



## RESEARCH PAPER

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## Catching up with the standards: Infection prevention and control in the rural health units in region 2 Philippines

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### Abstract

This study assessed the current state of Infection Prevention and Control (IPC) in Rural Health Units in the four provinces of Region 2 in the Philippines amidst the ongoing COVID-19 pandemic. Using a concurrent mixed-method research design, the study employed structured interviews, document analysis, and focus group discussions. The World Health Organization's Infection Prevention and Control Assessment Framework (IPCAF) and the National Standard for Infection Control in the Health Care Facility of the Department of Health (DOH) were utilized as primary tools. Results revealed very good scores in the core components of IPC. While efforts to implement IPC measures were evident, significant gaps were identified. Based on the findings, the study underscores the need for strengthening IPC measures and recommends focused interventions on RHUs scoring lower on IPC standards, the importance of fostering a culture of safety and vigilance, and the need for robust regulatory mechanisms to uphold IPC standards. Future research directions include longitudinal studies for tracking improvements and investigating barriers to effective IPC implementation. The study offers critical insights for enhancing patient safety and protecting healthcare workers, thereby contributing to healthcare system resilience during pandemics.

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## Introduction

Countries of lesser and middling income, including the archipelago of the Philippines, wrestle with the Herculean task of effective infection control (Mitchelle *et al.*, 2017). The Covid-19 Pandemic, like a tidal wave swelled hospital populations, and nosocomial infections climbed to unseen heights (Zou *et al.*, 2020). By June 2020, the Philippines reported almost 3000 COVID-19 confirmed cases amongst its healthcare legion (DOH, 2020). One study (Villanueva *et al.*, 2020) found that out of 324 HCWs screened, eight tested positive, one of whom had served in a COVID-19 ward.

Beyond the patients, the brave healthcare warriors (HCWs) were also at peril. Their daily dance with death, the risk of occupational infection, is an inescapable reality. The breach of standard precautions swells the odds against them, fueling transmission of infections within their healing havens (Minhas *et al.*, 2011). In the theater of war against COVID-19, HCWs form the bulwark. Their losses would not only cripple the healthcare battlefield but also send shockwaves through the morale of their comrades and create ripples of public panic. The Holy Grail? Achieving zero nosocomial infections amongst HCWs (Cheng *et al.*, 2020; Nguyen *et al.*, 2020).

Infection control is the unseen helmsman, guiding health care at all levels, combatting factors that fan the flames of infection spread. Its arsenal includes prevention, monitoring, investigation, and management of suspected or proven infection spread within the healthcare sanctuary (Minhas *et al.*, 2011). As the pandemic rages on, it's vital that effective infection prevention and control (IPC) measures stand their ground, forming a formidable bulwark to shield susceptible HCWs (Villanueva *et al.*, 2020).

To bolster this battle, every healthcare facility and service should wield an integrated infection prevention and control program (IPCP), serving as their shield and sword (Minhas *et al.*, 2015). The Philippines isn't unarmed; the National Standards in Infection Control for Health facilities (DOH, 2009) stands as a bulwark against this invisible enemy.

As the lines of this warfare are drawn, the preparedness of the healthcare facility becomes a critical fortress. To shore up these defences and to protect public health and the valiant HCWs, we must assess our current preparedness levels. The battle against this dread disease is a collective one; a synergy of efforts from the WHO, DOH, and the local authorities is crucial. Amidst this, the rural health units, the grassroots warriors of healthcare, stand prepared and capacitated by local government units to combat infection spread within the community.

This study, thus, dives into the current IPC status in rural health units across this region, utilizing the WHO Infection Prevention and Control Assessment Framework (IPCAF). Through this, we aim to measure the effectiveness of IPC, identify and address gaps in its implementation, and supplement the efforts of health institutions, LGUs, and the DOH to safeguard public health amidst this unprecedented global challenge.

## Materials and methods

### Research design

#### Locale of the study

The study was carried out in four provinces of Cagayan, which were selected due to their active role in providing healthcare, especially during the current pandemic. The study involved the Rural Health Units (RHU) and City Health Offices (CHOs). Interviews were primarily conducted onsite at the selected healthcare facilities.

