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Infection Prevention and Control in Public Hospitals and COVID-19 Temporary Treatment and Monitoring Facilities in the Philippines: Results of a Baseline Survey

Vergil de Claro *, Noemi Bautista, Ma. Rosario Torralba, Vina Vanessa Castro, Miguel Angelo Lucero, Lady Jedfeliz Molleno and Laurentiu Stan

RTI International Philippines, Ortigas Center, Pasig City 1600, Philippines
* Correspondence: vdeclaro@rti.org; Tel.: +63-9178989589

Abstract: Infection prevention and control measures are effective at protecting patients and healthcare workers from healthcare-acquired infections, averting onward transmission of the disease and mitigating the impact of the outbreak on the healthcare system. This study assessed the compliance of public hospitals and isolation facilities with a set of standards for COVID-19 infection prevention and control. A 35-point questionnaire was developed and utilized to collect data from selected facilities in 38 local government units across the country. Descriptive statistics were used to analyze the data, and differences between island groups were tested using Pearson's χ^2 test for categorical variables. The results indicate that hospitals reported better infection prevention and control preparedness and compliance than temporary treatment and monitoring facilities in the domains of engineering and administrative controls. However, weak compliance was observed in a number of indicators for waste management in both types of facilities. These suggest that periodic monitoring and the augmentation of resources are necessary to sustain adherence to standards and to immediately address compliance gaps. In addition, systemic improvements through sufficient planning and long-term investments are required to sustain infection prevention and control practices over time.

Keywords: COVID-19; infection prevention and control; public sector; Philippines

Citation: de Claro, V.; Bautista, N.; Torralba, M.R.; Castro, V.V.; Lucero, M.A.; Molleno, L.J.; Stan, L. Infection Prevention and Control in Public Hospitals and COVID-19 Temporary Treatment and Monitoring Facilities in the Philippines: Results of a Baseline Survey. *COVID* **2023**, *3*, 336–347. https://doi.org/10.3390/covid3030025

Academic Editors: Letizia Materassi, Andrea Guazzini, Mirko Duradoni, Guglielmo Bonaccorsi and Chiara Lorini

Received: 2 January 2023
Revised: 18 February 2023
Accepted: 1 March 2023
Published: 2 March 2023

1. Introduction

The impact of coronavirus disease 2019 (COVID-19) has been unprecedented and expansive in its consequences, affecting even the stability of social, economic, and political structures of many countries. It has particularly challenged the preparedness of healthcare systems in responding to large-scale outbreaks and has put to test the existing capacities of healthcare institutions and health workers. What first emerged as a local outbreak of a novel coronavirus in Wuhan, China, in late 2019 was confirmed to be transmitted from person to person [1] and rapidly spread in countries worldwide, quickly turning into a global pandemic [2].

Southeast Asia (SEA) was among the first regions to experience the scourge of the virus. Within nine months of its first reported case, SEA had recorded 11.3 million COVID-19 cases with a 3.3 case fatality rate [3]. Following an index case in Thailand, the Philippines was the second country to report its first COVID-19 infection, which occurred on 22 January 2020 [4] and which proceeded to infect three million of its population, 6.8 percent of which were still noted to be active cases by the end of 2021 [5]. As the number of confirmed COVID-19 cases admitted in hospitals continued to increase, the risk of exposure among frontline healthcare workers (HCWs) responding to the pandemic also became increasingly high [6]. Health workers, as defined by the World Health Organization (WHO), comprise not only medical personnel providing direct care to patients but also non-medical staff such as facility administrators, office support, and cleaners, who face equal occupational risks in terms of becoming infected with the virus [7].

An early report showed that the infection rate among HCWs globally was at 3.9 percent [8], but the actual number could have been much higher given that data on HCW infections in many countries were not readily available at that time. Even local studies have confirmed the high risk of exposure of HCWs to the disease [9,10]. For instance, in a single-center retrospective analysis based on admitted COVID-19 individuals in a referral hospital in metropolitan Manila, infected health workers accounted for 26.6 percent of these patients [10]. By the end of 2021, the Philippine Department of Health (DOH) had recorded a total of 28,744 health workers who had tested positive for COVID-19, with the percentage of those who had recovered, died, or were still in a critical condition were at 99.3 percent (28,539), 0.4 percent (115), and 3.2 percent (372), respectively [5]. The high rate of infected HCWs has huge implications for sustaining the capacity of health facilities to adequately support the surge of patients needing critical care. Ensuring their safety is vital, since any additional infected health personnel further reduce the already inadequate number of human resources in an overwhelmed health system, leaving HCWs excessively stressed and having to work for longer hours to the point of exhaustion [11].

