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Towards Enhanced Program: Correlates and Demographic Differences on Infection Prevention and Control Implementation and Practices of Hospitals and Healthcare Workers

[1]Dr. Kristoffeer C. Nemis, RN MAN, [2]Michael John L. Mendoza, RN MAN

Philippine Women's University

ABSTRACT

The study focused on the correlates and demographic differences on infection prevention and control implementation and practices of hospitals and healthcare workers in the province of Batangas. The study was conducted from May to June of 2021. An ethics review board clearance was obtained first before requesting approval from the target hospital's administration. A new enhancement program was designed for strengthening the implementation of IPC based on the results.

The researcher assessed the current IPC level of the hospital using Infection Prevention and Control Assessment Framework (IPCAF. Significant differences and relationships among hospital profile variables and infection prevention control professionals were determined. There is a total of 211 respondents among 10 participating hospitals in the locale. Statistical treatment was used to arrive at the research findings. The researcher conducted a semi-structured interview guide based on the results of the first phase of the study. Successful interviewees were given informed consent and were scheduled for an interview based on their time preferences. A total of 8 respondents were interviewed for the second phase, at which point all code levels were finished and no additional conceptual information necessitating the creation of a new code or extension of an existing code was discovered.

The results of the study are as follows. The majority of Level 2 hospitals in the province of Batangas are generally assessed as intermediate level in IPC implementation and the IPC professionals' practice level determined as proficient level. Workplace barriers to the effective implementation of Infection prevention and control, workplace interventions for successful implementation of an infection control program, and impact of COVID-19 pandemic to infection control professionals.

Overall, the study concluded that most aspects of IPC core components are appropriately implemented in ten (10) participating hospitals. The extent of implementation of IPC core components at the facility level considered themselves as intermediate level. However, the practice level of IPC professionals considered themselves proficient. Issues and challenges concerning the workplace barriers and impact of COVID-19 on healthcare workers are also evident. Hence, the proposed enhancement program was created to strengthen and improve the implementation and practices of infection prevention and control among hospitals and healthcare workers.

Keywords: *Infection Prevention and Control; Healthcare Workers*

Introduction

Infection prevention and control (IPC) is a method of developing and implementing safe, evidence-based practices to improve healthcare quality, and it is usually included in quality assurance. It is focused on infectious diseases, epidemiology, social science, and the improvement of the health system as stated by the World Health Organization, (2015). The IPC is critical for patient safety and according to Aghdassi, S. J., Grisold, A., Wechsler-Fördös, A., Hansen, S., Bischoff, P., Behnke, M., & Gastmeier, P. (2020), several guidance documents and tools are offered by the WHO that allows healthcare facilities to assess those IPC procedures and structures.

During the periods of the outbreak of COVID-19, implementations of infection prevention and control (IPC) become of great importance in healthcare settings, particularly the great importance of personal protection of healthcare workers. A major problem was insufficient personal safety for healthcare staff at the beginning of the pandemic. The pathogen was not well known by healthcare staff and their knowledge of personal security was not good enough. As a result, the risk of infection for healthcare staff increased directly during this long-term exposure to infected patients. The front-line healthcare staff obtained insufficient IPC instruction as stated by Wang, Zhou, & Liu (2021).

Conversely, Donaldson (2020) states that a healthcare-associated infection (HAI) develops in a patient in a hospital during the course of care that was not present at the time of admission. Moreover, Kim (2020) states that healthcare-related infections impair an individual's quality of life due to increased

pain and mortality, deteriorated health, dysfunction, cognitive impairment, and financial loss of the health management system because of delayed recovery and extended hospital stay.

Infection control professionals encountered various challenges in implementing infection prevention and control strategies in hospital settings, despite their significant and irreplaceable contribution in the face of the outbreak.

Based on my observation and experience, the researcher sees the different barriers and challenges in the implementation of IPC measures in the delivery of care. These concerns can be addressed using a strategy to facilitate effective infection prevention and control in the workplace. This study determined the correlates and demographic differences on infection prevention and control implementation and practices of hospitals and healthcare workers in the province of Batangas.

Based on the outcome of the study, an enhancement program was created and proposed to the various hospitals in Batangas to assist the institution in addressing the effective implementation of infection prevention and control programs and practices of healthcare workers.

Background of the Study

The coronavirus disease 2019 (COVID-19) pandemic has spread to most nations worldwide. The World Health Organization (WHO) has declared the presence of the COVID-19, which is quickly spreading and threatening worldwide hospitals as well as public health as a whole. As demonstrated by many research and reports, healthcare professionals faced different challenges in the effective implementation of infection prevention and control at the facility level. Based on the following background of the study, the researcher serving as the main investigator has been motivated in conducting this study.

Healthcare-associated infection (HAI) transmission most frequently happens through the infected hands of health care staff. The hands of healthcare staff are the most common tool for the transfer of pathogens associated with healthcare from patient to patient and within the healthcare community. Hand hygiene is recognized as a leading means of avoiding microorganism cross-transmission and avoiding the impact of infections associated with health care. Compliance with hand hygiene among health care professionals is as poor as 40%, considering the relative simplicity of this protocol as stated in the study of Longtin, Al, Polack, and Baden (2020).

In Asia, there is a lack of studies exploring this topic, although the prevalence of healthcare-related infections in this area is high; awareness of standard precautions, in particular, is rarely compared, as reported in the study of Anwar MA, Rabbi S, Masroor M, Majeed F, Andrades M, Baqi S; (2020). In the Philippines, infection control requirements are required for implementation by the hospital administration and licensing and accreditation by government regulatory agencies. Strict adherence to infection and control protocols and policies and procedures was the only accepted effective method for preventing and managing the global spread of disease. (Manual of Procedures for the Philippine Integrated Disease Surveillance and Response PIDSR, 2016).

With the present condition of a health crisis, the situation among hospitals in the province of Batangas has rapidly changed. This includes expanding areas for screening and triage, different approaches for preventing or minimizing disease transmission, the researcher observed that hospitals and healthcare professionals are applying practices based on interim guidelines provided by different organizations.

Furthermore, the researcher also sees the gap in terms of literature review wherein several studies and research are conducted locally and internationally on infection prevention and control measures, however, there are few actual studies concerning the differences in infection prevention and control implementation and practices of hospitals and healthcare workers.

The above findings and such studies have highlighted the need to assess the extent of infection prevention and control implementation and practices of hospitals and healthcare workers in Batangas to establish enhancement programs and control measures for healthcare workers.

Scope and Limitations of Study

The study focused on the correlates and demographic differences on infection prevention and control implementation and practices of hospitals and healthcare workers. The researcher used a mixed methodology of quantitative and qualitative explanatory design to determine the infection prevention and control levels of hospitals in the implementation of the WHO core components on infection prevention and control measures such as IPC program, evidence-based guidelines, education and training, healthcare-associated infection (HAI) surveillance, multimodal strategies, monitoring/audit of infection prevention and control (IPC) practices and feedback, workload, staffing and bed occupancy, and built environment, materials and equipment for IPC at the facility level.

The researcher made use of two (2) adopted questionnaires for data collection. The Infection Prevention and Control Assessment Framework (IPCAF) tool was adapted from World Health Organization (WHO) and was utilized to determine the condition of IPC at the individual health care facility level and to monitor the development and improvement of IPC activities. The second questionnaire was the adopted self-audit tool for Infection Prevention and Control Professionals from the Community and Hospital Infection Control Association of Canada (CHICA) and was utilized to identify strengths and learning opportunities in their practice.

The researcher used the entire population or total enumeration sampling method among IPC professionals at the facility level. If there are no professionals in charge of IPC or there is no IPC program established, the tool was answered by senior facility managers. The IPCAF assesses the health care facility

as a whole. The tool refers to the facility and is not directly addressing the IPC lead/professional answering the question. The IPC team may need to consult with other relevant teams in the facility to be able to respond to questions accurately.

The study was limited to the comparison of different health care facilities particularly when of different sizes, medical focus, and socioeconomic settings. Therefore, the framework was not primarily intended for external comparison or benchmarking, but these might be possible - provided that a sound methodology is used.

This research study upholds ethical considerations to protect the participants and their institution. A letter of approval to conduct the study was sent to the hospital administrators and informed consent was secured from the participants. The study was conducted from May to June 2021.

Conceptual Framework

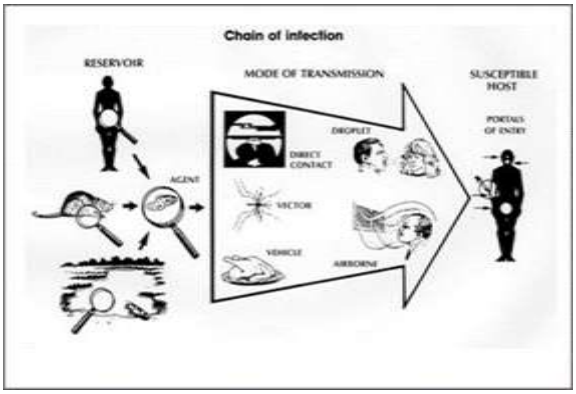

Figure 1. Chain of Infection (CDC, 2012)

Source: *Centers for Disease Control and Prevention. Principles of epidemiology, 2nd ed. Atlanta: U.S. Department of Health and Human Services;2012.*

The research study focused on the traditional epidemiologic triad model holds that infectious diseases result from the interaction of agent, host, and environment. Specifically, this model is relatively important to develop more vigorous healthcare systems with efficient infection prevention and control which is crucial in preventing or reducing the effects of an outbreak with the global experience of an outbreak. The chain of infection is highly applicable in this research study especially in the implementation of multimodal strategies and best hospital practices in infection prevention and control campaigns. The presentation of the above theory in this research study is a very significant factor in the awareness and strict implementation that provides a basis for the determination of suitable control steps. In this model, the most effective action for certain diseases may be aimed at controlling or removing the agent at its source.

Research Paradigm

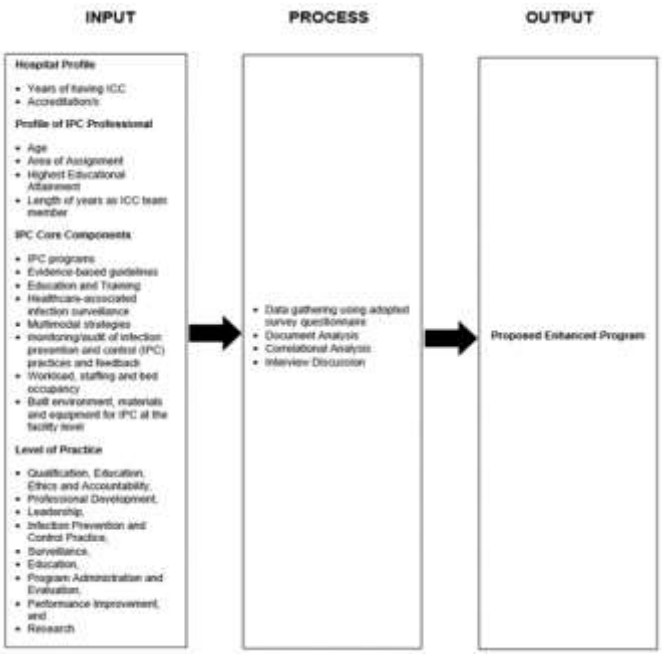

Figure 2. The research paradigm of the study composing Input, Process, and Output (IPO)

The research paradigm of the study is composed of Input, Process, and Output (IPO). Figure 2 shows the first frame in the paradigm is the input consisting of the participating hospital profiles including years of having ICC, and accreditations. It also includes the profiles of the IPC professionals such as age, area of assignment, highest educational attainment, and length of years as ICC members. It also includes the IPC core components to support implementation measures in terms of IPC programs, evidence-based guidelines, education and training, healthcare-associated infection surveillance, multimodal strategies, monitoring/audit of infection prevention and control (IPC) practices and feedback, workload, staffing, and bed occupancy, and built environment, materials, and equipment for IPC at the facility level. It also includes the extent of the practice in terms of qualification, education, ethics and accountability, professional development, leadership, IPC practice, surveillance, education, program administration and evaluation, performance improvement, and research

The second frame is the process of conducting the research study utilizing the data gathering using an adapted survey questionnaire, document analysis, correlational analysis, and focus group discussion. The last frame is the output of the study which is the proposed enhanced program based on the findings of the study.

