Compliance Level among Healthcare Workers of Rural Health Units on the Standard Infection Prevention and Control

Windy M. Luzon, Rm, Rn, Man., Ara L. Barlizo, Rm, Rn, Man., Ronald C. Abaño, Rn, Man., Marjorie R. Andalis, Rm, Rn, Man., Joyce N. Olea, Rn, Man., Bernadette F. Martirez, Rn, Man

College of Health Care Education, University of Saint Anthony, Baao, Camarines Sur, Philippines

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INTRODUCTION

In the landscape of community healthcare, the battle against the transmission of infectious diseases is a concern and underscored by the global impact of healthcare-associated infections (HAIs). These infections, which afflict millions annually, not only exacerbate patient suffering through extended recovery times and potential long-term health issues but also impose a heavy financial burden on healthcare systems. The prevalence of healthcare-associated infections can surpass those in more affluent areas by a significant margin, highlighting the critical need for robust infection prevention and control strategies. Within community healthcare settings, where interactions between healthcare providers and patients are frequent, and resources may be scarce, implementing effective infection prevention and control protocols is a significant challenge and an essential requirement to protect public health and prevent the spreading of potentially deadly infections.

Moreover, ensuring strict adherence to infection prevention and control measures within community healthcare environments is important for the safety of both patients and healthcare workers. Recent World Health Organization (WHO) findings have long emphasized the significance of IPC measures in safeguarding healthcare quality and patient safety. According to the World Health Organization (2023), good hand hygiene and other cost-effective IPC measures can prevent up to 70% of HAIs. Despite this, the prevalence of HAIs remains alarmingly high, with seven patients in high-income countries and 15 in low- and middle-income countries acquiring at least one HAI for every 100 patients in acute-care hospitals. The impact of HAIs extends beyond patient morbidity and mortality, contributing to increased healthcare costs and exacerbating the burden of AMR. The WHO's first-ever global report on infection prevention and control highlights the vast disparities in infection prevention and control implementation program across regions, with high-income countries being eight times more likely to have a more advanced infection prevention and control implementation status than low-income countries.

In the Philippines, the importance of infection prevention and control has been underscored by the COVID-19 pandemic, highlighting the need for preparedness among healthcare facilities to prevent and manage infectious diseases effectively. A study assessing the compliance of public hospitals and temporary treatment and monitoring facilities (TTMFs) with infection prevention and control standards revealed varying levels of preparedness and compliance across different domains of infection prevention and control practices. Public hospitals reported sufficient infection prevention and control preparedness and compliance compared to temporary treatment and monitoring facilities, particularly in engineering and administrative controls (De Claro, 2023).

The Department of Health (DOH) has implemented policies to enhance infection prevention and control (IPC). The DOH Administrative Order 2022-0051 outlines a revised national policy for IPC in all health facilities, while DOH Department Circular 2021-0447 disseminates the updated Manual of National Standards in IPC for Health Facilities. These guidelines provide a comprehensive framework for healthcare institutions to implement effective IPC measures, emphasizing key areas such as hand hygiene, environmental cleaning, and proper waste management.

Possessing an in-depth knowledge of infection prevention and control practices is paramount. This expertise protects individuals from spreading infectious diseases and protects public health systems against potential outbreaks. By understanding and implementing rigorous hygiene protocols, proper use of Personal Protected Equipment (PPE), prevention of needlestick and sharp injuries, and environmental cleaning and disinfection, healthcare professionals and the public can significantly reduce the incidence of infections. This, in turn, alleviates the strain on healthcare resources, diminishes economic burdens associated with disease management, and, most importantly, saves lives. Thus, comprehensive infection prevention and control knowledge is a cornerstone of a resilient and effective healthcare system.

As an IPC Nurse and frequent client at the Rural Health Unit, the researcher has experienced both sides of healthcare delivery, witnessing gaps in infection prevention practices while understanding the unique challenges faced by rural facilities. This dual role has sparked a personal commitment to improving IPC standards, recognizing that enhanced education and compliance are important for protecting both healthcare workers and clients in resource-limited settings. The researcher's professional expertise in IPC and firsthand experience as a service recipient provide a distinctive perspective that emphasizes the urgent need for this study to strengthen infection control measures in rural healthcare facilities.

Theoretical Framework

This study's theoretical framework comprises a model and a theory: **Florence Nightingale's Environmental Theory** and **Imogene King's Goal Attainment Theory**. These theories play important roles in understanding the compliance level among healthcare workers of Rural Health Units with standard infection prevention and control.

Florence Nightingale's **Environmental Theory** is a fundamental concept in nursing and public health that emphasizes the role of the environment in the healing process. This theory posits that health and disease are significantly influenced by environmental factors such as clean air, water, and sanitation. In the context of Rural Health Units (RHUs), where resources may be limited, applying this theory can be both challenging and essential for preventing and controlling infections.

The application of Nightingale's Environmental Theory in evaluating RHUs involves assessing how these facilities manage their environments to support health and recovery. This includes examining factors such as cleanliness, ventilation, access to natural light, and overall hygiene practices. By using this theoretical framework, healthcare professionals can critically analyze compliance with national standards, identify gaps in environmental management, and pinpoint potential infection risks. This approach provides a method for evaluating infection prevention standards and offers guidance for improving public health outcomes in resource-constrained settings, potentially serving as a cost-effective strategy for enhancing infection prevention and control in RHUs.

Imogene King's **Goal Attainment Theory** emphasizes the collaborative process between nurses and patients to set and achieve health-related goals. This theory is particularly relevant in understanding compliance in infection prevention and control as it highlights the importance of communication, mutual goal setting, and interaction between healthcare workers and their environment. According to

King, effective nursing involves a dynamic process of action, reaction, and interaction in which the nurse and patient share information and set goals together

This theory suggests that healthcare workers can improve compliance with Infection control standards by actively involving patients in their care processes. By setting mutual goals related to hygiene practices and infection prevention, healthcare workers can foster a sense of ownership among patients, which may lead to better adherence to recommended practices. The theory also underscores the importance of understanding individual perceptions and roles within the healthcare setting, which can help address specific barriers to compliance.

Conceptual Framework

This study utilizes the systems view of research which includes the input, process, and output model, which is demonstrated in the conceptual paradigm of this study is illustrated in Figure 2.

The **Input** included the demographic profile of the respondents based on age, sex, civil status, educational attainment, designation, length of service, and related training attended. Aside from the demographic profiles, the researcher analyzed compliance level among healthcare workers of Rural Health Units on the standard infection prevention and control along with hand hygiene practices, use of Personal Protective Equipment (PPE), prevention of needlestick and sharp injuries, and environmental cleaning and disinfection and determined challenges encountered by healthcare workers of Rural Health Units affecting the compliance with the standard in infection prevention and control along with resource constraints, infrastructure and facility limitations, and human resource challenges.

The **Process** involved preparation of questionnaire, data gathering through questionnaire, retrieval of questionnaires, analysis and interpretation of data, testing the significant relationship, and formulation of proposed strategies to enhance the compliance level among healthcare workers of Rural Health Units on the standard infection prevention and control.

The **Output** of the study is a training guide on Standard infection Prevention and Control Procedure and Policy provide clear, actionable guidelines and standardized practices across all RHUs. It includes detailed policies and procedures for each IPC component, thus aims to enhance the knowledge and skills of healthcare workers, ultimately improving patient safety and healthcare quality in rural settings.

Finally, the researcher adopted a **feedback loop** so that the output of this study provides insights and information about the proposed strategies to be done.

The feedback shall present a continuing improvement phase on the proposed strategy as it will be implemented and the study variables' efforts. This improvement to the proposed strategy has to be made to ensure effective delivery among healthcare workers of Rural Health Units to enhance adherence to standard infection prevention and control practices.

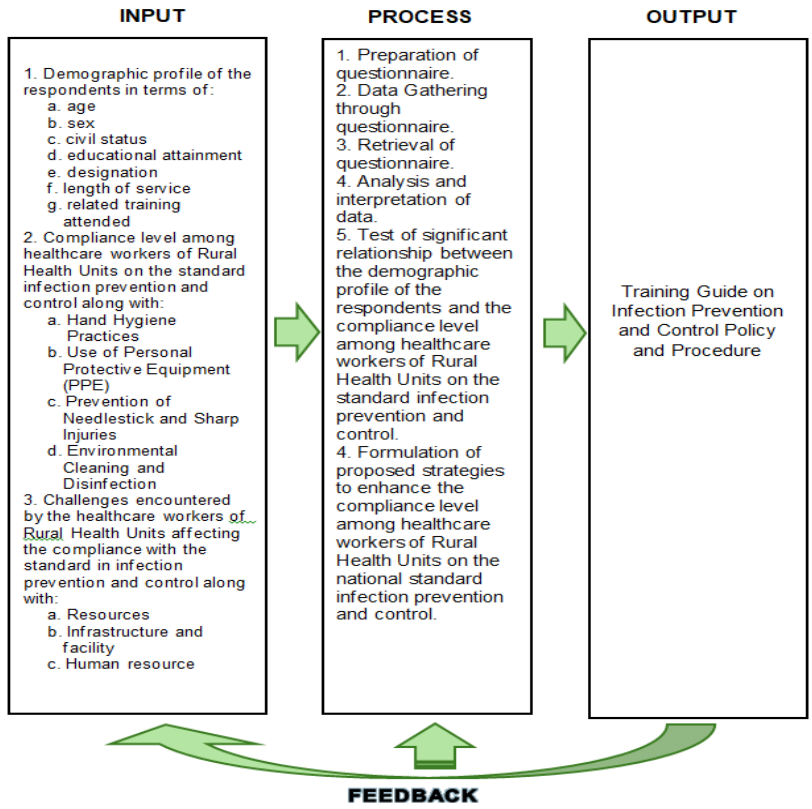

Figure 2 Conceptual Paradigm

Statement of the Problem

The study focuses on determining the compliance level among healthcare workers of Rural Health Units on the standard infection prevention and control. Specifically, it sought to answer the following:

1. What is the demographic profile of the respondents in terms of:

a. Age

b. Sex

c. Civil Status

d. Educational Attainment

e. Designation

f. Length of Service

g. Related Training Attended

2. What is the compliance level among healthcare workers of Rural Health Units on the standard infection prevention and control along:

a. Hand Hygiene Practices

b. Use of Personal Protective Equipment (PPE)

c. Prevention of Needlestick and Sharp Injuries

d. Environmental Cleaning and Disinfection

3. Is there a significant relationship between the demographic profile and compliance level among healthcare workers of Rural Health Units on the standard infection prevention and control?

4. What are the challenges encountered by the healthcare workers of Rural Health Units affecting the compliance level with the standard in infection prevention and control along:

a. Resources

b. Infrastructure and facility

c. Human resource

5. What strategies maybe proposed to enhance the compliance level among healthcare workers of Rural Health Units on the standard infection prevention and control?

Assumptions of the study

The following assumptions guided the study:

1. The profile of the respondents varies.

2. The compliance level with standard in infection prevention and control is compliant among healthcare workers of Rural Health Units.

3. There are challenges encountered by healthcare workers of Rural Health Units that affect the compliance level with the standard in infection prevention and control.

4. There are strategies that could be proposed to enhance the compliance level among healthcare workers of Rural Health Units on the standard infection prevention and control.

Hypothesis of the Study

H_0: There is no significant relationship between the respondents' profile and the compliance level among healthcare workers of Rural Health Units on the standard infection prevention and control.

Significance of the Study

The findings of the study are expected to be of great importance to the following:

Healthcare Workers. The benefit of the study is gaining insights into the areas where compliance with infection prevention and control standards may be lacking. This understanding can lead to targeted training programs, provision of necessary resources, and implementation of protocols to improve adherence to standards, thus enhancing the safety of both patients and healthcare workers.

5th District of Camarines Sur Residents. The study's findings directly impact client and residents of the 5th District of Camarines Sur by ensuring safer medical services, reducing infection risks during facility visits, and preventing disease transmission, ultimately contributing to improved community health outcomes and population well-being.

Department of Health Personnel. The findings of this study will benefit as it provides valuable insights into the overall state of infection prevention and control practices in Rural Health Units. The Department of Health can utilize this information to formulate policies, allocate resources, and develop training programs to improve compliance across the healthcare system, thereby enhancing public health outcomes.

Researcher. Through this study, the researcher will gain knowledge and expertise in the field of infection prevention and control, particularly in rural healthcare settings. The findings contribute to the existing body of literature on this topic and may guide future research directions. Additionally, the researcher may use the study's results to advocate for policy changes or interventions to improve infection prevention and control practices in Rural Health Units.

Future Researchers. The study provides a foundation for future research endeavors related to infection prevention and control in rural healthcare settings. It offers insights into potential areas for further investigation, such as the effectiveness of specific interventions or the impact of socioeconomic factors on compliance with standards. Future researchers can build upon the study's findings to deepen understanding and address remaining gaps in knowledge.

