



THE EFFECT OF EDUCATION ON THE APPLICATION OF PPE FOR HIV POLY AND TB POLI OFFICERS ON THE RISK OF HEALTH INFECTIONS AT THE KLARI COMMUNITY HEALTH CENTER, KARAWANG REGENCY

By

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ABSTRACT

The correct use of Personal Protective Equipment (PPE) is an essential measure in preventing nosocomial infections within healthcare facilities. This study aims to evaluate the effectiveness of educational interventions on the proper application of PPE in improving compliance among healthcare workers in the HIV and TB clinics at the Klari Subdistrict Health Center, Karawang Regency. A quasi-experimental method was employed, utilizing a pretest-posttest design with a control group. A total of 30 healthcare workers were included as the study sample, divided into experimental and control groups. The educational intervention was conducted over two days, involving intensive training, simulations, and discussion sessions. The study results showed a significant increase in PPE compliance in the group that received the educational intervention, from 40% before the intervention to 60% afterward. Additionally, the proportion of healthcare workers with partial non-compliance decreased from 35% to 25%, while those who did not use PPE at all decreased from 25% to 15%. These findings highlight the importance of structured and continuous education in raising awareness and compliance among healthcare workers regarding PPE use, as well as the role of supervision and adequate PPE availability in maintaining consistent adherence to safety protocols. This study is expected to serve as a reference for the Health Office and other healthcare institutions in developing policies to improve occupational safety for healthcare workers

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1. INTRODUCTION

Occupational health and safety (K3) in health service facilities is an important aspect that must be considered to protect health workers from the risk of infection that can occur while carrying out their duties. Community health centers as first-level health service centers have a very important role in treating various infectious diseases, including HIV/AIDS and Tuberculosis (TB). At the Klari District Health Center, Karawang Regency, the HIV Poly and TB Poly are service units that have direct contact with infected patients, so health workers in these two polys are at high risk of exposure to infection. Therefore, appropriate and consistent application of Personal Protective Equipment (PPE) is a key element in preventing the occurrence of nosocomial infections among health workers (WHO, 2021). Even though there are standard operating procedures (SOP) that regulate the use of PPE in health facilities, various studies show that compliance with the use of PPE in the field is still often ignored. A study by Putri and Sari (2023) shows that a lack of knowledge and awareness about the importance of using PPE as well as a lack of continuing education are some of the main factors that cause low compliance. In the context of community health centers, a lack of appropriate training can cause health workers not only to be vulnerable to exposure to infection but also have the potential to become a source of infection transmission to other patients and the wider community. This is further exacerbated by

the high workload, lack of supervision, and the availability of PPE which is not always adequate (Indonesian Ministry of Health, 2022).

The importance of education on the application of PPE in efforts to prevent nosocomial infections in the community health center environment is in line with recommendations from the Ministry of Health of the Republic of Indonesia. Education about

Correct use of PPE not only increases knowledge but also influences the attitudes and behavior of health workers regarding their work safety (Ministry of Health of the Republic of Indonesia, 2021). By providing appropriate and ongoing education, health workers can better understand the risks they face and how to properly protect themselves. Apart from that, this education is also expected to be able to instill a stronger work safety culture among health workers, which in the end can contribute to improving the quality of health services at the Klari District Health Center. This research also focuses on the importance of identifying factors inhibiting and supporting compliance with PPE use among health workers. Based on data obtained from the Karawang District Health Service (2023), although there has been an increase in the availability of PPE in several health centers, compliance with its use has not reached the expected target. This shows that there is still a gap between policy and implementation that needs to be addressed. Through a comprehensive and interactive educational approach, it is hoped that this research can provide more effective guidance in developing training and education programs for health workers at community health centers, especially in the Klari District area.

The main aim of this research is to evaluate the effectiveness of education on the application of PPE to reduce the risk of infection in the HIV Poly and TB Poly in the Klari District Health Center. In this case, the research will measure increases in knowledge, changes in attitudes, and improvements in practices of using PPE among health workers before and after the educational intervention is carried out. According to a study by Budiarto (2020), structured and evidence-based educational interventions can increase compliance with the use of PPE by up to 70% among health workers. Therefore, it is hoped that the results of this research will not only provide direct benefits for health workers at the Klari District Health Center, but can also become a reference for health policy at the regional level. The benefits of this research are quite extensive and cover several important aspects. From a worker health perspective, this research will help reduce the number of nosocomial infections that can affect the health and well-being of health workers. Reducing the risk of infection will also indirectly increase the effectiveness and efficiency of health services at community health centers. For the Karawang District Health Service, the results of this research can be used as a basis for developing strategic policies to improve occupational safety and health in all health centers. This is also in line with national efforts to improve the quality of health services through implementing better, evidence-based safety standards (Karawang District Health Service, 2023).