1.1. Challenges in IPC Implementation

Infection prevention and control (IPC) is a practical, evidence-based approach that supports the protection of both patients and health workers from avoidable infections [12]. It can potentially contain the spread of infectious disease threats like COVID-19 and could lead to a more than 30 percent reduction in facility-acquired infections if effectively implemented [9,13,14]. Among the IPC practices that have been identified as demonstrating effectiveness against COVID-19 are the use of personal protective equipment (PPE), surface disinfection, and the installation of engineering and environmental controls [15,16].

However, implementing even basic IPC has already been a challenge, particularly in low- and middle-income countries (LMICs), which have persisting issues in waste management, infrastructure, and financing. Poor systems for water, sanitation, and hygiene, and a shortage of protective equipment, posing sanitation and safety hazards, in addition to limited funding for procuring antimicrobials and cleansing solutions due to their deprioritization over medicines and life-saving commodities, and knowledge gaps in IPC practices among HCWs have hindered healthcare facilities from fully complying with IPC standards [17–19].

In the Philippines, compliance with the national IPC guideline serves as one of the bases for granting healthcare facilities a license to operate [20]. More than that, such guidance is crucial during infectious outbreaks to ensure a reduction in disease transmission and the prevention of unnecessary deaths. However, monitoring of IPC measures was not routinely conducted, which often resulted in neglect and reduced priority, and consequently weakened implementation.

1.2. Rapid IPC Assessment

At the height of the pandemic, supplemental IPC strategies were issued in line with WHO recommendations if COVID-19 was suspected or confirmed [21–24]. We have already noted a dearth of literature on the state of IPC capacity in the country, in addition to the fact that the level of compliance with these additional guidelines among public health facilities remains unknown. We hypothesize that the outbreak situation, which weighed heavily on the fiscal resources of health facilities, could have worsened existing deficiencies in IPC compliance, which necessitates the conducting of a rapid assessment in order to identify immediate gaps, mobilize resources to augment IPC practices, and support the COVID-19 response.

The assessment consists of a set of standards and corresponding indicators that can be grouped into four domains: engineering controls, environmental controls, waste management, and administrative controls. First, engineering and environmental controls include standards for adequate ventilation adapted to specific areas in health facilities, appropriate structural design, special separation, and adequate environmental cleaning. Second, proper

waste management constitutes reducing the amount of hazardous waste and the risks associated with its generation, ensuring the efficient transport of waste from the point of generation to storage and treatment while minimizing the risk to people, and maintaining separate storage areas for general, hazardous, and recyclable wastes depending on the volume of waste generated. Finally, administrative controls are policies, procedures, and processes put in place to decrease the exposure of individuals to certain threats, and include the provision of adequate IPC training for health workers, ensuring that they understand the importance of standard precautions, establishing institutional policies, and ensuring that compliance with IPC standards is enforced.

To our knowledge, this is the first rapid IPC assessment of health facilities conducted in an outbreak setting. The study provides valuable information on the IPC practices used during the early phase of the pandemic, and is useful for improving program planning for COVID-19 as well as future disease outbreaks.

2. Methods

2.1. Study Population and Period

We assessed public hospitals and COVID-19 temporary treatment and monitoring facilities (TTMFs) across the Philippines, which were selected through convenience sampling. The assessment was conducted between 20 July and 18 August 2020, covering 38 local government units (LGUs) across the main island groups of Luzon, Visayas, and Mindanao.

2.2. Data Collection

A 35-point survey questionnaire was developed separately for hospitals and TTMFs based on COVID-19 IPC standards issued by the DOH (Supplementary Tables S1 and S2). The tool contained the set of indicators for each of the key domains. The survey tool was converted into an electronic format using Google Forms (©Google LLC, Mountain View, CA, USA).

The survey was administered by trained data collectors, either virtually through remote interviews using Zoom and Facebook Messenger, or through face-to-face meetings. Field visits were conducted with the greatest caution, adhering strictly to the minimum public health protocols to ensure the safety of the data collectors. For questions with a positive response, a photo capture, video clip, or e-copy of the document was required as a means of verification (MOV). Responses were directly encoded into Google Forms, along with the MOVs.