Scope and Delimitation

The research thoroughly discussed the analysis of compliance level with standard infection prevention and control among Rural Health Units in the 5th District of Camarines Sur, along with hand hygiene practices, use of Personal Protective Equipment (PPE), prevention of needlestick and sharp injuries, environmental cleaning and disinfection, and education and training, and also the challenges faced by Rural Health Units in compliance with the standard in infection prevention and control along with resources, infrastructure and facility, and human resource challenges.

The respondents were delimited to healthcare providers consisting of a total enumeration of 147 healthcare workers from different Rural Health Units in the 5th District of Camarines Sur. In Rural Health Unit – Baao I and II, it included 2 Doctors, 13 Nurses, 15 Midwives, 2 Sanitary Inspector, and 1 Medical Technologist. Rural Health Unit – Balatan had 1 Doctor, 14 Nurses, 4 Midwives, 1 Sanitary Inspector, and 1 Medical Technologist. At Rural Health Unit – Bato, the staff consisted of 3 Doctors, 17 Nurses, 8 Midwives, 1 Sanitary Inspector, and 1 Medical Technologist. Rural Health Unit – Bula I and II employs 2 Doctors, 20 Nurses, 15 Midwives, 2 Sanitary Inspectors, and 1 Medical Technologist. Lastly, Rural Health Unit – Buhi I and II has 2 Doctors, 11

Nurses, 7 Midwives, 2 Sanitary Inspectors, and 1 Medical Technologist. One of the RHUs declined to take part in the research. This study was conducted from August 2024 up to December 2024.

Definition of Terms

To facilitate understanding and comprehension, the terms used have been defined conceptually and operationally:

Compliance is the act or process of complying with a desire, demand, proposal, and regimen. In the study, it refers to the extent to which healthcare workers in Rural Health Units consistently adhere to and correctly execute the prescribed infection prevention and control protocols and guidelines.

Healthcare workers an individual engaged in activities aimed at enhancing health involved in patient care within the healthcare sector. In the study, these are licensed professionals and support staff employed in Rural Health Units who are directly or indirectly involved in the delivery of healthcare services, including doctors, nurses, midwives, medical technologists, sanitary inspectors.

Standard Infection Prevention and Control is a practical, evidence-based approach preventing patients and health workers from being harmed by avoidable infections. In the study, it is the practices and procedures implemented by healthcare workers to minimize the risk of spreading infections within the RHU, including hand hygiene, use of personal protective equipment, prevention of needlestick and sharps injury, and environmental cleaning.

Rural Health Unit is a government-operated health facility located in rural areas. It provides primary health care services to the community it serves. This includes outpatient care, maternal and child health care, immunizations, minor surgical procedures, and health education. In the study, it is a primary healthcare facility situated in rural communities where healthcare workers are expected to implement and adhere to standard infection prevention and control protocols while delivering basic medical services to the local population.

5th District of Camarines Sur is a district located in the province of Camarines Sur, in the Bicol Region of the Philippines. The district comprises several municipalities and city: Baao, Bato, Balatan, Buhi, Bula, Nabua, and Iriga City.

REVIEW OF RELATED LITERATURE AND STUDIES

This section presents a summary of the relevant literature supporting the study. This review has provided the researcher with a broader perspective on generating concepts and further understanding of the study.

Compliance level with standard Infection Prevention and Control

The WHO Global Report on Infection Prevention and Control (2024) highlights the challenge of healthcare-associated infections (HAIs), which continue to pose significant threats to patient safety and healthcare quality worldwide. These infections not only cause substantial patient suffering and premature deaths but also serve as major drivers of antimicrobial resistance (AMR). The report emphasizes that while recent outbreaks like COVID-19, Ebola, Marburg, and Mpox have dramatically demonstrated infection risks in healthcare settings, HAIs remain a daily concern in hospitals and clinics globally. Importantly, the report points out that many of these infections are preventable through proper infection prevention and control (IPC) measures and basic water, sanitation, and hygiene (WASH) services, offering a high return on investment for healthcare systems. This comprehensive document provides updated evidence on HAI-related harm. It examines the implementation of IPC programs across all WHO regions, serving as a resource for improving global healthcare safety standards.

Moreover, the Centers for Disease Control and Prevention (CDC) has established a set of fundamental infection prevention and control practices essential for ensuring safe healthcare delivery across various settings. These core practices, which are applicable to inpatient and outpatient environments, include the

implementation of standard precautions such as hand hygiene, environmental cleaning, and safe injection practices. Additionally, CDC has introduced new practices to enhance medication safety by preparing medications in clean areas away from contamination sources and minimizing potential exposure to infectious agents through early detection and management of potentially infectious individuals. These practices are designed to serve as a baseline for healthcare facilities to prevent the transmission of infections and are expected to be integrated into the routine protocols of healthcare personnel.

According to Elkanafany (2024), Infection Prevention and Control (IPC) is a comprehensive scientific approach that aims to protect both patients and healthcare workers from harmful infections. Thoroughly examine how infectious diseases spread and the various methods to control them, from basic community-level interventions to sophisticated healthcare facility protocols. It emphasizes that effective IPC is fundamental to patient safety and health system strengthening, with statistics showing that proper implementation can reduce healthcare-associated infections by at least 30%. The aspects such as the epidemiological triad, standard precautions in healthcare settings, and the importance of environmental cleaning while also addressing broader societal factors like education and urban development that influence infection control. A particularly noteworthy aspect is its global perspective, discussing how IPC measures vary between developed and developing countries, where up to 7% and 10% of patients, respectively, acquire at least one healthcare-associated infection during their care.

In addition, Mark Cole (2023) work on emotional intelligence (EI) emphasizes its critical role in infection prevention and control. He argues that EI, which encompasses the ability to understand, use, and manage emotions in positive ways to relieve stress, communicate effectively, empathize with others, overcome challenges, and defuse conflict, is a vital asset for healthcare professionals. Cole suggests that by harnessing EI, individuals in the healthcare sector can significantly enhance their ability to manage and respond to the complex emotional and social dynamics encountered in infection control practices. This approach not only improves the effectiveness of infection prevention strategies but also fosters more supportive and responsive healthcare environment.

In her work, Heather Loveday (2021) examines the challenges and learning opportunities presented by the COVID-19 pandemic in infection prevention and control (IPC). She highlights the unprecedented epidemiological, operational, behavioral, and policy hurdles that IPC services worldwide have encountered to curb the spread of COVID-19 within healthcare and social care environments. Loveday points out that IPC teams have been pushed to their limits and emphasizes the necessity of extracting valuable insights to reinforce the critical role of IPC in future pandemic preparedness. Traditionally, IPC has been focused on enhancing practices to prevent healthcare-associated infections and tackle antimicrobial resistance, with less attention given to pandemic planning. Loveday suggests that the experiences from the COVID-19 crisis should inform and improve IPC strategies for better preparedness in the face of potential pandemics.

In addition, McCauley's (2021) reviews delve into the various elements that lead to lapses in care and a lack of adherence to infection prevention and control protocols among nursing staff. It examines the reasons behind these shortcomings, aiming to identify the root causes that hinder nurses from fully complying with established infection control measures. This comprehensive analysis seeks to shed light on the obstacles faced by nurses that prevent them from executing these critical practices effectively, which is essential for maintaining patient safety and reducing the spread of infections within healthcare settings.

Moreover, the article by Ramadan (2023) serves as a guide for community nurses on infection prevention and control practices. Ramadan emphasizes the importance of hand hygiene, proper use of personal protective equipment (PPE), and environmental cleaning in preventing healthcare-associated infections (HCAIs). The guide highlights the need for community nurses to adhere to standard precautions, including hand hygiene before and after patient contact and the appropriate use of PPE such as gloves, aprons, and face masks. Additionally, the article stresses the significance of proper waste management and the safe handling of sharps to minimize the risk of infection transmission in community healthcare settings.

Certainly, antimicrobial resistance (AMR) poses a significant challenge in the Middle East, exacerbated by ongoing conflicts that disrupt healthcare systems and hinder infection prevention and control (IPC) measures.

It highlights that the turmoil in the region not only damages healthcare infrastructure but also complicates the implementation of effective IPC strategies, which are important for managing AMR. The instability caused by conflict leads to a lack of resources, inadequate sanitation, and difficulties in maintaining hygiene practices, all of which contribute to the spread of resistant pathogens. Moreover, the displacement of populations increases the risk of disease transmission and limits access to medical care, further complicating efforts to combat AMR. Emphasizes the need for IPC programs and international collaboration to address these challenges, particularly in conflict-affected areas where the healthcare system's resilience is undermined (Collin and Farra, 2021).

Similarly, Domenico Cioffi (2023) highlights the challenges in achieving optimal infection prevention and control within healthcare settings, attributing these shortcomings to various factors inherent in the healthcare culture. Despite developing and implementing evidence-based guidelines and strategies to reduce healthcare-associated infections (HAIs), such as pneumonia, urinary tract infections, and bloodstream infections, healthcare facilities often struggle with consistent adherence. This inconsistency can be attributed to a combination of low compliance with infection prevention practices. This organizational culture may not prioritize infection control, financial constraints, limited engagement from frontline staff, and insufficient support from leadership. These issues underscore the need for a comprehensive approach that addresses both the technical and cultural aspects of infection prevention and control to combat HAIs effectively.

The study conducted by Ochie et al. (2022) focuses on understanding, factors influencing, and adherence to infection prevention and control measures among healthcare workers in primary care settings within the Enugu metropolis in southeastern Nigeria. It aims to assess the level of knowledge these workers possess regarding infection prevention, identify what determines their compliance with established protocols, and evaluate how consistently they adhere to these measures. Enhancing patient safety and healthcare quality by ensuring that frontline healthcare professionals are well-informed and committed to preventing the spread of infections within healthcare facilities.

Furthermore, Kinyenje (2020) examined the state of infection prevention and control (IPC) practices within primary healthcare facilities across Tanzania, utilizing a star-rating assessment method for evaluation. The findings revealed a concerning level of inadequacy in IPC measures across these facilities, with many not meeting the necessary standards for ensuring patient and staff safety from infections. This assessment highlighted the urgent need for improvements in IPC protocols and training within Tanzanian primary healthcare settings to elevate the quality of care and minimize the risk of infection transmission.

Based on the systematic review by Alhumaid et al. (2021), healthcare workers (HCWs) generally had moderate to good knowledge of IPC principles and practices. However, their compliance with recommended IPC measures was suboptimal. Several factors influenced HCWs' adherence to IPC guidelines, including individual factors (knowledge, attitudes, beliefs), organizational factors (training, resources, leadership support), and external factors (policies, guidelines). Adequate knowledge alone did not necessarily translate into better compliance. The review highlights the need for multifaceted interventions targeting various determinants to improve IPC compliance among HCWs, such as ongoing education, accessible resources, administrative support, and clear policies.

Moreover, Hillier (2020) emphasizes the role of effective hand hygiene practices in preventing and controlling infections in healthcare settings. Proper hand hygiene is one of the most important measures for reducing the spread of pathogens and healthcare-associated infections. The study stresses the significance of healthcare professionals adhering to the World Health Organization's "Five Moments for Hand Hygiene" and using correct handwashing techniques. Additionally, the study underscores the importance of ongoing education, training, and monitoring to ensure compliance with hand hygiene protocols, ultimately leading to improved patient safety and reduced infection rates.

Meanwhile, Abraao, L. M. et al. (2021) studied compared three infection prevention and control program (IPCP) assessment tools: IPCPE, IPCAF, and OGIPCP. The results showed that IPCPE was considered the most complete, effective, easy to apply, and had easily interpreted indicators. IPCAF was found to be the best in terms of purpose, easy reporting, and interpretation, although it requires professional experience to use effectively. OGIPCP was noted for its quick application, ease of understanding, and easily calculated

indicators, making it suitable for users with less experience. The qualitative data supported these quantitative findings and indicated that IPCPE and IPCAF were the most accepted tools among the participants. Overall, while all three tools showed similar potential for supporting IPCP improvements, IPCPE and IPCAF were deemed more advantageous in terms of effectiveness and fit-for-purpose compared to OGIPCP2.

Similarly, Asgedom A. A. (2024) conducted a narrative review of 13 full-length papers from Africa, Asia, and Europe to examine the status of infection prevention and control (IPC) in healthcare facilities using the WHO Infection Prevention and Control Assessment Framework (IPCAF) tool. The findings revealed significant disparities in IPCAF scores across different regions, ranging from insufficient to advanced levels. Middle-income and high-income countries generally demonstrated advanced IPCAF levels, while low-income countries showed lower IPCAF scores. The review highlighted the need for enhanced IPC capacity building and an improved supply of infection prevention resources, particularly in low-income countries, to prevent healthcare-associated infections (HAIs). These results underscore the importance of addressing gaps in IPC practices and resources globally across healthcare settings.

