

Evaluation of COVID-19 IPC Strategies in Selected Hospitals in the Philippines

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Abstract

The existing guidelines on Infection, Prevention, and Control (IPC) from the WHO were implemented within the Philippines by the Department of Health (DOH). However, to date, no evaluation process has been published to prove its effectiveness and to enhance its process. The evaluation process will help to further enhance the IPC process to mitigate COVID-19 cases. The study aims to work out the evaluation of the infection prevention and control (IPC) strategies by the nurses and nursing attendants in selected hospitals. A cross-sectional survey and a Focus group discussion were conducted in two selected hospitals to assess compliance to the COVID 19 IPC strategies. The population included nurses and nursing attendants within the two selected hospitals that cater to COVID-19 patients. An IPC strategy for COVID-19 compliance checklist was created to be used for the evaluation process. results show that the respondents have good compliance with IPC strategies. The compliance of the nurses and nursing attendants is indicative of an honest evaluation of the IPC strategies during this study. The IPC strategies are improving over time and an endless evaluation process is required.

Keywords: COVID-19, IPC Strategies, Evaluation of IPC Strategies, Infection, Prevention, and Control

INTRODUCTION

COVID 19 is a communicable disease that's caused by coronavirus. This new virus and disease began in an epidemic in Wuhan, China, in December 2019. COVID-19 is now an epidemic affecting many countries globally. The Philippine Department of Health reported the first case of COVID-19 within the country with a 38-year-old female Chinese national on January 30, 2020. the primary local transmission of COVID-19 was confirmed last March 2020 in the Philippines. (WHO, 2020). As of Sept 2, 2021, COVID-19 cases within the Philippines reached 18,874,753 supported cumulative samples tested. there's a cumulative positivity rate of 12.2% due to the increase of the Delta variant cases (DOH, 2021).

The World Health Organization (WHO) issued guidelines for the implementation of strategies of Infection prevention and control associated with COVID-19. As a response to the present pandemic, the DOH within the Philippines issued equivalent guidelines on the preparedness and response to 2019 N-COV which was released last January 21, 2020. equivalent guidelines were released by the DOH for hospitals and other health facilities last February 10, 2020.

The existing guidelines of the Infection, Prevention, and Control (IPC) from the WHO were implemented within the Philippines by the Department of Health (DOH). However, to date, no evaluation process has been published to prove its effectiveness and to enhance its process. The evaluation process will help to further enhance the IPC process to mitigate COVID 19 cases. Thus, this study is viable within the COVID-19 research. the method evaluation of IPC strategies is one of the important components of COVID-19 strategies. the method evaluation is significant in that the program is delivered consistently with the design. Identification of strengths and weaknesses and improvement of the program for future scale-up efforts resulted from the method evaluation. it'll give us an image of how the Philippines have successfully implemented the IPC strategies.

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Many have changed since the last launch of the Strategic Preparedness and Response Plan months ago consistent with the Health Organization (WHO, 2020). within the COVID 19 Strategy update which was released as of April 2020, WHO director-general Ghebreyesus mentioned that “As of April 13, 2020, quite 1.7 million people are infected, and almost 85 000 people have lost their lives and this continues up so far. The social and economic disruption has been noted because of the effect of the overwhelmed health systems. This pandemic is believed to be much more than a health crisis that needs a whole-of-government and whole-of-society response. The resolve and sacrifice of frontline doctors must be matched by every individual and every politician to put in place the measures to end the pandemic”

The WHO and therefore the global community are continuously updating their strategies to enhance measures to regulate the COVID-19 pandemic. the method evaluation is time to implement at this stage to contribute further to improving the strategies at the national level (Philippines). Countries are at a special stage of the outbreak and early action and implementation of comprehensive public measures that include IPC strategies are viable in suppressing the spread of COVID-19. This study is critical to update us on what’s happening immediately and where we are becoming in terms of the COVID-19 pandemic. Further, the evaluation process will tell us what we'd like to try to and improve within the IPC process to prevent COVID-19.

The COVID pandemic remains here to remain until all are going to be fully vaccinated. This disease has quickly spread everywhere globally, and its capacity for explosive spread and mutations has overwhelmed even the foremost resilient health systems. Until all are vaccinated, there's a requirement to enhance IPC strategies to stop transmission of COVID-19 and mortalities. Thus, the method evaluation is time to implement after its initial implementation and still after the implementation of quarantine periods

Research Objectives

General Objectives

To determine the evaluation of the infection prevention and control (IPC) strategies by the nurses and nursing attendants in selected hospitals.

Specific Objectives

To assess compliance to IPC strategies and processes implemented in the hospital setting in terms of :

proper triaging, early recognition, source control, and isolation of patients with suspected COVID 19

observance of standard precautions for all patients

implementation of additional empiric precautions (droplet, contact, and airborne) for suspected cases of COVID-19

implementation of administrative controls

utilization of environmental and engineering controls

To differentiate compliance of IPC strategies and processes implemented in the hospital in terms of:

age

sex

educational background

years of Experience

area of Assignment

hospital affiliation

Conceptual Framework

A process evaluation focuses on the implementation process and attempts to determine how successfully the project followed the strategy laid out in the logic model (inputs, activities, and outputs) (Figure 1). Process evaluation ensures that the program is delivered consistent with design. In addition, a process evaluation creates a feedback loop by including routine assessments such as documentation of resources used, measurement of output indicators, and tracking of the project reach among the target population. Lastly, process evaluation allows evaluators and program developers to pinpoint strengths and weaknesses within the program design and improve upon the program in future scale-up efforts.

