Public Health 213 (2022) 100–106

Contents lists available at ScienceDirect

Public Health

journal homepage: www.elsevier.com/locate/puhe

Themed Paper – Original Research

Status of infection prevention and control capacity in Korean hospitals: implications for disaster response and pandemic preparedness

Y. Jeong*

Ministry of Health and Welfare, Sejong, Republic of Korea

ARTICLE INFO

Article history:
Received 20 June 2022
Received in revised form
8 September 2022
Accepted 5 October 2022
Available online 16 November 2022

Keywords:
Infection control
COVID-19
Hospital
Disaster planning
Survey

ABSTRACT

Objectives: This study aims to explore the association of hospital infection prevention and control (IPC) structure (i.e. a dedicated IPC team and/or IPC committee) and IPC capacity in Korean hospitals, as well as its implications in the response and preparedness to COVID-19.

Study design: This was a cross-sectional study using data collected through a nationwide survey.

Methods: Participating hospitals completed an online questionnaire. Participation was voluntary. The survey questionnaire was developed by the government in consultation with IPC experts. The questionnaire was distributed to 2108 hospitals, including both acute and long-term care hospitals. The independent variables were the presence of an IPC team and/or IPC committee. The dependent variables were IPC activities and capacity measures, which were based on the World Health Organisation (WHO) recommendations on the core components in IPC.

Results: A total of 1442 hospitals completed the survey. Hospitals with IPC structures conducted significantly more IPC activities in all outcome measures compared with hospitals without IPC structures, with the exceptions of monitoring hand hygiene and screening for infectious diseases that showed non-significant differences. Hospitals with IPC structures showed a significant difference in performance in IPC risk assessment, operating outbreak response teams and appraisal of hospital IPC policies compared with hospitals without IPC structures.

Conclusions: The presence of a dedicated IPC team and IPC committee was associated with increased IPC activities and IPC capacity. Hospitals with IPC teams and IPC committees showed strong implementation of planning, appraisal, resource management and outbreak response, indicating that strengthening IPC structures within hospitals is the key to more effective IPC and disaster response.

Introduction

Healthcare-associated infection (HCAI) has become one of the most significant health issues with a high burden worldwide.[1] Furthermore, the current COVID-19 pandemic is revealing the inadequacy of infection prevention and control (IPC) in healthcare facilities and the importance of its effective implementation in hospital disaster response and preparedness.[2,3]

The structure of IPC at the institutional level should include the following two main components: (1) personnel (i.e. trained IPC specialist(s)); and (2) a mechanism for decision-making and systems change (usually an in-hospital IPC board or committee).[4,5] Since 2016, the World Health Organisation (WHO) has recommended dedicated IPC personnel as one of the core components (CC) of IPC.[6] In the COVID-19 IPC guidance developed by the WHO in 2021, it was highlighted that these essential IPC structures are critical in minimising transmission of COVID-19 in healthcare facilities and ensuring protection to staff and patients.[7]

IPC and disaster preparedness in healthcare institutions have emerged as major public health issues in Korea. The spread of Middle East respiratory syndrome in healthcare facilities in 2015 and notable HCAI incidents in the mid-2010s, including the hepatitis C epidemic due to the reuse of disposable syringes in a local clinic and intravenous fluid contamination in an intensive care unit that led to the death of neonates in 2017, resulted in great public interest in more robust IPC policy measures. This culminated in a series of relevant policies, including the mandatory establishment of IPC teams and committees, through the amendment of the Korean Medical Service Act (KMSA) in 2011.[8] In 2018, the Korean

* Ministry of Health and Welfare, Sejong 30113, Republic of Korea. Tel.: +82 1041817401.
E-mail address: yoolwon@gmail.com.

https://doi.org/10.1016/j.puhe.2022.10.008
0033-3506/

government conducted the first nationwide IPC survey (the Korean National Infection Prevention and Control Survey [KNIPCS]) to gain an overview of IPC structures and capacity in Korean hospitals. This study aims to explore the association of IPC structure and IPC capacity in Korean hospitals, as well as its implications in the response and preparedness to COVID-19, by cross-sectional analysis of the KNIPCS data.

