



Major Article

Health care workers' perceptions about infection prevention and control in Latin America



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Background: Limited information exists regarding health care workers' (HCWs) perceptions about infection prevention and control (IPC) in Latin America.

Methods: We conducted an electronic voluntary anonymous survey to assess HCWs' perceptions toward IPC in 30 hospitals in Latin America during August to September 2022. Nurses, physicians, and environmental cleaning (EVC) staff were prioritized for recruitment.

Results: Overall, 1,340 HCWs completed the survey. Of these, 28% were physicians, 49% nurses, 8% EVC staff, and 15% had "other" roles. Self-compliance with hand hygiene and prevention bundles was perceived to be high by 95% and 89% of respondents, respectively; however, ratings were lower when asked about compliance by their peers (reported as high by 81% and 75%, respectively). Regular training on IPC and access to health care-associated infections (HAI) rates were more limited among physicians than other HCWs (eg, 87% of EVC staff and 45% of physicians reported training upon hiring and thereafter, 60% of nurses and 51% of physicians reported regular access to HAI rate reports).

Conclusions: We identified several opportunities to strengthen IPC practices in Latin American hospitals, including improving HCW education and training on IPC and their awareness of HAI rates and compliance with prevention measures.

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BACKGROUND

The burden of health care-associated infections (HAIs) and antimicrobial resistance in low- and middle-income countries, including those in Latin America, is high.^{1–3} Sustained implementation of effective infection prevention and control (IPC) and antimicrobial stewardship programs in the region has been limited by inadequate human, financial, and technical resources.^{4,5} According to a recent study by Tomczyk et al that assessed IPC program implementation in health care facilities (HCFs) globally, including 21 countries in Latin America, using the World Health Organization (WHO) Infection Prevention and Control Assessment Framework (IPCAF), workload, staffing, and bed occupancy, and education and training were the areas with the largest gaps.⁶ A recent study by our group that evaluated IPC program implementation using the IPCAF survey among 35 HCFs in Latin America (including countries not included in the study by Tomczyk) found overall similar findings (lower scores in the same domains and larger gaps among nonprofit HCFs than for-profit HCFs).⁷

Previous studies conducted in high-resource settings have shown health care workers' (HCW) engagement in IPC and direct leadership support to IPC programs are important for sustained improvement in HAI rates.^{8–10} There is a paucity of studies investigating IPC personnel's perspective on challenges to IPC implementation or front-line HCWs' perceptions and attitudes toward IPC in Latin America. We conducted a survey to address some of these gaps and understand HCWs' perceptions of IPC practices.

METHODS

Study design, setting, and population

Between August and September 2022, we invited HCWs from 30 hospitals in Panama, Guatemala, Ecuador, and Argentina to participate in a 1-time survey to better understand their perceptions

regarding IPC. Physicians, nurses, and environmental cleaning (EVC) personnel were prioritized for recruitment. A link to the anonymous and voluntary survey was shared with the IPC contact at each HCF, who then shared the link through HCF list serves or with other key individuals (eg, head of nursing, EVC staff supervisor) for further dissemination via email or WhatsApp. The target number of responses was at least 30 responses per hospital.

The survey was conducted in the context of a larger study to evaluate IPC programs in the region. Country and hospital selection were discussed with national public health authorities and the Centers for Disease Control and Prevention (CDC) to ensure the study aligned with other work in the region. Hospitals were recruited through a regional research network (PROAnet).¹¹ All study activities were coordinated by Johns Hopkins University (JHU).

JHU, CDC, and participating HCFs ethics committees determined the study posed a minimum risk to participants and therefore was exempt from IRB review. CDC's Human Subject Office determined this study to be program evaluation/nonresearch (45 CFR 46.102(l)). Informed consent was required for participants, and they were not remunerated for taking the survey.

Survey development

The study team developed a questionnaire using the Qualtrics survey system (Qualtrics). The questionnaire included 11 questions that assessed HCWs' perceptions toward IPC. Physicians and nurses who self-identified as members of the core IPC team (referred to in the manuscript as "IPC personnel") were asked 5 additional questions about IPC program activities. The survey was developed in English, translated to Spanish by a certified translator, and verified by 2 bilingual native Spanish-speaking investigators (VF, REQ) to ensure the translation maintained the original meaning. A hospital epidemiologist from Latin America reviewed the questions to ensure they were relevant and clear.