METHODOLOGY

Research Design

The researcher utilized a mixed-methodological design to determine the Infection Prevention and Control implementation of private hospitals and healthcare workers in Batangas. A mixed-method study is described by Schoonenboom and Johnson, (2017) as a combination of at least one quantitative and one qualitative portion of the research. It is a type of analysis in which the researcher incorporates elements of qualitative and quantitative approaches to research within a single research investigation. Also, the explanatory design is a form of two-phase mixed method research that helps to clarify or expand on initial quantitative findings with qualitative data. Usually, this mixed-method explanatory design includes two phases: (1) the initial quantitative instrument process, followed by (2) the qualitative data collection phase, in which the qualitative phase is centered directly on the quantitative phase performance. Besides, to assess the challenges affecting the implementation of infection prevention and control steps, a mixed-method design will be used. To measure the relationship and differences between the variables of this research sample, a correlational research design was used. It will assess the statistical trend between two (2) intertwined variables, according to Blog (2020).

Participants of the Study

Participants of the study included the entire professionals who have direct authority in the implementation of infection prevention and control measures such as Infection Control Committee members, Nursing and Ancillary Department heads, and other related equivalent members or representatives. Among fourteen (14) Level 2 private hospitals in Batangas, 71.43% or only ten (10) hospitals approved agreed to participate in this study. Four (4) hospitals or 28.57% declined to participate due to some reason especially those institutions with existing policy not to participate in any research study or any kind. For phase 1, the total enumeration sampling method was used for the participating hospitals located in the City of Sto. Tomas, Lipa, and Batangas, and in the Municipality of Taal, Lemery, and San Jose. During the second phase, the researcher arrived in eight (8) IPC professionals representing each hospital who agreed to an individual interview discussion for qualitative data analysis when the researcher reached data saturation.

Research Locale

The research study was conducted in the province of Batangas. All professional members of the Infection Prevention and Control in the organization were utilized.

Hospital A is established in 1998 and located in Sto. Tomas City, Batangas. The hospital has a 100-bed capacity with 105 employees. The first hospital in Region IV accredited by the DOH for kidney transplantation.

Hospital B is located in Lipa City, Batangas, and was established in 2004. The hospital showcases the traditional features of a Medical Center equipped with all the advanced technologies and amenities to provide optimum health care services affordable to patients. The hospital has a 70-bed capacity.

Hospital C is a pioneering health care provider in Lipa City, Batangas. The hospital was established in 1970 and was known as Maternity and Medical Hospital. Also, it is the first private hospital in Batangas Province which is ISO 9001:2008 and currently, ISO 9001:2015 Quality Management System Certified as of February 8, 2018.

Hospital D is located in San Jose, Batangas, and was established in 2012. The hospital has a 50-bed capacity.

Hospital E is located in Batangas City, Batangas with 210 regular employees. The hospital was established in 2002 with a 106-beds capacity.

Hospital F is located in Barangay 4, Batangas City, Batangas. The hospital has a 100-bed capacity.

Hospital G is located in Alangilan, Batangas City, Batangas, and was established in 2018. The hospital has 75–bed capacity.

Hospital H is located in Bolbok, Batangas City, Batangas. The hospital has an 80- bed capacity and was opened to the public in 2013 to provide innovative and excellent healthcare along with years of hard work required to achieve their goal.

Hospital I was started in 1986 and located in Lemery, Batangas. The hospital has a 100-bed capacity with 110 well-trained human resources engaged in allied medical, administrative, and support services.

Hospital J is located at Barangay Carsuche, Batangas City, Batangas. The hospital has a 64-bed capacity and was established in 1998.

Ethical Considerations

This research study was examined for an ethics review to uphold and protect the participants of the study. Ethical principles were observed in the conduct of this study.

Conflict of Interest. With respect to affiliation or sources of funding for this report, there is no conflict of interest with the researcher. The research will be funded by a researcher. Expenses incurred in the conduct of this study are shouldered by a researcher.

Informed Consent. Informed consent shall be obtained in a written form or digital form assigned and checked by the participants before the questionnaires were filled out, especially if the participants opted for anonymity. It includes the intent or justification for inviting the participants to participate in the research, explains how the study will be conducted out, and allows participants to reject or terminate without penalty at any time. This means that the participants are completely aware of what kind of research they are going to engage in. The researcher is aware that the privacy, confidentiality, and integrity of the individual are maintained and secured.

Justice. The right of participants to equal care and privacy is included in this principle. Equal treatment requires selecting participants based on the study's inclusion criteria and conditions. Non-prejudicial care of the participants as stated in the informed consent for those who have declined to take part or withdrawn from the study. At any point in the study, the participants can contact the researcher to clarify details using the cell phone number and e-mail address stated in the informed consent as well. At all times, consideration and respect for the values, behaviors, lifestyles, history, and emotions of the participants, and courteous treatment will be observed.

Privacy and Confidentiality of Information. The researcher can only take the need for data and use it wisely to provide value and will avoid sharing information without the permission of the participant. The researcher, therefore, promises not to disclose the participants' identities with others. Data will be locked only by the researcher with keys managed and documents will be kept for five years (5), and then shredded by a machine.

Risks, Benefits, and Safety. The researcher will ensure that all precautionary steps to avoid the occurrence of psychological distress will be taken into account by the participants.

Research Instrument

The researcher used an adopted survey tool to the participating hospitals and infection prevention and control professionals in Batangas. The research used two (2) adopted survey questionnaires for the study. Part I is the Infection Prevention and Control Assessment Framework (IPCAF) tool developed by the World Health Organization in 2018 and is utilized for determining the IPC levels of participating hospitals. It provides a quantitative evaluation of IPC programs in a

systematic way, allowing changes to be tracked over time. The IPC facility-level assessment tool was tested for usability, reliability, and construct validity in a sample of 181 acute health care facilities in 46 countries across the world.

A Four-point Likert Scale response set was used with ratings. A table with descriptions and references is attached to guide the participants in answering the survey.

Scale	IPC Level	Range	Description
4	**Advanced**	3.51 – 4.00	The IPC core components are fully implemented according to the WHO recommendations and appropriate to the needs of your facility.
3	**Intermediate**	2.51 – 3.50	Most aspects of IPC core components are appropriately implemented. Continue to improve the scope and quality of implementation and focus on the development of long-term plans to sustain and further promote the existing IPC programme.
2	**Basic**	1.51 – 2.50	Some aspects of the IPC core components are in place, but not sufficiently implemented. Further improvement is required.
1	**Inadequate**	1.00 – 1.50	IPC core components' implementation is deficient. Significant improvement is required.

Part II is the adopted Self-audit Tool for Infection Prevention and Control to determine the practice level of professionals who are members of IPC and assessing the programs in the hospital. Below is a table with descriptions and references to guide the participants in answering the survey.

Scale	Practice Level	Range	Description	Definition
4	**Expert**	3.51 – 4.00	A skill or practice you feel you excel in.	• able to mentor others in this skill or practice • has the ability to make rapid and accurate decisions based on knowledge and experience • expertise is a hybrid of practical and experiential knowledge
3	**Proficient**	2.51 – 3.50	A skill or practice you feel you are good at.	• has handled similar relevant situations or areas of practice • able to distinguish important aspects and prioritize components of items or practices under consideration • capable of conscious, deliberate planning in carrying out the skill or practice • shows self-confidence and efficiency when carrying out the skill or practice
2	**Refining**	1.51 – 2.50	A skill or practice you feel could be improved	• demonstrates acceptable performance that could be improved • has enough experience to recognize important basic infection prevention and control aspects of a situation or area of practice
1	**Developing**	1.00 – 1.50	A skill or practice you do not currently use but which should be included in your role.	• limited understanding of the situation or area of practice • clear rules or mentorship/guidance is required for safe practice in this area

An open-ended question was used to elicit the responses on issues and concerns of participants in terms of the implementation of infection prevention and control.

Data Gathering Procedure

The data gathering procedure was divided into 2 phases. First, the researcher secured a formal letter of approval and permission to conduct a study from the Chief Nurses via email. The informed consent protocols were attached in front of the questionnaire to be read and understand clearly by the participants. The participants were informed of the anonymity and confidentiality of the data before continuing with the process. Participation in this study was completely voluntary and may withdraw from participation at any time without penalty.

During the process of answering the tool, the researcher was available to answer the questions and concerns of the participants. The minimum health standards were observed by wearing personal protective equipment and physical distancing. The data gathering procedure was coordinated to the human resource department with the approval from the management to obtain the active participation of targeted professionals.

After answering the questionnaire, the researchers were personally collected the papers ensuring that all relevant data and items were accomplished. The data responses were obtained for statistical treatment. These data were encoded converted into an Excel spreadsheet to have an organized collection of responses. From there, the data gathered from the survey were tabulated, treated statistically, analyzed, and were interpreted intelligently.

For the second phase, after interpreting the results of the first phase, a semi-structured interview guide questionnaire was developed based on the initial results. The researcher conducted an individual interview discussion via virtual meeting and phone calls since face-to-face is still not feasible due to pandemics. The created virtual meeting link was sent through the participant's email address and other social media platforms until the researcher reached data saturation. These were done at their most convenient time while complying with public health protocols and standards. The time frame of this investigation was from May to June 2021.

Statistical Treatment of Data

The following statistical treatments were utilized.

Phase 1:

For the statement of the problem number 1, to establish the profiles of participating hospitals and IPC Professionals, statistical treatment of data of frequency count and percentage distribution were calculated. Young (2020) explained that the frequency distribution is a representation that displays, either in graphical or tabular format, the number of observations over a given interval. The size of the period depends on the information being measured and the priorities of the analyst.

For the statement of the problem number 2, a weighted mean was used to determine the extent of the implementation of the hospital on infection prevention and control (IPC) core components.

For the statement of the problem number 3, to determine the level of participants' IPC practice in infection control and prevention, a weighted mean was used for statistical treatment of data. It is a type of average in which weights are assigned to individual values to determine the relative importance of each observation.

For the statement of the problem number 4, to determine the significant difference between the extents of implementation of IPC core components when group according to hospitals, an F-test or ANOVA was utilized.

For the statement of the problem number 5, to determine the significant relationship between the extent of implementation of IPC core components of the participating hospitals and the participant's level of practice in infection control and prevention, Pearson (r) correlation coefficient was used.

Phase 2:

For the statement of the problem number 6, to determine the issues and concerns of the participants in the implementation of IPC measures, the qualitative framework method of Amedeo P. Giorgi on the analysis and processing of qualitative data was utilized.

Giorgian Method of Qualitative Data Analysis

Steps	**Description**
Interview with Respondents	The relevant information, which consisted of naive descriptions, was obtained through open-ended questions and discussion.
Sense of the Whole	To acquire a general understanding of the entire statement, one reads the entire description.
Discrimination of Meaning Units	Once the meaning of the whole has been grasped, the researcher returns to the beginning and reads the text again, highlighting each time a transition in meaning occurs with the specific goal of distinguishing "meaning units" from a psychological point of view and with a focus on the phenomenon under investigation.
Transformation of Expressions into Psychological Language	The researcher then goes over all of the meaning units that are still expressed in the participants' concrete language, reflects on them, and comes up with the essence of the event for the participant. Following that, the researcher converts each appropriate unit into psychological science terminology.
Synthesis of Transformed Meaning Units into a Consistent Statement of the Structure of the Experience	The researcher constructs a consistent statement regarding the structure of the participant's experience after employing an imaginative variation on these changed meaning units.
Final Synthesis	Finally, the researcher combines all of the statements about each participant's experience into a single, consistent description of the experience's structure that characterizes and captures the core of the experience under investigation.

Source: Giorgi, A. P., & Giorgi, B. M. (2003). The descriptive phenomenological psychological method. In P. M. Camic, J. E. Rhodes, & L. Yardley (Eds.), Qualitative research in psychology: Expanding perspectives in methodology and design (pp. 243–273). Washington, DC: American Psychological Association

PRESENTATION, ANALYSIS, AND INTERPRETATION OF DATA

Phase 1: Quantitative Data

1. Hospital Profile

A total of 10 hospitals in the province of Batangas participated in this study. There were 211 members of the ICC professionals who had successfully submitted the questionnaires with valid data at the prescribed time, 44 of them are members of the core team.