Methods

Study design and data collection

The KNIPCS was conducted by the Ministry of Health and Welfare and the Korea Disease Control and Prevention Agency between February and March 2018. The survey data were collected through a web-based data entry system. IPC or administrative staff in participating hospitals were provided with an access link to the webpage to answer the survey questions. Participation was voluntary. The survey was pre-tested in two randomly selected hospitals before the official roll-out.

The questionnaire was developed by the Ministry of Health and Welfare and Korea Disease Control and Prevention Agency, in consultation with an expert group consisting of physicians and registered nurses with expertise in IPC. The contents of the questionnaire were primarily based on the IPC standards and responsibilities of hospitals stipulated in the KMSA, which is the legislation governing the duties and responsibilities of healthcare institutions in Korea. The legislation includes details such as the number of full-time IPC staff, the composition of the hospital IPC committee and hospital IPC programme requirements.

The KMSA defines the type of hospital as (a) ‘hospitals’, (b) ‘general hospitals’, (c) ‘tertiary hospitals’ or (d) ‘long-term care hospitals’, all of which were invited to participate in the current study. ‘Hospitals’ are defined as healthcare facilities with ≥30 beds, providing inpatient services; ‘general hospitals’ are healthcare facilities with >100 beds and seven to nine specialised departments; ‘tertiary hospitals’ refer to hospitals of the highest level of function with at least 20 specialised departments; and ‘long-term care hospitals’ are hospitals that provide long-term and chronic care health services. The survey questionnaire was distributed to all ‘tertiary hospitals’ ($n = 42$), all ‘general hospitals’ ($n = 298$), all ‘long-term care hospitals’ ($n = 1496$) in Korea and ‘hospitals’ that provide services on at least two of the following functions ($n = 272$): operating room (OR), emergency room (ER) and/or intensive care unit (ICU). Because many of the survey questions covered IPC activities associated with these three functions, hospitals with at least two of these functions were invited to participate to provide sufficient information. A total of 2108 hospitals received instructions for participation and the link to the questionnaire.

Measures

A cross-sectional analysis of KNIPCS data was conducted to examine whether the hospital structure of IPC (independent variable) was associated with the performance of IPC activities (dependent variable) in Korean hospitals. The selection of the dependent variables was based on the ‘WHO guidelines on CCs of infection prevention and control programmes’, which is an evidence-based guideline on eight essential CCs that are effective in reducing HCAI.[6] The detailed composition and the evidence-base of the WHO CCs are presented elsewhere.[6,9] For the analysis of this study, the following indicators were selected as dependent variables from the CCs: the development of IPC programmes and planning (CC1); outbreak response activities (CC2); isolation and screening of patients (CC2); received IPC education (CC3); HCAI surveillance (CC4); monitoring and auditing of IPC activities such as hand hygiene (CC6); number of IPC staff (CC7); and disinfection of medical equipment (CC8; Table 1). Hospitals answered ‘yes’ or ‘no’ when asked if they carried out a particular IPC activity. In the case of IPC education and frequency of IPC committee meetings, the exact number (e.g. hours of training, number of meetings) was entered. The subsets of data on IPC activities associated with different hospital functions (i.e. ORs, ERs and ICUs) were also analysed as

Table 1
WHO core component in IPC and variables from the Korean national IPC survey selected for the analysis of this study.