2.3. Data Processing and Analysis

After the survey was completed, the encoded data were extracted into Microsoft Excel 2019 version 16.67 (©2022 Microsoft Corporation, Redmond, WA, USA) where data curation was performed and imported into R 2021 version 4.1.1. (©2021 The R Foundation for Statistical Computing, Vienna, Austria) for analysis. Descriptive statistics were used and the differences between the island groups were tested using Pearson's χ^2 test for categorical variables.

2.4. Public Participation and Involvement

Respondents to the questionnaire were selected based on their knowledge of the topic or their direct involvement in the implementation of their facility's IPC program. No patients or facility personnel were involved in the design and management of the study, and their participation was limited to providing relevant information related to policies, procedures, and practices within their institutional setting. However, local decision-makers were later informed of the results of the baseline survey, in order that support could be immediately mobilized from the relevant LGU and its partners.

3. Results

3.1. Characteristics of Surveyed Facilities

A total of 222 responses were received: 37.4 percent (n = 83) were from public hospitals and 62.2 percent (n = 139) were from TTMFs. Geographic disaggregation of the combined responses collected nationwide is as follows: Luzon, 40.1 percent (n = 89); Visayas, 16.2 percent (n = 36); and Mindanao, 43.7 percent (n = 97). The total number of surveyed facilities constitutes a representative sample for each type of facility at the time the assessment was conducted. The demographic characteristics of the facilities and their respondents are shown in Table 1.

Table 1. Demographic characteristics of health facilities and associated respondents.

Characteristics	No. of Respondents *n* (%)	Comparison between Island Groups		
		Luzon	Visayas	Mindanao
Public hospitals	83 (100.0)	39 (47.0)	15 (18.1)	29 (34.9)
Respondents by profession:				
Chief of hospital	9 (10.8)	2 (5.1)	3 (20.0)	4 (13.8)
IPC physician	3 (3.6)	2 (5.1)	1 (6.7)	-
IPC nurse	53 (63.9)	26 (66.7)	6 (40.0)	23 (79.3)
IPC officer	7 (8.4)	4 (10.3)	3 (20.0)	-
Other professionals	11 (13.3)	5 (12.8)	2 (13.3)	2 (6.9)
Facility certification				
DOH licensed	83 (100.0)	39 (100.0)	15 (100.0)	29 (100.0)
PhilHealth accredited	78 (94.0)	39 (100.0)	14 (93.3)	25 (86.2)
TTMFs	139 (100.0)	50 (36.0)	21 (15.1)	68 (48.9)
Respondents by profession:				
Facility manager	32 (23.0)	6 (12.0)	4 (19.0)	22 (32.4)
IPC physician	25 (18.0)	9 (18.0)	5 (23.8)	11 (16.2)
IPC nurse	49 (35.3)	18 (36.0)	10 (47.6)	21 (30.9)
Other professionals	33 (23.7)	17 (34.0)	2 (9.5)	14 (20.6)
Facility certification				
DOH licensed	76 (54.7)	24 (48.0)	13 (61.9)	38 (55.9)
PhilHealth accredited	27 (19.4)	7 (14.0)	13 (61.9)	7 (10.3)

Abbreviation: IPC, infection prevention and control; DOH, Department of Health; TTMF, temporary treatment and monitoring facility.

3.2. Compliance with COVID-19 IPC Standards

Our baseline survey revealed key weaknesses in the level of compliance of facilities with IPC standards for COVID-19. Figure 1 presents a comparison of the aggregate values of the indicators per IPC domains for hospitals and TTMFs. We observed evident variations between facilities, with public hospitals generally reporting a higher degree of compliance than TTMFs. While both types of facilities are shown to have complied fairly well with engineering and environmental controls, TTMFs lagged behind in the waste management and administrative domains. Across the island groups, Mindanao consistently reported IPC compliance below the national average in all domains and for both types of facilities. Overall, the results show that public hospitals have better IPC preparedness and higher compliance with the updated standards than COVID-19 isolation facilities. The disaggregated assessment results for hospitals and TTMFs are presented in Tables 2 and 3, respectively.

Table 2. Geographical comparison of public hospitals' compliance with IPC standards, survey results from 83 responses in the Philippines, 4–18 August.