Furthermore, Silva et al. (2021) focused on evaluating the effectiveness of dissemination interventions aimed at improving healthcare workers' adherence to infection prevention and control (IPC) guidelines. Through a systematic review and meta-analysis, the research synthesized evidence from various studies to assess the impact of these interventions. The findings revealed that dissemination interventions, which include strategies like educational sessions, reminders, and feedback mechanisms, significantly enhance healthcare workers' compliance with IPC guidelines. This improvement in adherence is crucial for reducing the transmission of infections within healthcare settings, thereby safeguarding both patient and healthcare worker safety. The study underscores the importance of implementing targeted interventions to promote best practices in infection prevention and control among healthcare professionals.

A comprehensive study by Tartari et al. (2021) provides an analysis of how infection prevention and control (IPC) core components are implemented at the national level across various countries. The significant variations in IPC practices and policies reveal that while some nations have made substantial progress in establishing effective frameworks, others still face considerable challenges. The Tartari emphasize the importance of tailored strategies to strengthen IPC measures, particularly in resource-limited settings, and advocate for enhanced collaboration among stakeholders to ensure adherence to best practices. This situational analysis underscores the critical need for ongoing assessment and improvement of IPC systems to safeguard public health, especially in the context of global health threats like pandemics.

Also, Lotfinejad et al. (2020) found that emojis may be beneficial in bridging the gap between verbal text-based and nonverbal face-to-face interactions related to hand hygiene and infection prevention and control. The authors suggest that emojis could potentially be used to improve hand hygiene behavior in accordance with multimodal promotion strategies. They note that emojis are an integral part of digital communication and social media platforms, which have been shown to spread health-related messages effectively. The emotional content conveyed by emojis on social media was described as "contagious", indicating that health interventions using emojis could leverage this emotional cascade effect to improve efficacy and cost-effectiveness. Overall, the study concludes that further research is needed to evaluate the impact of emojis on hand hygiene and infection control behaviors, but that they show promise as a tool for promoting these important public health measures.

Moreover, the essential elements for an Infection Prevention and Control (IPC) manual framework emphasize the necessity of a hospital IPC program and alignment with the European Council's 2009 patient safety recommendations. It underscores the importance of management's commitment to HAI and AMR prevention through clear budgeting, resource allocation, and activity planning. The framework suggests beginning with an overview of relevant guidelines and standards, incorporating educational, monitoring, and feedback components to foster behavioral change among healthcare workers (HCWs). It highlights the need for a detailed training strategy, the implementation of a HAI surveillance program, and the effectiveness of the WHO's multimodal strategy in reducing HAIs. Additionally, it addresses staffing needs and the environment's role in IPC, proposing a standardized framework for hospital IPC manuals to facilitate the implementation of

best practices and address gaps in application, such as workload and staffing components (Gastaldi et al., 2024).

The DOH (2022) Guidelines on Tuberculosis Infection Prevention and Control Update provides comprehensive recommendations aimed at minimizing the risk of Mycobacterium tuberculosis transmission within healthcare and other high-risk settings. These guidelines emphasize the importance of implementing a hierarchy of infection control measures, including administrative controls, environmental controls, and respiratory protection, to effectively prevent TB transmission. The document underscores the necessity of integrating these TB-specific interventions with the core components of infection prevention and control (IPC) programs at both national and healthcare facility levels.

The National Standards in Infection Prevention and Control for Health Facilities, 3rd Edition, is a comprehensive guide that reflects the latest evidence-based practices and international standards in infection prevention and control (IPC). This updated edition incorporates key elements such as the WHO IPC Minimum Requirements, revised fundamental concepts, enhanced waste management protocols, and new chapters on healthcare-associated infection surveillance2. It also addresses antimicrobial stewardship, risk management strategies, healthcare worker safety, and the importance of IPC education and training. The manual aims to improve patient safety, enhance the quality of care, and promote efficient resource allocation in healthcare settings. (Department of Health, 2021).

Furthermore, UNICEF outlines the organization's efforts to combat the spread of COVID-19 in the Philippines through training and guidelines development. It highlights the challenges of implementing IPC measures due to restrictions from Enhanced Community Quarantine (ECQ) and the urgent need for community-level interventions. The report details the development and rollout of IPC guidelines, training methodologies, and the impact of these initiatives, including the training of thousands of community health workers and the adaptation of materials for various audiences (UNICEF Philippines, 2020).

Moreover, the Philippine Society for Microbiology and Infectious Disease, (2020)[31] provides interim guidelines for infection prevention and control (IPC) in healthcare and community settings. It emphasizes the importance of an organized Infection Control Committee (ICC) in healthcare facilities, the definition of healthcare workers, and the implementation of administrative and engineering controls. The guidelines cover triaging, personal protective equipment (PPE), disinfection, waste management, and the safety of healthcare workers, including the use of PPE and strategies for extended use or reuse of N95 respirators. It also addresses the management of deceased persons with COVID-19 and IPC in community settings, urging the public to practice good hygiene and self-quarantine when necessary

Subsequently, the Department of Health's Health Facility Development Bureau's 2021 emphasizes the critical need for updated standards in infection prevention and control, particularly in the context of the pandemic. It aims to ensure equitable access to safe and quality health services by complying with care standards in health facilities. This edition addresses the dissemination of the manual to a wide range of health professionals, including DOH executives, central and regional directors, and chiefs of health facilities, underscoring the importance of a unified approach to infection prevention. The document serves as a foundation for developing quality health service delivery and the necessity of adhering to updated infection control standards to protect both healthcare providers and patients.

Additionally, The Department of Health's Administrative Order No. 2022-0051 outlines a comprehensive framework for infection prevention and control across all public and private health facilities in the Philippines. This revised national policy emphasizes the importance of standardized protocols to mitigate healthcare-associated infections, ensuring patient safety and enhancing overall healthcare quality. It mandates regular training for healthcare workers, the implementation of effective surveillance systems, and the adoption of best practices in hygiene and sanitation. By establishing clear guidelines, the order aims to bolster the resilience of health facilities against infectious diseases, particularly in light of recent global health challenges (DOH, 2022).

Furthermore, Ma. Teresa Montemayor (2023) emphasizes the importance of hand hygiene as the simplest and most effective way to prevent infections, particularly in healthcare settings. Dr. Charmaine Louise Lozada, the

National Infection Prevention and Control (IPC) Program manager, highlighted that hand washing with soap and clean water is fundamental, and in the absence of these, hand sanitizers or alcohol-based hand rubs can be used unless hands are visibly dirty. The article outlines five critical moments for hand hygiene for healthcare workers, including before and after touching a patient, before aseptic procedures, after exposure to body fluids, and after touching a patient's surroundings. Dr. Lozada also discussed the significance of standard precautions, proper medical waste management, and the ongoing efforts of the IPC program to develop policies and strategies to combat Healthcare Associated Infections (HAI) and Antimicrobial Resistance, aiming to achieve Universal Health Care in the Philippines.

Similarly, UNICEF Philippines (2021), in collaboration with the Department of Education (DepEd) and the Department of Health (DOH), is committed to fostering a culture of handwashing in schools and communities as a vital measure against the pandemic. This initiative was part of a broader effort to enhance hygiene practices and public health safety, recognizing the significant role of handwashing in preventing the spread of infectious diseases. A collaborative study led by DepEd and UNICEF in Zamboanga del Norte demonstrated the effectiveness of these efforts, showing a notable increase of 17.3 percentage points in the handwashing practice among students. This initiative underscores the importance of sustained hygiene practices in educational settings and communities, aiming to protect public health and ensure the well-being of children and the broader population during and beyond the pandemic.

Furthermore, CDC (2022) conducted various activities in the Philippines to address public health concerns and enhance disease surveillance and control in the country. Findings revealed key areas of focus, including but not limited to infectious disease management, vaccine distribution, and community health education. The CDC's efforts contributed to bolstering the Philippines' capacity to respond effectively to health threats, thereby safeguarding the well-being of its population. Through collaborations with local health authorities and stakeholders, the CDC worked towards implementing evidence-based strategies to mitigate the spread of diseases and promote overall health and resilience within communities.

Moreover, Philippine Hospital Infection Control Society (PHICS) released its Infection Control Manual on May 17, 2020, outlining key findings and recommendations for infection control practices in Philippine hospitals. The manual provides comprehensive guidelines for healthcare professionals to mitigate the risk of infections within healthcare settings. It likely includes protocols for hand hygiene, proper use of personal protective equipment, environmental cleaning, and measures to prevent the spread of infectious diseases among patients and healthcare workers. These guidelines are essential for ensuring the safety and well-being of both patients and healthcare providers in Philippine hospitals, particularly in light of the ongoing global health challenges.

Additionally, Arianna Maever L. Amit (2021) on the early response to the Pandemic in the Philippines highlights several critical aspects of the country's handling of the pandemic, particularly focusing on the challenges and strategies implemented during the initial stages. It underscores the Philippines' vulnerability due to its status as a low- and middle-income country with a weak health system, making it particularly susceptible to the impacts of the pandemic. The government's early response included imposing travel restrictions, community interventions, risk communication, and testing from January 30, 2020, when the first case was reported, until March 21, 2020. Despite these efforts, they point out limitations such as inadequate pandemic preparedness, slow ramping up of testing capacities, and the resulting uncontrolled disease transmission. The findings suggest that investing in pandemic preparedness, surveillance, and testing capacity is crucial for the Philippines and other similar countries to manage current and future public health emergencies better.

Moreover, the COVID-19 pandemic highlighted the critical need for infection prevention and control (IPC) preparedness in healthcare facilities, with a study identifying key compliance gaps such as the need for better resource allocation towards waste bags, personal protective equipment (PPE), signage, informational materials, and ongoing staff training and policy development. The importance of government oversight in maintaining high compliance standards was emphasized, alongside the effectiveness of rapid IPC assessments in outbreak scenarios to prioritize and provide immediate support. Expanding IPC assessments to various facilities and contexts, urging further exploration into the tool's utility and accuracy compared to comprehensive

evaluations. Ultimately, it calls for systematic improvements, including thorough planning and sustained investment in IPC, to fortify health systems against future outbreaks, underscoring IPC's role in enhancing healthcare resilience (Vergil de Claro et al., March 2023).

Furthermore, the research conducted by Ellasus (2021), on infectious disease prevention and control practices among healthcare personnel, a complex interplay of factors influencing infection control in healthcare settings. It demonstrates a range of knowledge and compliance levels among healthcare workers regarding infection prevention guidelines, with significant gaps identified in hand hygiene practices, the use of personal protective equipment (PPE), and adherence to standard precautions. Factors such as the availability of resources, education and training, organizational support, and the social dynamics within healthcare teams were found to impact compliance rates. Additionally, the research underscores the importance of continuous education and monitoring, as well as the need for healthcare facilities to prioritize infection control measures to protect both healthcare workers and patients from the transmission of infectious diseases.

Similarly, despite clear guidelines on infection prevention and control (IPC), non-adherence remains a significant issue in healthcare settings globally, risking both patient and provider safety. A study focusing on Level I hospitals in Rinconada used a descriptive correlational method with questionnaires to assess IPC practices among healthcare providers, primarily nurses aged 26–35. Findings revealed that while general adherence to IPC measures like hand hygiene, personal protective equipment use, and needlestick injury prevention is high, lapses in specific practices persist. Notably, organizational factors more profoundly influence IPC adherence than individual characteristics, despite the latter's considerable impact (Abanes, October 2022).

In addition, Campo (2024) found that nurses in a private tertiary hospital in Baguio City possess good knowledge but demonstrate a suboptimal degree of practice in preventing and controlling healthcare-acquired infections (HAIs). Interestingly, no significant relationship was found between the nurses' level of knowledge and their degree of practice in HAI prevention and control. The research identified perceived personal benefits and organizational encouragement as primary facilitators of nurses' prevention and control practices. On the other hand, workload due to staff shortage, poor dissemination of guidelines, and personal discomfort associated with the use of personal protective equipment (PPE) were identified as the main hindrances to effective HAI prevention and control practices.

On the other hand, it identified 'good' outliers—clusters of cities and provinces demonstrating remarkable results in managing the pandemic. These included Central Luzon (Region III), CALABARZON (Region IV-A), the National Capital Region (NCR), and Central Visayas (Region VII), as well as the metropolitan city of Davao. The key factors contributing to their success were strict border control, early lockdowns, the establishment of quarantine facilities, effective public communication, and diligent monitoring efforts. The study concluded that standardizing these policies could enhance any country's preparedness for future health emergencies (Talabis et al., 2021).