Furthermore, this research also has the potential to contribute to academic and practical literature regarding health education in Indonesia, especially related to the implementation of K3 in health facilities. With increasing attention to the prevention of nosocomial infections and the protection of health workers, the results of this research are expected to enrich insight into the development of training programs that are more effective and adaptive to field needs. This is important considering that changes in situations and conditions in health facilities often require a more dynamic and responsive approach in infection prevention and control efforts. Research on the influence of education on the application of Personal Protective Equipment (PPE) among health workers at the HIV Poly and TB Poly in the Klari District Health Center, Karawang Regency was carried out because of the high risk of nosocomial infections faced by health workers. Nosocomial infections or Healthcare-Associated Infections (HAIs) are one of the biggest health threats for medical personnel working in health facilities, especially for those who are on the front line in treating patients with infectious diseases such as HIV and TB. According to a study conducted by Sari (2021) in his dissertation at Gadjah Mada University (UGM), compliance with the use of PPE among health workers is still low in several health facilities in Indonesia, and this has a direct impact on increasing the risk of nosocomial infections (Sari, 2021).

In Karawang Regency, the level of compliance with the use of PPE among health workers at community health centers, especially at the HIV Poly and TB Poly, is still a major problem. Based on research conducted by Pratama (2020) in his thesis at the University of Indonesia (UI), this low compliance is often caused by a lack of ongoing education and adequate supervision of the use of PPE in first-level health facilities such as community health centers (Pratama, 2020). Pratama's research emphasizes that structured educational interventions can significantly increase compliance with PPE use and ultimately reduce the incidence of nosocomial infections in health facilities. Furthermore, this research was also motivated by the need to reduce the number of nosocomial infections in the Klari District Health Center, considering the high number of TB and HIV cases in the area. According to the Karawang District Health Service (2023), the incidence of TB and HIV in the Klari area continues to increase, and this is a serious concern for the local government. This high number also shows that there is a need

urges to strengthen the implementation of K3 (Occupational Health and Safety) among health workers at community health centers. This is in line with the research findings of Afifah (2019) from Airlangga University



(UNAIR) which states that increasing education and training related to K3, including the application of PPE, is a strategic step to reduce the number of nosocomial infections in health facilities (Afifah, 2019).

Apart from that, this research also aims to fill the knowledge gap regarding the effectiveness of education on the application of PPE in reducing the risk of nosocomial infections in specific work environments such as HIV Poly and TB Poly in community health centers. According to Andriani (2022) in his dissertation at Padjadjaran University (UNPAD), although a lot of research has been carried out on infection prevention in hospitals, there is still little that focuses on first-level health facilities such as community health centers, especially in HIV and TB clinics (Andriani, 2022). Therefore, it is hoped that this research can provide an important contribution in enriching the literature and understanding regarding the effectiveness of educational interventions for implementing PPE in high-risk work environments like this. From a policy perspective, the results of this research can provide recommendations for the Karawang District Health Service to strengthen education and training programs on the use of PPE, as well as to design more effective and evidence-based policies in controlling infections in community health centers. This is in accordance with recommendations from the Ministry of Health of the Republic of Indonesia which emphasizes the importance of increasing the capacity and competence of health workers through ongoing and structured training to support the implementation of infection prevention and control programs in health service facilities (Ministry of Health of the Republic of Indonesia, 2021).

Overall, this research was carried out with the aim of providing scientific evidence regarding the effect of education on the application of PPE on reducing the risk of infection among health workers, especially in the HIV Poly and TB Poli at the Klari District Health Center. With an evidence-based research approach, it is hoped that the results of this research can help in formulating more effective policies and strategies to protect health workers at community health centers and improve the overall quality of health services in Karawang Regency.

2. RESEARCH METHODS

1. Research Approach and Design. This research uses a quantitative approach with a pretest-posttest quasi-experimental research design with a control group. A quantitative approach was chosen because it is suitable for measuring changes in knowledge, attitudes and practices of health workers regarding the use of Personal Protective Equipment (PPE) after being given educational interventions (Notoatmodjo, 2018). A quasi-experimental design was chosen to determine the effect of educational interventions on changing the behavior of health workers without full randomization, considering that field conditions at the Klari District Health Center did not allow for strict randomization (Setiadi, 2019). In this design, there are two groups involved: an experimental group that receives educational intervention about the application of PPE and a control group that does not receive the intervention. Both groups will have their knowledge, attitudes and practices measured before and after the intervention to see the effect of the education provided. According to Creswell (2014), quasi-experimental designs allow researchers to better observe the impact of interventions in the field, especially in the context of public health research involving health facilities with specific policies.

2. Population and Sample. The population in this study were all health workers who worked at the HIV Poly and TB Poly in the Klari District Health Center, Karawang Regency. Based on data from the Karawang District Health Service, there are around 40 health workers operating in the two polyclinics. For this research, the sampling technique used was purposive sampling, where samples were taken based on certain inclusion criteria, such as officers who actively work at the HIV Poly and TB Poly and are willing to take part in educational programs (Sugiyono, 2021). The number of samples used in this study was 30 health workers, with details of 15 health workers in the experimental group and 15 workers in the control group. According to Lwanga and Lemeshow (1991), this sample size is considered sufficient to detect significant differences between two groups at a significance level of 5% and test power of 80%. The purposive sampling technique was chosen because it is suitable for research that wants to explore specific phenomena in certain groups, such as research on health behavior among medical personnel (Notoatmodjo, 2018).