The evaluation process focused on the WHO IPC strategies which are included in the input box. The process included the conduct of the COVID-19 process evaluation in selected hospitals. The evaluation process included assessing nurses' and nursing attendants' compliance to the IPC strategies through the survey. The arrows represent that the process evaluation will lead to better outcomes that were evaluated in terms of compliance rates of nurses and nursing aides with COVID-19 IPC strategies

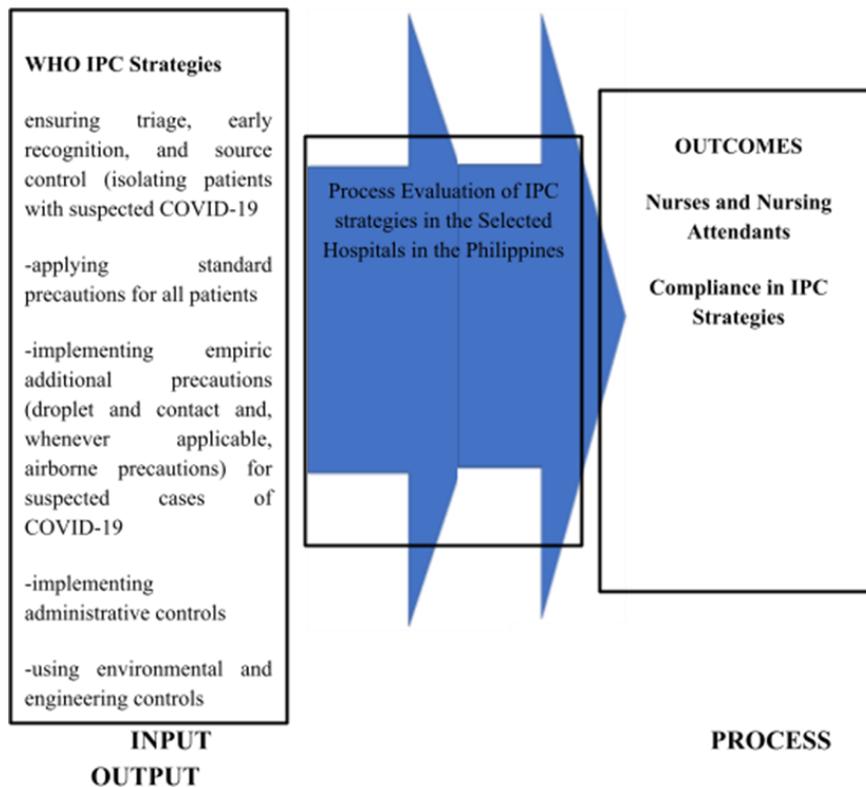


Figure 1: Process Evaluation of IPC Strategies for COVID-19

Significance of the Study

The study aims to assess the compliance of the nurses and nursing attendants with the COVID-19 IPC strategies. The results of the study are beneficial for nurses and nursing aids because IPC strategies are a critical and integral part of the clinical management of patients with COVID-19. With the evaluation process, the strategies are going to be improved, thus nurses and nursing attendants are going to be shielded from contracting the virus.

The studies are going to be beneficial to the hospital administrators and therefore the selected hospitals because the results of the evaluation process will give them information on the compliance of the HCWs to COVID-19 IPC strategies. This study can move to the development of the prevailing COVID-19 IPC strategies within the hospital setting, thus preventing COVID-19 transmission and reducing mortality.

The study also will be beneficial for patients with COVID-19 because the evaluation process will contribute to the development of IPC strategies. Thus, patients are going to be prevented from acquiring recurrent or additional hospital-acquired infections during their hospital stay.

Finally, the results of the study will contribute to the control of COVID-19 transmission by bringing in improved IPC strategies. Consequently, this may regain the social and economic status of the country.

Related Literature & Studies

Epidemiology of COVID-19

The impact on the human health of Coronavirus disease 2019 (COVID-19) which is caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has rapidly caught the eye of the research community and different primary studies have already been published about this pandemic.

In review, Coronavirus disease (COVID-19) is a communicable disease caused by a newly discovered coronavirus. Most of the people infected with the COVID-19 virus will experience mild to moderate respiratory disease and recover without requiring special treatment. Older people and people with underlying medical problems like disorders, diabetes, chronic respiratory illness, and cancer are more likely to develop serious illnesses. (WHO, 2020)

The emerging cases of COVID-19 show the distribution ages are mostly between 25 and 89 years old and adult patients between 35 and 55 years old. However, few results of infection are shown among children and infants. A study on early transmission dynamics of the virus reported the median age of patients to be 59 years, starting from 15 to 89 years, with the bulk (59%) being male. Tsang, et al., (2020) suggested that the population most in danger could also be people with poor immune function and with underlying sickness. (Tsang, et al.,2020).

IPC Strategies

The Philippine government mounted a multi-sectoral response to COVID-19, through the Interagency Task Force (IATF) on Emerging Infectious Diseases chaired by the Department of Health (DOH). The Philippines implemented various actions including a community quarantine; expanded its testing capacity from one national reference laboratory with the Research Institute of Medicine (RITM) to 23 licensed testing labs across the country; worked towards ensuring that its health care system can handle surge capacity, including for financing of services and management of cases needing isolation, quarantine, and hospitalization; and addressed the social and economic impact to the community including by providing social amelioration to low-income families. Existing surveillance systems were capitalized upon to hurry up the identification of cases. WHO assisted the DOH Epidemiology Bureau in developing COVID-19, a case and getting in touch with tracing reporting systems for epidemiology and surveillance officers, health care providers, and laboratory-based users, expanding the capacity of the previous COVID-19 data system. WHO also assisted the DOH with the accreditation of COVID-19 testing laboratories. To date, 23 real-time reverse transcription-polymerase chain reaction (RT-PCR) laboratories nationwide are now conducting COVID-19 diagnostic tests. (WHO,2020)