#### Sampling procedure

The respondents for the structured questionnaire, which evaluated the profile and IPC status of the healthcare facilities, were chosen representatives or focal persons for IPC at the selected facilities. The results of this evaluation were validated through a focus group discussion (FGD) involving administrators and staff who were also members of the IPCC.

Stratified random sampling technique was employed during the quantitative phase of the study. The healthcare facilities were initially grouped according to province. Each facility was then randomly selected using a lottery method. The sample size for each level was

determined proportionally. The Lynch formula was used to calculate the sample size for the study when correlations and differences were involved. For the qualitative phase conducted via FGD, a selective purposive sampling technique was applied to select participants. RHUs with the least score in the IPC assessment were included in each FGD group. Participants included IPCC members, administrators, and staff who had held their positions for at least 6 months and were willing to participate.

#### *Research instruments*

Triangulation methodology was used for data gathering, including structured questionnaires, observations, and record/document reviews. The data collection tool was developed by reviewing pertinent literature and adapting content from standardized IPC assessment tools and related studies. The WHO's IPCAF was primarily used in this process. The data collection tool comprised a three-part questionnaire. The first section detailed the demographic profile of the respondent, the second section involved the profile of the healthcare facility, and the final section facilitated a self-assessment using the WHO-IPCAF.

The IPCAF is a structured, closed-ended questionnaire with an associated scoring system that provides a comprehensive measure of IPC activities and identifies strengths and weaknesses of the health facility.

#### *Research procedures*

The research procedure began with the presentation of the study to the technical review committee of the University and the Department of Science and Technology - Cagayan Valley Health Research to the end. Upon approval, the research undergone ethics review prior data gathering procedures.

#### *Data analysis*

Quantitative data from the structured questionnaires were entered into excel and exported to statistical software package. Descriptive statistics (mean, standard deviation, frequency, and percentage) were used to summarize and describe the data. Inferential statistics were also employed to make comparisons among

different groups and establish relationships among variables. The Chi-square test was used to identify differences among categorical variables, and t-tests and ANOVAs were used to compare means between groups. Qualitative data collected from the document review, open-ended interviews, and focus group discussions were transcribed verbatim. These data were analyzed using content analysis, which involved carefully reading and re-reading the transcriptions, coding the data, identifying themes, and interpreting the patterns and meanings within the data. This iterative process helped to ensure the validity of the data and the credibility of the findings. The research team collectively coded and interpreted the data, adding to the reliability and validity of the findings. The mixed-methods approach allowed for the triangulation of data, providing a more holistic understanding of the status of IPC in the health facilities. The use of both quantitative and qualitative methods increased the robustness and credibility of the study's findings.

#### *Ethical considerations*

The study was carried out in accordance with the principles of the Declaration of Helsinki and was approved by the Institutional Review Board of the Cagayan State University and the Ethics Review Board of the Region 02 Trauma Medical Center. All participants were informed about the purpose of the study, what it would involve, the potential risks and benefits, and their right to withdraw from the study at any time without any adverse consequences. Written informed consent was obtained from all participants before data collection. Participation in the study was completely voluntary, and participants were assured that their identities would be kept confidential and that all responses would be used only for the purpose of this research. Furthermore, the study took into account the sensitive nature of conducting research within the context of a pandemic and implemented measures to protect the participants and the research team from potential Covid-19 exposure. For instance, where possible, data collection was conducted remotely to limit in-person interactions, and where in-person interactions were necessary, appropriate personal protective equipment was used, and physical distancing guidelines were followed. The

researchers committed to disseminating the results of the study to the participants and the healthcare facilities involved, thereby upholding the principle of reciprocity and ensuring that the study contributes to improving infection prevention and control practices in these facilities.

## Results

The level of implementation of the Infection Prevention and Control (IPC) Program across Rural

Health Units (RHUs) was assessed based on eight core components. For IPC Core Component 1 (IPC Program), 13.1% of RHUs were rated as very high, while the majority (68.9%) received a high rating. A smaller portion, 13.1%, rated low, and 4.9% were rated very low. IPC Core Component 2 (Internal IPC Guidelines or Procedures) showed a substantial 82.3% of RHUs with a very high rating, 16.1% rated high, and only 1.6% rated low, with no RHUs scoring very low (Table 1).