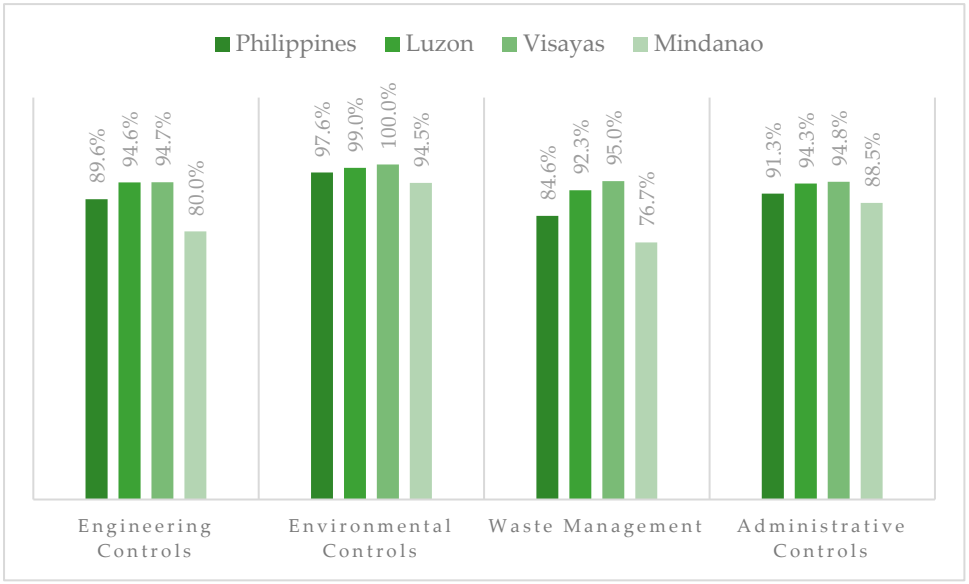
Domain/Standards	No. of Respondents *n* (%)	Comparison between Island Groups			
		Luzon	Visayas	Mindanao	*p*-Value
Engineering Controls					
Triage area has hand hygiene area	81 (97.6)	39 (100.0)	15 (100.0)	26 (89.7)	0.005
Triage area has directional signage	66 (79.5)	35 (89.7)	14 (93.3)	17 (58.6)	0.003
HCWs wearing proper PPE	80 (96.4)	39 (100.0)	15 (100.0)	26 (89.7)	0.005
Cleaners are wearing proper PPE	79 (95.2)	37 (94.9)	15 (100.0)	27 (93.1)	0.010
Emergency room isolation has contaminated zone	76 (91.6)	37 (94.9)	14 (93.3)	25 (86.2)	0.005
Emergency room isolation has buffer zone	76 (91.6)	37 (94.9)	15 (100.0)	24 (82.8)	0.008
Emergency room isolation has sterile zone	74 (89.2)	37 (94.9)	13 (86.7)	24 (82.8)	0.003
COVID-19 isolation ward has contaminated zone	71 (85.5)	36 (92.3)	14 (93.3)	21 (72.4)	0.005
COVID-19 isolation ward has buffer zone	71 (85.5)	36 (92.3)	14 (93.3)	21 (72.4)	0.005
COVID-19 isolation ward has sterile zone	70 (84.3)	36 (92.3)	13 (86.7)	21 (72.4)	0.003
Environmental Controls					
Cleaning and disinfection of surface areas once a day	82 (98.8)	38 (97.4)	15 (100.0)	29 (100.0)	0.007
Cleaning and disinfection upon discharge of patient	82 (98.8)	39 (100.0)	15 (100.0)	28 (96.6)	0.005
Use of 70% ethyl alcohol or 0.1% sodium hypochlorite to disinfect surfaces	81 (97.6)	39 (100.0)	15 (100.0)	27 (93.1)	0.005
Use of 0.5% sodium hypochlorite to clean bodily fluids	78 (93.9)	38 (97.4)	15 (100.0)	25 (86.2)	0.006
Compliance with $\geq$30 min standard waiting time for disinfection	82 (98.8)	39 (100.0)	15 (100.0)	28 (96.6)	0.005
Waste Management					
Appropriate labeling of waste bins	79 (95.2)	39 (100.0)	15 (100.0)	27 (93.1)	0.005
Use of color-coded bags	58 (69.9)	27 (69.2)	15 (100.0)	16 (55.2)	0.101
Presence of posters/printed instructions for disposal	69 (83.1)	36 (92.3)	14 (93.3)	19 (65.5)	0.003
Designated temporary collection point for infectious waste	76 (91.6)	37 (94.9)	13 (86.7)	28 (96.6)	0.004
Temporary collection point is covered/sealed	74 (89.2)	37 (94.9)	13 (86.7)	26 (89.7)	0.003
Temporary collection point is far from public access	79 (95.2)	39 (100.0)	15 (100.0)	27 (93.1)	0.002
Central storage for infectious waste	58 (69.9)	27 (69.2)	15 (100.0)	16 (55.2)	0.005
Central storage is proximate to exit gate/garbage pick-up	69 (83.1)	36 (92.3)	14 (93.3)	19 (65.5)	0.004
Administrative Controls					
Written policy on IPC	74 (89.2)	37 (94.9)	13 (86.7)	26 (89.7)	0.005
Dedicated IPC Officer	75 (90.4)	37 (94.9)	12 (80.0)	28 (96.6)	0.007
HCWs trained in IPC	81 (97.6)	39 (100.0)	15 (100.0)	29 (100.0)	0.007
Familiarity with the steps to proper handwashing	78 (94.0)	38 (97.4)	14 (93.3)	28 (96.6)	0.007
Familiarity with the steps to proper donning of PPE	81 (97.6)	38 (97.4)	15 (100.0)	28 (96.6)	0.007
Familiarity with the steps to proper doffing of PPE	81 (97.6)	38 (97.4)	15 (100.0)	28 (96.6)	0.007
Promotional materials on proper handwashing	74 (89.2)	39 (100.0)	15 (100.0)	20 (86.9)	0.002
Promotional materials on respiratory etiquette and physical distancing	72 (86.7)	32 (82.1)	15 (100.0)	25 (86.2)	0.048
Promotional materials on use of PPE per zone	66 (79.5)	33 (84.6)	14 (93.3)	19 (65.5)	0.012