WHO core component in IPC	Variables selected for analysis
Core component 1. IPC governance and programme	
Facility-level IPC programmes with clearly defined objectives based on local epidemiology and risk assessment should be organised	• Developing facility-level IPC programmes • Performing IPC risk assessment for planning
Core component 2. IPC guidelines	
Evidence-based guidelines should be developed and implemented across a series of activities led by IPC team (e.g. surveillance, outbreak response, precautions)	• Operating outbreak response teams • Conducting IPC activities to eliminate outbreaks • Isolation of patients suspected/confirmed with HCAI • Screening HCAI upon admission
Core component 3. IPC education and training	
IPC education should be in place for all healthcare workers	• Education received by IPC staff (number of hours, per year)
Core component 4. Healthcare-associated infection surveillance	
Facility-based HCAI surveillance should be performed to guide IPC interventions and detect outbreaks	• Performing of HCAI surveillance
Core component 6. Monitoring and audit of IPC practices and feedback	
Regular monitoring/audit and timely feedback of healthcare practices according to IPC standards should be performed	• Monitoring compliance to facility hand hygiene policies • Appraisal of hospital IPC policies and activities • Monitoring compliance to precautions • Reporting and sharing monitoring results
Core component 7. Workload, staffing and bed occupancy	
1) Bed occupancy should not exceed the standard capacity of the facility; 2) Healthcare worker staffing levels should be adequately assigned according to patient workload	• Number of IPC staff
Core component 8. Built environment, materials, and equipment for IPC	
Patient care must be undertaken in an appropriate environment, WASH services and with adequate materials and equipment for IPC	• Performing disinfection of equipment based on standard regulations

HCAI, healthcare-associated infection; IPC, infection prevention and control; WHO, World Health Organisation.

dependent variables (note: only hospitals that operate such functions were subject to analysis).

The independent variables were the presence of (1) a dedicated, in-hospital IPC team and (2) an IPC committee, the composition of which should meet the requirements stipulated in the KMSA. The number and type of staff required in the IPC team differ by type and size of hospital but should include at least one full-time professional working in IPC. The KMSA defines the IPC committee as the decision-making body for hospital IPC policies, which include IPC programmes, annual plans, regulations, procurements and arrangements of IPC resources. The KMSA also specifies the composition of the IPC committee as a group of 7–15 people that must include the head of the hospital, the head of the IPC team and an external consultant, among others.

Statistical analyses

To examine the difference in the performance of IPC activities between hospitals with and without IPC teams and IPC committees, the Chi-squared test was used. Fisher's exact test was used in the cases of small cell counts (e.g. IPC activities in ICUs). For continuous variables (e.g. hours of IPC education received), Student's *t*-test was used. The statistical significance was defined by a *P*-value of <0.05. All statistical analyses were performed using SPSS Statistics version 21.0 (IBM, Armonk, NY).

Ethical considerations

The implementation of the national survey was compliant with article 17 of the Infectious Disease Control and Prevention Act, which mandates the responsibility of the government to conduct surveillance associated with infection control. Ethical approval was not required, as the survey data did not contain any individual human data. Nevertheless, data collection and analysis were conducted by a third party, a statistical consulting company, to guarantee confidentiality and data protection.

Results

General characteristics

A total of 1442 hospitals completed the survey, with a response rate of 68.4%. The composition of hospitals in the final analysis was 42 tertiary hospitals (3.0%), 260 general hospitals (18.0%), 167 hospitals (11.6%) and 973 long-term care hospitals (67.4%; Table 2). A total of 459 (31.8%), 414 (28.7%) and 300 (20.8%) hospitals had ORs, ERs and ICUs, respectively. A total of 392 hospitals (27.2%) and 1067 hospitals (74.0%) operated an IPC team and IPC committee, respectively.

IPC activities by the presence of IPC teams

More than 80% of hospitals with IPC teams performed outbreak elimination activities (84.7%), HCAI surveillance (90.3%), isolation of patients suspected/confirmed with HCAI (87.2%), hand hygiene monitoring (92.6%), reporting of monitoring results (84.2%) and disinfection of equipment according to standard procedures (96.2%; Table 3). Among these activities, hospitals without IPC teams only performed hand hygiene monitoring (92.2%) and disinfection of equipment (81.5%) at similarly high frequencies. Hospitals with dedicated in-hospital IPC teams showed statistically higher frequencies of performing IPC activities in all areas, except for hand hygiene monitoring. The greatest differences in performance of IPC activities between hospitals with and without IPC teams were seen in IPC risk assessment, operating outbreak response teams, isolation of suspected/confirmed HCAI patients, appraisal of hospital IPC policies and monitoring compliance to precautions ($P < 0.001$).