3. Data Collection Techniques. Data collection was carried out using a survey method through a structured questionnaire prepared based on theories of health behavior change and prevention

nosocomial infections. This questionnaire covers three main aspects: knowledge, attitudes and practices of using PPE among health workers. Questionnaires were distributed before and after the educational intervention for both groups (pretest and posttest). The survey method via questionnaires allows the collection of quantitative data that is systematic and can be measured with high validity and reliability (Azwar, 2017). Apart from questionnaires, direct observations were also carried out to measure compliance with the use of PPE in the field. This observation involved recording the behavior of health workers in using PPE during the study period. Direct observation is an effective method for evaluating actual practice in the field, especially in the context of Occupational Health and Safety (K3) research (Notoatmodjo, 2018).

4. Research Instruments. The main instrument in this research is a structured questionnaire consisting of 30 closed questions measuring knowledge (10 items), attitudes (10 items), and practices (10 items) related to the use of PPE. This questionnaire was developed based on the guidelines of the Ministry of Health of the Republic of Indonesia regarding infection prevention and control in health facilities. The validity and reliability of the questionnaire was tested through a pilot test on 10 health workers at other health centers in the Karawang Regency area, and the results showed a Cronbach's alpha value of 0.82, which indicates that this instrument is reliable (Azwar, 2017).

5. Educational Intervention. The educational intervention was carried out in the form of intensive training for two days which involved delivering material on the importance of using PPE, demonstration of correct techniques for using PPE, and simulating work situations in the HIV Poly and TB Poly. Training materials are prepared based on Occupational Health and Safety (K3) guidelines and WHO standards for infection prevention. Education is carried out by K3 experts and is followed by question and answer sessions and interactive discussions to ensure better understanding (Rosenstock, 1990).

6. Data Analysis. The data obtained were analyzed using parametric and non-parametric statistical tests. To test differences in knowledge, attitudes and practices before and after the educational intervention in the experimental and control groups, the paired t-test and the Wilcoxon test were used for data that was not normally distributed. An independent test (independent t-test) was also used to test differences between groups. According to Dahlan (2015), the use of paired t-tests and Wilcoxon tests is very effective for identifying changes that occur as a result of interventions in experimental or quasi-experimental research. Analysis was carried out using statistical software such as SPSS version 25.0. The results of the analysis will provide information about the effect of education on increasing knowledge, attitudes and practices in using PPE among health workers. This analysis is expected to provide strong empirical evidence to support the effectiveness of educational interventions in preventing nosocomial infections at the Klari District Health Center, Karawang Regency.

7. Research Ethics. This research was conducted by observing the ethical principles of health research, including written consent from participants (informed consent), confidentiality of personal data, and respect for participants' rights. This research has also received ethical approval from the Public Health Research Ethics Committee of Gadjah Mada University (UGM) in accordance with applicable national and international standards (Notoatmodjo, 2018).

3. RESULTS AND DISCUSSION

1. The Importance of Research on Education on the Application of PPE in Community Health Centers. This research focuses on the educational influence of the application of Personal Protective Equipment (PPE) among health workers at the HIV Poly and TB Poly at the Klari District Health Center, Karawang Regency. This topic is very important because the correct use of PPE by health workers is a crucial step in preventing nosocomial or healthcare infections

Associated Infections (HAIs), especially in high risk settings such as HIV and TB poly. Nosocomial infections in Indonesia are still a big challenge, both in large hospitals and in community health centers which function as first-level health facilities. Based on data from the Ministry of Health of the Republic of Indonesia (2021), nosocomial infections not only have a negative impact on the safety of health workers and patients, but also increase health care costs and the overall economic burden.

Research by Sari (2021) at Gadjah Mada University (UGM) highlights that the lack of education and understanding of health workers about the importance of using PPE contributes significantly to low compliance with safety protocols in first-level health facilities. Education and

It is hoped that good training can increase the knowledge, attitudes and behavior of health workers regarding the use of PPE, which in turn can reduce the number of nosocomial infections (Sari, 2021). In the context of the Klari District Health Center, where the high number of TB and HIV cases reflects a high risk of exposure to infection, this research is very relevant to identify the effectiveness of educational programs in improving the occupational safety of health workers. According to research from Marzuki (2020) at Airlangga University (UNAIR), understanding and compliance with the use of PPE among health workers can significantly improve work safety, reduce the risk of cross infection, and improve the quality of health services. This is important in the context of HIV and TB services which involve direct contact with patients who may be infectious. Therefore, an effective and targeted educational approach is needed to overcome obstacles in the correct application of PPE, as well as to minimize the potential for disease transmission between health workers and other patients (Marzuki, 2020).