The Inter-Agency Task Force for the Management of Emerging Infectious Diseases (IATF – EID) was created through Executive Order No. 168, s. 2014 in pursuance of the constitutional policy enshrined in Article II, Section 15 of the 1987 Philippine Constitution, which provides that the State shall protect and promote the proper health of the people and instill health consciousness among them. The IATF–EID is an inter-sectoral collaboration created to determine preparedness and ensure efficient government response to assess, monitor, contain, control, and stop the spread of any potential pandemic within the Philippines. The IATF-EID is remitted to determine a system to spot, screen, and assist Filipinos suspected or confirmed to be infected with EID; and to stop and/or minimize the entry of suspected or confirmed individuals with EID within the country, also as prevent and/or minimize the local spread of EID within the country. (DOH, 2021)

Effectiveness of IPC strategies

In the study of Islam et al (2020), authors reviewed the worldwide COVID-19 IPC guidelines by organizations like the Planet Health Organization (WHO), the US Centers for Disease Control and Prevention (CDC), and therefore the European Centre for Disease Prevention and Control (ECDC). Guidelines from 2 high-income countries (Australia and the United Kingdom) and 1 middle-income country (China) were also reviewed. Nosocomial transmission of SARS-CoV-2 in healthcare settings occurs through droplets, aerosols, and therefore the oral-fecal or fecal–droplet route. However, the IPC guidelines fail to hide all transmission modes, and therefore the recommendations also conflict with one another. Most guidelines recommend surgical masks for healthcare providers during routine care and N95 respirators for aerosol-generating procedures. However, recommendations regarding the sort of mask vary, and therefore the CDC recommends cloth masks when surgical masks are unavailable. IPC strategies should consider all the possible routes of transmission and will target all patient care activities involving the danger of person-to-person transmission.

In April 2020, WHO commissioned a rapid review of prevention of COVID-19 in future care facilities (LTCFs) and located that IPC measures in LTCFs should aim to stop the introduction of SARS-CoV-2 into LTCFs which, if the virus is introduced, immediate and comprehensive measures must be taken to regulate its spread. Available data suggest that effective IPC strategies include the following; In areas of community transmission of SARS-CoV-2, regular testing of all residents and staff allows early detection and isolation of positive patients and staff (including asymptomatic and pre-symptomatic infected individuals).

A separate study found that testing of all residents and staff after a case is identified within the facility can identify 10–100 additional cases for every initial case diagnosed. Staff compartmentalization (organizing the work in order that the team works in small groups in one area of the LTCF with no physical connection or mixing with other members of the team) and staff cohorts (assignment of staff to worry separately for infected and uninfected residents) lowered the danger of SARS-CoV-2 cases in LTCFs. Providing paid leave for LTCF staff increased the speed of staff presenting for testing and isolating if they had symptoms of COVID-19, ultimately reducing the danger of transmission within the facility. Maintaining physical distancing of a minimum of 1 meter, including at mealtimes, decreased the danger of transmission. Maintaining maximum communal room occupancy limits in facilities (with signage as reminders) was related to a lower prevalence of COVID-19 infection. Appropriate use of PPE during care of all infected residents, signage to remind HWs about droplets and get in touch with precautions, and training and frequent audits to make sure proper mask use by HWs were related to a statistically significantly lower prevalence of infection among residents and staff. Cleaning of communal areas twice daily was significantly related to a better prevalence of SARS-CoV-2 infection among residents and staff. LTCFs that have bathrooms and sinks within the residents' rooms had significantly lower infection rates(WHO.2021)

Nurses as Implementers of the IPC Strategies

Healthcare workers within the frontline like doctors nurses and medical technologists are the most implementers of the IPC strategies within the battle against COVID-19. Nurses are playing an important role during this pandemic. From providing direct care to affected hospitalized patients to leading full-scale public health operations, nurses are front and center working round the clock to guard the health and well-being of patients and therefore the public at large. While public health nurses have traditionally been recognized for his or her efforts during times of a public health crisis, now nurses in acute care settings are applying evidence-informed public health principles to stop disease and look after a number of the world's sickest hospitalized patients. Today's nurses are leading response teams demonstrating skill and expertise in areas like disaster preparedness, predictive modeling, hospital and field operations, and human resource management, to call a couple. (Phillips, 2020).

Nurses are the backbone of the health sector, accounting for about 59% of health professionals. Their predominance in IPC is clear, with most IPC professionals having a nursing background. When considering the role of nurses in making the IPC programs become a reality, we all know that there exists strong participation in altogether areas, with some being particularly crucial, like (1) IPC programs, (2) IPC

Education and Training like delivering IPC training programs to several health professionals (3) Implementation using multimodal strategies like influences behavior towards adherence to IPC practices and overall organizational culture change by their engagement and leadership roles and lastly on (4) staffing workload and bed occupancy. (WHO,2020)

METHODOLOGY

A cross-sectional survey and Focus Group Discussion were conducted in two selected hospitals to assess compliance with the COVID 19 IPC strategies.

Study Population and Sampling Technique

The population included nurses and nursing attendants within the two selected hospitals. Respondents were determined utilizing the systematic sampling technique for the cross-sectional survey. The systematic sampling involved selecting every person from a staff list of nurses and nursing attendants until the entire population was identified.

Inclusion Criteria

Healthcare workers included are nurses and nursing attendants working within the selected hospitals

Must be working, or assigned in COVID-19 wards or areas.