Table 2
General characteristics of 1442 participating hospitals in the Korean national IPC survey.

Characteristics	*n* (%)[b]
Type of hospitals[a]	
Tertiary hospital	42 (3.0)
General hospital	260 (18.0)
Hospital	167 (11.6)
Long-term care hospital	973 (67.4)
Location	
Seoul and greater Seoul metropolitan area	471 (32.7)
Other	971 (67.3)
Number of hospital beds	
<100	163 (11.3)
100–200	706 (49.0)
201–400	403 (27.9)
≥401	170 (11.8)
Availability of additional functions	
Intensive care unit (adult)	300 (20.8)
Emergency room	414 (28.7)
Operating room	459 (31.8)
Presence of an IPC structure	
Dedicated IPC team	392 (27.2)
IPC committee	1067 (74.0)
Frequency of IPC committee meetings (mean number of meetings per year)	3.36
Number of IPC staff (Mean)	
Doctors	1.00
Nurses	1.40
IPC education of IPC staff (average hours of education received per year)	
Doctors	12.89
Nurses	26.92

IPC, infection prevention and control.
[a] As defined by the Korean Medical Services Act. 'Hospitals' are healthcare facilities with ≥30 beds, providing inpatient services. 'General hospitals' are healthcare facilities with >100 beds and 7–9 specialised departments. 'Tertiary hospitals' are healthcare facilities of the highest level of function with at least 20 specialised departments. 'Long-term care hospitals' are hospitals that provide long-term and chronic care health services.
[b] Unless stated otherwise.

Hospitals with IPC teams also showed a significantly higher frequency of performing IPC activities in ORs, ERs and ICUs than hospitals without IPC teams ($P < 0.001$), except in the monitoring of surgical scrubbing in ORs, which showed a non-significant difference (Table 5). Whereas more than 80% of hospitals with IPC teams had a screening procedure (97.2%) and triage areas (80.4%) within the ER, these percentages were 58.7% and 32.6%, respectively, in hospitals without IPC teams ($P < 0.001$).

IPC activities by the presence of IPC committees

More than 80% of hospitals with IPC committees performed HCAI surveillance (81.2%), hygiene monitoring (94.7%) and disinfection of equipment according to standard procedures (91.2%; Table 4). Among these activities, hospitals without IPC committees only performed hand hygiene monitoring (85.6%) at a similarly high frequency. Hospitals with IPC committees showed statistically higher frequencies of performing IPC activities in all areas, except for screening for infectious diseases on admission. The greatest differences in the performance of IPC activities between hospitals with and without IPC committees were seen in IPC risk assessment, operating outbreak response teams, appraisal of hospital IPC policies and monitoring compliance to precautions ($P < 0.001$).

Hospitals with IPC committees also showed a significantly higher frequency of performing IPC activities in ORs, ERs and ICUs than hospitals without IPC committees ($P < 0.001$), except in the monitoring of surgical scrubbing in ORs and screening of

Table 3
IPC activities and programmes by presence of a dedicated in-hospital IPC team.

Activity/programme	Dedicated in-hospital IPC team		
	Present ($n = 392$)	Not present ($n = 1050$)	P-value
IPC programmes and planning			
Development of facility-level IPC programmes	378 (96.4)	714 (68.0)	<0.001
Performing IPC risk assessment for planning	293 (74.7)	373 (35.5)	<0.001
Outbreak response			
Operating HCAI outbreak response teams	260 (66.3)	227 (21.6)	<0.001
Conducting IPC activities to eliminate outbreaks	332 (84.7)	629 (59.9)	<0.001
Management of patients			
Isolation of patients suspected/confirmed with HCAI (general ward)	342 (87.2)	371 (35.3)	<0.001
Screening HCAI upon admission (general ward)	113 (28.8)	232 (22.1)	0.007
IPC Education and training			
Received education of IPC staff (average number of hours, per year)	43.3	11.3	<0.001
Surveillance			
HCAI outbreak surveillance	354 (90.3)	768 (73.1)	<0.001
Monitoring and audit			
Monitoring compliance to facility hand hygiene policies	363 (92.6)	969 (92.2)	0.84
Appraisal of hospital IPC policies and activities	290 (74.0)	376 (35.8)	<0.001
Monitoring compliance to precautions	223 (56.8)	198 (18.8)	<0.001
Reporting and sharing monitoring results	330 (84.2)	572 (54.5)	<0.001
Number of IPC staff (Mean)			
Doctors	1.82	0.70	0.10
Nurses	2.52	0.98	0.02
Management of equipment and materials			
Performing disinfection of equipment, based on standard regulations	377 (96.2)	856 (81.5)	<0.001