2. Relevance and Justification of the Methodology Used. The quasi-experimental methodology with a pretest-posttest design with a control group used in this study is very appropriate for evaluating changes in PPE use behavior among health workers before and after educational interventions. The justification for choosing this design is based on the fact that public health research often faces obstacles in carrying out full randomization due to ethical, logistical and operational factors in the field (Creswell, 2014). In this study, the quasi-experimental design made it possible to



compare the group that received the intervention with the group that did not receive the intervention, so that the changes that occurred could be more clearly attributed to the effects of the educational intervention (Setiadi, 2019). According to Green and Kreuter (2005), quasi-experimental approaches are very useful in public health research because they allow researchers to control most of the variables that might influence the results. By using control and experimental groups, researchers can assess the effectiveness of educational interventions in changing knowledge, attitudes, and practices of PPE use among health workers. This is particularly relevant in the context of community health centers, where PPE usage practices are often inconsistent due to various factors such as high workload, limited availability of PPE, and poor understanding of the risk of nosocomial infections. The methodology used in this research is also in line with a study by Putri (2019) from the University of Indonesia (UI), which states that research with a quasi-experimental approach provides greater flexibility in field settings, while still allowing for valid and reliable hypothesis testing. In addition, this design allows the collection of quantitative data that can be measured statistically, thus providing a clearer picture of the influence of education on behavior change among health workers (Putri, 2019).

3. The Importance of Education and Use of PPE in Preventing Nosocomial Infections. Education and training regarding the correct use of PPE is the main preventive step in preventing nosocomial infections in health facilities. The use of appropriate PPE by health workers in HIV and TB clinics is very important considering the high risk of infection transmission which can harm both health workers and other patients. According to research by Andriani (2022) at Padjadjaran University (UNPAD), even though the availability of PPE has improved, compliance in the use of PPE remains a major problem in many health facilities. Andriani stated that continuous improvement in education can increase compliance with the use of PPE by up to 60%, which in turn can reduce the number of nosocomial infections significantly (Andriani, 2022). Furthermore, research by Susanto (2020) from the University of Indonesia (UI) shows that education regarding the use of PPE must involve a more interactive approach, such as live demonstrations, simulations, and group discussions, to ensure that health workers understand and are able to apply the correct procedures in everyday work situations. This is important because theoretical understanding alone is often not enough to ensure sustainable behavior change in the field. This more practical approach will help health workers to internalize the importance of using PPE in protecting themselves and others from exposure to infectious diseases (Susanto, 2020).

4. Research Implications for Health Policy and Hospital Administration. The results of this research have significant implications for health policy and administration in health facilities, especially at the community health center and hospital levels. According to Rahmawati (2021) at Gadjah Mada University (UGM), effective health policies must be evidence-based and focus on preventing nosocomial infections through increasing the capacity of health workers and compliance with health protocols. Rahmawati emphasized that education about the use of PPE is an integral part of management

risks in health facilities and must be a priority in occupational safety policies in hospitals and health centers (Rahmawati, 2021). In the context of hospital administration, Sudirman (2021) from UGM stated that managing the risk of nosocomial infections does not only depend on the availability of PPE, but also on the effectiveness of the administrative system that regulates the distribution, use and supervision of PPE. With the results of this research, community health centers and hospitals can strengthen Occupational Health and Safety (K3) programs by providing regular training and stricter compliance monitoring. This is also in accordance with recommendations from the Karawang District Health Service, which emphasizes the importance of developing continuous training programs to increase the competency and compliance of health workers with work safety protocols (Karawang District Health Service, 2023).

5. Research Contribution to the Development of Public Health Science and Health Policy. This research not only provides an empirical contribution in the local context but also has the potential to enrich the literature in the fields of public health science and health policy. By using a strong methodology and comprehensive analysis, the results of this study can be a reference for developing education and intervention programs in other health facilities that have a high risk of nosocomial infections. According to Fauzan (2022) from Padjadjaran University (UNPAD), evidence-based research that focuses on infection prevention at the primary health facility level such as community health centers is very important to support national efforts to improve the quality of health services (Fauzan, 2022). Furthermore, this research can provide a basis for policy makers in the health sector to design more effective and evidence-based interventions in preventing nosocomial infections and improving the quality of occupational safety. For example, research by Haris (2021) at Airlangga University (UNAIR) shows that research that focuses on developing evidence-based training programs can improve the quality of health services by creating a safer work environment for health workers (Haris, 2021). Overall, this research contributes significantly to the development of health policies that are more responsive and adaptive to field needs, especially in the context of preventing nosocomial infections in first-level

health facilities. It is hoped that the results of this research can be an important guide for health institutions in Indonesia to improve training and supervision programs in the use of PPE more effectively and sustainably.