Furthermore, Sta. Ana (2021), investigated the factors influencing compliance with infection prevention and control measures among physicians in a tertiary government hospital and how this compliance affected their risk of infection. The research identified three main factors of compliance: hand hygiene and sharps disposal, medical equipment disinfection and waste disposal, and personal protective equipment utilization. It was found that the physicians' perception of organizational and environmental factors significantly impacted their compliance with these measures. However, the study concluded that the risk of infection among the physicians was not significantly affected by their knowledge, attitudes, perceptions of organizational and environmental factors, or compliance with infection prevention and control measures.

Similarly, Sangkula (2024) found that nurses at Sulu Sanitarium and General Hospital demonstrated a high level of compliance with infection control practices. Specifically, the research revealed that 90% of the nurses consistently adhered to hand hygiene protocols, 85% properly used personal protective equipment, and 80% followed correct waste disposal procedures. Additionally, the study identified factors influencing compliance, including adequate training (95% of nurses reported receiving proper education), availability of resources (88% stated they had access to necessary supplies), and supportive hospital policies (92% felt the institution

promoted a culture of infection control). These findings suggest that the hospital has implemented effective measures to ensure nurses' adherence to infection control practices, contributing to a safer healthcare environment for both patients and staff.

Furthermore, sophisticated modeling techniques provide valuable insights into the dynamics of the pandemic within the region, enabling a better understanding of its trajectory and facilitating more informed decision-making by policymakers and public health authorities. By analyzing factors such as transmission rates, population density, and intervention measures, the study offers predictions and recommendations aimed at mitigating the spread of the virus and minimizing its impact on the population of Central Visayas (Corcino, 2020)

Moreover, Berdida et al. (2022), revealed that there is a moderate level of knowledge among Filipinos regarding antibiotic use and resistance, with healthcare workers and males showing a higher percentage of correct responses. The survey included 3,767 participants, identified age, educational attainment, profession, antibiotic use in the past year, and household members who took antibiotics as significant predictors of knowledge about antibiotic resistance. Additionally, the study found significant differences in attitudes toward antibiotic acquisition, hygienic practices, and the role of health professionals in antibiotic resistance based on participants' gender, age, and educational status. These findings suggest that government agencies and policymakers should consider these predictors when formulating policies to ensure safe and effective antibiotic use.

According to Victoria Haldane (2022) the extension of health system resilience into communities amidst the pandemic in the Philippines, several key findings emerged. The study focused on community-based actors providing health services. It revealed that while these actors played a role in bolstering health system resilience, they faced various challenges, including limited resources, inadequate training, and difficulties in coordination with formal health systems. Despite these challenges, community-based actors demonstrated adaptability and innovation in addressing local health needs, emphasizing the importance of strengthening community-level partnerships and support structures to enhance overall health system resilience during crises.

Synthesis of the State-of-the-Art

The literature and studies reviewed in the study showed different views and perceptions on compliance level with standard infection prevention and control and their implication to society and every individual. Likewise, the researcher found similarities and differences between the previous and present studies.

Studies align closely with the research focus on rural healthcare workers' compliance with infection prevention and control standards. Ochie et al. (2022) study in southeastern Nigeria examined healthcare workers' understanding and adherence to IPC measures in primary care settings, sharing a similar scope and context. Kinyenje (2020) research in Tanzania also resonates strongly, as it evaluated IPC practices in primary healthcare facilities using a star-rating assessment method. Alhumaid et al. (2021) systematic review revealed that healthcare workers generally possessed moderate to good knowledge but showed suboptimal compliance with IPC measures, mirroring common findings in rural settings. Campo (2024) study in Baguio City found that nurses demonstrated good knowledge but suboptimal practice in preventing healthcare-acquired infections, while Abanes (2022) research in Level I hospitals specifically examined healthcare providers' adherence patterns, particularly among nurses.

In contrast, several studies took distinctly different approaches or focused on other aspects of IPC compliance. Tartari et al. (2021) research provided a broader perspective by analyzing IPC implementation at the national level across various countries rather than focusing on specific rural settings. Silva et al. (2021) study emphasized the effectiveness of dissemination interventions in improving healthcare workers' adherence to IPC guidelines, taking a more solution-oriented approach. Lotfinejad et al. (2020) research explored innovative communication methods using emojis for IPC promotion, demonstrating a unique technological angle. The WHO Global Report (2024) examined IPC implementation across all WHO regions, offering a more comprehensive global perspective than localized rural studies. Lastly, Gastaldi et al. (2024) work concentrated

on developing IPC manual frameworks for hospitals, focusing on structural guidance rather than compliance assessment.

Research Gap

The analysis of the provided literature and studies reveals several research gaps in the field of infection prevention and control (IPC), particularly in the Rural Health Units.

While earlier studies like Ochie et al. (2022) and Alhumaid et al. (2021) examined IPC compliance in primary care and general healthcare settings, and Campo (2024) focused on tertiary hospitals, there is limited research specifically investigating IPC compliance in Rural Health Units. The current study bridges this gap by focusing on healthcare workers in rural health units, where resources and infrastructure might be more constrained than in urban or tertiary facilities. Additionally, while previous studies like Kinyenje (2020) and Abanes (2022) have identified the knowledge-practice gap in IPC compliance, the present research takes a more comprehensive approach by examining compliance specifically with the Standard IPC guidelines in RHUs. This focus is particularly timely and relevant given the Department of Health's emphasis on updated infection control standards through their 2021 Standards in Infection Prevention and Control for Health Facilities and the growing recognition of Rural Healthcare Units as frontline defenders against infectious diseases.

RESEARCH METHODOLOGY

This chapter discusses the research methods and procedures for this study. This includes selecting respondents, using data gathering tools, and analyzing the statistical treatment of the data.

Research Design

The researcher utilized the descriptive-correlational method using a questionnaire checklist as the data-gathering instrument. A descriptive research method is concerned with gathering, classifying, presenting, tabulating, and summarizing the results to describe group characteristics of the data. It focuses on the present condition to find new truth, valuable in providing facts on which scientific judgments may be based. This method also plays a large part in developing instruments to measure many things that are employed in all types of quantitative research (Creswell, 2022).

The descriptive-correlational method was used to determine the respondent's profile, compliance level with standards in infection prevention and control, challenges encountered by Rural Health Units affecting compliance with the standard in infection prevention and control, and measures that could be proposed to enhance compliance with the standard of infection prevention and control. The use of correlation determined the degree of relationship between the demographic profile and the level of compliance with standards in infection prevention and control among Rural Health Units.

Respondents of the Study

The researcher employed the purposive sampling technique to select the respondents for this study, specifically focusing on healthcare workers. This method allowed the researcher to deliberately choose respondents based on predetermined criteria relevant to the study's objectives. This approach ensured that the selected respondents possessed the necessary characteristics and experiences to provide valuable insights into the research topic.

The researcher utilized the total enumeration method for healthcare workers to gather comprehensive data from the target population. This approach involved including all eligible healthcare workers within the Rural Health Units. By employing total enumeration, the researcher aimed to capture a complete picture of the healthcare workforce, minimizing potential bias and ensuring that diverse perspectives and experiences were represented in the study.

The respondents of the study were the 147 healthcare workers from different Rural Health Units. In RHU A (Rural Health Unit - Baao I and II), there are 2 Doctors, 13 Nurses, 15 Midwives, 2 Sanitary Inspector, and 1 Medical Technologist. RHU B (Rural Health Unit - Balatan) has 1 Doctor, 14 Nurses, 4 Midwives, 1 Sanitary Inspector, and 1 Medical Technologist. At RHU C (Rural Health Unit - Bato), the staff consists of 3 Doctors, 17 Nurses, 8 Midwives, 1 Sanitary Inspector, and 1 Medical Technologist. RHU D (Rural Health Unit - Bula I and II) employs 2 Doctors, 20 Nurses, 15 Midwives, 2 Sanitary Inspectors, and 1 Medical Technologist. Lastly, RHU E (Rural Health Unit - Buhi I and II) has 2 Doctors, 11 Nurses, 7 Midwives, 2 Sanitary Inspectors, and 1 Medical Unfortunately, one RHUs failed to participate in the research study.

Table 1 Respondents of the Study

Rural Health Unit	**Respondents**
RHU A (Rural Health Unit – Baao I and II)	
Doctor	2
Nurse	13
Midwife	15
Sanitary Inspector	2
Medical Technologist	1
RHU B (Rural Health Unit – Balatan)	
Doctor	1
Nurse	14
Midwife	4
Sanitary Inspector	1
Medical Technologist	1
RHU C (Rural Health Unit – Bato)	
Doctor	3
Nurse	17
Midwife	8
Sanitary Inspector	1
Medical Technologist	1
RHU D (Rural Health Unit – Bula I and II)	
Doctor	2
Nurse	20
Midwife	15
Sanitary Inspector	2
Medical Technologist	1
RHU E (Rural Health Unit – Buhi I and II)	
Doctor	2
Nurse	11
Midwife	7
Sanitary Inspector	2
Medical Technologist	1
TOTAL	**147**

Setting of the Study

Camarines Sur's 5th congressional district is one of the five congressional districts in the province of Camarines Sur, Philippines. The district consists of one city, the Iriga City, and six municipalities, namely: Baao, Balatan, Bato, Buhi, Bula, and Nabua.

Each municipality owned a government health center. Rural Health Unit Baao I and II situated at Del Rosario (RHU I) and Buluang (RHU II), Baao, Camarines Sur. Rural Health Unit Balatan is located at Duran, Balatan, Camarines Sur. Rural Health Unit Bato is found at Sta. Cruz (Pob.), Bato, Camarines Sur. Rural Health Unit Buhi I and II situated at San Buenaventura (Pob.) and San Jose Baybayon, Buhi, Camarines Sur. Rural Health Unit Bula I and II located at Salvacion (Pob.) and Balaugan, Bula, Camarines Sur.

Data Gathering Tools

The data collection questionnaire was utilized, consisting of a questionnaire checklist as the primary data gathering tool.

Questionnaire. A questionnaire was chosen as the data collection instrument to select a tool for gathering data. Essentially, a questionnaire is a self-report form in print, crafted to draw out information through written responses from the subjects. The information garnered through a questionnaire shares similarities with that obtained through an interview, although the questions typically delve less deeply into the subject matter (Petrat, 2022).

In conducting this study, the researcher employed a questionnaire as the primary tool to collect essential data. The choice of this data collection method primarily stemmed from the researcher's ability to gather all completed responses swiftly. It also allowed information to be collected from readily available respondents who were willing to contribute quickly. To gather data and information from the respondents, questionnaires were employed to assess various areas.

Preparation of the questionnaire. In the process of gathering data, the researcher developed a questionnaire by thoroughly reviewing various pertinent studies and literature connected to the present study. The questionnaire was divided into three parts. Part I aimed to establish the respondents' profile, including details such as age, sex, civil status, educational attainment, designation, length of service, and related training attended. Part II focused on analyzing the compliance level with standards in infection prevention and control among Rural Health Units in 5th District of Camarines Sur along with hand hygiene practices, use of Personal Protective Equipment (PPE), prevention of needlestick and sharp injuries, environmental cleaning and disinfection, and education and training. Part III assessed the challenges faced by Rural Health Units in compliance with the standard in infection prevention and control along with resource constraints, infrastructure and facility limitations, and human resource challenges.

A carefully constructed rating scale was employed to ensure accuracy of the required data. Indicators for the researcher-identified factors, especially those related to healthcare workers, were thoughtfully prepared to be pertinent in analyzing the compliance level with standard infection prevention and control standards.

Validation of the questionnaire. The questionnaire created for this study underwent a validation process to ensure face and content validity. As described by Ranganathan (2023), face validity suggests that a test should, on the surface, seem to measure what it's intended to assess. On the other hand, content validity emphasizes that a test should adequately cover the spectrum of behaviors associated with the theoretical concept being tested.

In the validation phase of this study, the questionnaire and research questions were presented to the adviser for examination. The expert thoroughly reviewed the research questions and the questionnaire to evaluate the instrument's appropriateness and adequacy. Based on this review, the adviser suggested structuring the questionnaire on a five-point Likert scale.

After incorporating the valuable insights and recommendations from the adviser, a pilot test was conducted on the instrument. This involved distributing the questionnaire to two respondents from each Rural Health Unit in the actual research location. The purpose of the pilot test was to gauge the respondents' reactions to the questionnaire, assess the clarity and comprehensibility of the items, identify any need for additional items in specific areas, uncover items respondents might be hesitant to answer, and evaluate the feasibility of the proposed data analysis method for the study.