Table 1
Characteristics of survey participants

	Overall N = 1,340 (%)	Physician N = 379 (%)	Nurse N = 657 (%)	EVC staff N = 102 (%)	Other* N = 202 (%)
Country					
• Argentina	733 (55)	223 (58.8)	341 (51.9)	38 (37.25)	131 (64.85)
• Ecuador	486 (36)	116 (30.6)	272 (41.4)	53 (51.9)	45 (22.3)
• Guatemala	64 (5)	26 (6.9)	21 (3.2)	6 (5.9)	11 (5.45)
• Panama	57 (4)	14 (3.7)	23 (3.5)	5 (4.9)	15 (7.4)
Years working at the HCF					
• 10 y	524 (39)	150 (39.6)	261 (39.7)	16 (15.7)	97 (48)
• 5–10 y	267 (20)	65 (17.15)	123 (18.7)	34 (33.3)	45 (22.3)
• < 5 y	549 (41)	164 (43.3)	273 (41.5)	52 (51)	60 (29.7)
Hours worked/wk					
• ≥ 40 h	748 (55.8)	219 (57.8)	343 (52.2)	76 (74.5)	110 (54.5)
• ≥ 20 < 40 h	493 (36.8)	127 (33.5)	268 (40.8)	16 (15.7)	82 (40.6)
• < 20 h	99 (7.4)	33 (8.7)	46 (7.0)	10 (9.8)	10 (4.95)
Type of HCF					
• For-profit	828 (61.8)	208 (54.9)	434 (66.1)	85 (83.3)	101 (50.0)
• Nonprofit	512 (38.2)	171 (45.1)	223 (33.9)	17 (16.7)	101 (50.0)

NOTE. The survey was conducted August to September 2022.

EVC, environmental cleaning; HCF, health care facility.

*Other includes microbiologists, pharmacists, and other health care roles such as physical, respiratory, speech therapists, technical radiologists, and so on.

Statistical analysis

Response options on a 5-point Likert scale were collapsed into 2 categories (eg, strongly agree/agree and neutral/disagree/strongly disagree).¹² Response options on a 3-point Likert scale were presented as such. Descriptive results were calculated overall based on the HCW role.

RESULTS

Participant characteristics

Overall, 1,340 HCWs from 30 HCFs completed the survey. The mean number of responses per HCF was 45, range 2 to 377 (half of participating HCFs met the minimum target of 30 responses per HCF). Most participants (87.6%) reported having direct patient contact. Respondents by role included 379 (28.3%) physicians, 657 (49.0%) nurses, 102 (7.6%) EVC staff, 37 pharmacists (2.8%), 18 microbiologists (1.3%), and 147 (11.0%) in “other” category (eg, respiratory/occupational/speech therapists, radiology or laboratory technicians). One-hundred and fifty-three participants (11.4%, 84 nurses, and 69 physicians) reported being members of the IPC team. Participant characteristics are summarized in [Table 1](#).

HCWs' perceptions about IPC

Among 1,187 HCWs (excluding those self-identified as members of the core IPC team), most (93.1%) indicated knowing who the members of their local IPC team were, and 73.3% rated their IPC program positively (excellent/very good).

Compliance with infection prevention bundles was perceived to be high (excellent/very good) by 89.0% of participants when rating self-compliance and 74.6% of participants when rating peer compliance. Compliance with hand hygiene was perceived to be high by 94.7% of participants when rating their own compliance and by 81.1% when rating their colleagues. Physicians had the largest difference in how they perceived compliance for themselves and their colleagues for either hand hygiene or IPC prevention bundles of all different HCW roles ([Table 2](#)).

Most participants (92.1%) reported they had the necessary resources to perform their work, 87.6% reported working as a team to implement quality improvement initiatives related to IPC, and 87.1% indicated they felt supported in implementing IPC practices. A lower

proportion of physicians reported working as a team to implement quality improvement initiatives than other roles (81.9% of physicians, 89.5% of nurses, and 97.0% for EVC staff) ([Table 2](#)).

IPC training upon hiring and thereafter was reported by 87.2% of EVC staff, 65.1% of nurses, and 44.8% of physicians. Receiving regular feedback of HAI rate data specific to their role (eg, central-line associated bloodstream infection rates for intensive care unit providers, *Clostridioides difficile* rates for EVC personnel) was reported by 76.5% of EVC staff, 60.0% of nurses, and 51.3% of physicians. Fewer physicians (60.6%) reported receiving regular feedback regarding hand hygiene compliance compared with nurses (79.9%) and EVC staff (93.1%).

Most (73.1%) participants perceived families to be involved in bedside patient care, such as caring for wounds and cleaning the patient's bed area and surroundings ([Table 2](#)).