HCAI, healthcare-associated infection; IPC, infection prevention and control.

infectious diseases on admission to ICU, which showed non-significant differences (Table 5).

Discussion

This cross-sectional study explored IPC structure and its association with the IPC capacity in 1442 Korean hospitals. The results are significant because this is the first survey on IPC structure and capacity conducted on a nationwide scale. The study revealed that the presence of hospital IPC structure, such as dedicated in-hospital IPC teams and IPC committees, is significantly associated with more IPC activities and stronger IPC capacity in Korean hospitals.

Hospital IPC structure is increasingly being considered an essential element in hospital management due to population ageing and the advancement in healthcare technology that has brought increased invasive procedures into the healthcare setting, making HCAI more prevalent in hospitals. It has also become apparent that IPC requires specific expertise, requiring trained healthcare professionals on the team.[4,10,11] The results of this study are in line with previous studies that indicated hospital IPC

Table 4
IPC activities and programmes by presence of a hospital IPC committee.

Activity/programme	Hospital IPC committee		
	Present ($n = 1067$)	Not present ($n = 375$)	P-value
IPC programmes and planning			
Development of facility-level IPC programmes	949 (88.9)	143 (38.1)	<0.001
Performing IPC risk assessment for planning	597 (56.0)	69 (18.4)	<0.001
Outbreak response			
Operating HCAI outbreak response teams	439 (41.1)	48 (12.8)	<0.001
Conducting IPC activities to eliminate outbreaks	795 (74.5)	166 (44.3)	<0.001
Management of patients			
Isolation of patients suspected/confirmed with HCAI (general ward)[a]	583 (54.7)	130 (34.6)	<0.001
Screening HCAI upon admission (general ward)	191 (17.9)	54 (14.4)	0.12
IPC Education and training			
Received education of IPC staff (Average number of hours, per year)	30.6	5.8	<0.001
Surveillance			
HCAI Outbreak surveillance	866 (81.2)	256 (68.3)	<0.001
Monitoring and audit			
Monitoring compliance to facility hand hygiene policies	1011 (94.7)	321 (85.6)	<0.001
Appraisal of hospital IPC policies and activities	577 (54.1)	89 (23.7)	<0.001
Monitoring compliance to precautions	356 (33.3)	65 (17.3)	<0.001
Reporting and sharing monitoring results	740 (69.4)	162 (43.2)	<0.001
Number of IPC staff (Mean)			
Doctors	1.13	0.64	0.40
Nurses	1.61	0.80	0.06
Management of equipment and materials			
Performing disinfection of equipment, based on standard regulations	973 (91.2)	260 (69.3)	<0.001

HCAI, healthcare-associated infection; IPC, infection prevention and control.
[a] A total of three hospitals did not answer this question (two with an IPC committee and one without an IPC committee). The percentage of hospitals that isolate patients suspected/confirmed with HCAI was calculated among hospitals that did not have a null value.

Table 5
IPC activities associated with different hospital functions (OR, ER and ICU) by presence of a hospital IPC team or IPC committee.