Contractual healthcare workers assigned in COVID areas/ wards Exclusion criteria:

Other healthcare workers working within the selected hospitals

Support workers working within the hospitals

Trainees, students, or health care workers on a part-time basis

Sample Size

The total population of nurses and nursing attendants has supported the inclusion criteria within the two hospitals. Using a systematic sampling technique, selecting every person from a staff list of 'nurses and nursing attendants until the entire population was identified.

Withdrawal Criteria

Respondents who refused to participate in the study or withdrew their participation in the study were excluded from the entire respondents of the study.

Ethical Considerations

The research proposal was submitted and approved by the EAMC Institutional Review Board (IRB) for the conduct of research on human subjects. Participation in the study is voluntary and therefore the respondents won't receive any monetary benefit. The participants have the proper to refuse participation or withdraw any time during the conduct of the study without worrying about retribution in terms of cash or their employment. For the protection of participants' data privacy, all data was stored within the cloud (Gmail accounts) and accessed only by the researchers involved in the study. The principle of confidentiality and anonymity was safeguarded during the conduct of the study. Participants' information was coded to ensure the anonymity of the information. Further, the investigators ensured that none of the participants' names or personal details were included in the report of the study findings.

Site of the Study

The study was conducted within the two (2) selected hospitals within the Philippines which include East Avenue Center (EAMC) and Sorsogon Provincial Hospitals in Sorsogon. The hospitals were chosen because the setting of the study because it caters to COVID 19 patients and is accessible to the researchers.

Research Instrument

A research-based instrument was created to assess the HCW's compliance with the COVID-19 IPC strategies. The instrument consists of two (2) parts that include respondents' demographic profiles like age, sex, educational attainment, position, years of experience, area of assignment, and hospital affiliation.

An IPC strategy for COVID-19 compliance checklist was created to be used for the evaluation process. The tool supported the Infection, prevention, and control during healthcare when COVID-19 is suspected interim guidelines by the Health Organization (WHO, 2020) and was adopted by the Department of Health (DOH). The checklist included COVID-19 IPC strategies that cover: ensuring triage, early recognition, and source control (isolating patients with suspected COVID-19, applying standard precautions for all patients, implementing empiric additional precautions (droplet and getting in touch with and, whenever applicable, airborne precautions) for suspected cases of COVID-19, implementing administrative controls and using environmental and engineering controls. Compliance was measured consistently with a Likert scale of 4, (very good compliance) 3 (good compliance) 2, (moderate compliance), and 1 (low compliance).

Nursing counterparts in each hospital setting that took part in the data collection process were trained on the instrument and method of knowledge collection.

Validation of Instrument

The IPC strategy for the COVID-19 compliance checklist was validated by three (3) experts in Infection prevention and control from other hospitals within the Philippines. It had been also tested for reliability using Cronbach statistics. The pilot testing was completed by 10 nurses and nursing attendants with equivalent criteria because the respondents of the study, however, these respondents were excluded from the study. A Cronbach alpha statistic of 0.86 means the instrument features good internal consistency.

Data Collection Process

The study utilized the cross-sectional survey process to collect data. This included a survey of participants on compliance with IPC strategies. The cross-sectional survey was conducted within the two (2) selected hospitals and involved nurses and nursing attendants as respondents of the study. The study used self-administered survey forms that were distributed to the respondents through the research correspondents in each hospital, with the approval of the hospital nursing office. Accomplished forms were then automatically encoded in Gforms, extracted, and submitted for data analysis.

Data Analysis

The profile of the respondents consistent with age, sex, educational attainment, position, years of experience, area of assignment, and hospital affiliation was described by frequency and percentage. The adherence and compliance to IPC strategies were described by descriptive statistics, mean, and standard deviation. To differentiate IPC compliance consistent with profiles like age, gender, area of assignment, and hospital affiliation, a T-test and ANOVA were utilized.

RESULTS

The profile of HCWs is presented in Table 1. The majority of the respondents are female (N=257; P=65.23); almost half are in 36-40 yrs old age bracket (N=130; P=32.99); the majority are BSN graduates (N=387; P=98.22); half of the respondents are with Nurse 1 position (N=197; P=50); with 1-5 years of working experience (N=257; P=65.23); and the majority are assigned in the COVID 19 ward.

Table 1: Profile of the HCWs

	Frequency	Percentage
Sex		
Male	137	34.77
Female	257	65.23
Age		

25-30 yrs old	107	27.16
31-35 yrs old	99	25.13
36-40 yrs old	130	32.99
41-45 yrs old	57	14.47
46 and above	1	0.25
Educational Attainment		
BSN	387	98.22
Master's units	2	0.51
Master's degree	5	1.27
Position/Rank		
Nurse 1	197	50.00
Nurse 2	84	21.32
Nurse 3	11	2.79
Nurse 4	1	0.25
Nurse 5	98	24.87
Nurse 6	3	0.76
Year of Experience		
1-5 years	257	65.23
6-10 years	71	18.02
11-15 years	41	10.41
16-20 years	16	4.06
21-25 years	3	0.76
26-30 years	6	1.52
Area of Assignment		
MS	27	6.85
Pedia	5	1.27
OB	23	5.84
Ortho	78	19.80
COVID 19 Ward	223	56.59
ER	38	9.64

Evaluation of IPC Strategies

The perception of respondents on the evaluation of Infection prevention control (IPC) strategies was determined by answering the survey checklist. The IPC strategies include different components from WHO IPC strategies which include 1) Triage, early recognition, and source control measures; 2) Standard precautions implemented for all patients; 3) Implementing additional empiric precautions; 4) Airborne precautions for aerosol-generating procedures; 5) Implementing administrative controls, and 6) Using environmental and engineering controls. The evaluation of nurses is presented in mean and standard deviation and verbally interpreted as very good compliance, good compliance, moderate compliance, and low compliance. Further, an FGD was conducted to better understand and describe the findings of the study.