**Table 1.** Level of implementation of the infection prevention and control program in the rural health units in terms of the 8 core components based on IPC scores

IPC Core Component	Very High	High	Low	Very low
CC1. IPC Program	8 (13.1%)	42 (68.9%)	8 (13.1%)	3 (4.9%)
CC2. Internal IPC Guidelines or Procedures	50 (82.3%)	10 (16.1%)	1 (1.6%)	-
CC3. IPC Education and Training	27 (44.3%)	25 (41%)	6 (9.8%)	3 (4.9%)
CC4. Health Care Associated Surveillance	18 (29.5%)	38 (62.3%)	5 (8.2%)	-
CC5. Multimodal Strategies for Implementation of IPC	11(18.1%)	24 (39.3%)	8 (13.1%)	18 (29.5%)
CC6. Monitoring/Audit of IPC Practices and Feedback	50 (81.9%)	9 (14.8%)	2 (3.3%)	-
CC7. Workload, Staffing, and Bed Occupancy	13 (21.3%)	19 (31.2%)	11 (18%)	18 (29.5%)
CC8. Built Environment, Materials and Equipment for IPC	57 (93.4%)	2 (3.3%)	2 (3.3%)	-

For IPC Core Component 3 (IPC Education and Training), 44.3% of RHUs scored very high, 41% were rated high, 9.8% rated low, and 4.9% rated very low.

IPC Core Component 4 (Healthcare-Associated Surveillance) had 29.5% of RHUs with very high scores, 62.3% rated high, and 8.2% rated low, with no units receiving a very low rating.

IPC Core Component 5 (Multimodal Strategies for IPC Implementation) results indicated that 18.1% of RHUs were rated very high, 39.3% rated high, 13.1% rated low, and 29.5% scored very low. In IPC

Core Component 6 (Monitoring/Audit of IPC Practices and Feedback), 81.9% of RHUs were rated very high, with 14.8% rated high and 3.3% rated low; no RHUs received a very low rating.

IPC Core Component 7 (Workload, Staffing, and Bed Occupancy) had 21.3% of RHUs rated very high, 31.2% rated high, 18% rated low, and 29.5% rated very low. Finally, IPC Core Component 8 (Built Environment, Materials, and Equipment for IPC) had the majority of RHUs, 93.4%, rated very high, while

3.3% scored high, and another 3.3% scored low, with none rated very low.

**Table 2.** Status of the infection prevention and control programme of the RHUs based on IPCAF

Status of the IPC program	RHUs (n=61)
Advanced	13 (21.3%)
Intermediate	42 (68.9%)
Basic	6 (9.8%)
Inadequate	-

The status of the Infection Prevention and Control Program (IPC) in RHUs based on the Infection Prevention and Control Assessment Framework (IPCAF) showed that 21.3% of RHUs had an advanced status, while the majority, 68.9%, were at an intermediate level. A smaller proportion, 9.8%, was at the basic level, and none were rated as inadequate (Table 2).

## Discussion

The results echoes previous research, indicating that access to better resources and expertise often results in more effective IPC programs in higher-level hospitals (Sahiledengle *et al.*, 2018). The performance of the RHUs in the first component underlines the necessity of

increased IPC investment in these facilities, pointing toward the existing health inequities (Herzig *et al.*, 2016). Effective IPC implementation requires sufficient resources, including staff and infrastructure, which vary among healthcare facilities (Behnke *et al.*, 2021). The COVID-19 pandemic has further emphasized the need for robust IPC practices, underlining the importance of sustainable improvements in IPC practices beyond the pandemic (Gilbert and Kerridge, 2022).