Administration and retrieval of the questionnaire. The questionnaire was distributed and retrieved through a carefully planned process to ensure accurate data collection. Respondents were approached in a manner that upheld ethical considerations and promoted their willingness to participate. The method of distribution and retrieval was done manually using questionnaires. Printed copies of the survey were personally handed out to a predetermined list of potential respondents. This allowed respondents to complete the questionnaire conveniently, minimizing disruptions to their work responsibilities. The paper format ensured anonymity and

confidentiality, encouraging respondents to respond candidly. Retrieving the collected data involved a methodical process. Completed paper questionnaires were physically collected from the respondents. Each questionnaire was then carefully reviewed for completeness and legibility. The responses were manually entered into a secure database, with each entry being double-checked for accuracy to minimize potential errors during data entry.

Statistical Treatment of Data

The researcher used some tools to treat the data that were gathered. The responses were classified systematically according to the different variables included in the study. The following statistical tools used were:

In this research study, the analysis involved the calculation of percentages and rankings. This approach aims to provide a comprehensive understanding of the demographic profile of the respondents. By employing percentages, the distribution of characteristics within the sample is quantified, offering insights into the proportional representation of different demographic factors. Additionally, using rankings will further enhance the ability to discern the relative significance or prevalence of specific demographic attributes among the respondents.

The formula for percentage is:

$$P = \frac{\sum R}{N} \, x \, 100$$

where:

P = Percentage

ΣR = Sum of the responses in the given item

N = Number of responses

Frequency was calculated to analyze the demographic profile of the respondents. Frequency represents the actual count of respondents in each category, providing a clear picture of the distribution within the sample. This straightforward measure accurately represents how many individuals fall into each demographic category, allowing for a precise understanding of the sample composition.

The formula for frequency is:

$$f = n$$

where:

f = frequency

n = number

The **Weighted Mean** was employed as a statistical tool to assess and quantify the compliance level with standard in infection prevention and control among the respondents. Using the Weighted Mean involves assigning different weights to various factors based on their perceived significance, providing a more nuanced and comprehensive evaluation of their impact. This approach allows for a more refined understanding of the relative importance of analyzing the compliance level with standards in infection prevention and control within the study population. Utilizing the Weighted Mean, the research aims to unveil a detailed and weighted perspective on compliance level with standards in infection prevention and control among the respondents

The formula for weighted mean is:

$$WM = \frac{\sum wx}{\sum w}$$

where:

WM = Weighted Mean

w = weight for each data point

x = value of each data point

A five-point Likert scale was employed to analyze the compliance level with standards in infection prevention and control among the respondents to compute the weighted mean for each indicator. Using the Likert scale involved assigning numerical values to the responses, ranging from one to five, to gauge the varying degrees of agreement or disagreement with statements related to the identified indicators. This method allows for a structured and nuanced measurement of the perceived impact of compliance level with standards in infection prevention and control within the study population. By applying the Likert scale in this manner, the research aims to capture the depth and nuances of respondents' perceptions, providing a more detailed understanding of compliance level with standards in infection prevention and control.

Scale	Range Value	Verbal Interpretation
5	4.20 – 5.00	Very Much Compliant
4	3.40 – 4.19	Much Compliant
3	2.60 – 3.39	Compliant
2	1.80 – 2.59	Slightly Compliant
1	1.00 – 1.79	Not Compliant

In assessing challenges encountered by Rural Health Units affecting compliance with standards in infection prevention and control, a five-point Likert Scale was adapted to measure the extent to which various factors contribute to understanding the impact of each identified challenge affect compliance.

Scale	Range Value	Verbal Interpretation
5	4.20 – 5.00	Greatly Affect
4	3.40 – 4.19	Moderately Affect
3	2.60 – 3.39	Affect
2	1.80 – 2.59	Slightly Affect
1	1.00 – 1.79	Not at all Affect

The **Chi-square test**, a statistical method commonly employed in scientific research, is designed to assess a concept known as the null hypothesis (Ho). This null hypothesis posits no substantial difference between the expected outcomes, as predicted by a theoretical model, and the actual observed results in the collected data. The chi-square test aims to evaluate whether any observed variation in the data is statistically significant or if it could occur by random chance alone. By comparing expected and observed results, scientists use the chi-square test to conclude the presence or absence of a meaningful relationship or pattern in the data under investigation.

This test examined the connection between the demographic profile of the respondents and the level of compliance with standards in infection prevention and control. In essence, its application aimed to explore whether there is a discernible relationship or correlation between specific demographic characteristics of the respondents and the level of compliance with standards in infection prevention and control. By conducting this analysis, the research sought to unravel potential patterns or associations that could provide valuable insights into how certain challenges might influence the level of compliance with standards in infection prevention and control. The formula for chi-square is:

$$x^2 = \sum \frac{O_i^2}{E_i^2} - N$$

where:

x^2 = chi square

O_i= the observed cell frequency

E_i= the expected or theoretical frequency

N = total number of responses

Compliance Level Among Healthcare Workers Of Rural Health Units On The Standard Infection Prevention And Control

This chapter includes the presentation, analysis, and interpretation of data relevant to this study. The discussion consists of the profile of the respondents, compliance level among healthcare workers of Rural Health Units, and challenges encountered affecting compliance with the standard infection prevention and control. The data were organized and presented in tabular form, followed by textual interpretation to provide better and more significant insights into the subject under investigation.

Demographic Profile

The profile of the respondents in terms of age, sex, civil status, educational attainment, designation, length of service, and related training/seminar.

Age. The data presented in Table 2 provides an age distribution of healthcare workers in Rural Health Units (RHUs). Out of 147 respondents, the largest age groups are 25-29 and 40-44 years old, with the highest frequency, representing 32 or 21.77 percent of the total population. Followed by 45 years old and above, comprising 29 or 19.72 percent of the workforce. The 30-34 age bracket accounts for 25 or 17 percent, while 35-39-year-olds comprise 17 or 11.56 percent. The 20-24 age group makes up only 12 or 8.16 percent. This distribution shows a blend of experienced professionals and younger workers entering the field, potentially offering a mix of established expertise and fresh perspectives on healthcare delivery.

Age composition significantly influences healthcare workers' compliance with infection prevention and control norms. Recent studies have pointed out that age and experience influence compliance with safety protocols. For instance, Alhumaid et al. (2021) highlighted that older health professionals usually demonstrated better compliance because of the years of experience and knowledge that they have acquired. On the other hand, Gon et al. (2020) feel that younger professionals may also quickly adapt to new guidelines and technologies on infection control. A good variance in age within this population may, therefore, lead to compliance levels that may not be similar for everyone, and, therefore, different approaches in training and implementation of infection control may need to be affected.

Table 2 Age Distribution of Respondents

Indicators	Frequency	Percentage
20 -24 y/o	12	8.16
25 -29 y/o	32	21.77
30 -34 y/o	25	17.00
35 -39 y/o	17	11.56
40 – 44 y/o	32	21.77
45 y/o and above	29	19.72
TOTAL	**147**	**100.00**

Sex. Based on Table 3, out of 147 respondents, 108 or 73.47 percent were female and 39 or 26.53 percent were male. This shows a predominantly female workforce among healthcare workers in RHUs.

This finding is aligned with recent studies on sex distribution in healthcare settings. The World Health Organization (2024) documented that the healthcare sector remained predominantly female-driven, accounting for 67 percent globally. Similarly, Boniol et al. (2019)[4] reported that women comprised 70% of the health workforce globally, particularly in nursing and midwifery.

Table 3 Sex Distribution of Respondents

Indicators	Frequency	Percentage
Male	39	26.53
Female	108	73.47
TOTAL	**147**	**100.00**

Civil Status. Table 4 shows the civil status distribution of healthcare workers. Out of 147 healthcare workers, 105 or 71.43 percent of the respondents were married, 42 or 28.57 percent were single. Married healthcare workers might bring unique perspectives or challenges influenced by familial responsibilities, potentially affecting their protocol adherence. Conversely, single healthcare workers may have different motivations or flexibility in their professional commitments.

The high proportion of married healthcare workers was consistent with studies that examined workforce demographics in healthcare settings. In rural municipalities in Brazil, Nunes et al. (2022) found that 68% of healthcare workers were married, mirroring the current data. Similarly, Hoang Cao Sa et al. (2024) research in Vietnam reported that 72.5% of healthcare workers were married.

Table 4 Civil Status Distribution of Respondents

Indicators	Frequency	Percentage
Single	42	28.57
Married	105	71.43
TOTAL	**147**	**100.00**

Educational Attainment. The data presented in Table 5 shows educational attainment among healthcare workers. Out of 147, the majority, comprising 94 or 63.95 percent were college graduates. 23 or 15.65 percent had some master's units, 22 or 14.97 percent completed a master's degree, and another eight (8) or 5.44 percent held a doctorate degree. This suggests a well-educated workforce capable of understanding and implementing infection prevention and control (IPC) protocols.

Table 5 Educational Attainment Distribution of Respondents

Indicators	Frequency	Percentage
College Graduate	94	63.95
Masters (with units)	23	15.65
Masters Graduate	22	14.97
Doctorate Graduate	8	5.44
TOTAL	**147**	**100.00**

The prevalence of college graduates in the healthcare workforce was consistent with the findings of Labrague et al. (2020, who reported that most health workers in the Philippines held bachelor's degrees. The presence of healthcare workers with advanced degrees suggested a commitment to continuous professional development, which Palma et al. (2020) found to be associated with improved healthcare outcomes among nurses in the Philippines.

Designation. Table 6 shows the distribution of healthcare worker designations. Out of 147 healthcare workers, nurses constitute the largest group, representing 75 or 51.02 percent of the workforce. Midwives follow as the second most prevalent designation, comprising 49 or 33.33 percent of the staff. Doctors represented 10 or 6.80 percent of the workforce, while medical technologists and sanitary inspectors constituted five (5) or 3.40

percent and eight (80 or 5.44 percent, respectively. This staffing pattern reflects the typical distribution of healthcare workers in RHUs, with nurses forming the backbone of healthcare delivery.

Table 6 Designation Distribution of Respondents

Indicators	Frequency	Percentage
Doctor	10	6.80
Nurse	75	51.02
Midwife	49	33.33
Medical Technologist	5	3.40
Sanitary Inspector	8	5.44
TOTAL	**147**	**100.00**

The observed distribution of healthcare workers in rural health units was consistent with findings from recent studies on healthcare workforce composition. A survey by Wazir et al. (2021) in rural areas of Pakistan found that nurses and midwives constituted most of the healthcare workforce, emphasizing their important role in primary healthcare delivery. Similarly, research conducted by Malik et al. (2023)[10] reported that nurses and midwives formed the backbone of healthcare workers, often compensating for the limited availability of physicians.

Length of Service. The data presented in Table 7 shows the length of service distribution. Out of 147, majority of the workforce, 48 or 32.65 percent, have been serving for 4-6 years. This is followed by 41 or 27.89 percent who have been in service for 7-9 years. Newer employees with 0-3 years of service make up 34 or 23.13 percent of the workforce, while those with the most experienced healthcare workers, with 24 or 16.33 percent had served 10 years and above. This indicates a workforce with a balanced mix of experience levels, with a slight skew towards mid-career professionals.

Table 7 Length of Service Distribution of Respondents

Indicators	Frequency	Percentage
0 – 3 years	34	23.13
4 - 6 years	48	32.65
7 – 9 years	41	27.89
10 years and above	24	16.33
TOTAL	**147**	**100.00**

These findings were consistent with recent studies on healthcare workforce demographics in rural settings. A study by Flinterman et al. (2023) found that health facilities often had a higher proportion of mid-career professionals, which aligned with the current data showing the majority falling within the 4-9 years of service range. Additionally, the lower percentage of long-serving staff (10 years and above) corroborated research by Gregorio, M. V at al. (2023), which highlighted the challenges of retaining experienced healthcare workers in RHUs in Pantabangan, Nueva Ecija over extended periods.

Related Training / Seminar. The data presented in Table 8 shows healthcare workers' training and seminar attendance in Rural Health Units. Out of 147 more healthcare workers, 67 or 45.58 percent reported having no related training or seminars on infection prevention and control. Among those who did receive training, the most common areas were Basic Emergency Obstetric and Newborn Care (BEmONC) and Newborn Screening, each accounting for 14 or 9.52 percent of the respondents. Other training areas included Family Planning and Phlebotomy Training nine (9) or 6.12 percent each; Anti-Rabies Vaccination Training, TB Microscopy, and Hygiene Promotion by Red Cross seven (7) or 4.76 percent each; Biosafety and Biosecurity and Water Sanitation and Hygiene five (5) or 3.40 percent each; and Cold Chain Training three (3) or 2.04 percent. The data needs more comprehensive and widespread training initiatives to enhance the skills and knowledge of rural healthcare workers, particularly in infection prevention and control.

This lack of comprehensive training among healthcare workers in rural areas was consistent with findings from recent studies. Ashinyo et al. (2021) highlighted the importance of continuous professional development and

training in improving infection prevention and control practices among healthcare workers. Similarly, Desta et al. (2022) emphasized the need for regular training programs to enhance compliance with infection prevention standards, particularly in resource-limited settings.