IPC personnel perceptions of IPC activities

Among 153 respondents that self-identified as part of the core IPC team, most reported spending most of their time performing core IPC activities such as conducting HAI surveillance (96.7%), monitoring hand hygiene compliance (95.4%), implementing IPC initiatives (94.8%), reporting IPC data (hand hygiene compliance and HAI rates) to HCF leadership (88.9%), or assessing the quality of EVC (88.2%) ([Fig. 1](#)).

Regarding their involvement in occupational health services, most IPC team members were responsible for HCW immunization programs (93.5%), followed by needle-stick injury programs (85.0%), and less frequently HCW TB screening and management program (49.0%).

Half of IPC team members stated possible causes contributing to HAIs were reviewed for every new HAI (54.4%). Most reported using IPC data to develop and implement IPC action plans and improvement initiatives on a regular basis (81.0%) and reporting IPC data to national authorities on a regular basis (69.9%).

IPC team members perceived a broad range of elements were needed to strengthen IPC programs at their HCFs ([Table 3](#)).

DISCUSSION

We conducted an electronic multicountry multicenter survey among 1,340 Latin American HCWs to identify potential areas for intervention to strengthen IPC in HCFs in the region. We found that

Table 2
Health care workers perceptions toward infection prevention and control (IPC) practices and activities (excludes those self-identified as IPC team members)

Statement	Overall N = 1,187	Nurse N = 573 (48.3%)	Physician N = 310 (26.1%)	EVC staff N = 102 (8.6%)	Other* N = 202 (17.0%)
Rated self-compliance with IPC bundles as excellent/very good	1,056 (89.0)	512 (89.3)	268 (86.4)	97 (95.1)	179 (88.6)
Rated peer compliance with IPC bundles as excellent/very good	885 (74.6)	445 (77.7)	200 (64.5.2)	90 (88.2)	150 (74.3)
Rated self-compliance with hand hygiene as excellent/very good	1,124 (94.7)	545 (95.1)	290 (93.5)	100 (98.0)	189 (93.6)
Rated peer compliance with hand hygiene as excellent/very good	963 (81.1)	485 (84.6)	220 (71.0)	96 (94.1)	162 (80.2)
Strongly agreed/agreed that it is easy to implement isolation precautions in their hospital	1,149 (96.8)	562 (98.1)	296 (95.5)	101 (99)	190 (94.0)
Strongly agreed/agreed that they had the necessary resources to perform their work	1,093 (92.1)	539 (94.1)	272 (87.7)	100 (98.0)	182 (90.1)
Strongly agreed/agreed that they work as a team to implement quality improvement initiatives	1,040 (87.6)	513 (89.5)	254 (81.9)	99 (97.0)	174 (86.1)
Strongly agreed/agreed that they have the support to implement/practice infection prevention measures	1,034 (87.1)	514 (89.7)	260 (83.9)	96 (94.1)	164 (81.2)
Strongly agreed/agreed that HCF leadership supports IPC activities	1,047 (88.2)	518 (90.4)	259 (83.5)	99 (97.1)	171 (84.65)
Strongly agreed/agreed that work climate is good at their hospital	998 (84.1)	487 (85.0)	251 (81.0)	99 (97.1)	161 (79.7)
Strongly agreed/agreed that they feel comfortable giving their opinions to colleagues with the same role	1,000 (84.2)	476 (83.1)	261 (84.2)	94 (92.2)	169 (83.7)
Strongly agreed/agreed that they feel comfortable giving their opinions to colleagues with a different role	965 (81.3)	461 (80.4)	256 (82.6)	95 (93.1)	202 (99.0)
Strongly agreed/agreed that they feel comfortable giving their opinions to their supervisors	972 (81.9)	464 (89.0)	251 (81.0)	96 (94.1)	161 (79.7)
Received IPC training specific to role					
● Induction and thereafter	691 (58.2)	365 (65.1)	139 (44.8)	89 (87.2)	98 (48.5)
● Occasionally	392 (33.0)	173 (30.2)	136 (43.9)	12 (11.8)	71 (35.15)
● Have not received IPC training	104 (8.8)	35 (6.1)	35 (11.3)	1 (1.0)	33 (16.3)
Received HAI rates reports					
● Regularly	675 (56.9)	344 (60.0)	159 (51.3)	78 (76.5)	94 (46.5)
● Only if there was an increase in HAIs	230 (19.4)	120 (20.9)	78 (25.2)	10 (9.8)	33 (16.3)
● Only if there was a decrease in HAIs	35 (2.9)	19 (3.3)	6 (1.9)	5 (4.9)	5 (2.5)
● Have not received these data	247 (20.8)	90 (15.7)	67 (21.6)	9 (8.8)	70 (34.65)
Received regular feedback regarding hand hygiene compliance for their hospital	877 (73.9)	458 (79.9)	188 (60.6)	95 (93.1)	136 (67.3)
Strongly agreed/agreed that patient families participate in bedside patient care	868 (73.1)	435 (75.9)	212 (68.4)	77 (75.5)	144 (71.3)
Strongly agreed/agreed that patient and families are educated on how to prevent health care-associated infections	966 (81.4)	490 (85.5)	233 (75.72)	86 (84.3)	157 (77.7)