Activity	IPC team (among hospitals with an OR)			IPC committee (among hospitals with an OR)		
	Present ($n = 328$)	Not present ($n = 131$)	*P*-value	Present ($n = 358$)	Not present ($n = 101$)	*P*-value
Monitoring positive pressure in ORs	246 (75.0)	32 (24.4)	<0.001	258 (72.1)	20 (19.8)	<0.001
Monitoring surgical scrubbing in ORs	260 (79.2)	97 (74.0)	0.22	283 (79.0)	74 (73.2)	0.21
	IPC team (among hospitals with an ER)			IPC committee (among hospitals with an ER)		
	Present ($n = 322$)	Not present ($n = 92$)	*P*-value	Present ($n = 351$)	Not present ($n = 63$)	*P*-value
Availability of ER regulations for screening patients suspected/confirmed with infectious diseases	313 (97.2)	54 (58.7)	<0.001	336 (95.7)	31 (49.2)	<0.001
Availability of triage areas	259 (80.4)	30 (32.6)	<0.001	273 (77.8)	16 (25.4)	<0.001
	IPC team (among hospitals with an ICU)			IPC committee (among hospitals with an ICU)		
	Present ($n = 271$)	Not present ($n = 29$)	*P*-value	Present ($n = 286$)	Not present ($n = 14$)	*P*-value
Screening of infectious diseases upon admission to ICU	165 (60.8)	7 (24.1)	<0.001	168 (58.7)	4 (28.6)	0.06
Isolation of patients suspected/confirmed with infectious diseases	257 (94.8)	10 (34.4)	<0.001	262 (91.6)	5 (35.7)	<0.001

ER, emergency room; ICU, intensive care unit; IPC, infection prevention and control; OR, operating room.

structure, such as trained physicians in IPC and infection control nurses, is an essential component in the effective control of HCAI.[4,5,12,13] A landmark study on this issue by Haley et al. described that implementation of an IPC programme including IPC physicians and nurses significantly reduced urinary tract infection rates by 30%.[5] In addition, a full-time IPC nurse in ICUs not only reduced device-associated HCAI by 42%[10] but was also cost-effective.[13,14]

In light of such evidence, in 2011, the establishment of IPC teams was made mandatory in all hospitals with >150 beds in Korea.[15] This study showed that 392 hospitals (27.2%) were operating IPC teams and that these hospitals showed higher IPC capacity, as shown through the higher frequency of various IPC activities, compared with hospitals without IPC teams. The greatest differences in performance of IPC activities between hospitals with and without IPC teams were seen in outbreak response, surveillance, monitoring and planning. It is speculated that these activities generally require a higher level of resources, institutional support and devoted time and expertise by the IPC teams compared with other activities (e.g. environment and waste management).[16,17] This study also showed that hospitals with IPC teams had a significantly higher frequency of performing IPC activities in ORs, ERs and ICUs, which also require expertise in a specific area, and is in accordance with existing evidence.[18,19] As such, hospitals with an established IPC team and committee more frequently performed complex and resource-intensive IPC activities compared with hospitals without IPC teams and committees, suggesting the positive impact of hospital IPC structure in sustainable and systematic response to complex healthcare risks. The only activity area that did not show a significant difference between hospitals with and without IPC teams was hand hygiene monitoring. This implies that hand hygiene management is the most basic IPC capacity that all hospitals share, irrespective of the availability of IPC teams.

The specific composition of IPC teams remains controversial and warrants further study; however, the WHO recommends a minimum of one full-time IPC professional per 250 beds, with a suggestion that a higher ratio (e.g. one per 100 beds) should be considered as a result of increasing complexity in health care.[6] Examples of staffing recommendations from independent studies suggest one full-time IPC professional per 125–167 beds.[16,20] The KMSA requires one full-time IPC professional in (1) all tertiary and general hospitals regardless of size and (2) hospitals with >150 beds. This full-time professional is supported by members of the IPC team, of which the number and composition are different according to the size and type of hospital. This study revealed that the mean number of nurses on the IPC team is 2.52, roughly equating to one per 109 beds. Previous surveys conducted in Australia and the United States estimated actual staffing at one per 150[21] and one per 80–83 inpatients,[22,23] respectively. As a result of the national survey and review of existing evidence, MoWH of Korea made amendments to the KMSA in 2021 to require IPC staff in hospitals with >100 beds and also released a plan to require IPC staff in long-term care hospitals and clinics. Although data are not shown, the present study also found that other professions were included in IPC teams, such as laboratory technicians and general administrative staff. However, the average number of these staff was much smaller than doctors and nurses (0.51 persons per team on average). There is a need for further study into the ideal composition of an IPC team due to the expanding responsibilities of hospital IPC teams and differences in local epidemiology and resources.