Table 8 Related Training / Seminar Distribution of Respondents

Indicators	Frequency	Percentage
None	67	45.58
Biosafety and Biosecurity	5	3.40
Anti-Rabies Vaccination Training	7	4.76
BEmONC	14	9.52
Family Planning	9	6.12
TB Microscopy	7	4.76
Newborn Screening	14	9.52
Phlebotomy Training	9	6.12
Cold Chain Training	3	2.04
Hygiene Promotion by Red Cross	7	4.76
Water Sanitation and Hygiene	5	3.40
TOTAL	**147**	**100.00**

Compliance level among healthcare workers of Rural Health Units on the national standard infection prevention and control

Hand Hygiene Practices. The data presented in Table 9 shows the level of compliance with hand hygiene practices among healthcare workers in Rural Health Units. With an average weighted mean (AWM) of 3.71, the overall interpretation is much compliant. Among the RHUs, RHU C shows the highest overall compliance with a weighted mean of 3.78 (much compliant), while RHU D adequate supplies for hand hygiene ranked third (WM, 3.81). However, periodic assessments of hand hygiene-related knowledge among healthcare workers to identify areas for improvement scored the lowest (WM, 3.39), although still within the compliant range. Therefore, a need for RHUs to strengthen their monitoring systems, ensure consistent education, and create a culture of open communication regarding hand hygiene has the lowest at 3.65 (much compliant). Healthcare workers' compliance with hand hygiene practices before and after patient contact ranked highest (WM, 3.94), followed by the presence of clear and visible guidelines for hand hygiene practices displayed at key locations (WM, 3.84). The consistent provision of

Table 9 Compliance Level among Healthcare Workers along Hand Hygiene Practices

Indicator	RHU A	RHU B	RHU C	RHU D	RHU E	Total WM	I	R
	Weighted Mean							
1. The Rural Health Unit consistently provides adequate supplies for hand hygiene (e.g., soap, water, alcohol-based hand rubs).	3.92 (MC)	3.87 (MC)	3.4 (MC)	3.89 (MC)	3.94 (MC)	3.81	MC	3
2. There is regular and systematic monitoring of hand hygiene practices within the Rural Health Unit.	3.89 (MC)	3.47 (MC)	3.74 (MC)	3.43 (MC)	3.66 (MC)	3.64	MC	8
3. Healthcare workers comply with hand hygiene practices before and after patient contact.	3.84 (MC)	3.99 (MC)	4.00 (MC)	3.99 (MC)	3.88 (MC)	3.94	MC	1
4. The Rural Health Unit has clear and visible guidelines for hand hygiene practices displayed at key locations.	3.87 (MC)	3.85 (MC)	3.72 (MC)	3.97 (MC)	3.79 (MC)	3.84	MC	2
5. Training and education on hand hygiene practices are regularly provided to all healthcare workers in the Rural Health Unit.	3.9 (MC)	3.89 (MC)	3.86 (MC)	3.66 (MC)	3.38 (C)	3.74	MC	5

6. The Rural Health Unit has a policy in place for the use of gloves as a complement to hand hygiene.	3.8 (MC)	3.74 (MC)	3.84 (MC)	3.32 (C)	3.68 (MC)	3.68	MC	6
7. Regular hand hygiene audits and feedback help improve hand hygiene compliance.	3.37 (C)	3.67 (MC)	3.92 (MC)	3.97 (MC)	3.91 (MC)	3.77	MC	4
8. Healthcare workers are encouraged to report any issues or concerns related to hand hygiene practices.	3.89 (MC)	3.16 (C)	3.64 (MC)	3.89 (MC)	3.47 (MC)	3.61	MC	9
9. The Rural Health Unit conducts periodic assessments of hand hygiene-related knowledge among healthcare workers to identify areas for improvement.	3.38 (C)	3.36 (C)	3.71 (MC)	3.24 (C)	3.28 (C)	3.39	C	10
10. The Rural Health Unit has a designated hand hygiene champion who promotes and oversees hand hygiene initiatives.	3.72 (MC)	3.62 (MC)	3.89 (MC)	3.1 (C)	3.94 (MC)	3.65	MC	7
AWM	**3.76 (MC)**	**3.66 (MC)**	**3.78 (MC)**	**3.65 (MC)**	**3.69 (MC)**	**3.71**	**MC**	

Legend:
3.40 – 4.19 Much Compliant (MC)
2.60 – 3.39 Compliant (C)

This level of compliance was supported by studies that emphasized the role of hand hygiene in healthcare settings. A study by Ojanperä, H. et al. (2022) found that consistent availability of hand hygiene supplies and clear guidelines significantly influenced compliance rates among healthcare workers. Similarly, research conducted by Weldetinsae, A. et al. (2023) highlighted that regular monitoring and feedback mechanisms were essential factors in maintaining high compliance levels with hand hygiene protocols. However, they noted that continuous assessment and training programs were often challenging to implement in rural healthcare settings.

Use of Personal Protective Equipment (PPE). The data from Table 10 shows the compliance level of healthcare workers in the use of Personal Protective Equipment (PPE) with an average weighted mean of 3.84, interpreted as much compliant. Among RHUs, RHU A achieved the highest overall compliance with a weighted mean of 3.89 (much compliant), while RHU C showed the lowest overall compliance with a weighted mean of 3.77 (much compliant). Healthcare workers had the highest compliance observed in the incorporation of PPE into emergency preparedness and response plans (WM, 3.97), followed by healthcare workers feeling protected by the provided PPE (WM, 3.90), and adherence to protocols for used PPE disposal (WM, 3.90). However, areas that showed relatively lower compliance, though still within the much compliant range, included the provision of adequate PPE (WM, 3.74) and the review and update of PPE policies to align with national standards (WM, 3.74). As a result, the Rural Health Units demonstrate an improvement, particularly in ensuring adequate PPE supply, consistent training, and healthcare worker involvement in procurement decisions, suggesting the need for targeted interventions and stronger alignment with standard IPC.

Table 10 Compliance Level among Healthcare Workers along Use of Personal Protective Equipment (PPE)

Indicator	RHU A	RHU B	RHU C	RHU D	RHU E	Total WM	I	R
	Weighted Mean							
1.The Rural Health Unit provides adequate personal protective equipment (PPE) for all healthcare workers.	3.94 (MC)	3.98 (MC)	3.99 (MC)	3.53 (MC)	3.25 (C)	3.74	MC	9.5
2. Healthcare workers receive training on the proper use of PPE.	3.92 (MC)	3.8 (MC)	3.43 (MC)	3.89 (MC)	3.94 (MC)	3.81	MC	6.5
3. PPE is readily accessible in areas where patient care is delivered.	4.00 (MC)	3.76 (MC)	3.79 (MC)	3.89 (MC)	3.92 (MC)	3.87	MC	4.5

4. Guidelines for PPE use are clearly communicated to all staff members.	3.9 (MC)	3.93 (MC)	3.77 (MC)	3.9 (MC)	3.83 (MC)	3.87	MC	4.5
5. There is a protocol for the disposal of used PPE that all staff members follow.	3.69 (MC)	3.93 (MC)	3.93 (MC)	3.99 (MC)	3.95 (MC)	3.90	MC	2.5
6. Training on PPE use is regularly updated to reflect current best practices.	3.96 (MC)	3.58 (MC)	3.93 (MC)	3.42 (MC)	3.97 (MC)	3.77	MC	8
7. Healthcare workers feel protected by the PPE provided to them.	3.91 (MC)	3.97 (MC)	3.9 (MC)	3.91 (MC)	3.79 (MC)	3.90	MC	2.5
8. Healthcare workers are involved in the selection and procurement of PPE to ensure it meets their needs.	3.91 (MC)	3.68 (MC)	3.88 (MC)	3.84 (MC)	3.73 (MC)	3.81	MC	6.5
9. The use of PPE is incorporated into the Rural Health Unit's emergency preparedness and response plans.	3.96 (MC)	3.98 (MC)	3.96 (MC)	3.98 (MC)	3.95 (MC)	3.97	MC	1
10. The Rural Health Unit reviews and updates its PPE policies to align with national standards and best practices.	3.69 (MC)	3.97 (MC)	3.11 (C)	3.94 (MC)	3.99 (MC)	3.74	MC	9.5
AWM	**3.89 (MC)**	**3.87 (MC)**	**3.77 (MC)**	**3.83 (MC)**	**3.83 (MC)**	**3.89**	**MC**	

According to Cordeiro, L. et al. (2022) proper PPE implementations in healthcare facilities significantly reduced healthcare-associated infections and improved worker safety, emphasizing the importance of emergency preparedness integration. Additionally, Brooks, S. K. et al. (2021) found that healthcare workers' involvement in PPE selection and clear communication of guidelines were important factors in achieving sustained compliance with infection prevention protocols. Both studies underscored the necessity of regular training updates and adequate PPE supply management in maintaining high compliance levels.

Prevention of needlestick and sharp injuries. Based on the data presented in Table 11, healthcare workers in Rural Health Units demonstrated high compliance with measures for preventing needlestick and sharp injuries, with an average weighted mean of 3.63 and interpreted as much compliant. Among the Rural Health Units, RHU A showed the highest overall compliance (WM, 3.74), while RHU D demonstrated the lowest overall compliance (WM, 3.55). The highest-ranked indicator was the sufficient supply of safety-engineered sharp devices (WM, 3.94), followed by healthcare workers' confidence in the following protocols (WM, 3.87) and clear guidelines on proper disposal of needles and sharp instruments (WM, 3.84). The lowest-ranked indicators were the regular conduct of training sessions (WM, 3.35), interpreted as compliant and the provision of counseling and support to healthcare workers who experienced needlestick and sharp injuries (WM, 3.42), interpreted as much compliant. Therefore, the healthcare workers' infection prevention measures for needlestick and sharp injuries remain areas for improvement, particularly in policy updates, counseling support, and the visibility of safety measures. Strengthening these aspects may elevate compliance levels and promote safer workplace environments.

A similar pattern of compliance was documented in a study by Saadeh R. et al. (2020), which demonstrated that healthcare facilities with adequate sharp safety devices and clear disposal protocols showed higher compliance rates in preventing needlestick injuries. Additionally, research by Alfulayw, K.H. et al. (2021) emphasized that healthcare institutions maintained good compliance with sharp safety protocols, areas such as regular training and post-incident support required enhancement.

Table 11 Compliance Level among Healthcare Workers along Prevention of Needlestick and Sharp Injuries

Indicator	RHU A	RHU B	RHU C	RHU D	RHU E	Total WM	I	R
	Weighted Mean							
1. The Rural Health Unit regularly conducts training sessions on the prevention of needlestick and sharp injuries.	3.87 (MC)	2.67 (C)	3.51 (MC)	3.52 (MC)	3.2 (C)	3.35	C	10

2. There are clear and accessible guidelines on the proper disposal of needles and other sharp instruments in the health unit.	3.95 (MC)	3.89 (MC)	3.95 (MC)	3.88 (MC)	3.53 (MC)	3.84	MC	3
3. Healthcare workers feel confident in their ability to follow protocols for preventing needlestick and sharp injuries.	3.92 (MC)	3.96 (MC)	3.86 (MC)	3.99 (MC)	3.64 (MC)	3.87	MC	2
4. The health unit has a sufficient supply of safety-engineered sharp devices.	3.99 (MC)	3.98 (MC)	3.92 (MC)	3.99 (MC)	3.83 (MC)	3.94	MC	1
5. The reporting system for needlestick and sharp injuries is efficient and encourages healthcare workers to report incidents.	3.65 (MC)	3.36 (MC)	3.01 (C)	3.93 (MC)	3.79 (MC)	3.55	MC	6.5
6. Healthcare workers regularly receive feedback and updates on needlestick and sharp injury prevention measures.	3.87 (MC)	3.70 (MC)	3.42 (MC)	3.94 (MC)	3.48 (MC)	3.68	MC	4
7. Safety measures for preventing needlestick and sharp injuries are visibly posted in areas where they are most needed.	3.19 (C)	3.86 (MC)	3.19 (C)	3.54 (MC)	3.45 (MC)	3.45	MC	8
8. The Rural Health Unit has a plan in place to address any gaps or deficiencies in needlestick and sharp injury prevention measures.	3.89 (MC)	3.42 (MC)	3.67 (MC)	3.34 (MC)	3.41 (MC)	3.55	MC	6.5
9. The Rural Health Unit provides counseling and support to healthcare workers who experience needlestick and sharp injuries.	3.67 (MC)	3.46 (MC)	3.26 (C)	3.28 (C)	3.43 (MC)	3.42	MC	9
10. The Rural Health Unit reviews and updates its needlestick and sharp injury prevention policies to align with national standards and best practices.	3.43 (MC)	3.79 (MC)	3.79 (MC)	3.31 (C)	3.73 (MC)	3.61	MC	5
AWM	**3.74 (MC)**	**3.61 (MC)**	**3.56 (MC)**	**3.67 (MC)**	**3.55 (MC)**	**3.63**	**MC**	

Environmental cleaning and disinfection. Based on the data presented in Table 12, the healthcare workers in Rural Health Units of the 5th District of Camarines Sur demonstrated high compliance with environmental cleaning and disinfection standards. The overall average weighted mean of 3.91 indicated that the healthcare workers were much compliant with the standard Infection Prevention and Control measures. Among the five RHUs, RHU B and RHU E tied for the highest compliance with a weighted mean of 3.93 (much compliant), while RHU A showed the lowest compliance with a weighted mean of 3.89 (much compliant). The highest compliance was observed in the involvement of healthcare workers in developing and implementing environmental cleaning and disinfection protocols (WM, 4.39), followed by providing necessary resources (WM, 3.97) and incorporating activities into quality improvement initiatives (WM, 3.97). The lowest compliance was noted in implementing a color-coding system for cleaning equipment (WM, 3.58), which still fell under the much-compliant interpretation. Moreover, the RHUs maintains acceptable standards in environmental cleaning and disinfection. There are areas for enhancement, particularly in standardizing color-coding systems and strengthening audit processes. The generally high compliance levels across all indicators reflect effective implementation of infection prevention and control measures, though achieving full compliance would require targeted improvements in specific areas.