Results on the status of the infection prevention and control (IPC) program in terms of their internal IPC guidelines or procedures showed a very high status. Specifically, 82.3% of RHUs have a very high status of IPC program implementation, indicating that these facilities have well-established internal IPC guidelines or procedures in place. The high status of IPC program implementation in healthcare facilities is crucial for controlling the spread of infectious diseases and ensuring patient safety. IPC programs play a vital role in preventing healthcare-associated infections (HAIs) and reducing the transmission of infectious diseases within healthcare settings (Herzig *et al.*, 2016). Effective IPC programs include various measures such as hand hygiene, proper use of personal protective equipment (PPE), environmental cleaning and disinfection, and adherence to standard precautions (Islam *et al.*, 2020).

The implementation of IPC programs is particularly important during outbreaks of infectious diseases, such as Lassa Fever and COVID-19. In the case of Lassa Fever, the implementation of an intensive IPC program was found to be effective in controlling the outbreak and reducing the transmission of the virus within healthcare facilities (Ilesanmi *et al.*, 2020). Similarly, during the COVID-19 pandemic, the implementation of IPC measures, including the use of PPE, proper hand hygiene, and environmental cleaning, has been crucial in preventing the spread of the virus in healthcare settings (Islam *et al.*, 2020). However, despite the high status of IPC program implementation in many healthcare facilities, there are still challenges and areas for improvement. Some studies have highlighted deficiencies in IPC programs, including a lack of trained infection control professionals, inadequate resources,

and gaps in knowledge and practice of IPC measures among healthcare workers (Colet *et al.*, 2017; Michael, 2020). To address these challenges and improve IPC program implementation, it is important to invest in training and capacity building for healthcare workers, provide adequate resources and infrastructure, and promote a culture of infection prevention and control within healthcare facilities (Oppong *et al.*, 2020; Birgand *et al.*, 2015). Additionally, regular monitoring and evaluation of IPC programs, as well as the use of standardized assessment frameworks like the IPC Assessment Framework (IPCAF) developed by the World Health Organization (WHO), can help identify areas for improvement and ensure the continuous quality improvement of IPC programs (Aghdassi *et al.*, 2020; Opollo *et al.*, 2021).

The status of Infection Prevention and Control (IPC) programs in different types of healthcare facilities in relation to IPC Education and Training as revealed in this study showed that nearly half of Rural Health Units (RHUs) (44.3%) achieved a very high score in this component. This suggests that these facilities have robust training and education programs in place that potentially cover a wide array of topics related to infection prevention and control. On the other hand, a significant proportion of RHUs (41%) scored 'High', indicating good education and training practices, but with some room for improvement. When we look into the existing literature, studies suggest that regular, comprehensive training in IPC protocols can lead to significant reductions in healthcare-associated infections (Haischer *et al.*, 2020). The lack of such training and education, especially in lower-scoring hospitals and Level 1 facilities, may risk patient safety and overall healthcare outcomes (Mitchell *et al.*, 2019).

The status of the Infection Prevention and Control (IPC) program in terms of their Healthcare-Associated Infection (HAI) surveillance showed a considerable portion of RHUs (29.5%) scored "Very High", indicating an effective HAI surveillance program. The data suggests a trend that may be attributed to better resources and access to expertise in larger or higher-level hospitals, as

supported by literature (Bryant *et al.*, 2016; Birgand *et al.*, 2015).

Research also supports the finding that smaller and rural healthcare facilities, like RHUs may have more limited resources, which could affect the comprehensiveness of their HAI surveillance (Bryant *et al.*, 2016). The presence of RHUs in this category scoring "Low" or highlights the need for interventions to improve HAI surveillance, a crucial component of patient safety and a critical part of an effective IPC program (Allegranzi *et al.*, 2011).

The Multimodal Strategies for Implementation of IPC resulted to only 18.1% of the RHUs having a "Very High" score, indicating that a significant portion of these facilities might not have a comprehensive multimodal strategy. Alarming, a considerable number of RHUs (29.5%) scored "Very Low", suggesting that there may be significant gaps in their multimodal strategies for IPC implementation. The data shows a general trend where larger or higher-level healthcare facilities tend to score higher, which aligns with previous research that indicates better resources and expertise in these facilities (Bryant *et al.*, 2016). The significant proportion of RHUs scoring "Low" or "Very Low" is concerning and highlights the need for further resources and interventions in these areas, as suggested by literature (Birgand *et al.*, 2015).