Table 2: Triage, early recognition, and source control measures of the hospitals during COVID-19 pandemic

Triage, early recognition and source control	Mean	SD	V.I.
1. Establishes a well-equipped triage station at	3.01	0.77	Good

the entrance of the facility supported by trained staff			Compliance
2. Institutes the use of screening questionnaires according to the updated case definition	3.14	0.74	Good Compliance
3. Post signs in public areas reminding symptomatic patients to alert HCWs	3.11	0.81	Good Compliance
4. Performs hand hygiene and respiratory hygiene in triage areas	3.21	0.75	Good Compliance
Average Mean	3.12	0.67	Good Compliance

The nurse’s evaluation of IPC strategies in terms of triage, early recognition, and source control measures of the hospitals during the COVID-19 pandemic shows good compliance (M=3.12; SD 0.67). The four criteria for early triage and early recognition strategies are also evaluated as “good compliance”.

Results of the FGD show that the hospital practices a cohort process that will enable effective triage of patients. As mentioned by one of the participants:

N1: “Yes po Ma’am. May cohorting po na ginagawa po, sa hospital namin”

Participants further mentioned in the FGD that patient triage usually starts in the Emergency room

N1: “Yes po”. “Opo” . At sa ER level pa lang po.. Sa ER triage, nag start na po tayo doon ng ano..ng IPC protocol. Mahigpit po tayo doon, para po maiwasan na magka hawa hawa ng mga patients and mga health workers.”

The participants further explained the triage process in the FGD:

N1: “Yes po”“Ahhmm..sa triage.. Ahh pagdating ng mga patients, let’s say, mga walk-in patients.Tina triage po natin yong mga patients na may symptoms and without symptoms. So, automatic po tayo ngayon, especially sa may mga symptoms, nag a undergo sila ng rapid antigen test po. So, na test na po yon, ma di determine natin kung mag positive o mag negative yong patient.. Though, mag negative ang patient pero may symptoms sya, so may mga tents po tayo, outside ng Emergency Room na single patient po yon sa mga negative patients, sa mga positive patients, na while awaiting sila ng RT PCR or mabakante yong room na pupuntahan nila like sa probable or covid ward, doon po muna sila sa tents, hindi po sila makakapasok sa Emergency Room, unless na mga vehicular accident patients, trauma cases na walang symptoms.”

Table 3: Standard precautions implemented for all patients in the hospitals during COVID COVID-19 pandemic

Standard precautions for all patients	Mean	SD	V.I.
1. Hand and Respiratory Hygiene	3.14	0.79	Good Compliance
1.1 Ensures that all patients cover their nose and mouth with a tissue or elbowwhen coughing or sneezing.			
1.2 Offers a medical mask to patients withsuspected COVID-19 while they are inwaiting or public areas or in cohorts rooms	3.12	0.85	Good Compliance
1.3 Performs hand hygiene after contactwith respiratory secretions	3.31	0.70	Good Compliance
1.4 Applies WHO’s My 5 moments of Handhygiene approach after touching a patient	3.27	0.72	Good Compliance
1.5 Applies WHO’s My 5 moments of Handhygiene approach before any clean aseptic procedure is performed	3.30	0.69	Good Compliance
1.6 Applies WHO’s My 5 moments of Handhygiene approach after exposure to body fluid	3.33	0.69	Good Compliance
1.7 Applies WHO’s My 5 moments of Handhygiene approach after touching the patient’s surroundings	3.29	0.71	Good Compliance
1.8 Rational, correct, and consistent useof PPEs	3.15	0.78	Good Compliance
1.9 Ensures environmental cleaning and disinfection procedures are followedconsistently and correctly	3.07	0.74	Good Compliance

1.10 Ensures medical devices, equipment, laundry, food service utensils, and medical waste should bemanaged by safe routine procedures.	3.06	0.73	Good Compliance
Average mean			

protection (goggles) or facial protection (face shield) to avoid contamination of mucous membranes				Compliance
1.8 Ensures that HCWs should wear a clean, non-sterile, long-sleeved gown;	3.16	0.80	Good	Compliance
1.9 Ensures that HCWs should also use gloves	3.16	0.80	Good	Compliance
1.10 Ensures that after patient care, appropriate doffing and disposal of all PPE and hand hygiene should be carried out	3.13	0.81	Good	Compliance
1.11 Ensures that a new set of PPE is needed when care is given to a different patient;	3.03	0.87	Good	Compliance
1.12 Ensures that equipment should be either single-use and disposable or dedicated equipment (e.g. stethoscopes, blood pressure cuffs, and thermometers). If equipment needs to be shared among patients, clean and disinfect it between use for each individual patient (e.g. by using ethyl alcohol 70%)	3.06	0.83	Good	Compliance
1.13 Ensures that HCWs should refrain from touching eyes, nose, or mouth with potentially contaminated gloved or bare hands; maintains a record of all persons entering a patient's room, including all staff and visitors.	3.17	0.74	Good	Compliance
1.14 Ensures to avoid moving and transporting patients out of their room or area unless medically necessary. Use designated portable X-ray equipment or other designated diagnostic equipment. If transport is required, use predetermined transport routes to minimize exposure for staff, other patients, and visitors, and have the patient wear a medical mask	3.14	0.74	Good	Compliance
1.15 Ensures to notify the area receiving the patient of any necessary precautions as early as possible before the patient's arrival	3.13	0.75	Good	Compliance
1.16 Ensures that HCWs who are transporting patients perform hand hygiene and wear appropriate PPE as described in this section; □ routinely clean and disinfect surfaces with which the patient is in contact;	3.14	0.75	Good	Compliance
1.17 Ensures to limit the number of HCWs, family members, and visitors who are in	3.10	0.76	Good	Compliance

contact with suspected or confirmed COVID-19 patients

The evaluation of healthcare workers’ IPC strategies in terms of implementing additional empiric precautions shows good compliance (M= 3.09; SD = 0.66). The US study is in contrast to the FGD results which are indicative of enough supplies of PPEs from the Philippine government. This may be because this study was conducted a year after the pandemic started and hospitals have adjusted to the needs of their areas on COVID management.