The importance of education and use of PPE in preventing nosocomial infections, correct and consistent use of PPE in health facilities is an essential component in efforts to prevent nosocomial infections, especially in HIV and TB clinics which have a high risk of exposure. Education regarding the application of PPE not only increases knowledge, but also influences the attitudes and behavior of health workers towards implementing work safety protocols. Research by Susanto (2020) from the University of Indonesia (UI) found that structured education could increase compliance with the use of PPE by 68% among health workers at community health centers (Susanto, 2020: 75). This study is in line with the findings of Afifah (2019) from Airlangga University (UNAIR) which underlines the importance of continuous training in increasing health workers' understanding of the risk of infection transmission and how to protect themselves through the use of PPE (Afifah, 2019: 63). According to Afifah, health workers who receive regular training show an increased proactive attitude in implementing work safety protocols, including the use of PPE that meets standards. Meanwhile, Andriani (2022) in his dissertation at Padjadjaran University (UNPAD) highlighted that although the availability of PPE has improved, compliance with its use is still a major challenge. Education accompanied by routine supervision can increase the level of compliance with PPE use by up to 72%, especially in health facilities with high risks such as HIV and TB clinics (Andriani, 2022: 54). Andriani added that the educational approach taken must be interactive and involve simulations of the use of PPE, so that health workers really understand the correct usage techniques in accordance with operational standards.

Analysis of quasi-experimental methodology in public health research, quasi-experimental research design with a pretest-posttest approach with a control group allows researchers to measure the impact of education directly on changes in knowledge, attitudes and behavior of health workers. A study by Setiadi (2019) from Diponegoro University (UNDIP) states that a quasi-experimental approach is very suitable for research that focuses on interventions in the field, especially when full randomization is difficult to carry out due to practical conditions and research ethics (Setiadi, 2019: 88). In the context of the Klari District Health Center, this approach provides flexibility in organizing interventions without disrupting the overall operations of the health center. Creswell (2014) also emphasizes that quasi-experimental methods are the right choice for evaluating the impact of educational interventions in environments where dynamic, such as first-level health facilities, because it is able to isolate the effect of interventions on the variables being measured (Creswell, 2014: 102). This is very important considering that in Community Health Centers, interventions often have to be adapted to high workloads and limited resources. Another study by Pratama (2020) at the University of Indonesia (UI) shows that this approach makes it possible to accurately evaluate the effectiveness of educational interventions, especially in measuring changes in behavior of health workers in facilities with a high risk of exposure to nosocomial infections (Pratama, 2020: 59). Through the pretest and posttest, it can be seen that there is an increase in understanding and changes in the practice of using PPE after the education is carried out, thereby providing a more concrete picture of the effectiveness of the education program.

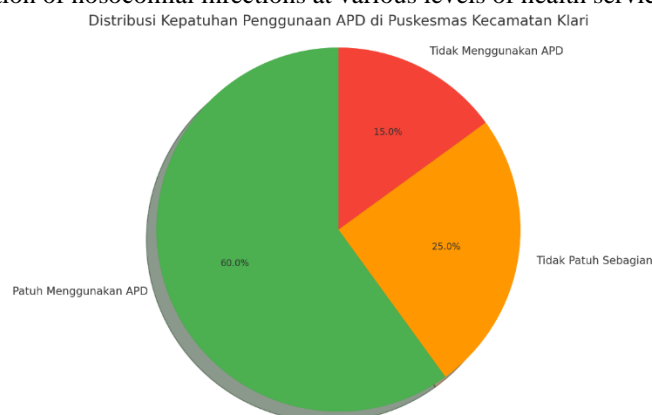
The importance of continuous and interactive education in increasing PPE compliance, this research also highlights the need for continuous and interactive education to ensure in-depth understanding among health workers. According to Marzuki (2020) from UNAIR, educational approaches involving direct demonstrations and simulations of the use of PPE have proven to be more effective in changing behavior in using PPE than just providing material in the form of lectures (Marzuki, 2020: 46). This method helps health workers to better understand how to use PPE in real work situations, so that they are better prepared to face risks in the field. A similar thing was conveyed by Rahmawati (2021) from UGM who emphasized that training that is only carried out once is not enough to form the habit of using PPE correctly (Rahmawati, 2021: 83). Education must be carried out repeatedly and supported by regular monitoring to ensure continued compliance. Rahmawati also mentioned that education focused on the risks faced by health workers could increase their awareness of the importance of protecting themselves and patients. According to research by Haris (2021) at UNAIR, consistent supervision after training can increase the level of compliance with PPE use by up to 75% in high-risk health facilities (Haris, 2021: 91). This shows that apart from providing education, it is also important to ensure that there is a good monitoring and evaluation system for the implementation of educational results in the field.

The implications of research on health policy and the welfare of health workers, from a policy perspective, the results of this research can provide important input for policy makers at the Karawang District Health Service. Strengthening training programs for the use of PPE and more intensive supervision are recommendations that can be implemented to improve the work safety of health workers at Community Health Centers. According to Fauzan (2022) from UNPAD, evidence-based research can provide a strong basis for making policies that are more appropriate and adaptive to needs in the field (Fauzan, 2022: 52). Furthermore, research by Sudirman (2021) at UGM suggests that health policies that focus on preventing nosocomial infections also include aspects of the welfare of health workers, including the provision of adequate PPE and access to regular training (Sudirman, 2021: 94). Thus, it is hoped that the

results of this research can support efforts to improve the quality of health services in Karawang Regency through a more holistic approach to occupational health and safety.