Table 1.1 Demographic Profile of Hospitals

Profile Variables	Frequency	Percentage
A. Years of ICC		
1-5 years	19	43.2
6-10 years	15	34.1
>11 years	10	22.7
Total	**44**	**100**
B. Accreditation/s		
DOH and PhilHealth	34	77.3
DOH, PhilHealth and ISO	10	22.7
Others	0	0
Total	**44**	**100**

Table 1.1 shows the profile variables of participating hospitals including the years of having ICC and its hospital accreditations. The majority of the hospitals have established hospital infection control committees between 1-5 years which is 43.2% and 22.7% obtained for more than 11 years. As expected, all hospitals are DOH and PhilHealth accredited with 77.3% and 22.7% had obtained their hospital ISO certification. The researcher determined that hospital accreditation is considered as a self-evaluation and external peer review process used by health care institutions to accurately measure their level of performance against specified criteria and to adopt strategies for continuous improvement. Accreditation is a practice of systematically reviewing the quality of hospital care against acknowledged criteria, according to Andres, E. B., Song, W., Schooling, C. M., and Johnston, J. M. (2019). Patients and other stakeholders would know that a minimum quality standard has been met if accreditation has been successfully certified.

Demographic Profile of Infection Control Professionals

A total of 211 participants had successfully submitted the questionnaires. In table 1.2 presented the demographic profiles of IC professionals in 10 hospitals under the study such as age, sex, area of assignment, highest educational attainment, and length of the year as a team member.

Table 1.2 Demographic Profile of Infection Control Professionals

Profile Variables	Frequency	Percentage
Age		
21-30 years	88	41.7
31-40 years	83	39.3
41-50 years	30	14.2
51-60 years	10	4.7
>61 years	0	0
Total	**211**	**100**
Sex		
Male	64	30.3
Female	147	69.7
Total	**211**	**100**
Area of Assignment		
Administration	13	6.2
Infection Prevention and Control	24	11.4
Medical Affairs	6	2.8
Nursing	126	59.7

Ancillary	39	18.5
Others	3	1.4
Total	**211**	**100**
Highest Educational Attainment		
College	176	83.4
Master's	27	12.8
Doctorate	8	3.8
Total	**211**	**100**
Length of Year as ICC Member		
<1 year	23	10.9
2-5 years	118	55.9
6-9 years	51	24.2
>10 years	19	9.0
Total	**211**	**100**

Age

The profile in Table 1.2 shows that the participants are relatively young between the ages of 21 to 40 years old where the majority belongs to the 21 to 30 years old bracket with a total frequency count of 41.7%. Followed by those who belong in the group with age bracket of 31-40 and 41-50 with a frequency distribution of 39.3% and 14.2% respectively. The least numerous group is age 51-60 years old which is 4.7% and 0% from >61 years of age.

Based on this result, it is shown that IPC professionals working in the hospitals are mainly those who belong to young adulthood. This finding is further supported in the claims of the study by Auerbach (2017) mentioned that Millennials' attachment to nursing careers could be influenced by characteristics of that generation which has a high propensity for a balance between their work and life. These workforce patterns are occurring in a dynamic health care environment.

Sex

As expected by the researcher, nursing is a female-dominated occupation, as can be seen in the profile where a high percentage (69.7%) was female with 147 counts and a very low percentage (30.3%) was male with only 64 counts. As mentioned in the study of Folami, (2017) she mentioned the public insights that nursing is a female-oriented role have been a major factor in the low numbers of men in the nursing field and continue to apply pressure on those in the profession.

Area of Assignment

A total of 211 professionals from different healthcare departments in the hospitals participated in the study, the majority of the participants came from the Department of Nursing which is made of 129 nurses (59.7%). There were 39 (18.5%) from the Ancillary, and IPC departments with 24 (11.4%) followed by the Administrative department with 13 (6.2%) respondents. The least number is from medical and other related departments with 6 (2.8%) and 3 (1.4%) respectively. Also, based on the surveyed hospitals all of them have an existing infection prevention and control committee.

Highest Educational Attainment

As the profile data shows, the researcher observed that the majority of the participants obtained a college degree which was 83.4% followed by those with master's degrees, 12.8%, and the least was 3.8% with a doctorate. As stated by Randhawa, G. K., & Jackson, M. (2019) in their study on the role of artificial intelligence in learning and professional development for healthcare professionals, education and training are central to preparing a skilled and knowledgeable workforce. The researcher refers to training as learning that is provided to improve performance on the present job, whereas education provides learning to improve performance on a future job.

Length of Years as ICC member

In terms of the years as ICC member who has direct responsibility in the implementation of infection prevention and control measures in the hospitals, 118 (55.9%) of the participants was a member from 2-5 years bracket. The group of 6-9 years has 51 (24.2%) followed by <1 year with 23 (10.9%). The least number is 19 (9%) having a member of more than 10 years in the field of implementation. In a similar study, Beyamo, A., Dodicho, T., and Facha, W. (2019) found that 35% of health care employees did not follow conventional precaution methods, whereas 65% of health care workers did. When compared to health care personnel with more than five years of experience, those with less than or equal to five years of experience were 2.5 times more likely to follow standard precautionary practices. This could be related to recent memories, a strong commitment, or a fear of nosocomial infection, according to the researcher.

2. The extent of implementation of IPC core components at the facility

The extent of implementation of IPC core components at the facility was measured to support the World Health Organization guidelines on core components of IPC programs and activities within the health care facility. The Infection Prevention and Control (IPC) Assessment Framework (IPCAF) adopted survey questionnaire was used to 10 participating hospitals to determine the extent of implementation using a 4-point Likert scale. Results in terms of the eight (8) core components, namely: IPC Program, IPC guidelines, IPC Education and Training, Healthcare-associated Infection (HAI) Surveillance, Multimodal strategies, Monitoring, Audit and Feedback, Workload, Staffing and bed Occupancy, and Built environment, materials, and equipment for IPC are shown in Tables 2.1-2.8.

Table 2.1 shows the facility level on infection prevention and control programs. The indicator with the highest mean score of 3.30 interpreted as "intermediate" rated by the ICC core team members was on the item "the IPC program is supported by an IPC team comprising IPC professionals".

Table 2.1 Infection Prevention and Control (IPC) Program

Core Component 1: Infection Prevention and Control (IPC) Program	**Weighted Mean**	**IPC Level**
The hospital has an IPC program with clearly defined objectives and an annual activity plan.	3.25	Intermediate
The IPC program is supported by an IPC team comprising IPC professionals.	3.30	Intermediate
The IPC team has at least one full-time IPC professional *(nurse or doctor working 100% in IPC)* available.	3.25	Intermediate
There is an IPC committee actively supporting the IPC program.	3.14	Intermediate
IPC objectives are measurable outcome indicators and set future targets	3.05	Intermediate
Composite Mean	3.20	Intermediate

IPC Level: 1.00-1.50 Inadequate; 1.51-2.50 Basic; 2.51-3.50 Intermediate; 3.51-4.00 Advanced

The researcher analyzed the need of the IPC professionals in the implementation of programs. The majority of the participating hospitals have an IPC program that includes activities, procedures, and policies designed to reduce the spread of infections, usually within their facilities. IPC professionals mentioned that the primary goal is to prevent susceptible patients from acquiring disease-causing micro-organisms. In support of this, Lee & Lind (2017), the Infection Control Committee uses several tools such as establishing different IPC programs to ensure patient and employee safety. The Infection Control Committee is actively involved with the program planning and implementation of new procedures that pose a potential infection control risk. In addition, they monitor infectious processes within the healthcare facility.

However, the indicator rated by the core team with the lowest mean score of 3.05 interpreted as "intermediate" on the item "IPC objectives are measurable outcome indicators and set future targets". Based on the result finding rated with the lowest score, the researcher observed that targets within the program are not fully met as evident that the hospital implementation level ranked at intermediate which is one scale lower. However, successful implementation of infection prevention and control is aligned with the objective targets. Timen et al., (2018) reported in the study that there is a lack of concrete performance targets that were found in the implementation programs.

As an overall rating in terms of infection prevention and control program, the core team members obtained a rating score of 3.20 interpreted as intermediate. The researcher considered that patients and healthcare personnel are both protected when infection control precautions are followed. According to Hammoud, S., Ghazi, B., Nassredine, M., & Haidar, M. A. (2017), ensuring that all healthcare workers observe universal standards for infection control precautions is a useful technique for controlling and avoiding hospital-acquired infections.

Table 2.2 Infection Prevention and Control (IPC) Guidelines

Core Component 2: Infection Prevention and Control (IPC) Guidelines	**Weighted Mean**	**IPC Level**
The facility has the expertise *(in IPC and/or infectious disease)* for developing adopting guidelines.	2.86	Intermediate
The hospital has guidelines available for standard precautions, hand hygiene, transmission-based precautions, outbreak management, and preparedness, prevention of healthcare-associated infections, prevention of transmission of multidrug-resistant (MDR) pathogens, disinfection and sterilization, health care worker protection and safety, injection safety, waste management, and antibiotic stewardship.	3.30	Intermediate

Health care workers receive specific training related to new or updated IPC guidelines introduced in the facility.	2.95	Intermediate
There has regular monitoring of the implementation of at least some of the IPC guidelines in the facility.	3.07	Intermediate
There are relevant stakeholders *(for example, lead doctors and nurses, hospital managers, quality management)* involved in the development and adaptation of the IPC guidelines in addition to IPC personnel.	3.00	Intermediate
Composite Mean	3.04	Intermediate

IPC Level: 1.00-1.50 Inadequate; 1.51-2.50 Basic; 2.51-3.50 Intermediate; 3.51-4.00 Advanced

Findings in Table 2.2 show the facility level on infection prevention and control (IPC) guidelines. The indicator with the highest mean score of 3.30 interpreted as "intermediate" rated by the core group members was on the item "The hospital has guidelines available for standard precautions, hand hygiene, transmission-based precautions, outbreak management, and preparedness, prevention of healthcare-associated infections, prevention of transmission of multidrug-resistant (MDR) pathogens, disinfection and sterilization, health care worker protection and safety, injection safety, waste management, and antibiotic stewardship." The researcher considered the need for the creation of IPC guidelines for the effective implementation of IPC programs. Concerning this, the purpose of putting policies and procedures in place for Infection Control is to ensure employees, clients, and families are protected against infectious diseases and infections by providing guidelines for their investigation, control, and prevention. These practices are designed to reduce the risk of hospital-associated infections and to ensure a safe and healthy hospital environment for our patients, healthcare providers, and visitors as published by Halton Healthcare Services. Infection Control - Halton Healthcare (2020).

While the indicator rated with the lowest mean score of 2.86 interpreted as "intermediate" was on the item "The facility has the expertise (in IPC and/or infectious disease) for developing adopting guidelines". The researcher observed the lack of experts assigned for infectious disease-related concerns as evident as the majority of the respondents are members for 2-5 years (55.9%) length of years as ICC members. In support of this, Barker, et al., (2017) conclude that institutional support for infection control and prioritizing resources to recruit and retain trained, experienced nursing staff are critical to the effective implementation of infection control practices.

As an overall rating on the facility assessment level in terms of infection prevention and control guidelines, the core group rated it with a composite mean of 3.04 interpreted as "intermediate". The researcher evaluated that standard precautions are work practices that must be followed to achieve the highest level of infection control possible when treating all clients, regardless of diagnosis. It encompasses all policies, guidelines, procedures, and activities aimed at preventing or reducing the risk of infectious disease transmission in healthcare settings. Standard precautions are recommended for all patients, regardless of suspected or confirmed infection, according to Beyamo, A., Dodicho, T., and Facha, W. (2019).

Table 2.3 Infection Prevention and Control (IPC) Education and Training

Core Component 3: Infection Prevention and Control (IPC) Education and Training	**Weighted Mean**	**IPC Level**
The hospital has personnel with IPC *(in IPC and/or infectious diseases)* to lead IPC training.	3.30	Intermediate
There is a new employee orientation and regular *(at least annually)* mandatory IPC training for all health care workers.	3.18	Intermediate
There is frequently IPC training for cleaners and other personnel directly involved in patient care.	3.00	Intermediate
The administrative and managerial staff receive general training on IPC in your facility.	3.00	Intermediate
The hospital offered educational development for IPC staff like attending conferences.	3.05	Intermediate
Composite Mean	3.09	Intermediate

IPC Level: 1.00-1.50 Inadequate; 1.51-2.50 Basic; 2.51-3.50 Intermediate; 3.51-4.00 Advanced

Findings in Table 2.3 in terms of IPC education and training revealed that "The hospital has personnel with IPC (in IPC and/or infectious diseases) to lead IPC training." This item was the highest indicator with WM of 3.30 and interpreted as "intermediate". In contrast, there were two (2) indicators with the lowest rating score of 3.00 on items "there is frequently IPC training for cleaners and other personnel directly involved in patient care" and "the administrative and managerial staff receive general training on IPC in your facility". The researcher observed the need for trained staff dedicated to infectious disease. According to Wang, J., Zhou, M., and Liu, F. (2020), front-line healthcare workers (excluding infectious disease physicians) received insufficient IPC training, particularly for respiratory-borne infectious illnesses. Healthcare staff has not had adequate time for systematic training and practices since the start of emergency reactions. There was a dearth of professional supervision and guidance, as well as a monitoring system. The risk of infection for healthcare professionals was increased as a result of this condition.