Abbreviation: IPC, infection prevention and control; HCW, healthcare worker; PPE, personnel protective equipment; COVID-19, coronavirus disease 2019.

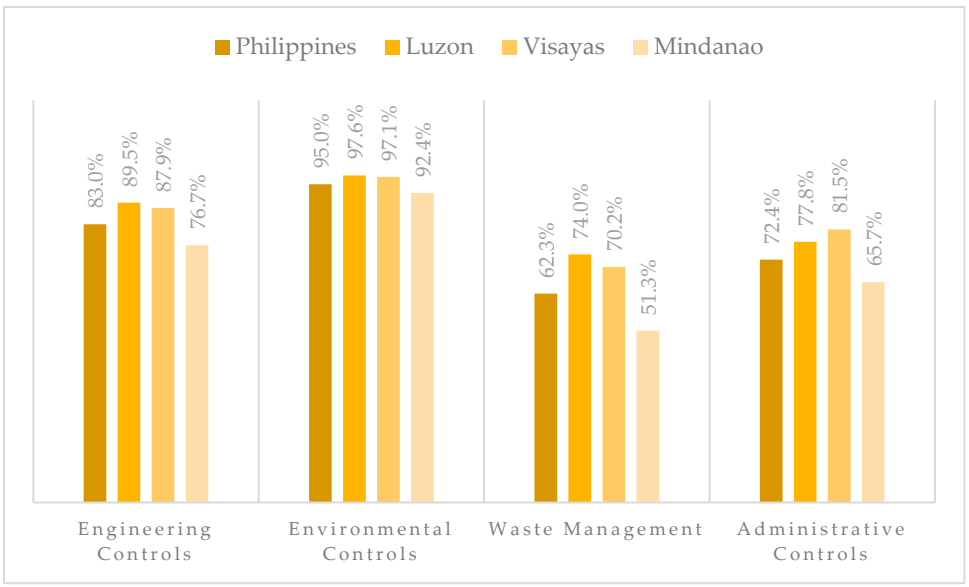
Table 3. Geographical comparison of TTMFs' compliance to IPC standards, survey results from 139 responses in the Philippines, 20 July to 15 August 2020.