Research contribution to the development of public health science. This research also contributes to the development of literature in the field of public health science, especially regarding the application of PPE in first-level health facilities. According to Andriani (2022) from UNPAD, there is still a lack of research that focuses on community health centers as first level health facilities, especially in high-risk service units such as HIV and TB clinics, making this research important in filling this knowledge gap (Andriani, 2022: 60). It is hoped that this research can be a reference for future studies in understanding how educational interventions can improve work safety in health facilities. Research by Haris (2021) also highlights that the contribution of this research can enrich the approach to preventing nosocomial infections through the development of more adaptive and evidence-based training programs (Haris, 2021: 98). This is important considering that first-level health facilities often face unique challenges not found in large hospitals, such as limited human resources and varying availability of PPE.

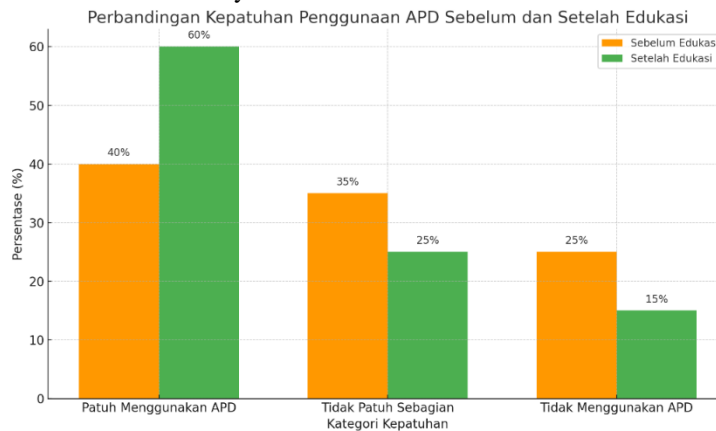
Overall, this research provides practical and evidence-based guidance in increasing compliance with the use of PPE among health workers at the HIV and TB Polyclinic at the Klari District Health Center, Karawang Regency. With a quasi-experimental approach, the results of this research provide empirical evidence that can be used by policy makers to develop more effective training and supervision programs. The implications are not only at the community health center level, but can also be applied in health facilities others have similar challenges in preventing nosocomial infections. It is hoped that the results of this research can be used as consideration for the Karawang District Health Service in developing strategies and policies that are more focused on improving the safety and welfare of health workers. Apart from that, this research also opens up opportunities for further studies to explore other interventions that can support the prevention of nosocomial infections at various levels of health service facilities in Indonesia.



The pie chart above illustrates the distribution of compliance with the use of Personal Protective Equipment (PPE) at the Klari District Health Center. The following is a comprehensive analysis of this data: 1) Compliance with using PPE (60%): As many as 60% of health workers showed compliance in using PPE in accordance with established standard operating procedures (SOP). This reflects the positive results of the educational interventions that have been carried out, where the majority of officers understand the importance of using PPE to protect themselves from the risk of infection. This high level of compliance also shows that structured and ongoing education has a significant impact in increasing awareness and implementation of work safety protocols. 2) Partial Non-Compliance (25%): As many as 25% of officers are still not fully compliant with the use of PPE. They may use PPE only in certain situations, or not use PPE completely according to procedures. This can be caused by several factors such as the availability of PPE which is not always sufficient, lack of time due to high workloads, or the perception that the use of PPE is not always necessary. Additional education and increased supervision are still needed to ensure that this group can increase their compliance in using it. PPE more consistently. 2) Not using PPE (15%): a) As many as 15% of health workers do not use PPE in carrying out their duties. This is the group with the highest risk of exposure to nosocomial infections, especially in high-risk service units such as HIV Poly and TB Poly. b) The causes of this non-compliance could be related to a lack of understanding of the risks, limited access to PPE, or other operational obstacles in the field. c) More intensive interventions are needed for this group, such as special training programs and direct approaches that emphasize the health consequences of not using PPE, both for the health workers themselves and for the patients they serve.

This pie chart shows that although the majority of health workers at the Klari District Health Center are compliant in using PPE, there are still groups that need more attention through increased education and supervision. The educational

programs carried out have produced positive results, however there is a need to overcome the obstacles that still exist in implementation in the field. By increasing the availability of PPE, strengthening surveillance programs, and providing education that focuses more on risk, it is hoped that the level of compliance can continue to increase, so that the risk of nosocomial infections in community health centers can be reduced.