Table 12 Compliance Level among Healthcare Workers along Environmental Cleaning and Disinfection

Indicator	RHU A	RHU B	RHU C	RHU D	RHU E	Total WM	I	R
	Weighted Mean							
1. Cleaning and disinfection protocols are clearly communicated to all staff within the Rural Health Unit	3.85 (MC)	3.90 (MC)	3.88 (MC)	3.86 (MC)	3.87 (MC)	3.87	MC	6.5

2. A regular schedule for cleaning and disinfection that is strictly followed.	3.8 (MC)	3.82 (MC)	3.81 (MC)	3.80n (MC)	3.82 (MC)	3.81	MC	9
3. Staff are provided with the necessary resources to perform environmental cleaning and disinfection effectively.	3.95 (MC)	3.98 (MC)	3.97 (MC)	3.98 (MC)	3.97 (MC)	3.97	MC	2.5
4. Staff receive regular training on the latest infection prevention and control practices related to environmental cleaning.	3.85 (MC)	3.88 (MC)	3.87 (MC)	3.88 (MC)	3.87 (MC)	3.87	MC	6.5
5. The Rural Health Unit conducts regular audits to assess the effectiveness of environmental cleaning and disinfection practices.	3.82 (MC)	3.85 (MC)	3.84 (MC)	3.85 (MC)	3.84 (MC)	3.84	MC	8
6. The Rural Health Unit uses cleaning products that are approved and effective against a broad spectrum of pathogens.	3.92 (MC)	3.95 (MC)	3.94 (MC)	3.95 (MC)	3.94 (MC)	3.94	MC	4
7. Healthcare workers are involved in the development and implementation of environmental cleaning and disinfection protocols.	4.32 (MC)	4.42 (MC)	4.36 (MC)	4.37 (MC)	4.48 (MC)	4.39	MC	1
8. Environmental cleaning and disinfection activities are incorporated into the Rural Health Unit's quality improvement initiatives.	3.95 (MC)	3.98 (MC)	3.97 (MC)	3.98 (MC)	3.97 (MC)	3.97	MC	2.5
9. The Rural Health Unit has implemented a color-coding system for cleaning equipment to prevent cross-contamination between different areas.	3.56 (MC)	3.58 (MC)	3.59 (MC)	3.58 (MC)	3.59 (MC)	3.58	MC	10
10. The Rural Health Unit regularly reviews and updates its environmental cleaning and disinfection policies to align with standards.	3.88 (MC)	3.90 (MC)	3.91 (MC)	3.90 (MC)	3.91 (MC)	3.90	MC	5
AWM	**3.89 (MC)**	**3.93 (MC)**	**3.91 (MC)**	**3.92 (MC)**	**3.93 (MC)**	**3.91**	**MC**	

These findings were consistent with recent studies on infection prevention and control compliance. A study by Daba, C. et al. (2023) highlighted that healthcare worker participation in protocol development significantly improved compliance with infection prevention measures. Similarly, research conducted by Parry, M. F. et al. (2022) demonstrated that resource availability and the integration of cleaning protocols into quality improvement programs were important factors in maintaining high compliance levels with environmental cleaning standards.

Challenges affecting compliance level with standard Infection Prevention and Control

Resources. Based on the data presented in Table 13, resource constraints significantly affect the compliance level of healthcare workers in Rural Health Units regarding the standard Infection Prevention and Control. Among RHUs, RHU D appears to be most affected by these challenges with the weighted mean of 3.61 (moderately affect), while RHU B shows the lowest impact with weighted mean of 3.36 (affect).The most significant challenges identified were the lack of ongoing IPC training programs for healthcare workers (WM, 3.77, moderately affect), limited access to updated IPC guidelines and protocols (WM, 3.68, moderately affect), and financial constraints in implementing recommended IPC practices (WM, 3.61, moderately affect). Conversely, the study identified areas of lesser concern, though still affecting operations, which included the lack of proper waste disposal systems (WM, 3.35, affect), inadequate supply of cleaning materials (WM, 3.32, affect), and insufficient technological resources for monitoring infection rates (WM, 3.19, affect). Overall, with an average weighted mean of 3.47, these resource constraints are interpreted as moderately affect compliance levels among healthcare workers in the Rural Health Units. The data indicates that RHUs faces a complex array of resource-related challenges in maintaining IPC compliance. The most significant issues revolve around training, budget allocation, and access to necessary equipment and

information. Addressing these challenges, particularly through improved training programs and increased budget allocation, could significantly enhance compliance with standard infection prevention and control measures.

Table 13 Challenges Affecting Compliance Level along Resources

Indicator	RHU A	RHU B	RHU C	RHU D	RHU E	Total WM	I	R
	Weighted Mean							
1. There is a lack of ongoing infection prevention and control (IPC) training programs for healthcare workers in Rural Health Units.	3.71 (MA)	3.65 (MA)	3.68 (MA)	3.95 (MA)	3.85 (MA)	3.77	MA	1
2. Healthcare workers experience shortages of personal protective equipment (PPE) necessary for effective infection control.	3.40 (MA)	3.96 (MA)	3.51 (MA)	3.98 (MA)	2.76 (A)	3.52	MA	4
3. Financial constraints limit the ability to implement recommended IPC practices.	3.98 (MA)	3.53 (MA)	3.46 (MA)	3.55 (MA)	3.53 (MA)	3.61	MA	3
4. The facility lacks proper waste disposal systems to manage infectious materials.	3.90 (MA)	2.91 (A)	3.28 (A)	3.07 (A)	3.61 (MA)	3.35	A	7.5
5. There are insufficient technological resources for monitoring and reporting infection rates.	2.05 (SA)	3.94 (MA)	2.39 (A)	3.86 (MA)	3.73 (MA)	3.19	A	10
6. Support services for thorough cleaning and disinfection of the facility are deficient.	3.38 (MA)	3.12 (A)	3.34 (A)	3.46 (MA)	3.45 (MA)	3.35	A	7.5
7. There are struggles with the timely replacement of outdated or non-functioning equipment	3.95 (MA)	2.27 (SA)	3.50 (MA)	3.46 (MA)	3.92 (MA)	3.42	A	6
8. Access to updated guidelines, protocols, and research on infection prevention and control is limited.	3.68 (MA)	3.69 (MA)	3.65 (MA)	3.68 (MA)	3.69 (MA)	3.68	MA	2
9. There is an inadequate supply of cleaning materials and disinfectants to maintain a hygienic environment.	2.62 (A)	3.36 (MA)	3.53 (MA)	3.55 (MA)	3.52 (MA)	3.32	A	9
10. Insufficient budget allocation for IPC activities makes it difficult to prioritize and implement effective infection control measures.	3.64 (MA)	3.19 (A)	3.49 (MA)	3.52 (MA)	3.41 (MA)	3.45	MA	5
AWM	**3.43 (MA)**	**3.36 (A)**	**3.38 (A)**	**3.61 (MA)**	**3.55 (MA)**	**3.47**	**MA**	

Recent research has emphasized the role of continuous IPC training and resource availability in healthcare settings. A study conducted in Myanmar public hospitals demonstrated that approximately 80% of hospitals maintained functional IPC status and provided training on infection prevention, yet resource constraints remained a significant challenge, particularly in primary healthcare facilities (Than, T. M. et al., 2024). Similarly, a comprehensive review of healthcare workers' behaviors towards IPC practices highlighted that knowledge-oriented, person-oriented, and environment-oriented factors significantly influenced compliance with IPC protocols, emphasizing the importance of adequate resources and continuous professional development (Mutsonziwa, G. A. et al., 2024).

Infrastructure and facility. The data from Table 14 highlights the infrastructure and facility limitations impacting IPC compliance among healthcare workers in RHUs. The RHUs most and least affected by these challenges, RHU A, showed the highest overall impact (WM=3.46), while RHU D experienced the lowest overall impact (WM=3.38) from these infrastructure and facility limitations. The lack of separate areas for sterile and non-sterile supplies emerged as the most concern with a weighted mean of 3.68, indicating a

moderate affect on infection control practices. This was followed by inadequate WASH facilities and insufficient waiting areas, both scoring 3.52, indicating a moderate affect. Conversely, the layout of the health unit, with a weighted mean of 3.26; lack of emergency power sources, with a weighted mean of 3.29; and inadequate physical infrastructure, with a weighted mean of 3.32, were identified as less impactful barriers, though still affects infection prevention protocols. Overall, the AWM is 3.43; these infrastructure limitations collectively moderate affect the ability to adhere to national standard IPC protocols. These results emphasize the need for targeted interventions, such as improving infrastructure (e.g., isolation rooms, ventilation systems, and lighting) and ensuring the availability of fundamental IPC resources, including water and sanitation facilities. Addressing these challenges would likely enhance compliance with IPC standards and improve overall healthcare delivery in RHUs.

Table 14 Challenges Affecting Compliance Level along Infrastructure and facility

Indicator	RHU A	RHU B	RHU C	RHU D	RHU E	Total WM	I	R
	Weighted Mean							
1. The layout of the health unit makes it difficult to follow infection prevention protocols.	3.02 (A)	3.13 (A)	3.98 (MA)	3.01 (A)	3.14 (A)	3.26	A	10
2. The ventilation system is inadequate for preventing the spread of infections.	3.11 (A)	3.47 (MA)	3.30 (A)	3.57 (MA)	3.95 (MA)	3.48	A	4
3. The physical infrastructure does not adequately support IPC practices (e.g., isolation rooms and proper ventilation).	3.22 (A)	3.35 (A)	3.54 (MA)	3.27 (A)	3.23 (A)	3.32	MA	8
4. Inadequate availability of water, sanitation, and hygiene (WASH) facilities for IPC.	3.80 (MA)	3.97 (MA)	3.33 (A)	3.25 (MA)	3.24 (A)	3.52	MA	2.5
5. The water supply is insufficient for hygiene and sanitation needs.	3.46 (MA)	3.36 (A)	3.59 (MA)	3.31 (A)	3.40 (MA)	3.42	MA	5.5
6. Lack of emergency power sources to support infection control during outages.	3.23 (A)	3.65 (MA)	3.02 (A)	3.25 (A)	3.32 (A)	3.29	A	9
7. Absence of necessary signage to guide patients and staff on infection control practices.	3.65 (MA)	3.43 (MA)	3.09 (A)	3.25 (A)	3.33 (A)	3.35	A	7
8. Inadequate waiting areas for patients, leading to overcrowding and increased risk of infection transmission.	3.64 (MA)	3.38 (A)	3.43 (MA)	3.55 (MA)	3.61 (MA)	3.52	MA	2.5
9. Lack of separate areas for sterile and non-sterile supplies, increasing the risk of contamination.	3.64 (MA)	3.68 (MA)	3.62 (MA)	3.69 (MA)	3.77 (MA)	3.68	MA	1
10. Insufficient lighting in patient care areas makes it difficult to maintain proper hygiene and infection control practices.	3.78 (MA)	3.12 (A)	3.39 (A)	3.67 (MA)	3.16 (A)	3.42	MA	5.5
AWM	**3.46** (MA)	**3.45** (MA)	**3.43** (MA)	**3.38** (A)	**3.42** (MA)	**3.43**	**MA**	

Legend:

3.40 – 4.19	Moderately Affect (MA)
2.60 – 3.39	Affect (A)

Recent studies have highlighted similar infrastructure-related challenges in healthcare facilities. In a comprehensive analysis of 7,948 health facilities across multiple countries, only 19.71% had all basic infection control materials, with particularly significant gaps in rural healthcare settings (Hakim, S. et al, 2024). Additionally, a study in Ethiopia found that consistent water supply at hand washing stations increased

adherence to infection prevention practices by nearly three-fold (AOR, 2.90; 95% CI, 1.62-5.20), while proper training improved compliance by 1.7 times (AOR, 1.68; 95% CI, 1.04-2.72) (Babore, G. O. et al, 2020).