Domain/Standards	No. of Respondents *n* (%)	Comparison between Island Groups			
		Luzon	Visayas	Mindanao	*p*-Value
Engineering Controls					
Entrance and exit for HCWs are connected to clean/sterile area	116 (83.5)	47 (94.0)	20 (95.2)	49 (72.1)	<0.001
Entrance and exit for HCWs have directional signage	68 (48.9)	29 (58.0)	14 (66.7)	25 (36.8)	0.069
Entrance and exit for patients are connected to contaminated area	115 (82.7)	45 (90.0)	19 (90.5)	51 (75.0)	<0.001
Entrance and exit for patients have directional signage	68 (48.9)	30 (60.0)	14 (66.7)	24 (35.3)	0.056
Use of the following PPE by HCWs:					
Face mask	128 (92.1)	48 (96.0)	20 (95.2)	60 (88.2)	<0.001
Eye protection	134 (96.4)	50 (100.0)	20 (95.2)	64 (94.1)	<0.001
Gloves	133 (95.7)	50 (100.0)	20 (95.2)	63 (92.6)	<0.001
Gown	127 (91.4)	49 (98.0)	18 (85.7)	60 (88.2)	<0.001
Has a designated contaminated zone	129 (92.8)	48 (96.0)	20 (95.2)	61 (89.7)	<0.001
Has a designated buffer zone	127 (91.4)	49 (98.0)	19 (90.5)	59 (86.8)	<0.001
Has a designated sterile zone	124 (89.2)	47 (94.0)	19 (90.5)	58 (85.3)	<0.001
Environmental Controls					
Cleaning and disinfection of surface areas daily	134 (96.4)	49 (98.0)	19 (90.5)	66 (97.1)	<0.001
Cleaning and disinfection upon discharge of patient	139 (100.0)	50 (100.0)	21 (100.0)	68 (100.0)	<0.001
Use of 70% ethyl alcohol or 0.1% sodium hypochlorite to disinfect surfaces	135 (97.1)	50 (100.0)	20 (95.2)	65 (95.6)	<0.001
Use of 0.5% sodium hypochlorite to clean bodily fluids	122 (87.8)	47 (94.0)	21 (100.0)	54 (79.4)	<0.001
Compliance with ≥30 min standard waiting time for disinfection	130 (93.5)	48 (96.0)	21 (100.0)	61 (89.7)	<0.001
Waste Management					
Appropriate labeling of waste bins	87 (62.2)	39 (78.0)	16 (76.2)	32 (47.1)	0.008
Use of color-coded bags	46 (33.1)	20 (40.0)	12 (57.1)	14 (20.6)	0.323
Presence of posters/printed instructions for disposal	47 (33.8)	27 (54.0)	7 (33.3)	13 (19.1)	<0.001
Designated temporary collection point for infectious waste	114 (82.0)	46 (92.0)	18 (85.7)	50 (73.5)	<0.001
Temporary collection point is covered/sealed	98 (70.5)	39 (78.0)	16 (76.2)	43 (63.2)	0.002
Temporary collection point is far from public access	102 (73.4)	41 (82.0)	17 (81.0)	44 (64.7)	0.002
Central storage for infectious waste	97 (69.8)	42 (84.0)	15 (71.4)	40 (58.8)	<0.001
Central storage is proximate to exit gate/garbage pick-up	102 (73.4)	42 (84.0)	17 (81.0)	43 (63.2)	0.002
Administrative Controls					
Written policy on IPC	82 (58.9)	25 (50.0)	10 (47.6)	47 (69.1)	<0.001
Dedicated IPC Officer	114 (82.0)	48 (96.0)	19 (90.5)	47 (69.1)	<0.001
HCWs trained in IPC	114 (82.0)	42 (84.0)	17 (80.9)	55 (80.9)	<0.001
Familiarity with the steps to proper handwashing	133 (95.7)	50 (100.0)	21 (100.0)	62 (91.2)	<0.001
Familiarity with the steps to proper donning of PPE	132 (94.9)	48 (96.0)	21 (100.0)	63 (92.6)	<0.001
Familiarity with the steps to proper doffing of PPE	133 (95.7)	49 (98.0)	21 (100.0)	63 (92.6)	<0.001
Promotional materials on proper handwashing	78 (56.1)	35 (70.0)	18 (85.7)	25 (36.8)	0.060
Promotional materials on respiratory etiquette and physical distancing	58 (41.7)	27 (54.0)	14 (66.7)	17 (25.0)	0.091
Promotional/educational materials on use of PPE per zone	62 (44.6)	26 (52.0)	13 (61.9)	23 (33.8)	0.106

Abbreviation: TTMF, temporary treatment and monitoring facility; IPC, infection prevention and control; HCW, healthcare worker; PPE, personnel protective equipment; COVID-19, coronavirus disease 2019.



(**a**)



(**b**)

Figure 1. Comparison of IPC compliance between public hospitals and TTMFs across island groups. (**a**) IPC compliance in public hospitals, showing aggregate values per domain; (**b**) IPC compliance in TTMFs, showing aggregate values per domain.

3.2.1. Engineering and Environmental Controls

Both types of facilities were highly compliant with standards for engineering and environmental controls, except for the indicators on directional signage. A relatively low 60.2 percent of all the facilities combined were reported to have installed the entrance and exit signage required in certain areas. This was particularly noticeable for TTMFs, of which only 48.9 percent (n = 68/139; 95% CI: 47.6–50.2) had directional signage in place to guide the movement of HCWs and patients.