The status of the infection prevention and control (IPC) program of healthcare facilities in terms of Monitoring/Audit of IPC Practices and Feedback presented that a large majority of Rural Health Units (RHUs) (81.9%), had a "Very High" score. This suggests that monitoring and audit practices of IPC programs are well-implemented in most healthcare facilities regardless of the level of care they provide. This aligns with previous literature emphasizing the importance of monitoring and auditing IPC practices for effective infection prevention and control. Regular monitoring and feedback mechanisms have been shown to be crucial in identifying gaps, ensuring compliance, and driving continuous improvements in IPC practices (Mitchell *et al.*, 2015). However, a small

proportion of RHUs (3.3%) scored "Low", indicating a need for improved monitoring and audit processes in these facilities.

Meanwhile, a lesser proportion of RHUs (21.3%) achieved a "Very High" rating. This suggests that higher-level healthcare facilities may be better equipped to handle the workload and staffing demands in relation to their bed occupancy. However, nearly a third (29.5%) of RHUs scored "Very Low" in this domain, indicating significant challenges related to workload, staffing, and bed occupancy. These findings are consistent with existing literature that has identified understaffing and high workload as key barriers to effective IPC in lower-resource settings (Cayô *et al.*, 2014). The effective management of workload, adequate staffing, and appropriate bed occupancy are crucial components of an effective IPC program. The data suggests that while some facilities excel in this regard, others, particularly RHUs, face significant challenges.

Finally, RHUs scored a 'Very High' in the 8<sup>th</sup> core component which is the Built Environment, Materials, and Equipment for IPC. To be precise, 93.4% of RHUs, achieved this status. This indicates that these facilities have highly suitable environments, materials, and equipment needed for effective infection prevention and control. However, a small fraction of RHUs, scored 'High', implying that they still maintain good standards but might have room for a slight improvement. Similarly, a very small portion of RHUs (3.3%) scored 'Low', which could be a concern and requires further investigation. It is well-acknowledged that the built environment and the availability of proper materials and equipment play a significant role in preventing and controlling infections (Dettenkofer *et al.*, 2004; Sehulster *et al.*, 2004). Thus, high performance in this category is crucial for the effective implementation of IPC programs.

### Conclusion

The Infection Prevention and Control practices in any level of health facility is critical. The Rural Health Unit being a first level healthcare facility and the first line in the health of the community, must uphold IPC

standards to protect public health. According to the results of analysis, RHUs have very good scores in most of the IPC core components and have an intermediate IPC status. It should be noted however that most RHUs' IPC Program. Education and Training; Multimodal Strategies for Implementation of IPC and Workload, Staffing, and Bed Occupancy needed significant attention to further improve implementation of IPC practices.

### Recommendations

The study particularly emphasizes the significance of robust IPC measures in the face of a global pandemic, such as COVID-19, not just to protect patients, but the healthcare workers who form the frontline in the fight against such infectious diseases. In this light, the effective implementation and regular monitoring of IPC measures need to be upheld as a priority. The RHUs that scored lower, should be the focus of intensive training and capacity-building efforts to improve their IPC status. The findings underscore the importance of fostering a culture of safety and vigilance and will involve continuous training of healthcare workers, regular updates of protocols as per the latest guidelines, and periodic self-assessments to identify areas of improvement.

Regarding policy implications, our study advocates for the strengthening of regulatory mechanisms to ensure that all RHUs meet minimum IPC standards. These standards must be integrated into the accreditation processes for healthcare facilities.

For future research, longitudinal studies could be instrumental in tracking improvements over time and determining the effectiveness of specific interventions. Further studies could also investigate the barriers and facilitators to implementing effective IPC practices at different levels of healthcare facilities.

The COVID-19 pandemic has underscored the importance of IPC, not only for preventing healthcare-associated infections but also for maintaining the resilience of the healthcare system during times of crisis. Therefore, it is imperative to address the identified gaps

and strengthen IPC measures across all healthcare facilities in the Cagayan region and beyond. This will not only bolster the region's preparedness for future health crises but will also contribute to improved patient outcomes and the safety of healthcare workers in the longer term.

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