NOTE: The survey was conducted August to September 2022.

EVC, environmental cleaning; HAIs, health care-associated infections; HCF, health care facility.

* Other includes microbiologists, pharmacists, and other health care roles such as physical, respiratory, speech therapists, technical radiologists, and so on.

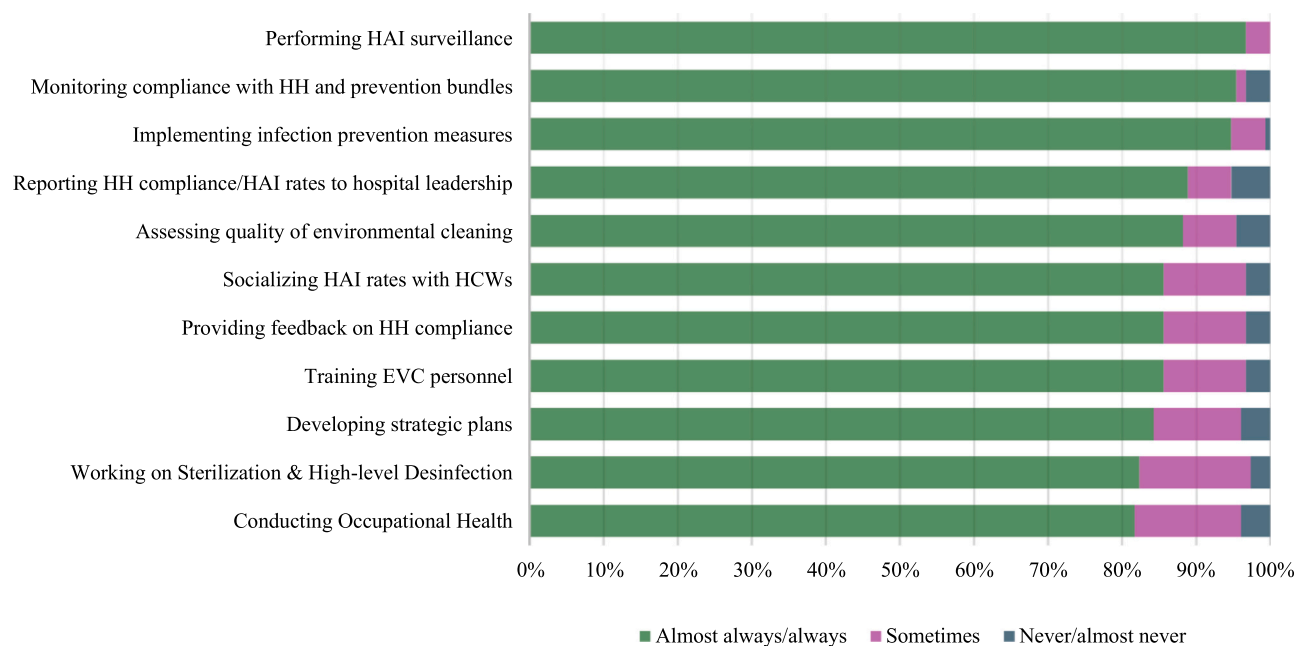


Fig. 1. Infection Prevention and Control (IPC) activities performed reported by IPC team members (n = 153). The questions was “How often does your IPC program work on the following areas”? EVC, environmental cleaning; HAIs, health care-associated infections; HCW, health care worker; HH, hand hygiene.

HCWs perceived their compliance with IPC prevention measures (hand hygiene and prevention bundles) higher than their peers. Education and sharing of IPC data, such as hand hygiene compliance or HAI rates, could be improved.