3.2.2. Waste Management

Concerning waste management standards, only 46.8 percent of the facilities reported the use of color-coded bags (n = 104; 95% CI: 45.8–47.8), divided into 69.9 percent for hospitals and 33.1 percent for TTMFs. Similarly, for both types of facilities, 33 percent

reported not having central storage for infectious waste, with only 69.9 percent of hospitals (n = 58/83; 95% CI: 68.7–71.1) and 69.8 percent of TTMFs (n = 97/139; 95% CI:67.3–72.3) having complied. In addition, nearly half of the TTMFs did not observe the standards for the proper labeling of waste bins and the posting of instructional materials for proper waste disposal.

3.2.3. Administrative Controls

The TTMFs also reported sub-optimal compliance with a number of subset indicators under the administrative domain, specifically with having an institutional IPC policy (58.9%; 95% CI: 55.8–62.0), installing promotional materials for proper handwashing (56.1%; 95% CI: 54.7–57.5), respiratory etiquette and physical distancing (41.7%; 95% CI: 40.6–42.8), and the use of appropriate PPE per zones (44.6%; 95% CI:43.5–45.7).

4. Discussion

An IPC program is integral to a health facility's operation and aims to avert and limit the spread of healthcare-acquired infections. With the high clinical and economic burden of COVID-19, IPC's significance extends beyond ensuring the safety of patients and healthcare workers and improving health outcomes [25] to reducing the impact of COVID-19 infections on the country's health system [26]. Our study presents an assessment of IPC practices among public facilities during the early phase of the pandemic when IPC guidelines had just been updated in line with the growing evidence on COVID-19 transmission. The main objective was to rapidly assess IPC preparedness, particularly that of public hospitals and COVID-19 isolation units, in order to immediately identify gaps and mobilize the necessary support in the midst of the global health crisis.

The key domains assessed in this paper are aligned with the core components of an effective IPC program [14]. Optimal compliance with standards such as engineering and environmental controls that support transmission-based precautions such as screening and triage; administrative controls including an active IPC policy, and dedicated and trained IPC personnel; and proper management of infectious waste are associated with decreased risk of the spread of COVID-19 [14,15]. Our assessment indicates significant variations being reported between facilities, particularly for engineering controls, where hospitals had better compliance with standards. Indeed, in the early months of the pandemic, about half of the isolation facilities were operating without proper certification from the DOH, and therefore compliance with IPC protocols has not been ascertained. A clear reason for this is that TTMFs were converted from available public spaces such as auditoriums, gymnasiums, classrooms, vacant hotels, courts, and even open fields with tents to enhance the surge capacity of existing health facilities in meeting the demand for critical care [27]. Many of these converted spaces had to be partitioned into isolation units and fitted with equipment to be made functional.

Operationally, setting up engineering controls entails higher initial costs and time than procuring PPE and disinfectants, and printing health promotional materials as part of regular IPC activities. Even though an IPC program is a standard requirement for TTMFs to operate [28], compliance may take a while, especially in a crisis situation where the demand for temporary facilities is critically urgent, indicating a clear gap in this area. For many of these facilities, placing barriers between health workers and the sources of risk [29], and ensuring the rational and proper use of PPE to reduce exposure to and infection with the virus [30], should be the bare minimum; although more recently, design strategies have been conceptualized and proposed to provide adequate spacing in waiting areas, hallways, entrances, and exits that would support safe distancing and promote adequate cross-ventilation [31], and which further require sufficient planning and investment.

Another significant aspect that our study highlighted is the unsatisfactory disposal capacity for healthcare waste. The proper segregation, storage, collection, and transport of waste materials are critical to ensuring the safety of health workers, waste collectors, and the general public, and to reducing the chances of COVID-19 spreading to the commu-

nity [32,33]. A good waste management system in health facilities requires an assessment of the waste stream and existing environmental practices, an evaluation of waste management options, the development of a waste management plan, and the promulgation of institutional policies that clearly define the roles and responsibilities of personnel [34]. The amount of waste generated by health facilities because of COVID-19 increased tremendously, and failure to properly manage it could perpetuate the spread of the virus via secondary transmission. This potential health risk demands a review of the adequacy of existing waste management practices and the identification of more sustainable solutions in the long term.