The IPC committee has a critical role in supporting IPC programmes through securing protected resources (e.g. budget, manpower), arranging these resources according to the IPC plan and establishing links between IPC programmes and other hospital functions.[4,6] Although there is sufficient evidence on the significance of general facility leadership on service delivery, operational efficiency and performance outcomes,[24–26] there was a relatively scarce literature on IPC leadership. The results of this study revealed that the presence of an IPC committee is significantly associated with more IPC planning, appraisal of hospital policies and resource mobilisation (e.g. operation of outbreak response teams, securing triage spaces), underscoring the critical role of the IPC committee in effective IPC programmes.

It is well known that IPC education and training are effective in reducing HCAI.[6,27,28] In the present study, staff in hospitals with IPC structures received 3–5 times more hours of IPC education and training compared with hospitals without IPC structures. Although a relatively high percentage of hospitals without IPC teams performed disinfection of medical equipment based on standard regulations (81.5%), this percentage was higher in hospitals with IPC teams, highlighting the important role of IPC teams and committees in ensuring hygienic environment at the point of care.

The current COVID-19 pandemic has revealed that adequate IPC in healthcare settings is a critical component in minimising the transmission of COVID-19. The global society has come to realise that IPC is not just an issue at the facility level, but a broader agenda of disaster preparedness and response, involving various sectors and levels of the healthcare system.[29] In turn, this is expanding the roles and responsibilities of hospital IPC teams and committees and requiring facilities to promote systems monitoring and readiness, enforce safe workplace measures, perform more complex outbreak response activities, incorporate emergency scenarios and specific response mechanisms based on the national-level surveillance data.[29–31] As shown in this study, IPC teams and committees are the key factors in a facility's capacity to perform IPC planning and disaster response activities. Nevertheless, a stronger role is demanded on the part of IPC teams and committees in the current public health landscape, underscoring the need to enforce hospital IPC structure, in both scale and competence. Further studies are warranted to examine what the ideal scale and competence should look like and how this should be achieved.

This study has several limitations. First, the outcome measures of this study were IPC capacity and not the incidence of HCAIs, which would directly represent an improvement in healthcare quality. However, evidence suggests that an increase in IPC activity and/or capacity is an intermediate measure that predicts an eventual decrease in HCAI.[6] Moreover, a decrease in HCAI is usually the result of a combined implementation of IPC activities rather than a single intervention, highlighting the importance of a hospital IPC structure that enables the execution of activities in a systematic and sustainable manner.[32–34] Another limitation is that the participating hospitals included hospitals with different characteristics (e.g. long-term care hospitals), suggesting the need for further studies to examine the areas that could not be explored in aggregate data analysis.

This national-level cross-sectional study confirmed that a dedicated IPC team and IPC committee are associated with more IPC activities and stronger IPC capacity in Korean hospitals. Hospitals with IPC teams and IPC committees showed strong implementation of planning, appraisal, resource management and outbreak response, indicating that strengthening IPC structures within hospitals is the key to more effective IPC and disaster response in healthcare facilities.

Author statements

Acknowledgements

The author wishes to thank the survey participants and the expert group for their valuable input in the development and implementation of the national survey.

Ethical approval

Ethics approval was waived for this survey because it did not contain any individual human data, and the development and execution of the survey were in full alignment with the relevant domestic legislation.

Funding

This research did not receive any specific grant from funding agencies in the public, commercial or not-for-profit sectors.

Competing interests

The author declares no competing interests.

Author contributions

Y.J. contributed to the study design, data collection, data analysis and interpretation, and drafting, appraisal and final approval of the article.

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