As an overall rating in terms of IPC education and training, the core team members rated it with a composite mean of 3.09 interpreted as "intermediate". Pre-orientation training with appropriate time and lengths for quick participation of the new employee in standard precaution practices, according to the researcher, will improve standard precaution practices. The most commonly perceived challenges in the implementation of infection prevention and control standards, according to Salem & Youssef (2017), are a lack of time to apply infection control standards, limited opportunities for infection control training, and work overload.

Table 2.4 Healthcare-associated infection (HAI) surveillance

Core Component 4: Healthcare-associated infection (HAI) surveillance	**Weighted Mean**	**IPC Level**
The facility has a defined component of surveillance included in the IPC program.	3.09	Intermediate
There is a professional responsible for surveillance activities who are trained in surveillance methods, data management, and basic epidemiology.	3.16	Intermediate
The hospital conducted surveillance for healthcare-associated infections such as SSI, CLABSI, HAP/VAP, and CAUTI.	3.05	Intermediate
There is an adequate microbiology and laboratory capacity to support surveillance.	3.11	Intermediate
The surveillance data is used to make tailored unit/facility-based plans for the improvement of IPC practices.	3.11	Intermediate
Composite Mean	3.11	Intermediate

IPC Level: 1.00-1.50 Inadequate; 1.51-2.50 Basic; 2.51-3.50 Intermediate; 3.51-4.00 Advanced

Results, as shown in Table 2.4, revealed that in terms of healthcare-associated infection (HAI) surveillance, the indicators with the highest mean score of 3.11 and as interpreted "intermediate" was on the items "There is an adequate microbiology and laboratory capacity to support surveillance" and "The surveillance data is used to make tailored unit/facility-based plans for the improvement of IPC practices". The researcher observed that all of the hospitals have their laboratory section for microbial procedures. Conversely, the indicator with the lowest mean score of 3.05 rated by the core team was on the item "The hospital conducted surveillance for healthcare-associated infections such as SSI, CLABSI, HAP/VAP, and CAUTI" interpreted as "intermediate". The researcher witnessed that since 2005, the World Health Organization launched the First Global Patient Safety Challenge "Clean Care is Safer Care" to create a global momentum and commitment to reducing HAI.

As an overall rating, the facility level among hospitals in terms of healthcare-associated infection (HAI) surveillance was rated as an "intermediate" with a composite mean of 3.09. The researcher considered the burden of healthcare-associated infections (HAIs). In recent years, increasing awareness of patient safety and the avoidance of possible preventable morbidity has prompted increased focus on HAI prevention and surveillance. There should be a presence of disease surveillance coordinating body as well as an infectious disease consultant that performs routine monitoring of infectious disease surveillance in the health care settings. The doctors are very responsive to authority to act as surveillance coordinators as stated in the research study of Nemis, K (2016).

Table 2.5 Multimodal strategies for the implementation of infection prevention and control (IPC) interventions

Core Component 5: Multimodal strategies for the implementation of infection prevention and control (IPC) interventions	**Weighted Mean**	**IPC Level**
The hospital uses the best evidence-based approach to implement IPC interventions.	3.02	Intermediate
The hospital multimodal strategies include system change, education and training, monitoring and feedback, communication and reminders, and safety climate and culture change.	2.93	Intermediate
There is a multidisciplinary team used to implement IPC multimodal strategies.	2.93	Intermediate
There is a regular link to colleagues from quality improvement and patient safety to develop and promote IPC multimodal strategies.	3.00	Intermediate
There is a bundle of care in the facility that focused on improving the care process in a structured manner.	3.05	Intermediate
Composite Mean	2.97	Intermediate

IPC Level: 1.00-1.50 Inadequate; 1.51-2.50 Basic; 2.51-3.50 Intermediate; 3.51-4.00 Advanced

In Table 2.5, the result showed in terms of multimodal strategies for the implementation of infection prevention and control (IPC) intervention as rated by the core team. The indicator rated with the highest mean score of 3.05 on items "There is a bundle of care in the facility that focused on improving the care process in a structured manner". The research evaluated that majority of the private hospitals complied with the national and international standards and this attributes to the accreditation of each institution. Furthermore, The ABCDEF bundle represents an evidence-based guide for clinicians to approach the organizational changes needed for optimizing patient recovery and outcomes. The ABCDEF bundle includes: Assess, Prevent, and Manage Pain, Both Spontaneous Awakening Trials (SAT) and Spontaneous Breathing Trials (SBT), Choice of analgesia and sedation, Delirium: Assess, Prevent, and Manage Early mobility and Exercise, and Family engagement (Marra, A., Frimpong, K., & Ely, E. W. (2016).

Also, findings revealed that items "The hospital multimodal strategies include system change, education and training, monitoring and feedback, communication and reminders, and safety climate and culture change" and "There is a multidisciplinary team used to implement IPC multimodal strategies" obtained the lowest indicators as mean score of 2.93 and interpreted as "intermediate". It is critical to persuade senior managers and key experts of the importance of implementing multimodal strategies at the national and institutional levels, and this requires effective communication and engagement (WHO, 2017).

As an overall rating on multimodal strategies, the core team rated it with a composite mean of 2.97 interpreted as "intermediate". The researcher analyzed that a multimodal approach allowed for the reduction of the incidence of the spread of infection and offered a protective strategy. To support this, Matsen Ko, L. J., Yoo, J. Y., Maltenfort, M., Hughes, A., Smith, E. B., & Sharkey, P. F. (2016) implemented multimodal programs and effective strategies to reduce infection rates in their institution.

Table 2.6 Monitoring/Audit of IPC practices and feedback

Core Component 6: Monitoring/Audit of IPC practices and feedback	**Weighted Mean**	**IPC Level**
Trained personnel responsible for monitoring/audit and feedback is present.	3.11	Intermediate
The hospital has a well-defined monitoring plan with clear goals, targets, and activities.	3.14	Intermediate
There is a regular monitoring of hand hygiene compliance, healthcare-associated infections, cleaning of the environment, disinfection and sterilization of medical equipment/instruments, and waste management.	3.18	Intermediate
There are feedback auditing reports such as hand hygiene compliance data or other processes on the state of IPC activities/performance.	3.05	Intermediate
The monitoring and feedback of IPC processes and indicators performed in a "blame-free" institutional culture.	3.00	Intermediate
Composite Mean	3.10	Intermediate

IPC Level: 1.00-1.50 Inadequate; 1.51-2.50 Basic; 2.51-3.50 Intermediate; 3.51-4.00 Advanced

Table 2.6, shows the assessment framework in monitoring/audit and feedback in IPC practices. Specifically, in item "There is a regular monitoring of hand hygiene compliance, healthcare-associated infections, cleaning of the environment, disinfection and sterilization of medical equipment/instruments, and waste management" was rated as the highest indicator with a weighted mean of 3.18 interpreted as "intermediate". The researcher observed the difficulties in monitoring IPC programs in most hospitals that are commonly attributed to the current health crisis. During the periods of an outbreak of COVID-19 or other infectious diseases, implementations of infection prevention and control (IPC) becomes of great importance in healthcare settings particularly the great importance of personal protection of healthcare workers (Wang et al., 2020).

On the other hand, the lowest indicator was rated 3.00 on the item "The monitoring and feedback of IPC processes and indicators performed in a "blame-free" institutional culture" and interpreted as "intermediate". The researcher clarifies the activities of hospitals concerning culture and climate, it found out that all hospitals have their institutional manual provided by respective administrators. In the study of Ross et al., (2017) on reducing the blame culture through clinical audit in nuclear medicine, the study documents performance feedback as a key facilitator of medical engagement with the clinical audit. They found that a supportive blame-free culture of trust for medical engagement with clinical audit was associated with reduced levels of professional anxiety and higher levels of perceived self-efficacy.

Findings showed the overall rating in monitoring/audit and feedback in IPC practices, the core team rated it with a composite mean of 3.10 interpreted as "intermediate". The researcher analyzed that even the result was intermediate, there is a need to improve the monitoring and audit implementation to attain the highest level of practice. In support of this, strengthening the surveillance and reporting of new cases in healthcare settings and countries is necessary to monitor the epidemiological situation so that, if necessary, the implemented IPC prevention strategies can be refined on time as concluded in the study of Magiorakos et al., (2017).

Table 2.7 shows that the indicators with the highest mean score of 3.20 interpreted as "intermediate" on the item "There is an adequate spacing of >1 meter between patients per bed". The researcher sees the compliance of all facilities concerning bed capacity requirements and sustaining the prescribed set-up. The availability of hospital beds reflects the accessibility of service in a hospital. In contrast with the current health crisis, the study on the shortage

of hospital beds in the Philippines using system dynamics by German et al., (2018), focused on evaluating the Filipino patients' needs in terms of in-patient bed occupancy or hospital bed ratio per 10,000 people. According to the Department of Health, the country's health agency, only four of the country's 17 regions met the standard local hospital bed ratio, and only one, the National Capital Region, met the World Health Organization's criterion on an international level.

Table 2.7 Workload, staffing, and bed occupancy

Core Component 7: Workload, staffing, and bed occupancy	**Weighted Mean**	**IPC Level**
Staffing levels are appropriate to patient workload using the national standard method.	2.91	Intermediate
There is a system in the facility to act on the results of the staffing need assessments when staffing levels are deemed to be too low.	2.98	Intermediate
The bed capacity design in the facility is based on international standards.	2.91	Intermediate
There is an adequate spacing of >1 meter between patients per bed.	3.20	Intermediate
There is a system in place in the facility to assess and respond when adequate bed capacity is exceeded.	2.93	Intermediate
Composite Mean	2.99	Intermediate

IPC Level: 1.00-1.50 Inadequate; 1.51-2.50 Basic; 2.51-3.50 Intermediate; 3.51-4.00 Advanced

Conversely, the indicators with the lowest mean registered as 2.91 on items “Staffing levels are appropriate to patient workload using the national standard method”. The researcher analyzed the result was attributed to the national current issue of nursing manpower shortage. According to Labrague et al., (2018) in their study on organizational commitment and turnover intention among rural nurses in the Philippines: Implications for nursing management, the continuous trend of Filipino nurses migrating to other countries has put the country's patient care services at threat. In the Philippines, researchers looked into the amount of nurses' organizational commitment and turnover intentions. In addition, predictors of nurses' organizational commitment and intention to leave were discovered.

The facility level in terms of workload, staffing, and bed occupancy was “intermediate” as shown by the composite mean of 2.99. The researcher analyzed long-time exposure to large-scale infected patients directly increased the risk of infection for healthcare workers. Also, the pressure of treatment, work intensity, and lacking rest indirectly increased the probability of infection for healthcare workers as stated by Wang, J., Zhou, M., & Liu, F. (2020).

Table 2.8 Built environment, materials, and equipment for IPC at the facility level

Core Component 8: Built environment, materials, and equipment for IPC at the facility level	**Weighted Mean**	**IPC Level**
Water services are available at all times and of sufficient quantity for all uses (handwashing, drinking, personal hygiene, sterilization, decontamination, cleaning, and laundry).	3.34	Intermediate
Hand hygiene stations are available at all points of care.	3.34	Intermediate
The appropriate and well-maintained materials for cleaning are available.	3.36	Intermediate
PPE is available at all times and in sufficient quantity for all uses of all health care workers.	3.30	Intermediate
Waste collection containers for non-infectious (general) waste, infectious waste and, sharps waste close to all waste generation points are functional.	3.32	Intermediate
Composite Mean	3.33	Intermediate

IPC Level: 1.00-1.50 Inadequate; 1.51-2.50 Basic; 2.51-3.50 Intermediate; 3.51-4.00 Advanced

Table 2.8 shows the variables in terms of built environment, materials, and equipment for IPC at the facility level. The highest mean score of 3.36 interpreted as “intermediate” on items “The appropriate and well-maintained materials for cleaning are available”. The researcher observed that most of the hospitals are compliant with the cleanliness of their facilities which attributes to healthcare satisfaction. Most hospital systems aim to improve patient, doctors, and other healthcare workers’ satisfaction by ensuring that the hospital environment is clean as stated by Davidson et al., (2016).