Training and education in IPC are critical to ensure the safety of both patients and HCWs.^{13,14} In our study, 40% of participants reported not receiving or occasionally receiving training in IPC specific to their role, with physicians being more likely to report not receiving IPC training than other HCW roles. Our survey did not assess the reasons for limited HCW education on IPC; however, it is likely multifactorial. Lack of leadership support for educational activities (eg, lack of funds to develop in-house activities, sponsor or allow attendance to conferences) were barriers to improving access to education and training in antimicrobial stewardship in Latin America and likely contributing factors for limited education and training opportunities in IPC.⁴ Studies have also shown variability in IPC nurses’ roles and approaches related

to interacting with physicians and HCF leaders based on the country and/or region’s organizational and societal culture.^{15,16} One study reported that the focus of IPC education depended on HCW role with nurses receiving competency-based training and physicians receiving IPC theory and microbiology.¹⁷ These studies highlight the need to develop or provide access to already existing effective educational material to all relevant HCWs providing care to patients.

Teamwork is critical to reducing HAIs. In our study, physicians had lower ratings related to working as a team to implement IPC quality improvement initiatives than other roles, suggesting they may be less integrated into IPC activities. A previous multicenter study evaluating safety culture in Latin American HCFs showed nurses were more likely to report better teamwork than physicians.¹⁸ Inadequate staffing and excessive workload are commonly reported for Latin American HCFs and may be negatively impacting efforts at promoting stronger multidisciplinary work.^{6,7,19} Further

Table 3
Infection Prevention and Control (IPC) team members’ perceptions regarding elements needed to strengthen IPC program in their health care facilities (n = 153)

Elements needed to improve IPC programs at the HCF	Strongly agree/agree N (%)	Neutral N (%)	Strongly disagree/disagree N (%)
Having electronic systems that facilitate rapid identification of possible cases for surveillance	134 (87.6)	16 (10.5)	3 (1.96)
Increasing IPC staffing	144 (94.1)	8 (5.2)	1 (0.65)
Increasing/dedicating a budget for IPC	148 (96.7)	4 (2.6)	1 (0.65)
Increasing HCW training in IPC	152 (99.35)	1 (0.65)	-
Increasing training in implementation of prevention measures	152 (99.35)	-	1 (0.65)
Providing more information on the level of adherence to hand hygiene at the individual or by unit/service level	153 (100)	-	-
Providing more information on the level of adherence to prevention bundles at the individual or unit/service level	152 (99.35)	-	1 (0.65)
Communicating the importance of IPC by HCF leadership	152 (99.35)	1 (0.65)	-
Improving integration/collaboration with other departments or committees (eg, patient safety, microbiology, ASP)	152 (99.35)	1 (0.65)	-
Developing specific annual goals for IPC	152 (99.35)	1 (0.65)	-
Strengthening detection of multidrug-resistant organisms	152 (99.35)	1 (0.65)	-

ASP, antimicrobial stewardship program; HCF, health care facility; HCW, health care worker.

studies are needed to understand how to better engage physicians in IPC quality improvement initiatives. Our study revealed there are opportunities to improve socialization of IPC data (hand hygiene compliance, HAI rates, etc) across HCWs roles. Although most IPC personnel stated they usually provide feedback to units about hand hygiene compliance, up to 40% of HCWs did not receive these data. Furthermore, HCWs' perception of compliance with hand hygiene or prevention bundles was higher when thinking about themselves than their peers, which emphasizes the need to increase HCWs awareness of true compliance rates.

Most respondents in our study perceived families were involved in the care of patients (eg, through cleaning of patient surroundings). Further research is needed to better understand the role of family members in the transmission of pathogens and infections in health care settings and approaches to promote family members to be IPC advocates.

There are several limitations to this study, including the lack of a response rate due to the distribution method of the survey (links to the survey were shared with IPC contacts at each HCF, who then shared the link with other groups). HCWs may have given socially desirable answers which may result in overestimation of findings (eg, most HCWs perceived hand hygiene compliance to be very high). We used a convenience sample of HCFs recruited from a regional research network, which may have biased the selection of HCFs with stronger IPC programs. Furthermore, we only included 4 out of the 31 countries in Latin America; hence, the results may not be generalizable to the whole region. Despite these limitations, many of our observations are consistent with other reports, including misperceptions around self- versus peer-compliance with hand hygiene and opportunities to improve education and training in IPC as well as dissemination of IPC data among HCWs.^{6,7,19,20}

CONCLUSIONS

Our study indicates that there are several opportunities to strengthen IPC in Latin American HCFs, including improving HCW engagement in IPC through education and training and awareness of HAI rates and compliance with prevention measures, and promoting a culture of safety and teamwork. HCF leadership support is critical to address these opportunities.

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