N2: “Ma’am, Regarding po sa PPE. Kumpleto naman po ang PPE namin”

Nurses used level 4 PPEs in COVID areas which are the recommended use for COVID patients across the globe. Further, the use of PPEs is also required when caring for suspected cases of COVID-19.

N2: “Ahhh, sa covid ward po, automatic po..ahhh.. level 4 PPE ginagamit.. probable tsaka covid ward po. Yong sa OR naman po, pag may suspect probable confirmed silang... incorporation, automatic po na level 4 sila”

Aside from the use of PPE, empiric precautions include proper disinfection of equipment and the use of administrative and engineering control measures. The participants explained how they managed the disinfection process in the hospital:

N2: “Sa devices naman po, ahhh..every now and then po..nag di disinfect nman po...every gamit ng pasyente po ay nag di disinfect naman po, lalo na po sa covid ward, instructed naman namin sila na every patient mag di disinfect.”

N3: “Kami po kasi, ang gamit lang po namin dito is yong, properly dini disinfect.. Halimbawa po yong suction machine properly cleaned po sya, then wina wash, then sino soaked po sya, yong mga ginagamit na tubings. Then yong iba po ahh.. Disposable.. Then yong ibang equipment naman po, instructed din po sila then trained na..ahhh.. Na dinidis infect ang lahat ng gamit.”

Table 5: Airborne precautions for aerosol-generating procedures

Airborne precautions for aerosol-generating procedures	Mean	SD	V.I.
1. Ensures performance procedures in an adequately ventilated room – that is, natural ventilation with airflow of at least 160 L/s perpatient or in negative-pressure rooms with atleast 12 air changes per hour and controlled direction of airflow when using mechanical ventilation	3.07	1.24	Good Compliance
2. Ensures that use of a particulate respirator at least as protective as a US National Institute for Occupational Safety and Health(NIOSH)-certified N95, European Union (EU) standard FFP2, or equivalent. When HCWs put on a disposable particulate respirator, they must always perform the seal check. Note that facial hair (e.g. a beard) may prevent a proper respirator fit	3.06	0.84	Good Compliance
3. Ensures the use of eye protection (i.e.goggles or a face shield)	3.13	0.79	Good Compliance
4. Ensures to wear a clean, non-sterile, long-sleeved gown and gloves. If gowns are not fluid-resistant, HCWs should use a waterproof apron for procedures expected to create high volumes of fluid that might penetrate the gown	3.11	0.77	Good Compliance
5. Ensures to limit the number of persons present in the room to the absolute minimumrequired for the patient’s care and support	3.12	0.90	Good Compliance
Average Mean			

3.09 0.72 Good Compliance

The respondent's compliance to airborne precautions shows good compliance with a mean of 3.09 and SD of 0.72. All of the criteria under these guidelines show good compliance. The highest compliance is observed in the use of eye protection (goggles or face shield) ($M=3.13$; $SD=0.79$). While the use of N95 masks has the lowest mean but is still rated as good compliance ($M=3.06$; $SD=0.84$). The results are also consistent with the narrative statements of the participants during the FGD.

As the precautionary measures, the participants reiterated in the FGD that when they performed aerosol-generating procedures they wore level 4 PPEs:

N3: "Once gumagamit sila ng aerosol equipment, mini make sure po namin na yong staff, naka PPE talaga sya na N95, yon po talaga ang proper na naka PPE po sa kanila. Then yong machine po, everytime after use po nila, dini disinfect po. Yon po."

Table 6: Implementing administrative controls

Implementing administrative controls	Mean	SD	V.I.
1. Ensures administrative measures related to health care workers.	2.98	0.83	Good Compliance
1.1 Provides adequate training for HCWs			
1.2 Ensures an adequate patient-to-staff ratio	2.82	0.93	Good Compliance
1.3 Establishing a surveillance process for acute respiratory infections potentially caused by COVID-19 virus among HCWs	3.06	0.79	Good Compliance
1.4 Ensures that HCWs and the public understand the importance of promptly seeking medical care	3.08	0.75	Good Compliance
1.5 Ensures monitoring of HCW compliance with standard precautions and providing mechanisms for improvement as needed	3.07	0.75	Good Compliance
Average Mean	3.00	0.71	Good Compliance

Implementing administrative controls has good compliance among the respondents ($M=3.00$; $SD=0.71$). The highest compliance is noted in the importance of seeking prompt medical care when infected with COVID-19 ($M=3.08$; $SD=0.75$). While the lowest compliance is in ensuring an adequate patient-to-staff ratio ($M=2.82$; $SD=0.93$).

The surveillance process among HCWs was strictly implemented in the hospitals as verbalized by the participants in the FGD:

N2: "Nag ko contract tracing po kami. We determine po yong high risk versus yong low risk staff. And then yong high risk po, automatic po pina pa swab namin po, at hinde po pinag du duty.."