While the indicator with the lowest mean score of 3.30 was interpreted as “intermediate” on the item “PPE is available at all times and in sufficient quantity for all uses of all health care workers”. The researcher considered that the shortage of personal protective equipment (PPE) was a serious problem during the time of the pandemic, thus, emergency responses were initiated in various parts of the country, which has led to a rapid increase in the demand

for PPE. Barker et al., (2017), reported that despite having a plentiful supply of gowns, masks, and gloves in prominent locations, infection management has previously been hampered by a shortage of personal protective equipment.

As an overall rating in terms of the built environment, materials, and equipment for IPC at the facility level, the core team members rated it with a composite mean of 3.33 interpreted as "intermediate". Wang et al., (2020) summarized some reasons for such a high number of infected healthcare workers during the emergency outbreak. The inadequate personal protection of healthcare workers at the beginning of the epidemic was a great issue. Therefore, the front-line healthcare workers did not implement effective personal protection before conducting the treatment.

Table 2.9 Summary of the extent of implementation of IPC core components at the facility

Core Component	**Weighted Mean**	**IPC Level**
IPC Programs	3.20	Intermediate
IPC Guidelines	3.04	Intermediate
IPC Education and Trainings	3.09	Intermediate
Healthcare-associated infection (HAI) surveillance	3.11	Intermediate
Multimodal strategies	2.97	Intermediate
Monitoring/Audit of IPC practices and feedback	3.10	Intermediate
Workload, staffing, and bed occupancy	2.99	Intermediate
The built environment, materials, and equipment	3.33	Intermediate
Composite Mean	3.10	Intermediate

IPC Level: 1.00-1.50 Inadequate; 1.51-2.50 Basic; 2.51-3.50 Intermediate; 3.51-4.00 Advanced

Based on the overall results, most aspects of IPC core components are appropriately implemented in ten (10) participating hospitals. The extent of implementation of IPC core components at the facility level can be interpreted as intermediate at a composite mean of 3.10. This shows that the general IPC level marked among institutions is the intermediate meaning most aspects of IPC core components are appropriately implemented, however, the findings showed a scale level 1 below from the highest scale of 4. Therefore, the researcher considers to comes up with an enhancement program to strengthen the IPC implementation. Infection control in healthcare settings prevents or slows the spread of infections. The CDC provides an overview of how diseases spread, as well as prevention strategies and more specific recommendations based on the kind of healthcare facility.

3. The extent of IPC professionals' practice in infection prevention and control

To measure the extent of IPC professionals' practice in infection control and prevention, the Self-Audit Tool for infection prevention and control professionals was used. Results are presented in Tables 3.1 – 3.9.

Table 3.1 Qualifications, Education, Ethics, and Accountability

Qualifications, Education, Ethics, and Accountability	**Weighted Mean**	**Practice Level**
I am an experienced health care professional with a health sciences background.	1.51	Refining
I have completed the basic infection prevention and control (IPC) training orientation that has been provided in the hospital.	1.57	Refining
I have maintained Certification in Infection Prevention and Control provided by the Philippine Hospital Infection Control Nurses Association (PHICNA) / Philippine Hospital Infection Control Society (PHICS).	1.20	Developing
I support my profession's standards/code of ethics and PHICNA/PHICS research papers on the role of the infection control practitioner/professional.	1.24	Developing
I professionally engage in IPC research.	1.01	Developing
Composite Mean	1.31	Developing

Practice Level: 1.00-1.50 Developing; 1.51-2.50 Refining; 2.51-3.50 Proficient; 3.51-4.00 Expert

Table 3.1 shows the professional's practice level in terms of qualifications, education, ethics, and accountability rated by the IPC professionals. The indicator with the highest mean score of 1.57 interpreted as "refining" means that a skill or practice level of professionals could be improved on the item

"I have completed the basic infection prevention and control (IPC) training orientation that has been provided in the hospital". The research evaluated the results are attributed as a basic requirement for the IPC professionals. The continuous education of healthcare workers (HCW) is considered one of the key components of infection control programs. Since nurses are the frontline healthcare staff; their optimal and periodic training in basic infection control practices is essential. According to Gawad et al., (2018), the educational intervention had a significant impact on the improvement in the knowledge of the nursing staff. Similar periodic interventions should be encouraged to facilitate the learning of HCWs on the best infection control practices. However, the lowest indicator with a mean score of 1.01 on the item "I professionally engage in IPC research" interpreted as "developing" means skill or practice do not currently use but which should be included in their role. The researcher observed that most of the participants are not interested in research that attributes to limited resources and expending large time requirements for each research conduction.

As overall ratings in terms of qualifications, education, ethics, and accountability rated by the IPC professionals, the professionals rated it with the composite mean of 1.31 interpreted as "developing". The researcher analyzed that to enhance the knowledge and change the attitude is proved in many studies.

Table 3.2 Professional Development

Professional Development	**Weighted Mean**	**Practice Level**
I demonstrate basic knowledge and skills related to Infection Prevention and Control.	3.27	Proficient
I collaborate with and support, others to improve competency in the science of IPC.	3.25	Proficient
I demonstrate professional commitment to keep current in all aspects of infection prevention and health promotion	3.33	Proficient
I participate in continuing education.	3.25	Proficient
I am committed to protecting clients/patients/residents and staff through the support of safe practices and policies.	3.46	Proficient
Composite Mean	3.31	Proficient

Practice Level: 1.00-1.50 Developing; 1.51-2.50 Refining; 2.51-3.50 Proficient; 3.51-4.00 Expert

In the results shown in Table 3.2, the practice level in terms of professional development revealed the highest weighted mean of 3.46 on the item "I am committed to protecting clients/patients/residents and staff through the support of safe practices and policies" interpreted as "proficient" which means that the professionals' practice level is good at. The researcher observed that the nurses are reflecting to practice tender, loving, care in the delivery of quality and safe patient care. However, the lowest indicators rated by the professionals with a mean score of 3.25 on items "I collaborate with and support, others to improve competency in the science of IPC" and "I participate in continuing education" interpreted as proficient. The researcher analyzed that the lowest-rated by them attributes on limited trained personnel for scientific knowledge.

As overall rating in terms of the practice level on professional development, the core team members rated it with 3.31 interpreted as proficient. The researcher interpreted the importance of improving the IPC training programs targeting hand hygiene practices among health care workers. As stated in the study of Nair, Hanumantappa, Hiremath, Siraj, & Raghunath, (2016) hand hygiene training sessions for health care professionals may need to be conducted more regularly, with ongoing monitoring and performance evaluation, to encourage them to maintain proper hand hygiene practices.

Table 3.3 Leadership

Leadership	**Weighted Mean**	**Practice Level**
I provide direction and work collaboratively with others.	3.29	Proficient
I am creative and innovative in furthering the practice of IPC and I share knowledge and skills with others.	3.16	Proficient
I monitor IPC policies, procedures, and standards for the organization to ensure compliance with relevant legislation or guidelines applicable to my health care setting.	3.14	Proficient
I seek opportunities to influence and educate policymaking bodies	3.14	Proficient
Composite Mean	3.18	Proficient

Practice Level: 1.00-1.50 Developing; 1.51-2.50 Refining; 2.51-3.50 Proficient; 3.51-4.00 Expert

Results in Table 3.3 show the professional's practice level in terms of leadership. The indicator with the highest mean score of 3.29 is interpreted as "proficient" on the item "I provide direction and work collaboratively with others". Conversely, the lowest indicators as rated by the IPC professionals were marked on items "I monitor IPC policies, procedures, and standards for the organization to ensure compliance with relevant legislation or guidelines

applicable to my health care setting" and "I seek opportunities to influence and educate policymaking bodies" with a weighted mean of 3.14 interpreted as "proficient". The researcher observed the highest rated by them attributes the behavior to influence others to improve the quality of care.

However, the overall findings for the leadership variable were marked as "proficient" and rated by the IPC professionals with a composite mean of 3.18. the researcher sees that most of the implementers were proficient, need for enhancement in terms of leadership is required. In support of this, to promote improvements in infection control, effective clinical governance is required. The focus has always been on ensuring that infection control practice and policy are evidence-based. Leaders should concentrate on addressing contextual variables at the organizational level that would otherwise compromise the ability to apply the evidence-based practice, which is critical to maintaining current infection control accomplishments and fostering additional advances as reported by Halton, K., Hall, L., Gardner, A., MacBeth, D., & Mitchell, B. G. (2016).

Table 3.4 Infection Prevention and Control Practice

Infection Prevention and Control Practice	**Weighted Mean**	**Practice Level**
I review, analyze and implement regulations, standards, and professional organizations related to IPC.	3.13	Proficient
I review, analyze and apply pertinent information from current scientific literature and publications related to IPC.	3.06	Proficient
I assess the effect of international, national, and local trends on IPC practice.	2.95	Proficient
I acknowledge personal limitations and seek advice from others with specific expertise when necessary.	3.19	Proficient
Composite Mean	3.08	Proficient

Practice Level: 1.00-1.50 Developing; 1.51-2.50 Refining; 2.51-3.50 Proficient; 3.51-4.00 Expert

The findings in Table 3.4 show the infection prevention and control practice level of professionals. The indicator with the highest mean score of 3.19 interpreted as "proficient" on the item "I acknowledge personal limitations and seek advice from others with specific expertise when necessary". The researcher assessed that respondents need to explore themselves by acquiring knowledge and skill to overcome limitations. According to Kim and Seo (2016), an intensive education program on hospital infection control was effective for the nurses who will be professional nurses who will carry out autonomous roles in infection control in a near future.

However, the indicator with the lowest mean score of 2.95 was interpreted as "proficient" on the item "I assess the effect of international, national, and local trends on IPC practice". As an overall rating in terms of IPC practice level, the professionals obtained a rating score of 3.08 interpreted as "proficient". The researcher sees the lowest-rated by them was attributed to limited and unclear guidelines. This supports the study of Houghton et al., (2020) on barriers and facilitators to healthcare workers' adherence with infection prevention and control (IPC) guidelines. The study states that when local guidelines diverged from national or international guidelines, healthcare staff were unclear whether to follow them. They found it difficult to follow long or ambiguous instructions, especially if the advice was impractical or constantly changing.

Table 3.5 Surveillance

Surveillance	**Weighted Mean**	**Practice Level**
I have designed and maintained a system of surveillance for healthcare-associated infections appropriate to my health care setting.	3.00	Proficient
I use standardized definitions for the identification and classification of indicators, events, or outcomes.	3.09	Proficient
I determine the incidence or prevalence of infections in my health care setting	3.09	Proficient
I analyze surveillance data and calculate risk-adjusted infection rates appropriate to the indicator.	2.92	Proficient
I utilize process surveillance audit tools to evaluate the best IPC practices in my facility.	2.98	Proficient
Composite Mean	3.02	Proficient

Practice Level: 1.00-1.50 Developing; 1.51-2.50 Refining; 2.51-3.50 Proficient; 3.51-4.00 Expert

Table 3.5 shows the professionals' practice level in terms of surveillance. The indicators with a highest weighted mean of 3.09 rated by the IPC professionals and interpreted as "proficient" on items "I use standardized definitions for the identification and classification of indicators, events, or outcomes" and "I determine the incidence or prevalence of infections in my health care setting". While the indicator rated by themselves with a lowest

mean score of 2.92 interpreted as proficient was on the item "I analyze surveillance data and calculate risk-adjusted infection rates appropriate to the indicator".

As an overall rating on the professionals' practice level in terms of surveillance, the professionals rated it with a composite mean of 3.02 interpreted as "proficient". Nemis, K (2016), states that policy and procedures are vital for the surveillance of Healthcare-Associated Infections (HAI) and notifiable diseases in the hospital. In monitoring notifiable disease, the use of standard case management protocols and guidelines for infection prevention and control should be provided.

Table 3.6 Education

Education	**Weighted Mean**	**Practice Level**
I assess the learning needs of my clients/customers and develop educational objectives and strategies to meet those needs.	3.16	Proficient
I utilize learning principles appropriate to the target audience.	3.07	Proficient
I prepare, present, or coordinate educational workshops, lectures, discussions, or instruction on a variety of IPC topics.	2.80	Proficient
I collaborate with colleagues on the development and delivery of educational programs and/or tools that relate to IPC.	3.01	Proficient
I instruct patients, families, and other visitors about methods to prevent and control infections.	3.24	Proficient
Composite Mean	3.05	Proficient

Practice Level: 1.00-1.50 Developing; 1.51-2.50 Refining; 2.51-3.50 Proficient; 3.51-4.00 Expert

Table 3.6, shows the results of practice level in terms of education. The indicator with the highest mean score of 3.24 on the item "I instruct patients, families, and other visitors about methods to prevent and control infections" interpreted as "proficient". In contrast, the lowest indicator with a weighted mean of 2.80 is interpreted as proficient on the item "I prepare, present, or coordinate educational workshops, lectures, discussions, or instruction on a variety of IPC topics". A lack of education and training decreases compliance with the fundamental aspects of infection control practices according to Larson, E. L., Early, E., Cloonan, P., Sugrue, S., & Parides, M. (2017).