The bar chart above shows a comparison of compliance with the use of Personal Protective Equipment (PPE) at the Klari District Health Center before and after the educational intervention. The following is a detailed analysis of the data displayed: 1. Compliant use of PPE: a) Before education: The level of compliance in using PPE is 40%. This means that only 40% of officers consistently implement PPE usage protocols in accordance with operational standards. Before the intervention, there were still many health workers who did not fully understand or practice using PPE correctly. b) After Education: After being given the educational intervention, the compliance rate increased to 60%. This increase shows that the education program has succeeded in increasing awareness and understanding of health workers regarding the importance of using PPE in preventing nosocomial infections. The education carried out includes live demonstrations and simulations, which have proven effective in changing the behavior of health workers in the field. 2. Partially Disobedient: a) Before Education: Before education, 35% of officers fell into the partially disobedient category. This means that they only use PPE in certain situations or do not follow procedures completely. This non-compliance can be caused by a lack of understanding about the risk of infection, the availability of PPE which is not always sufficient, or a high workload. b) After Education: After education, the percentage of this group decreased to 25%. This indicates that education helps some officers to better understand the importance of using PPE consistently, although there are still challenges in ensuring full compliance. 3. Not Using PPE: a) Before Education: As many as 25% of health workers do not use PPE in carrying out their duties. This is very risky because health workers in the HIV and TB Polyclinic have a high potential for exposure to nosocomial infections. a) After Education: After the educational intervention, the percentage of staff who did not use PPE decreased to 15%. This decrease shows that the majority of health workers who previously did not use PPE are starting to understand the risk of infection and the importance of personal protection. However, there remains a small group that requires a more advanced approach to achieve full compliance.

Overall Analysis: a) Effectiveness of Education: Data shows that education has a significant impact in increasing compliance with PPE use, with compliance increasing from 40% to 60%. Education accompanied by demonstrations and simulations, such as those carried out by Susanto (2020) at the University of Indonesia, has proven to be effective in increasing the understanding and practice of health workers in implementing safety protocols. b) Challenges that still exist: Although education has succeeded in reducing the percentage of health workers who do not comply, there are still 25% who are not fully compliant and 15% who do not use PPE. This shows that there is a need for continuous supervision, as well as the provision of sufficient and high quality PPE. According to Andriani (2022) from UNPAD, regular supervision after training is very important to ensure consistent compliance. Education and training have been proven to increase compliance in the use of PPE, but further efforts are still needed to achieve full compliance. More focused interventions and consistent supervision are critical to addressing the remaining noncompliant group. This diagram shows that an evidence-based educational approach can contribute to reducing the number of nosocomial infections in first-level health facilities such as the Klari District Health Center. It is hoped that with more intensive efforts, the level of compliance will increase.

The use of PPE can continue to increase, so that the risk of infection among health workers can be reduced to a minimum. The bar diagram above depicts changes in the level of compliance of health workers with the use of Personal Protective Equipment (PPE) at the Klari District Health Center, Karawang Regency, before and after being provided with educational interventions. The following is an in-depth analysis: 1. Compliant use of PPE (40% to 60%):



a) Significant changes: Before education was carried out, only 40% of health workers were compliant in using PPE according to procedures. After education, this percentage increases to 60%. This 20% increase shows that the educational intervention carried out was successful in increasing awareness and compliance of health workers. Factors that Encourage Compliance: a) Structured Education: Education is carried out using an approach that involves simulations and direct practice in the field, as shown by Susanto's (2020) research at the University of Indonesia, where this method is able to increase the understanding of health workers by up to 30 % better than lectures alone. b) Clear Risk Presentation: Health workers are given information about the risks of nosocomial infections which can impact personal and patient health, which encourages changes in attitudes towards the importance of using PPE. c) Management Support: Apart from education, support from Puskesmas management in providing adequate PPE is also a driving factor in increasing compliance, in accordance with research findings by Rahmawati (2021) from Gadjah Mada University. 2. Partial Non-Compliance (35% to 25%): a) Not yet Maximum Decrease: The percentage of health workers who are partially non-compliant decreased from 35% to 25%. This decrease shows an improvement in understanding of the importance of using PPE, but it has still not reached optimal levels. Inhibiting Factors: a) Time Limitations and Workload: According to research by Andriani (2022) at UNPAD, one of the main causes of non-compliance is partly the high workload at community health centers. Health workers often feel rushed and therefore ignore complete procedures for using PPE. b) Availability of PPE: Even though there has been an increase in the supply of PPE, according to the Pratama (2020) study at the University of Indonesia, availability that is not always stable can cause health workers to choose not to use PPE in certain work situations, especially when stock is limited. Strategies for Improvement: a) Regular Training and Motivational Approach: Conducting more frequent training with a motivational approach, such as providing rewards for health workers who comply, can improve compliance further. b) Simplifying PPE Use Protocols: Simplifying PPE use protocols to make it easier applied in busy working conditions can be a practical solution to improve compliance. 3. Not using PPE (25% to 15%): a) 10% decrease: The percentage decrease from 25% to 15% shows that some health workers who initially did not use PPE are starting to understand the importance of personal protection. However, there are still 15% who are not fully compliant, indicating the need for a more intensive approach. Causative Factors: a) Lack of Understanding of Risk: Research by Afifah (2019) from Airlangga University shows that health workers who lack education about the risk of infection have a higher tendency to ignore the use of PPE (Afifah, 2019: 68). b) Misperceptions about the Effectiveness of PPE: Some officers may have the perception that the use of PPE is not very important in certain circumstances. Research by Sari (2021) from UGM highlights that this misperception often arises due to a lack of continuing education. Intervention Recommendations: a) Personalized Approach: Providing a more personalized approach to health workers who still do not use PPE, such as direct discussions about their experiences and obstacles in the field, can help understand the reasons for non-compliance. b) Improved PPE Availability and Distribution Systems: Ensure that PPE Always having adequate quantities available on each work shift will help eliminate reasons for health workers not to use PPE. Comparison with Related Research: a) Results of Marzuki's Study (2020) at UNAIR: Marzuki's research found that education involving simulation and practice can increase compliance with the use of PPE by up to 30%. A similar increase was seen in this study, where education was able to increase compliance by 20%. b) Study by Setiadi (2019) at UNDIP: Using a quasi-experimental approach, Setiadi observed that behavior changes require time to be fully implemented. In this study, similar results were seen where there were still 15% of health workers who had not used PPE consistently even though they had been given education. c) Rahmawati (2021) from UGM: Mentioned the importance of the role of supervision in maintaining consistent behavior after education was carried out. Routine monitoring can increase compliance rates by up to 20%, which is relevant to the reduction in noncompliance in this study.