Human Resources. Table 15 highlights human resources affecting compliance with standards infection prevention and control among healthcare workers. Among RHUs, RHU B shows a moderate effect (WM, 3.60), while RHU A demonstrates an affect (WM, 3.21). Insufficient training on IPC standards emerged as the most significant concern with a weighted mean of 3.65, followed by limited availability of IPC mentors and coaches (WM, 3.58), and insufficient motivation among healthcare workers to adhere to IPC guidelines (WM, 3.55). On the other end of the spectrum, high turnover rates, unfunded resources for additional staffing, and inadequate leadership emphasis on IPC were identified as the least impacting factors, all scoring a weighted mean of 3.35. Overall, the AWM of 3.48, these challenges collectively have a moderate affect on IPC compliance. Correspondingly, the compliance level of healthcare workers in RHUs is primarily hindered by insufficient training, limited mentorship, and lack of recognition systems, suggesting the need for comprehensive human resource development strategies to enhance adherence to infection prevention and control standards.

Table 15 Challenges Affecting Compliance Level along Human Resources

Indicator	RHU A	RHU B	RHU C	RHU D	RHU E	Total WM	I	R
	Weighted Mean							
1. Insufficient training on IPC standards for healthcare workers.	3.02 (A)	3.88 (MA)	3.74 (MA)	4.00 (MA)	3.63 (MA)	3.65	MA	1
2. The high turnover rate of healthcare workers affects the continuity of IPC practices.	3.15 (A)	3.14 (A)	3.99 (MA)	3.26 (A)	3.19 (A)	3.35	A	9
3. Unclear directives in implementing IPC guidelines arise from higher authorities' lack of clear communication.	3.09 (A)	3.95 (MA)	3.61 (MA)	3.07 (A)	3.88 (MA)	3.52	A	4.5
4. Inadequate staffing ratios, leading to increased workload and decreased attention to infection control practices.	3.37 (A)	3.09 (A)	3.12 (A)	3.98 (MA)	3.56 (MA)	3.42	MA	7
5. Healthcare Workers are not sufficiently motivated to adhere to infection prevention and control guidelines.	3.19 (A)	3.93 (MA)	3.53 (MA)	3.86 (MA)	3.25 (A)	3.55	MA	3
6. There are unfunded resources to hire additional staff necessary for effective infection prevention and control.	3.05 (A)	3.87 (MA)	3.01 (A)	3.66 (MA)	3.15 (A)	3.3	A	9
7. Inadequate leadership emphasis on infection prevention and control negatively impacts staff adherence to protocols.	3.19 (A)	3.25 (A)	3.40 (MA)	3.15 (A)	3.77 (MA)	3.35	A	9
8. Limited opportunities for professional development and continuing education on infection prevention and control exist for healthcare workers	3.38 (A)	3.73 (MA)	3.48 (MA)	3.17 (A)	3.65 (MA)	3.48	MA	6

9. There is a limited availability of IPC mentors and coaches to support new staff members.	3.55 (MA)	3.52 (MA)	3.82 (MA)	3.52 (MA)	3.48 (MA)	3.58	MA	2
10. Lack of recognition or incentives for healthcare workers who demonstrate excellent infection prevention and control practices, leading to low motivation and adherence to protocols.	3.08 (A)	3.67 (MA)	3.67 (MA)	3.39 (A)	3.77 (MA)	3.52	MA	4.5
AWM	**3.21 (A)**	**3.60 (MA)**	**3.54 (MA)**	**3.51 (MA)**	**3.53 (MA)**	**3.48**	**MA**	

Recent studies supported these findings, where compliance with IPC guidance was significantly influenced by training and mentorship. A study in Ethiopia showed that healthcare workers who received IPC training were 1.68 times more likely to adhere to infection prevention practices, with only 60.2% demonstrating good adherence overall (Babore, G. O. et al, 2020). Similarly, research in Addis Ababa public hospitals indicated a mere 36.49% compliance rate with standard precautions, emphasizing that receiving IPC training (AOR, 1.81, 95% CI 1.06, 3.09) and knowledge of standard precautions significantly improved compliance levels.

Relationship between the demographic profile and compliance level among healthcare workers of Rural Health Units on the standard infection prevention and control

Table 16 shows significant relationships between all demographic factors and compliance levels among healthcare workers. All computed values exceed their respective tabular values, leading to the rejection of the null hypothesis for each factor. Age (47.2), sex (19.01), civil status (23.06), educational attainment (37.32), designation (23.06), and length of service (39.82) all demonstrate statistically significant associations with compliance to standard infection prevention and control measures. In conclusion, these findings highlight the complex interplay between personal and professional characteristics and compliance with infection prevention and control standards. Healthcare administrators and policymakers should consider these demographic factors when designing training programs, implementing compliance measures, or developing targeted interventions to improve overall adherence to infection control protocols in RHUs.

Table 16 Relationship between the demographic profile and Compliance Level among Healthcare Workers of Rural Health Units on the Standard Infection Prevention and Control

Demographic Profile	**Computed Value**	**Tabular Value**	**Decision on Ho**	**Interpretation**
Age	47.2	31.41	Rejected	Significant
Sex	19.01	9.49	Rejected	Significant
Civil Status	23.06	15.51	Rejected	Significant
Educational Attainment	37.32	21.03	Rejected	Significant
Designation	36.11	26.30	Rejected	Significant
Length of Service	39.82	21.03	Rejected	Significant

Training Guide on Infection Prevention and Control Procedure and Policy

The Training Guide on Infection Prevention and Control Policy and Procedure was developed in response to a critical finding that 45.58% (67 out of 147) healthcare workers in Rural Health Units had no training in infection prevention and control. This significant knowledge gap poses substantial risks to both healthcare

providers and patients, emphasizing the fundamental importance of proper infection control measures in healthcare delivery. The study identified inadequate training as a major challenge affecting compliance, with a weighted mean of 3.77, demonstrating an urgent need for structured educational interventions.

Resource limitations, particularly in ongoing IPC training programs and access to current guidelines, were found to significantly impact healthcare workers' ability to maintain proper infection control standards. It highlighted insufficient IPC training as the primary human resource concern, with limited availability of IPC mentors and coaches following closely. These findings emphasize the need for a comprehensive, standardized training resource that can effectively bridge knowledge gaps and ensure consistent guidance across all RHUs.

The study also revealed significant correlations between demographic factors and compliance levels, necessitating a training guide capable of addressing diverse learning needs while maintaining standardized practices. The guide responds to these challenges by incorporating practical, cost-effective, and sustainable strategies specifically tailored to rural healthcare settings with limited resources. Through clear, actionable guidelines and standardized procedures, this training guide serves as a vital tool for enhancing infection prevention and control compliance and ultimately improving healthcare quality in Rural Health Units.

SUMMARY, FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

This chapter presents the summary of the study, the findings, and conclusions based on the findings of the study as well as the recommendations.

Summary

The study focused on assessing the compliance level among healthcare workers of Rural Health Units on the standard of infection prevention and control. Specifically, it sought to answer the following: 1. What is the demographic profile of the respondents in terms of age, sex, civil status, educational attainment, designation, length of service, and related training attended? 2. What is the compliance level among healthcare workers of Rural Health Units on the standard infection prevention and control along with hand hygiene practices, use of Personal Protective Equipment (PPE), prevention of needlestick and sharp injuries, and environmental cleaning and disinfection? 3. Is there a significant relationship between the demographic profile and compliance level among healthcare workers of Rural Health Units on the standard infection prevention and control? 4. What are the challenges encountered by healthcare workers of Rural Health Units affecting the compliance level with the standard in infection prevention and control along with resources, infrastructure and facility, and human resources. 5. What strategies may be proposed to enhance the compliance level among healthcare workers of Rural Health Units on the standard of infection prevention and control?

The study used a descriptive-correlation method with the use of a survey questionnaire as the primary instrument for conducting the study. The respondents of the study consisted of 147 healthcare workers of Rural Health Units

Findings

The following are the findings derived from the result of the research study:

1. The demographic profile of healthcare workers in Rural Health Units (RHUs reveals a diverse workforce. Most of the respondents are between 25-29 and 40-44 years old (32 or 21.77 percent each), females (108 or 73.47 percent), and married (105 or 71.43 percent). The majority were college graduates (94 or 63.95 percent), with nurses comprising the largest group (75 or 51.02 percent). Most have 4-6 years of service (48 or 32.65 percent). Notably, 67 or 45.58 percent reported no related infection prevention and control training or seminars.

2. The compliance level among healthcare workers of Rural Health Units on the standard infection prevention and control were Hand Hygiene Practices (3.71), use of Personal Protective Equipment (3.84), Prevention of needlestick and sharp injuries (3.63), and Environmental cleaning and disinfection (3.91), all interpreted as much compliant.

3. The significant correlations between demographic profile and compliance level among healthcare workers demonstrated statistically significant relationships, as their computed values consistently exceeded their respective tabular values, leading to the rejection of the null hypothesis.

4. Implementing the standard of infection prevention and control among healthcare workers faces significant challenges. Resources (3.47, interpreted as affect), infrastructure and facility (3.43, interpreted as affect), and human resources (3.6, interpreted as moderately affect).

5. Strategic interventions to enhance compliance levels among healthcare workers in Rural Health Units regarding standard infection prevention and control can be proposed. There's a need to strengthen the training and education component. Additionally, improving facility infrastructure would support better compliance with infection control protocols. Developing a comprehensive documentation and reporting system would enhance accountability and tracking of compliance levels. This should include standardized incident reporting protocols, regular infection prevention practices assessments, and clear procedure guidelines. Lastly, fostering a culture of safety and continuous improvement is essential. This involves encouraging open communication about infection control concerns, recognizing and rewarding good practices, and ensuring leadership support for infection prevention initiatives.

Conclusions

In the light of the findings, the following conclusions were drawn:

1. Most of the respondents were females, married, college graduates, nurses and lacked related training and seminars.

2. Healthcare workers in the RHUs demonstrated a generally high level

of compliance with standard infection prevention and control measures, such as hand hygiene, use of personal protective equipment, prevention of needlestick and sharp injuries, and environmental cleaning and disinfection, which are all rated as much compliant. This suggests a positive foundation for infection control practices but also indicates room for improvement to reach full compliance.

3. There is statistically significant relationship between demographic profiles and compliance levels among healthcare workers. It suggests that factors such as age, education level, professional role, and years of service may influence adherence to infection control standards. Understanding these relationships can help in tailoring interventions and training programs to specific demographic groups for maximum effectiveness.

4. Significant challenges exist in implementing standard infection prevention and control measures such as resource constraints, infrastructure limitations, and human resource issues are identified as key factors affecting compliance. These challenges underscore the need for targeted interventions and resource allocation to improve RHUs' overall infection control environment.

5. A multi-faceted approach is necessary to enhance compliance levels with standard infection prevention and control measures. This approach should include strengthening training and education programs, improving resource allocation and infrastructure, developing comprehensive documentation and reporting systems, and fostering a culture of safety and continuous improvement. Such strategic interventions are important for addressing the identified gaps and challenges, ultimately leading to better infection prevention and control practices in the RHUs of the 5th District of Camarines Sur.

Recommendations

In the light of the findings and conclusions, the following recommendations were formulated.

1. A multifaceted approach to improving IPC compliance begins with establishing comprehensive education and training programs. Healthcare workers should receive regular updates on IPC practices, including hand

hygiene practices, use of Personal Protective Equipment (PPE), prevention of needlestick and sharp injuries, and environmental cleaning and disinfection.

2. Infrastructure and resource allocation must be addressed to support IPC compliance. This includes ensuring adequate supplies of PPE, hand hygiene facilities, and proper cleaning materials.

3. The development and implementation of a comprehensive IPC Manual of Policy and Procedure serves as a cornerstone for standardizing practices. This manual is evidence-based, regularly updated, and easily accessible to all healthcare workers. It should include detailed protocols for all aspects of infection prevention and control, clear guidelines for implementation, and specific procedures tailored to rural health unit settings.

4. LGU and RHU foster a culture of safety, and continuous improvement is essential. This involves encouraging open communication about infection control concerns, recognizing and rewarding good practices, and ensuring leadership support for infection prevention initiatives.

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