As an overall rating in terms of education, professionals rated it with a composite mean of 3.05 interpreted as "proficient". The researcher noted that continuing education courses on hospital infections positively impacted infection control procedures and compliance with barrier techniques.

Table 3.7 Program Administration and Evaluation

Program Administration and Evaluation	**Weighted Mean**	**Practice Level**
I develop an IPC program plan with mission and vision statement, goals, measurable objectives, and action plans that are based on the needs of the health care setting.	2.82	Proficient
I evaluate the effectiveness of the IPC program goals and objectives annually.	2.80	Proficient
I develop and implement IPC policies and procedures based on currently accepted best practices, standards, and research.	2.83	Proficient
I ensure that IPC policies are disseminated to appropriate groups or individuals.	2.96	Proficient
I provide knowledge on the function, role, and value of the IPC program.	2.97	Proficient
Composite Mean	2.87	Proficient

Practice Level: 1.00-1.50 Developing; 1.51-2.50 Refining; 2.51-3.50 Proficient; 3.51-4.00 Expert

Results in Table 3.7 show the practice level in terms of program administration and evaluation. The highest mean score of 2.97 on the item "I provide knowledge on the function, role, and value of the IPC program" is interpreted as "proficient". According to Sodhi, K., Shrivastava, A., Arya, M., & Kumar, M. (2016), the threat of hospital-acquired infections persists despite advances in the health care system. A lack of knowledge regarding infection control practices among health care workers decreases compliance with these practices.

While the indicator with the lowest mean score of 2.80 is interpreted as "proficient" on the item "I evaluate the effectiveness of the IPC program goals and objectives annually". Hospital administrators should strive to create an organizational atmosphere in which adherence to recommended infection control practices is considered to be an integral part of providing high-quality care Sodhi et al., (2016).

As an overall rating in the practice level in terms of program administration and evaluation, the professionals rated it with a composite mean of 2.87 interpreted as "proficient". The researcher concluded that training should include regular educational programs on infection control, standard and transmission-based precautions, and ward-based teaching programs on various care bundles to maintain the effectiveness of IPC programs.

Table 3.8 Performance Improvement

Performance Improvement	**Weighted Mean**	**Practice Level**
I identify opportunities for improvement based on indicators, observations, and other findings.	3.06	Proficient
I act as an agent of change and participate in the change process.	3.06	Proficient
I participate in the health care setting's multidisciplinary improvement strategies.	3.16	Proficient
Composite Mean	3.09	Proficient

Practice Level: 1.00-1.50 Developing; 1.51-2.50 Refining; 2.51-3.50 Proficient; 3.51-4.00 Expert

The findings in Table 3.8 show the professionals' practice level in terms of performance improvement. The indicator with the highest mean score of 3.16 is interpreted as "proficient" on the item "I participate in the health care setting's multidisciplinary improvement strategies". However, the indicators with the lowest mean score of 3.06 and interpreted as "proficient" on the item "I identify opportunities for improvement based on indicators, observations, and other findings" and "I act as an agent of change and participate in the change process".

While, the overall rating in the practice level in terms of performance improvement, as rated by the professionals with a composite mean of 3.09 interpreted as "proficient". The researcher interpreted that during the outbreak of COVID-19, we have witnessed that IPC professionals have done numerous and significant efforts to contain the transmission of infections between patient-to-patient and patient-to-healthcare workers. Additionally, Wang, J., Liu, F., Zhou, M., & Lee, Y. F. (2020) recommended that the challenges of IPC implementation techniques during the outbreak, as well as what to be addressed, should be identified first to improve and sustain IPC measures at the hospital level.

Table 3.9 Research

Research	**Weighted Mean**	**Practice Level**
I critically evaluate research literature relevant to IPC and practice issues.	2.86	Proficient
I am aware of current research findings and related literature relevant to my area of expertise	2.96	Proficient
I participate in IPC-related research independently or collaboratively.	2.87	Proficient
I understand how to change practice based upon the results of research.	3.02	Proficient
Composite Mean	2.93	Proficient

Practice Level: 1.00-1.50 Developing; 1.51-2.50 Refining; 2.51-3.50 Proficient; 3.51-4.00 Expert

Table 3.9 shows the practice level of IPC professionals in terms of research. The indicator with the highest mean score of 3.02 interpreted as "proficient" on the item "I understand how to change practice based upon the results of research". On the other hand, the indicator with the lowest mean score of 2.86 interpreted as "proficient" on the item "I critically evaluate research literature relevant to IPC and practice issues". COVID-19 is a serious infectious disease that is causing widespread concerns around the world. Controlling the COVID-19 outbreak will almost certainly necessitate a multifaceted, evidence-based strategy as stated by Xiao & Torok (2020).

As an overall rating in the practice level of IPC professionals in terms of research, it is rated with a composite mean of 2.93 interpreted as "proficient". The researcher analyzed that we need to communicate the epidemiology and risks of COVID-19, both to healthcare workers and the general population, and to implement infection prevention and control measures that are based on sound scientific principles.

Table 3.10 Summary of the extent of IPC professionals' practice in infection prevention and control

Elements	**Weighted Mean**	**Practice Level**

Qualification, Education, Ethics, and Accountability	1.31	Developing
Professional Development	3.31	Proficient
Leadership	3.18	Proficient
Infection Prevention and Control Practice	3.08	Proficient
Surveillance	3.02	Proficient
Education	3.05	Proficient
Program Administration and Evaluation	2.87	Proficient
Performance Improvement	3.09	Proficient
Research	2.93	Proficient
Composite Mean	2.87	Proficient

Practice Level: 1.00-1.50 Developing; 1.51-2.50 Refining; 2.51-3.50 Proficient; 3.51-4.00 Expert

Based on the overall result, infection prevention and control professionals' practice revealed proficient and they feel they are good at their skills or practice. They demonstrate basic knowledge and skills related to infection prevention and control, and IPC professionals are committed to keeping current in all aspects of infection prevention and control and health promotion. The researcher concludes that the IPC respondents can distinguish important aspects and prioritize components of items or practices under consideration, can handle similar relevant situations or areas of practice, capable of conscious, deliberate planning in carrying out the skill or practice, and shows self-confidence and efficiency when carrying out the skill or practice. However, the results are marked lowest as rated by themselves at the developing level in the elements of qualifications, education, ethics, and accountability specifically that respondents have attended and completed the basic infection prevention and control (IPC) training orientation that has been provided by the hospital and the support of them to research papers.

4. Difference between the extents of implementation of IPC core components when grouped according to hospitals

Table 4 Test for significant difference between the extents of implementation of IPC core components

Core Component	Extent of Implementation of IPC	f-value	p-value	Interpretation	Decision
1	IPC Programs	1.196	.329	Not Significant	Accept H_o
2	IPC Guidelines	.751	.661	Not Significant	Accept H_o
3	IPC Education and Trainings	3.162	.007	Significant	Reject H_o
4	Healthcare-associated infection (HAI) surveillance	.538	.836	Not Significant	Accept H_o
5	Multimodal strategies	2.478	.027	Significant	Reject H_o
6	Monitoring/Audit of IPC practices and feedback	2.029	.066	Not Significant	Accept H_o
7	Workload, staffing and bed occupancy	1.752	.115	Not Significant	Accept H_o
8	Built environment, materials, and equipment	2.498	.026	Significant	Reject H_o

Legend: If the p-value is <.05, Significant. If the p-value is >.05, Not Significant.

Table 4.1 shows the difference between the extents of implementation of IPC core components when grouped according to hospitals. Implementation in terms of IPC education and training, multimodal strategies, and built environment, materials, and equipment have a P-value ranging from 0.007 to 0.026 which is lower than 0.05 and interpreted as "significant" which implies that the null hypothesis was rejected. Based on the findings, the researcher analyzed the significant factors that can affect the successful implementation of infection prevention and control at the facility level. The quantitative results showed that most of the respondents (83.4%) are college degree holders and the researcher concludes that they are knowledgeable in basic infection control performances. Additionally, most of the hospitals are accredited by the DOH and PhilHealth which are practicing the government agency's standards in structural design of the facility, providing adequate stocks of PPEs for the healthcare workers, and the establishment of the organization such as the ICC committee.

While the indicator with the highest P-value of 0.836 was interpreted as "not significant" on the implementation in "healthcare-associated infection (HAI) surveillance". In contrast, the indicator with the lowest P-value of 0.066 was interpreted as "not significant" and was accepted on the item "monitoring, audit of IPC practices and feedback". In this result, the researcher interpreted that HAI surveillance in the hospital is partially implemented wherein the IPC professionals with their length of years can able perform monitoring of possible hospital-acquired infections or outbreaks.

5. Relationship between the extent of implementation of IPC core components of the participating hospitals and the participant's level of practice in infection control and prevention.

Tables 5.1 to 5.9 illustrate the result of the test for a significant relationship between the extent of implementation of IPC core components of the participating hospitals and the professionals' level of practice in infection control and prevention.

Table 5.1 Qualification and Education vs Extent of Implementation

Extent of Implementation of IPC	r-value	p-value	Interpretation	Decision
IPC Programs	.183	.236	Not Significant	Accept H_o
IPC Guidelines	-.197	.200	Not Significant	Accept H_o
IPC Education and Trainings	-.170	.269	Not Significant	Accept H_o
Healthcare-associated infection (HAI) surveillance	-.040	.797	Not Significant	Accept H_o
Multimodal strategies	.026	.869	Not Significant	Accept H_o
Monitoring/Audit of IPC practices and feedback	-.097	.532	Not Significant	Accept H_o
Workload, staffing, and bed occupancy	.016	.918	Not Significant	Accept H_o
The built environment, materials, and equipment	.082	.597	Not Significant	Accept H_o

Legend: If the p-value is <.05, Significant. If the p-value is >.05, Not Significant.

Table 5.1 revealed that qualification and education do not have a significant relationship with the extent of implementation, therefore, the null hypothesis is accepted. The importance of health care professionals' knowledge and compliance with basic precautions cannot be emphasized, as they are vulnerable to many infections and diseases if precautions are not taken appropriately. Fashafsheh, I., Ayed, A., Koni, M., Hussein, S., & Thultheen, I. (2016) states that training programs for newly employed healthcare personnel must be conducted following industry standards and at regular intervals. Furthermore, the level of compliance should be assessed utilizing an observation checklist.

Table 5.2 Professional Development vs Extent of Implementation

Extent of Implementation of IPC	r-value	p-value	Interpretation	Decision
IPC Programs	-.024	.875	Not Significant	Accept H_o
IPC Guidelines	.077	.621	Not Significant	Accept H_o
IPC Education and Trainings	-.018	.907	Not Significant	Accept H_o
Healthcare-associated infection (HAI) surveillance	.101	.513	Not Significant	Accept H_o
Multimodal strategies	.010	.947	Not Significant	Accept H_o
Monitoring/Audit of IPC practices and feedback	-.083	.593	Not Significant	Accept H_o
Workload, staffing, and bed occupancy	-.040	.795	Not Significant	Accept H_o
The built environment, materials, and equipment	.153	.322	Not Significant	Accept H_o

Legend: If the p-value is <.05, Significant. If the p-value is >.05, Not Significant.

Results shown in Table 5.2 revealed that there is no significant relationship between professional development and the extent of implementation, hence, the null hypothesis is accepted. Broad, R. (2018), states that good hand hygiene practices are essential for staff and visitors, but also patients. The commitment to protect clients/patients/residents and staff by promoting safe practices and policies was examined by the researcher.

Table 5.3 Leadership vs Extent of Implementation

Extent of Implementation of IPC	r-value	p-value	Interpretation	Decision

IPC Programs	.072	.640	Not Significant	Accept H_o
IPC Guidelines	.269	.078	Not Significant	Accept H_o
IPC Education and Trainings	.204	.183	Not Significant	Accept H_o
Healthcare-associated infection (HAI) surveillance	.277	.069	Not Significant	Accept H_o
Multimodal strategies	.071	.647	Not Significant	Accept H_o
Monitoring/Audit of IPC practices and feedback	.295	.052	Not Significant	Accept H_o
Workload, staffing, and bed occupancy	-.048	.755	Not Significant	Accept H_o
The built environment, materials, and equipment	.268	.079	Not Significant	Accept H_o

Legend: If the p-value is <.05, Significant. If the p-value is >.05, Not Significant.