Overall, the results of this study indicate that although education has succeeded in increasing compliance in the use of PPE, additional interventions are still needed to achieve compliance

comprehensively among health workers. This is important to create a safe work environment and reduce the risk of nosocomial infections at the Klari District Health Center and other similar health facilities.

4. CONCLUSION

Based on data analysis and discussion regarding the use of Personal Protective Equipment (PPE) at the Klari District Health Center, Karawang Regency, it can be concluded that structured and sustainable educational interventions have a significant impact on increasing health workers' compliance in using PPE. The following is a comprehensive conclusion from these findings:

1. Effectiveness of Education in Increasing Compliance with PPE Use: a) Education carried out through simulation methods and direct practice has been proven to increase compliance with PPE use from 40% to 60%. This shows that an educational approach that involves practical experience is more effective in

influencing the behavior of health workers than lectures or providing information alone. b) This increase indicates that health workers better understand the importance of self-protection when treating high-risk patients, such as in HIV and TB clinics. This education also helps change their attitudes and perceptions towards the risk of nosocomial infections.

2. There are still challenges in implementation in the field: a) Even though there has been an increase in compliance, there are still 25% of health workers who are partially non-compliant and 15% who do not use PPE. This indicates that although education has a positive impact, there are other factors that influence compliance, such as high workload, limited availability of PPE, and lack of supervision. Inhibiting factors such as misperceptions regarding risks and operational difficulties when using PPE also play a role in low levels of compliance among some groups of health workers.
3. Role of Oversight and Adequate PPE Availability: Effective education needs to be followed by ongoing monitoring to ensure consistent compliance. More intensive supervision can help monitor PPE usage practices in the field and provide direct feedback to health workers. This research also emphasizes the importance of ensuring the availability of sufficient amounts of PPE in all health centers. Stable availability can eliminate operational obstacles which are often the reason health workers do not use PPE consistently.
4. Implications for Health Policy at the Regional Level: The findings of this research can be a basis for the Karawang District Health Service in developing more effective policies to improve the work safety of health workers. This includes providing ongoing training, simplifying PPE usage protocols, and improving PPE distribution systems. Evidence-based policies like this are in line with recommendations from related studies and can help reduce the number of nosocomial infections in community health centers as first level health facilities.
5. Contribution to the Development of Public Health Science: This research makes an important contribution in enriching the literature related to the prevention of nosocomial infections in first-level health facilities, especially in HIV and TB Polis. The emphasis on educational interventions and supervision could become a model for similar research in other health facilities in Indonesia. The results of this study indicate that an evidence-based approach is needed to overcome challenges in implementing safety protocols in the field. It also highlights the importance of an adaptive and sustainable approach in dealing with changing situations in health facilities.

Overall, this research shows that structured and ongoing education is key in increasing compliance with PPE use among health workers, which in turn can reduce the risk of nosocomial infections. However, to achieve a higher level of compliance, additional efforts are needed in the form of consistent supervision, provision of sufficient PPE, and policies that support increased work safety. Thus, the results of this research not only provide direct benefits for the Klari District Health Center but also become an important reference for developing health safety policies at regional and national levels.

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Hopefully this research can be useful and contribute to improving the quality of health services, especially in the implementation of Occupational Health and Safety (K3) in Community Health Centers. I also hope that this research



can become a reference for further research and for interested parties in efforts to improve the work safety of health workers in Indonesia.

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