Returning employees who are symptomatic and with a history of travel and exposure shall be not allowed to return to work and must present a quarantine certificate. These guidelines are evident in the hospital setting as explained by the participants in the FGD:

N2: "Depende po Ma'am, kasi sa guidelines po kapag asymptomatic, within 10 days po na maka recover ka, pini "fit to work" na po sila."

N2: “If with symptoms po they need to complete 14 days quarantine if still symptoms beyond 14 days, nag extend up to 21 days until symptoms not resolved “

Further, proper training was also done for HCWs to ensure compliance with IPC guidelines. As one of the participants in the FGD verbalized:

N4: “Nung una may resistant po pero dahil sa orientation, training, so lahat ng health workers oriented na po. Lahat sila aware sila lahat importance ng IPC po para sa kabutihan ng lahat para maiwasan pag spread ng Coronavirus. Lahat nag adhere at lahat aware, if may symptoms mag notify kagad para maiwasan mag hawa hawa ng health workers sa patient.”

Table 7: Using environmental and engineering controls

Using environmental and engineering controls	Mean	SD	V.I.
1. Address the basic infrastructure of the healthcare facility and aim to ensure adequate ventilation in all areas of the health care facility, as well as adequate environmental cleaning. Ensure that cleaning and disinfection procedures are followed consistently and correctly.	2.97	0.81	Good Compliance
2. Ensures separation of at least 1 meter should be maintained between all patients. Both spatial separation and adequate ventilation can help reduce the spread of many pathogens in the healthcare setting.	2.99	0.85	Good Compliance
3. Ensures cleaning environmental surfaces with water and detergent and applying commonly used hospital disinfectants (such as sodium hypochlorite) is effective and sufficient.	3.07	0.76	Good Compliance
4. Ensures to manage laundry, food service utensils, and medical waste in accordance with safe routine procedures.	3.11	0.74	Good Compliance
Average Mean	3.03	0.71	Good Compliance

The use of environmental and engineering control has good compliance with a mean of 3.03 and SD of 0.71. The highest compliance in this criteria is the management of laundry, food service utensils, and medical wastes by safe routine procedures (M=3.11; SD=0.74). The lowest compliance is the basic infrastructure of the health care facility and ensuring adequate ventilation (M=2.97; SD= 0.81).

The use of negative pressure rooms will not be available in all the hospitals in the Philippines and this is true in the setting of this study:

N3: “Ahhh, wala po kaming negative pressure Ma’am. So ang ginagawa po ng Hospital, ang ventilation namin, open lang ang windows nya.. Opo! Yan lang po... tapos exhaust. Kasi wala po talaga yong hospital namin na negative pressure.”

Although nurses are not equipped with modern equipment and infrastructure they are very good at improvising effective strategies and optimizing the use of equipment and materials even in scarcity.

N2: “Provided naman po ng hospital pag may kulang na address naman po ng admin office kailangan lang i brought up sa kanila na ito kailangan na gamit para sa welfare ng lahat”

Table 8: Differences in the evaluation of COVID-19 IPC Strategies according to profile

Profile	Mean	SD	t/f-value	Sig.
Sex				
Male	3.86	0.93	3.44	0.002*

	Female	3.61	0.82		
Age					
	25-30	3.34	0.63	28.84	0.000*
	31-35	3.31	0.62		
	36-40	2.71	0.66		
	41 and above	3.29	0.69		
Educational Attainment					
	BSN	3.08	0.68	4.26	0.01*
	Master's units	3.79	0.24		
	Master's degree	3.88	0.35		
Length of service					
	1-5	2.88	0.66	16.45	0.000*
	6-10	3.49	0.55		
	11-15	3.43	0.56		
	16-20	3.46	0.49		
	21-25	3.36	0.62		
	26-30	3.34	0.77		

*significant @<0.05 level

The differences in the evaluation of IPC by the participants are significantly different in sex ($t=3.44$; $p=0.002$), age ($f=28.84$; $p=0.000$), educational attainment ($f=4.26$, $p=0.01$), and length of service ($f=16.45$, $p=0.00$). The results show that the evaluation of the IPC strategies is different according to profile and this may affect their compliance.

In terms of sex, male nurses ($M=3.86$, $SD= 0.002$) have higher compliance compared to female nurses. In terms of age, the highest compliance is in the younger age group (25-30 years old) ($M=3.34$, $SD=0.63$). The lowest compliance is in the 36-40 age group ($M=2.71$, $SD= 0.66$). This data shows that the younger group of nurses are more compliant with IPC strategies compared to the older nurses. The educational attainment of the respondents shows that those with a master's degree ($M=3.79$, $SD= 0.24$) are more compliant with IPC strategies compared to nurses with a BSN degree ($M=3.08$, $SD= 0.68$). Lastly, in terms of length of service, those with 6-10 years of service ($M=3.49$, $SD= 0.55$) have higher compliance compared to those with less than 5 years of experience ($M=2.88$, $SD= 0.66$).

The male population is the most compliant is interesting to note because nursing is populated by females and the majority of the respondents are also female. While education and length of service play a great role in understanding the importance of IPC strategies. The higher the education and experience the higher the compliance.

DISCUSSION

Existing triage guidelines are present in each country and this is often implemented altogether in hospitals at the least levels and this is true during this study. The WHO issued a suggestion for the algorithm for COVID-19 triage and referral (WHO, 2020).

Triage and referral decisions depend upon existing resources, local ethical considerations, and patient acceptance of referral (WHO, 2020). The Philippine hospitals follow the WHO guidelines which were implemented by the DOH.