Findings in Table 5.3 illustrate that leadership has no significant relationship with the extent of implementation, consequently, the null hypothesis is accepted. Infection prevention and control are usually regarded as requiring strong leadership (IPC). Its goal is to keep making progress in reducing the risk of healthcare-associated infections, particularly those caused by antimicrobial-resistant organisms, as well as to improve quality. Despite its significance, however, there is a little thorough study on successful leadership in IPC. While there is some evidence that IPC experts and physicians on the front lines of patient care may lead, there has been little published about IPC leadership at the top level (Gould, D., Gallagher, R., & Allen, D. A., 2016). Leadership plays a crucial role in infection prevention initiatives, according to the researcher. Others who want to prevent HAI could adopt the actions of great leaders.

Table 5.4 IPC Practice vs Extent of Implementation

Extent of Implementation of IPC	**r-value**	**p-value**	**Interpretation**	**Decision**
IPC Programs	.056	.716	Not Significant	Accept H_o
IPC Guidelines	-.065	.673	Not Significant	Accept H_o
IPC Education and Trainings	-.098	.526	Not Significant	Accept H_o
Healthcare-associated infection (HAI) surveillance	.095	.541	Not Significant	Accept H_o
Multimodal strategies	-.032	.839	Not Significant	Accept H_o
Monitoring/Audit of IPC practices and feedback	.073	.640	Not Significant	Accept H_o
Workload, staffing, and bed occupancy	-.290	.056	Not Significant	Accept H_o
The built environment, materials, and equipment	.177	.250	Not Significant	Accept H_o

Legend: If the p-value is <.05, Significant. If the p-value is >.05, Not Significant.

Table 5.4 shows that IPC practice does not have a significant relationship with the extent of implementation, therefore, the null hypothesis is accepted. Larson et al., (2017), states that implementing programs with rules and procedures aimed to protect patients and HCWs from infection should be part of effective measures to prevent the transfer of organisms that cause HAIs. The researcher determined that the programs should be developed by a hospital-wide committee that comprises a physician and infection control practitioners.

Table 5.5 Surveillance vs Extent of Implementation

Extent of Implementation of IPC	**r-value**	**p-value**	**Interpretation**	**Decision**
IPC Programs	.221	.150	Not Significant	Accept H_o
IPC Guidelines	.352	.019	Significant	Reject H_o
IPC Education and Trainings	.165	.285	Not Significant	Accept H_o

Healthcare-associated infection (HAI) surveillance	.287	.059	Not Significant	Accept H_o
Multimodal strategies	.111	.472	Not Significant	Accept H_o
Monitoring/Audit of IPC practices and feedback	.351	.019	Significant	Reject H_o
Workload, staffing, and bed occupancy	-.142	.357	Not Significant	Accept H_o
Built environment, materials, and equipment	.357	.017	Significant	Reject H_o

Legend: If the p-value is <.05, Significant. If the p-value is >.05, Not Significant.

Results in Table 5.5 shows that surveillance has a significant relationship between the core components in the extent of implementation such as IPC guidelines, monitor/audit of IPC practices and feedback, and built environment, materials, and equipment. The P-value was rated from 0.017-0.019, therefore, the null hypothesis is rejected. The researcher analyzed that policy and procedure manuals are reviewed to determine that all policies conform to current infection control standards.

Furthermore, according to Bryce et al., (2020), all personnel should be monitored and evaluated for infection control measures using a standardized form to identify lapses in recognized practice.

Though the remaining core components in this section have not significant relationship in surveillance and the null hypothesis is accepted.

Table 5.6 Education vs Extent of Implementation

Extent of Implementation of IPC	**r-value**	**p-value**	**Interpretation**	**Decision**
IPC Programs	.044	.776	Not Significant	Accept H_o
IPC Guidelines	.029	.850	Not Significant	Accept H_o
IPC Education and Trainings	.104	.500	Not Significant	Accept H_o
Healthcare-associated infection (HAI) surveillance	.216	.159	Not Significant	Accept H_o
Multimodal strategies	.179	.244	Not Significant	Accept H_o
Monitoring/Audit of IPC practices and feedback	.204	.184	Not Significant	Accept H_o
Workload, staffing, and bed occupancy	-.142	.357	Not Significant	Accept H_o
The built environment, materials, and equipment	.139	.369	Not Significant	Accept H_o

Legend: If the p-value is <.05, Significant. If the p-value is >.05, Not Significant.

Table 5.6 indicates that education has no significant relationship with the extent of implementation, thus, the null hypothesis is accepted. According to Hammoud, Ghazi, Nassredine, & Haidar (2017), healthcare-associated infections are grave problems in the healthcare sector that impose a great threat to patient's safety. The researcher considered that one of the major causes of morbidity in the clinical area is nosocomial infection. Therefore, nurses should have the proper knowledge and should practice according to standard precautions while giving care to patients as an initial level of infection control.

Table 5.7 Program Administration and Evaluation vs Extent of Implementation

Extent of Implementation of IPC	**r-value**	**p-value**	**Interpretation**	**Decision**
IPC Programs	.040	.798	Not Significant	Accept H_o
IPC Guidelines	.053	.734	Not Significant	Accept H_o
IPC Education and Trainings	-.030	.848	Not Significant	Accept H_o
Healthcare-associated infection (HAI) surveillance	-.026	.866	Not Significant	Accept H_o
Multimodal strategies	-.106	.494	Not Significant	Accept H_o

Monitoring/Audit of IPC practices and feedback	.069	.655	Not Significant	Accept H_o
Workload, staffing, and bed occupancy	-.066	.671	Not Significant	Accept H_o
The built environment, materials, and equipment	.184	.231	Not Significant	Accept H_o

Legend: If the p-value is <.05, Significant. If the p-value is >.05, Not Significant.

Table 5.7 illustrates that the program administration and evaluation have no significant relationship with the extent of implementation, therefore, the null hypothesis is accepted. The researcher believes that the effectiveness of all IPC programs, goals, and objectives should be evaluated annually. Bryce et al., (2020) emphasized that the infection control audit presents an opportunity to promote infection prevention and control improvement activities in partnership with an organization's multidisciplinary teams.

Table 5.8 Performance Improvement vs Extent of Implementation

Extent of Implementation of IPC	**r-value**	**p-value**	**Interpretation**	**Decision**
IPC Programs	-.070	.651	Not Significant	Accept H_o
IPC Guidelines	.027	.861	Not Significant	Accept H_o
IPC Education and Trainings	.105	.499	Not Significant	Accept H_o
Healthcare-associated infection (HAI) surveillance	.073	.636	Not Significant	Accept H_o
Multimodal strategies	-.095	.540	Not Significant	Accept H_o
Monitoring/Audit of IPC practices and feedback	.203	.185	Not Significant	Accept H_o
Workload, staffing, and bed occupancy	-.059	.703	Not Significant	Accept H_o
The built environment, materials, and equipment	.273	.703	Not Significant	Accept H_o

Legend: If the p-value is <.05, Significant. If the p-value is >.05, Not Significant.

Table 5.8 revealed that performance improvement has no significant relationship with the extent of implementation, so, the null hypothesis is accepted.

The researcher identified that the infection control audit is an opportunity to implement changes process and to introduce remedial measures in collaboration with various departments and services. According to Bryce, E., Scharf, S., Walsh, A., & Harris, L. (2020), a standardized approach to the audit allows benchmarking of practices across the institution and enhances standards of care.

Table 5.9 Research vs Extent of Implementation

Extent of Implementation of IPC	**r-value**	**p-value**	**Interpretation**	**Decision**
IPC Programs	.198	.276	Not Significant	Accept H_o
IPC Guidelines	.052	.739	Not Significant	Accept H_o
IPC Education and Trainings	-.119	.440	Not Significant	Accept H_o
Healthcare-associated infection (HAI) surveillance	-.047	.760	Not Significant	Accept H_o
Multimodal strategies	-.118	.447	Not Significant	Accept H_o
Monitoring/Audit of IPC practices and feedback	.205	.181	Not Significant	Accept H_o
Workload, staffing, and bed occupancy	-.073	.637	Not Significant	Accept H_o
The built environment, materials, and equipment	.294	.052	Not Significant	Accept H_o

Legend: If the p-value is <.05, Significant. If the p-value is >.05, Not Significant.

Findings in Table 5.9 revealed that research has no significant relationship with the extent of implementation, consequently, the null hypothesis is accepted. The Department of Health (DOH) has recognized the need for high-quality research in addressing our knowledge gaps in the causes of hospital-acquired infection. However, a misunderstanding over the employment of diverse paradigms and the discipline's lack of research pedigree may limit nursing research's contribution (Cole, 2016).

5. Issues and concerns of the participants in the implementation of IPC measures

Phase 2

To determine issues and concerns of the participants in the implementation of IPC measures in the hospital, the researcher conducted an individual interview that can describe the challenges of IPC professionals. The participants consented to take part in a virtual discussion of the study. The researcher made use of the semi-structured interview guide questionnaire to gathered responses from IPC professionals. To fully describe the meaning of the entire challenges and experiences through the identification of important themes, the qualitative framework of Amedeo Giorgi was used. The researcher sought infection control core team members from different participating hospitals who were willing to take part in the study's second phase and who had experienced challenges with the phenomena and the ability and willingness to describe them.

Emerged Themes

From the transcript of interviews among ten (10) IPC core team members of participating hospitals, three central themes were identified by the researcher namely: Workplace barriers on the effective implementation of Infection prevention and control, Workplace interventions for successful implementation of an infection control program, and Impact of COVID-19 pandemic to infection control professionals.

Theme 1: Workplace barriers on the effective implementation of Infection prevention and control

This theme includes the different barriers encountered by the IPC professionals in terms of infection prevention and control implementation in their respective institutions. The highlights emphasize the limitations encountered in the effective implementation of infection control programs. The following are the statements that refer to this theme:

"Masarap sa pakiramdam na may suporta kaming nakikita sa aming mga head. Yung mga ginamitin na medical supplies tulad ng PPE ay napo-provide naman. Pero siyempre habang suot naming yun, hindi ko din maiaalis yung takot at kaba kasi may kasama akong bata at senior yung nanay ko sa bahay." (ICN1)

"Nahirapan talaga kami nung nagsisimula yung pandemic, lahat hindi alam ang mga dapat gawin at sundin. Yung mga protocols sa COVID hindi malinaw, hirap kami kumilos sa duty, nakakapagod at nakakatakot isipin na pwede kang mahawa kung talagang di ka magiging maingat. Lakas ng loob at dasal lang talaga." (ICN2)

"Okay Sir, when it comes to implementation ng infection control, we face challenges kahit maganda yung mga programs and campaign ng infection control especially sa hand hygiene program. Kailangan magpasunod talaga. Una, mahirap mag-monitor ng compliance ng staff kasi laging dahilan nila ay nalilimutan daw nila pero kasama naman yun sa basic orientation nila upon hiring. Pangalawa, yung mga PPE naman ay available sa bawat area nila pero gagamitin na lang nila, hindi pa maiayos. Pangatlo, 'yung mga housekeeping namin, hindi alam paano idi-disinfect ng tama at maayos yung area." (ICN3)

"May mga staff na nagrereklamo na talaga at ayaw dumuty sa COVID areas tulad ng isolation and triage dahil sa init na nararanasan habang suot yung PPE, so may time talaga na inaalis nila ang facemask or shield, minsan nahuhuli pa naming na nakababa at hinuhubad yung bunny suit eh diba non-compliance nay un sa infection control." (ICN4)

"Dahil kulang kami sa nurses, na-support na din kami sa duty. Minsan pull-out ako sa Ward or ER para tumulong lalo na kung toxic na sa area." (ICN5)

Based on the transcription, the respondents mentioned different barriers as issues and challenges as they experienced in the effective implementation of infection prevention and control. These issues include attitude and awareness of healthcare workers in the compliance of IPC programs, fear, and anxiety of getting COVID virus, manpower shortage, uncleared guidelines, and protocols. In support of these experiences, Al-Dossary et al., (2020) highlighted in their study that nurses had greater awareness, positive attitudes, optimal prevention, and positive perceptions during the COVID-19 outbreak. The study also summarizes key considerations for supporting the health care workforce, so nurses are equipped to provide care for their patients and communities.