Nevertheless, we want to underscore that the sustained implementation of an IPC program is highly contingent on the involvement and engagement of HCWs as primary implementers, and adequate financing for its implementation. Firstly, the current evidence points to a number of factors that could influence the ability and willingness of HCWs to follow IPC guidelines including proper dissemination, supportive management, workplace culture, training, access to PPE, and personal motivation for delivering quality services [35–37]. Therefore, efforts to monitor the gaps occurring between the development of IPC guidelines, their introduction, and their eventual implementation must be given close attention to help address individual-level barriers [16,38–40]. Secondly, IPC financing should be facilitated by both national and local government as a necessary component of public health strategy to prevent the massive depletion of HCWs [40,41]. Our survey showed an extremely low accreditation rate among TTMFs with the national health insurance agency. Accreditation facilitates access to public funding from PhilHealth as the country's main purchaser of healthcare services. In the course of the pandemic, the fiscal capacity of health facilities was greatly diminished and resources to pay for health personnel and for the purchase of PPE, equipment, and medicines were stretched beyond limits, compromising the implementation of IPC strategies. This highlights the need to effectively set a baseline for the resource and infrastructure requirements of temporary facilities on IPC, even in non-outbreak settings, so that the health system will have a better cushion should emerging infections of COVID-19-like proportions happen again in the future [42].

Finally, we also echo the importance not only of empowering HCWs [43] but also of engaging the community [44] in practicing IPC guidelines by strengthening individual, organizational, and community-level facilitators and addressing barriers that will potentially hamper implementation. A strong and effective IPC program requires a collective approach that supports and maintains the safe provision of high-quality, people-centered, and integrated health services, particularly in emergency settings.

5. Limitations

This study may present some limitations. The survey was conducted during a period when physical movements were highly restricted, resulting in the selection of facilities from a conveniently available pool of samples within a specific geographic coverage, and the availability of field personnel to carry out data collection was a clear consideration. Hence, some types of facilities may be generally under-represented, more so for certain island groups. Additionally, most respondents were interviewed virtually, with a few exceptions where a facility visit was possible. In both instances, these present a potential risk for selection and information bias. Despite these limitations, the survey tool uses universally accepted IPC standards, allowing for the wider comparability of the data and the cross-analysis of our results with other contexts and settings.

6. Conclusions

The COVID-19 pandemic underscored the importance of IPC preparedness among healthcare facilities. The study was able to concretely identify compliance gaps that required urgent attention and prioritization, such as the need to allocate resources for the purchase of waste bags and PPE, the installation of signage, the printing of information materials, and the continuous provision of technical support for staff training and the development

of IPC policies. It was particularly crucial for the government to consistently monitor and assist healthcare facilities in meeting the standards, and to sustain their compliance over time.

The study has also demonstrated the potential use of rapid IPC assessments in an outbreak situation and how collected data can be exploited to define priorities and deploy immediate support. Our findings offer an opportunity to expand the use of IPC assessment into other types of facilities and contexts. The utility and accuracy of the tool compared with comprehensive assessments must also be explored in future studies. Nonetheless, our work has highlighted the need for systemic improvements through sufficient planning and long-term investment in IPC as a critical component in building health systems that are resilient and better equipped for future outbreaks.

Supplementary Materials: The following supporting information can be downloaded at: https://www.mdpi.com/article/10.3390/covid3030025/s1, Table S1: IPC Assessment Tool for Hospitals; Table S2: IPC Assessment Tool for Temporary Treatment and Monitoring Facilities.

Author Contributions: Conceptualization, V.d.C., N.B., M.R.T. and L.S.; methodology, V.d.C., N.B. and M.R.T.; data curation, V.V.C., M.A.L. and L.J.M.; writing—original draft preparation, V.d.C. and N.B.; writing—review and editing, V.d.C., N.B., M.R.T., V.V.C., M.A.L., L.J.M. and L.S.; visualization, V.d.C.; supervision, V.d.C., N.B. and L.S. All authors have read and agreed to the published version of the manuscript.

Funding: The assessment was part of the COVID-19 technical assistance provided to LGUs by USAID's ReachHealth Project formally known as Family Planning and Maternal and Neonatal Health Innovations and Capacity Building Platforms, a six-year project implemented by RTI International and funded by the United States Agency for International Development (USAID). However, all claims expressed in this article are solely those of the authors and do not necessarily reflect the views of USAID or the United States government.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Informed consent was obtained from all respondents of the study.

Data Availability Statement: No additional data are available.

Acknowledgments: The authors are grateful for the contribution of the provincial and city technical officers of USAID's ReachHealth Project who were responsible for collecting the data for this study.

Conflicts of Interest: The authors declare no conflict of interest.

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