and attitude—and one dependent variable, PPE compliance. Compliance data were obtained through direct observation to assess adherence to established safety protocols. Questionnaires were administered to gather respondents' demographic information and their understanding and perception of PPE usage. Observations were performed during routine laboratory activities to objectively measure the consistency of PPE use according to Standard Operating Procedures (SOPs). Data analysis included univariate and bivariate methods. Univariate analysis described the frequency and percentage distribution of each variable, while bivariate analysis assessed correlations between knowledge, attitude, and compliance. The Chi-Square test was used to determine categorical associations, and the Spearman Rank Correlation test was applied to measure the strength and direction of relationships between variables.

## RESULTS

Table 1 Respondent Characteristics of laboratory health workers at Bangil Regional Hospital

Characteristic	Category	n	%
Gender	Female	17	70.8%
	Male	7	29.2%
Age (years)	< 30	13	54.2%
	30–40	7	29.2%
	> 40	4	16.7%
Length of Work	< 5 years	14	58.3%
	5–10 years	6	25.0%
	> 10 years	4	16.7%

Characteristic	Category	n	%
Education Level	D3 (Diploma)	15	62.5%
	D4 (Applied Bachelor of Health Analyst)	9	37.5%

According to the table above show that most respondents were female (70.8%), while males was 29.2%. The majority of participants were under 30 years old (54.2%) and had worked for less than five years (58.3%). Regarding education, most respondents held a Diploma degree (62.5%), and the rest (37.5%) had completed an Applied Bachelor of Health Analyst program.

Table 2 Distribution of Knowledge Variables on the Use of Personal Protective Equipment

No.	Knowledge Variable	Frequency (N)	Percentage (%)
1	Good	18	75%
2	Enough	1	4,2%
3	Not enough	5	20,8%
	Total	24	100%

Based on table 2, it can be seen that the frequency of distribution of respondents based on their level of knowledge of PPE use among laboratory staff at Bangil Regional Hospital was categorized as good with 18 respondents (75%), sufficient knowledge with 1 respondent (4.2%), and poor knowledge with 5 respondents (20.8%). This indicates that most respondents already have sufficient understanding of the use of personal protective equipment (PPE) in the laboratory, although there are still some that need to be improved.

Table 3 Distribution of Attitude Variables on the Use of Personal Protective Equipment

No.	Attitude Variables	Frequency (N)	Percentage (%)
1	Positive	11	45,8%
2	Negative	13	54,2%
	Total	24	100%

Based on Table 3, it can be seen that the frequency distribution of respondents based on attitudes towards the use of PPE among laboratory staff at Bangil Regional Hospital. Those with positive attitudes were 11 people (45.8%), while those with negative attitudes were 13 people (54.2%). This indicates that efforts are still needed to build positive attitudes towards the importance of using PPE when working in the laboratory.

Table 4 Distribution of PPE Use Compliance Variables

No.	Compliance Variable	Frequency (N)	Percentage (%)
1	Comply	12	50%
2	Not Compliant	12	50%
	Total	24	100%

Based on Table 4, it can be seen that the frequency distribution of respondents based on compliance with the use of PPE among laboratory staff at Bangil Regional Hospital were compliant, with 12 people (50%), while those who were not compliant were 12 people (50%). This indicates that the level of compliance of laboratory staff at Bangil Regional Hospital still needs to be improved.

## DISCUSSION

The findings of this study indicate that most laboratory workers possessed a good level of knowledge (75%), followed by a small proportion with fair (4.2%) and poor knowledge (20.8%). This suggests that while the majority of respondents understand the importance of PPE, some still require additional training and education.

According to Green's behavioral model (Notoatmodjo, 2007), knowledge serves as a predisposing factor that shapes health-related behaviors. Without sufficient understanding, individuals may lack motivation or awareness to engage in safe work practices. Similarly, Zahara et al. (2017) explain that knowledge provides the cognitive foundation necessary for evaluating the benefits and risks of a particular health action. When employees are equipped with appropriate knowledge, they are more likely to exhibit safe behaviors and comply with preventive measures, such as the consistent use of PPE.

Therefore, periodic training programs and continuous education are crucial to maintain awareness and reinforce safe behavior among laboratory personnel.