The triage pathway starts from patient entry and healthcare workers get to screen the initial symptoms of COVID-19. The first and secondary facilities conduct the initial assessment, triage, and begin necessary management of the suspected cases, and, if available, perform sampling and testing for severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) (WHO, 2020).

All the standards within the IPC strategies show good compliance. The results show good compliance with empiric precautions however, resources of the hospital are scarce. In the US, the US Department of Health and Human Services conducted a national pulse survey in March 2020 among hospitals on their experiences responding to COVID-19. Hospital experiences reported that the shortage of PPE was threatening their ability to keep staff safe while they worked to treat patients with COVID-19. The foremost needed PPE items were reported were masks, followed by gowns and gloves. The rise in the use of masks is caused by delays in the results of COVID tests.

Personal protective equipment (PPE) is the last line of defense and therefore the core component of protection for healthcare workers. Consistent with the review conducted by Park (2020), there are inconsistencies within the PPE recommendations of international and national organizations. The amount of protection provided is supported by the danger of exposure and possible modes of transmission.

It is noted that the Philippines is the only country that imposed using face shields not just for health care workers but also to all or any citizens during this pandemic. This is often supported by the IATF guidelines and proposals. WHO country representative Dr. Rabindra Abeyasinghe said in a web news conference last August 2021 that the Philippines is one among the few countries advocating the utilization of face shields in addition to a mask. Consistent with him, the face shields are getting used to scale back the likelihood of infection through the eyes then that's not a further layer of protection (Domingo, 2021).

As of this date, the removal of the utilization of face shields for citizens is suggested. The present guidelines on COVID-19 state that the SARS-Cov 2 virus is especially transmitted through airborne and closed contacts. However, these guidelines have uncertainty that the virus is often transmitted albeit the aerosol-generating procedure isn't performed.

The hospital follows quarantine and returns to figure procedures supported by the Department of Health (DOH) guidelines. A ten-day quarantine is imposed on HCWs with positive tests but asymptomatic and a 14-day quarantine with symptoms that reach up to 21 days until symptoms are resolved. Supported the DOH Department Memorandum 2020 Interim Guidelines on Return to Work (DOH, 2020), returning employees shall be screened for symptoms associated with COVID-19 and travel or exposure within the last 14 days.

Negative room pressurization and HEPA filtration remove aerosols from the environment, decrease environmental contamination of the space itself following aerosol-generating procedures, and reduce the time that an area must remain closed before it is often entered by individuals without respiratory protection (Duke Health, 2020).

Philippine hospitals aren't well equipped with a well-built infrastructure compared to hospitals within the US and other Western countries. The shortage of budget and support plays an excellent role in these concerns.

In general, the evaluation of the nurses and nursing attendants in IPC strategies is good and nurses emphasize the importance of compliance to stop the spread of infection. Although there are tons of inconsistencies in terms of guidelines and protocols within the implementation of IPC, the hospital settings covered during this study have successfully implemented the IPC strategies. The COVID-19 virus remains here and there's a requirement to continue the strict implementation of IPC strategies to ensure control of infection.

CONCLUSION

The compliance of the nurses and nursing attendants is indicative of an honest evaluation of the IPC strategies during this study. The IPC strategies are improving over time and an endless evaluation process is required.

REFERENCES

- Domingo, K. (2021). WHO says reviewing Philippine experience in the use of face shields vs COVID-19. Accessed in <https://news.abs-cbn.com/news/08/31/21/who-says-reviewing-ph-experience-in-face-shield-use> on November, 12, 2021
- Duke Health (2020). COVID 19 Recommendations for negative pressure rooms and / or Hepa filtration. Accessed in https://dicon.medicine.duke.edu/sites/dicon.medicine.duke.edu/files/recommendations_for_negative_pressure_rooms_and-or_hepa_filtration_04.10.20.pdf on November 12, 2021
- Park, S,H, (2020). Personal Protective Equipment for Healthcare Workers during the COVID-19 Pandemic. *Infect Chemother.* 2020 Jun; 52(2): 165–182. Published online 2020 Jun 24. doi: 10.3947/ic.2020.52.2.165
- WHO. Novel Coronavirus–China. 2020. Retrieved May 19, 2020 <https://www.who.int/csr/don/12-january-2020-novel-coronavirus-china/en/>. Accessed 1 Feb 2020.
- World Health Organization (2020). Report of the WHO-China Joint Mission on Coronavirus Disease 2019 (COVID-19). Retrieved from <https://www.who.int/docs/default-source/coronaviruse/who-china-joint-mission-on-covid-19-final-report.pdf>
- World Health Organization (2020). Infection, prevention and control during healthcare when covid-19 is suspected. Retrieved from file:///C:/Users/ASUS-pc/Downloads/WHO-2019-nCoV-IPC-2020.3-eng.pdf
- World Health Organization (2020a). Report of the WHO-China Joint Mission on Coronavirus Disease 2019 (COVID-19) 2020.: Retrieved May 19, 2020 from <https://www.who.int/docs/default-source/coronaviruse/who-china-joint-mission-on-covid-19-final-report.pdf>.
- World Health Organization (WHO) (2020). COVID 19 Strategy Update. Retrieved from <https://www.who.int/publications-detail/covid-19-strategy-update---14-april-2020> on May 2, 2020.
- World Health Organization (2020). 100 days of COVID-19 in the Philippines: How WHO supported the Philippine response. Retrieved from <https://www.who.int/philippines/news/feature-stories/detail/100-days-of-covid-19-in-the-philippines-how-who-supported-the-philippine-response>
- World Health organization (2020). Risk Assessment and Management Exposure of Health Care Workers in the context of COVID 19: Retrieved from <https://apps.who.int/iris/handle/10665/331496> on May 3, 2020.