Furthermore, based on transcription, other operational challenges were identified by the hospital implementing bodies including sudden structural changes in their workplace, monitoring and surveillance of infectious disease, and dedicated staff for integrated disease surveillance and response system as evidenced by these responses:

"The hospital has a good structural design, but we are not ready during the outbreak, nagbago talaga ang lahat, from the entrance to exit, location ng isolation triage and everything, ang dami naming adjustments sa infection control, pati bed capacity affected, 'yung mga semi-private rooms ay naging solohan na kasi kulang din ang mga isolation beds namin at hindi namin ma-accomodate lahat ng pasyente." (ICN6)

"Puno ang ICU at isolation ward namin sa ngayon, daming pasyente eh. With regards sa HAI, meron kaming bundles of care, bale minomonitor namin lahat pasyente na intubated, naka-catheter, at yung may mga central lines na possible mag acquire ng hospital related infections."(ICN7)

"Actually Sir, isa ako sa mga appointed person ng management to report infectious disease related cases ng hospital sa local government, very supportive naman sila sa ibang programs ko pero sa totoo lang, wala pa akong maayos na training for disease surveillance activities. Sa ngayon, asa lang sa updates ng CESU at ilang provided webinars. Napakaraming reports at monitoring na pinapagawa lalo na sa hospital acquired infections, may daily bed tracker reporting about sa COVID cases, may reporting sa swab test, pati yung sa ResBakuna na AEFI ginagawan lahat ng documentations."(INC8)

Based on these transcriptions, the stated issues and challenges in the structural facilities, bed occupancies, and monitoring of disease surveillance for healthcare-associated infection (HAI) cases can affect the spread of infection in the facility. Dramowski & Woods (2020) in their study about the role and structure of infection prevention and control programs emphasized that healthcare facilities are places where sick people congregate, creating many opportunities for micro-organisms to spread between patients, visitors, and healthcare workers. Medical care is also increasingly complex, with multiple, invasive procedures increasing the risk of developing healthcare-associated infections (HAI). Many of these infections (up to 70%) are preventable. The researcher has proven that IPC programs can make healthcare safer and more affordable by preventing the suffering, loss of life, and cost caused by healthcare-associated infection.

Theme 2: Workplace interventions for successful implementation of an infection control program

This theme highlights the different workplace interventions by the IPC professionals and other ICC members for successful implementation of an infection control program as they encountered barriers and challenges in their respective hospitals. The following responses were determined related to this:

"Madami ang nagbago simula nung nagka-pandemic, takot kaming lahat na ward nurses kasi alam namin na kami ang mae-expose sa gagawing COVID facility. Sa totoo lang, ayuko talaga sir magduty don para maghandle ng cases, pero kinausap naman kami ng aming mga heads at binigyan ng brief overview on how to manage and handle COVID patients. Malaking tulong na 'yun na may kaalaman ako sa mga dapat gawin sa loob ng COVID ward." (ICN2)

"Palagiang paghugas ng kamay talaga sir, napaka importante yan sa mga frontliner, yung pagsusuot ng face mask at all times mahalaga na ginagawa namin at inaapply yung principle ng infection control. Nagkakaroon din kami ng regular environmental cleaning and disinfection. Maayos na policy at laging updated sa changes na inilalabas ng national at local government." (ICN3)

"Mahirap magduty, nakakapagod lalo na kung kulang kami (nurses) sa area, expose kami sa mga pasyente na positive. Kailangan ready kami talaga sa pwedeng mangyari samin, mahirap pag may absent dahil nagkakasakit. Buti na lang yung Hospital Admin namin ay nagpapabigay sa lahat ng frontliners ng mga vitamins, yung food naming sa duty libre na at nabigyan kami ng maayos na hazard pay,at binigyan din kami ng staff house, yung routine swab naming sagot din kaya okay na samin." (ICN 5)

"Pinapanatili namin ang physical distancing, di kami allowed kumain ng sabay sabay, hindi na tulad ng dati na pwede kami magkakasalo, kasi pag nakita kami (management), siguradong ipapatawag kami…. hehehehe" (ICN6)

"Tuwing may admission, may waiting list kami sa admitting section, kung may bakanteng room, tinatawagan naman, naka separate naman ang COVID facility, intermediate ward at general ward for clean cases para maiwasan yung exposure risk ng karamihan." (ICN7)

"Dahil sa COVID, nag-create ang management ng COVID team para sa health and workplace risk assessment, may members ito na doctor, nurses at admin para mapanatilli na ligtas kami sa hospital outbreak. The hospital consider the environment, mga tasks, possible threat, resources available" (ICN8)

Based on the transcriptions, the stated workplace interventions of respondents are focused on the support of hospital management to fight COVID infections. This includes providing reiteration on standards precautions and infection control practices such as proper wearing and disposal of personal protective equipment, free COVID-19 testing, free food, and accommodation, giving additional hazard pay and risk allowance, alternative scheduling to provide the importance of having rest among healthcare workers. The creation of the COVID-19 task force was also described for the frequent monitoring of practices in their workplace.

In support of these workplace interventions, Peiffer-Smadja et al., (2020) state in their study that many health structures will face an increasing number of patients with COVID-19 and have to anticipate the consequences, including the need for more beds and trained healthcare workers. To face the outbreak, hospitals have to anticipate the consequences of COVID-19 on all the departments, to ensure the commitment of hospital management staff and health authorities, to encourage effective leadership, to involve and care for all front liners, and to organize communication with the wider community.

Theme 3: Impact of COVID-19 pandemic to infection control professionals

This theme highlights the overall impact based on respondents' insights and realizations towards infection prevention and control programs. Even before the pandemic, infection control measures were challenging work in terms of implementation and compliance to the standards set by the professionals. However, given the current situation, the degree of difficulty increases, and different problems have been encountered throughout the crisis period. The following responses are the impacts of the COVID-19 pandemic on healthcare professionals.

"Okay po, actually mas na-challenge ako na maghandle ng infectious cases, dahil sa mga karanasan ko sa COVID ward, nasanay na ako., wala eh…lakasan lang ng loob at dasal sa Panginoon na gabayan kami sa bawat duty namin. Pasasaan ba at matatapos din ito." (ICN1)

"Nakakapag-isip na akong tumigil muna sa pagiging nurse, kasi hindi talaga madali. Madami naman kasi na pwedeng maging trabaho maliban dito, pero dito talaga ako dinadala ng aking propesyon…. at ito ang sinumpaan kong tungkulin." (ICN3)

"Grabe dati., ramdam ko yung discrimination na pag alam ng tao na nurse ka, nakauniform uuwi o papasok, lalayuan ka at iiwasan., ayaw makatabi o makasalamuha, nakaka-asar din minsan. 'Yung hindi nila kasi alam ang bawat sakripisyo ng mga frontliners tulad natin. Pero sa ibang banda, nagbago din naman ang sitwasyon, nakakataba ng puso yung mga nakaka-appreciate, nagshe share ng pagkain, nagbibigay ng priority lane lalo na sa mga supermarket o other establishments. Ramdam ko din na proud ang family ko sakin, ganun na din ang pagsaludo at paghanga ng ibang tao sa mga frontliners, sobrang nakakataba ng puso talaga."(ICN4)

"Nakakapag-alinlangan ang bawat pag duty, lalo pa nung nababalitaan natin na madami ang nahawang frontliner tulad ng doctor, nurses at iba pa., sobrang nakakalungkot na namatay sila sa paglilingkod laban sa pandemya." (ICN7)

According to the transcriptions, respondents stated that nursing is a challenging career. The work needed in nursing is difficult, especially during the COVID-19 pandemic. Due to the various problems and concerns they experienced, as well as the threats to their physical health, the nursing profession remains their oath-bound duty, demonstrating their social sense of obligation to serve as professional health care providers during the epidemic. According to Internation Nursing Review on the challenging times: ethics, nursing, and the COVID-19 pandemic conducted by Turale, Meechamnan, & Kunaviktikul (2020), nurses and other health and emergency workers are suffering physical and emotional stress and moral distress from conflicting professional values. They are faced with unpalatable and complex ethical issues in practice, with moral conflicts, high levels of acuity and patient deaths, and long working hours. A rising number of nurses are infected with SARS-CoV-2 or dying in the line of duty. Nurses need strong moral courage, stamina, and resilience to work on the front lines of the pandemic. In their conclusions, nurses need strong leadership, clear direction, and continued support from each other, their employers, the public, and their nursing organizations to continue to protect communities, save lives and prevent suffering in this pandemic and for new and emerging diseases.

Proposed model on the Implementation of Infection Prevention and Control

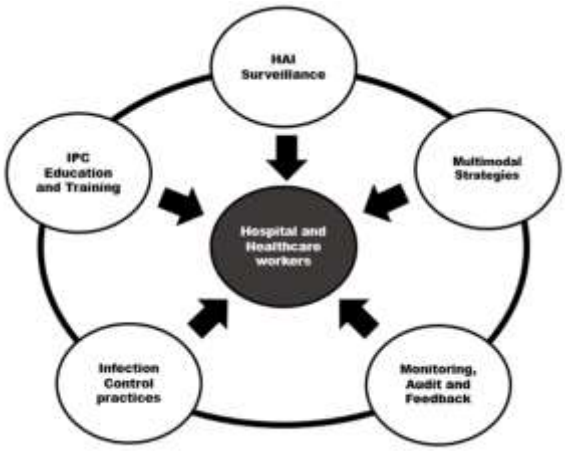

Figure 3. Proposed model on the Implementation of Infection Prevention and Control

Figure 3 shows a proposed model on the implementation of infection prevention and control which was conceptualized from the study as a whole. The overall issues and challenges of IPC professionals in the study clearly showed the important factors in the delivery of care. Hospital and healthcare workers were placed in the center within the interconnecting circles which represent the main recipient of infection control practices and implementation. Using the interconnecting circles of elements on IPC education and training, HAI surveillance, multimodal strategies, monitoring, audit and feedback, and infection control practices shows the important factors that influence the implementation of infection prevention and control measures. However, different approaches to strengthen the implementation can lead to different challenges and impacts in healthcare worker's practices to render care. Different levels of knowledge and skills, and practices can affect workplace barriers.

Overall, the model emphasizes that hospital infection prevention and control implementation and practices of healthcare workers are affected by different workplace issues and challenges among institutions and healthcare workers.

Conclusions

Based on the findings of this study, the following conclusions were formulated:

1. The majority of level 2 private hospitals in the province of Batangas are generally assessed as intermediate level in IPC programs and activities based on the World Health Organization (WHO) core components to support infection prevention and control implementation at the facility level.

2. Enhancement programs are centered on the areas of education & training, guidelines, surveillance, and monitoring, audit, and feedback. However, the research creates a strengthening action plan to cover all IPC core components for improving hospital infection control implementation and practices.

3. Since significant difference exists in the extent implementation of IPC core components on education and training, multimodal strategies, and built environment, materials, and equipment for the facility, the null hypothesis is rejected.

4. As the extent of implementation of IPC core components of the participating hospitals has no significant relationship with the participant's level of practice on qualification and education, professional development, leadership, IPC practice, program administration and evaluation, performance improvement, and research; therefore, the null hypothesis is accepted. But, surveillance has shown a significant correlation with the extent of implementation; thus, the null hypothesis is rejected.

Recommendations

The recommendations are based on the findings of the study. These findings have highlighted the correlates and demographic differences on infection prevention and control implementation and practices of hospitals and health care workers. It is therefore recommended that the strategies identified can be implemented at the hospital nursing practice, in nursing education, and in nursing research.

1. Hospital Infection Prevention and Control

    - IPC must be made a strategic priority for hospital administration, with a zero-tolerance policy for non-implementation of IPC procedures.
    - On the IPC of implementation, infection prevention and control professionals must be empowered.
    - The researcher recommends to all participating hospitals to adopt the proposed enhancement program in this study.

2. Nursing Practice

    - Nursing administration must improve knowledge of the importance of IPC compliance and the national policy that governs IPC compliance.
    - IPC must be strengthening and sustaining focus for nursing management, with full compliance for the implementation of IPC protocols at their facility.

3. Nursing Education

    - All health care staff in the facility are required to attend IPC training and orientation.
    - Basic infection prevention and control refresher training courses for nurses and other health care workers should be developed and implemented.
    - Education and training that clearly define ICC member's role and responsibility for infection prevention and control activities.
    - Infection prevention and control are given as a module in nursing education institutions' undergraduate and graduate programs.

4. Nursing Research

    - The study was conducted at a private Level 2 hospital in Batangas. It is recommended that the study is replicated in public hospitals.
    - Future research should be conducted on compliance with the implemented strategies of IPC measures utilizing other variables and research design.

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