In terms of attitude, this study found that 54.2% of respondents demonstrated negative attitudes toward PPE, while only 45.8% expressed positive attitudes. A negative perception of PPE can influence the consistency of its use, as discomfort or inconvenience may discourage compliance. According to Azwar (2012), attitude formation involves three components: the cognitive (knowledge), affective (emotional response), and conative (behavioral intention). If one of these elements is weak, the overall attitude tends to become negative. This concept supports the notion that even well-informed workers may not always comply with PPE standards if their emotional or behavioral commitment is low.

Furthermore, Green's theory emphasizes that attitudes serve as a predisposing factor influencing behavior. Negative attitudes can manifest as unsafe practices, including partial or complete non-compliance with PPE guidelines (Notoatmodjo, 2007). In this study, negative attitudes were mainly related to the comfort of PPE use; many respondents stated that PPE was uncomfortable to wear for long periods. Such discomfort can affect compliance over time. Therefore, efforts to improve PPE comfort—such as selecting ergonomic materials or adjusting environmental conditions—are essential to promote a more positive attitude toward PPE usage.

The compliance rate observed in this study (50%) suggests that adherence to PPE guidelines among laboratory personnel remains insufficient. Some respondents did not use eye protection or head coverings consistently and failed to follow proper hand hygiene procedures before and after PPE use. These findings indicate that non-compliance is not solely due to individual factors but also involves organizational aspects such as supervision, SOP enforcement, and the adequacy of PPE supplies.

The Regulation of the Minister of Health of the Republic of Indonesia No. 70 of 2016 highlights PPE use as an integral component of occupational safety, especially in healthcare laboratories. Non-compliance can increase the likelihood of occupational injuries and disease exposure. According to Zahara et al. (2017), compliance is influenced by three categories of factors: (1) personal factors (knowledge and attitude), (2) environmental factors (availability, comfort, and workload), and (3) management-related factors (supervision and policy enforcement).

This research found significant relationships between knowledge and compliance ( $p = 0.018$ ;  $r = 0.436$ ) as well as between attitude and compliance ( $p = 0.004$ ;  $r = 0.585$ ). Both correlations were positive with moderate strength, indicating that improved knowledge and more favorable attitudes contribute to higher PPE compliance. However, a few respondents with positive attitudes were still non-compliant, and some with negative attitudes continued to comply. This outcome suggests that compliance is a multidimensional behavior affected by not only individual cognition but also organizational culture, leadership, and the availability of resources.

Azwar (2013) states that attitude development is shaped by personal experience, the influence of role models, and social norms within the workplace. Even with a positive personal attitude, compliance may remain low if the organizational environment does not reinforce safe behavior. Therefore, fostering a safety culture through consistent supervision, reinforcement, and reward systems is essential to sustain compliance. Supervisors and senior staff should act as role models, promoting PPE adherence and ensuring all staff members understand the importance of following safety standards.

In summary, improving PPE compliance requires an integrated approach that addresses both personal and environmental factors. Strengthening knowledge and attitudes through continuous education, providing comfortable and adequate PPE, and reinforcing supervision are critical to minimizing occupational hazards and building a culture of safety in laboratory environments.

## CONCLUSION

This study examined the relationship between the knowledge and attitudes of laboratory personnel and their compliance with the use of Personal Protective Equipment (PPE) at Bangil Regional General Hospital. The results revealed that most respondents demonstrated good knowledge (75%), yet a proportion still lacked sufficient understanding (20.8%). Additionally, negative attitudes toward PPE use were dominant (54.2%), highlighting the need to strengthen awareness and a sense of responsibility among laboratory workers.

Compliance with PPE use was evenly distributed, with half of the respondents adhering to proper procedures (50%) and the other half failing to comply (50%). Statistical analysis confirmed significant correlations between knowledge and compliance ( $p = 0.018$ ) and between attitude and

compliance ( $p = 0.004$ ). This indicates that both cognitive and affective factors play important roles in influencing safety behaviors.

Improving compliance with PPE standards requires continuous training programs, supportive workplace supervision, and management policies that encourage consistent safety practices. Enhancing knowledge and fostering positive attitudes through education and reinforcement will contribute to improved occupational safety culture within healthcare laboratories.

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