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Short Communication

Perceived challenges of COVID-19 infection prevention and control preparedness: A multinational survey

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1. Introduction

Implementation of effective infection prevention and control (IPC) measures is needed to support global capacity building to limit the transmission of coronavirus disease 2019 (COVID-19) and mitigate its impact on health systems. The COVID-19 pandemic has shown a high incidence of transmissibility of health care-associated infections and outbreaks affecting healthcare workers (HCWs) who are at the forefront of these crises, illustrating the importance of being prepared [1].

2. Methods

We assessed the perceptions of infection preventionists on the current global IPC preparedness measures for COVID-19. Between 26 February 2020, and 20 March 2020, we conducted a cross-sectional self-administered web-based survey study to gain a rapid insight into the preparedness of healthcare facilities and investigate current global practices and perceptions among IPC professionals concerning the prevention and control of COVID-19. All IPC professionals working in healthcare facilities preparing for the detection, investigation and management of confirmed and

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Table 1
Geographical comparison of healthcare facilities and IPC preparedness for patients with COVID-19, results from a survey of representatives from 339 responses in 63 countries worldwide, February–March 2020.

	No. (%) of respondents	Comparison between regions						
	n (%)	Africa *n* (%)	Americas *n* (%)	East Mediterranean *n* (%)	Europe *n* (%)	Southeast Asia *n* (%)	Western Pacific *n* (%)	*P*-value
COVID-19 guidelines								
National guidelines	226 (66.67)	53 (46.9)	22 (66.67)	13 (86.67)	65 (70.65)	60 (83.33)	13 (92.86)	<0.001
Local guidelines	182 (53.69)	40 (35.4)	21 (63.64)	8 (53.33)	42 (45.65)	62 (86.11)	9 (64.29)	<0.001
Guidelines recommend the use of PPE								
Guidelines address PPE	214 (63.13)	60 (53.1)	20 (60.61)	9 (60)	51 (55.43)	63 (87.5)	11 (78.57)	<0.001
Facemask	272 (80.24)	87 (76.99)	25 (75.76)	11 (73.33)	70 (76.09)	65 (90.28)	14 (100)	0.06
Gown	251 (74.04)	81 (71.68)	22 (66.67)	9 (60)	65 (70.65)	60 (83.33)	14 (100)	0.04
Cap	182 (64.31)	66 (68.75)	8 (29.63)	5 (50)	42 (60)	57 (86.36)	4 (28.57)	<0.001
Eye protection	245 (72.27)	75 (66.37)	22 (66.67)	10 (66.67)	65 (70.65)	60 (83.33)	13 (92.86)	0.07
Gloves	266 (97.08)	90 (96.77)	26 (96.3)	10 (100)	65 (95.59)	62 (98.41)	13 (100)	0.004
Preparedness effort								
Hand hygiene	259 (96.28)	86 (93.48)	24 (92.31)	10 (100)	63 (98.44)	65 (98.48)	11 (100)	0.34
Training HCWs	235 (86.72)	67 (72.83)	24 (85.71)	10 (100)	59 (92.19)	64 (96.97)	11 (100)	<0.001
PPE in community	144 (53.33)	51 (55.43)	8 (29.63)	1 (10)	27 (42.19)	51 (77.27)	6 (54.55)	<0.001
PPE in the outpatient setting	243 (91.35)	80 (86.96)	21 (84)	10 (100)	56 (90.32)	65 (98.48)	11 (100)	0.07
Environmental decontamination								
Use of hypochlorite	199 (73.7)	74 (80.43)	13 (48.15)	5 (50)	40 (62.5)	61 (92.42)	6 (54.55)	<0.001
Automated disinfection system	100 (37.04)	12 (13.04)	6 (22.22)	4 (40)	25 (39.06)	52 (78.79)	1 (9.09)	<0.001

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

Table 2
Protective equipment (PPE) included in national or local COVID-19 guidelines.

	No. (%) of respondents	Comparison between regions						
	n (%)	Africa *n* (%)	Americas *n* (%)	East Mediterranean *n* (%)	Europe *n* (%)	Southeast Asia *n* (%)	Western Pacific *n* (%)	*P*-value
Face mask	*n* = 267							
FFP1	6 (2.25)	2 (2.35)	0 (0)	0 (0)	3 (4.41)	1 (1.54)	0 (0)	0.16
N95/FFP2	120 (44.94)	36 (42.35)	13 (52)	7 (70)	38 (55.88)	20 (30.77)	6 (42.86)	<0.001
Respirators	21 (7.87)	8 (9.41)	1 (4)	0 (0)	12 (17.65)	0 (0)	0 (0)	<0.001
Surgical mask and N95/FFP2	39 (14.61)	1 (1.18)	1 (4)	0 (0)	2 (2.94)	33 (50.77)	2 (14.29)	<0.001
Surgical mask	77 (28.84)	36 (42.35)	10 (40)	3 (30)	11 (16.18)	11 (16.92)	6 (42.86)	<0.001
Other	4 (1.5)	2 (2.35)	0 (0)	0 (0)	2 (2.94)	0 (0)	0 (0)	<0.001
Gown type	*n* = 242							
Short-sleeved plastic	27 (11.16)	4 (5.41)	2 (9.09)	0 (0)	1 (1.59)	20 (33.33)	0 (0)	<0.001
Long-sleeved water repellent	170 (70.25)	52 (70.27)	20 (90.91)	8 (88.89)	55 (87.3)	23 (38.33)	12 (85.71)	<0.001
Coverall	29 (11.98)	18 (24.32)	0 (0)	1 (11.11)	7 (11.11)	1 (1.67)	2 (14.29)	<0.001
Long-sleeved water resistant and short-sleeved plastic	16 (6.61)	0 (0)	0 (0)	0 (0)	0 (0)	16 (26.67)	0 (0)	<0.001
Cap type	*n* = 181							
Cap covering the head and neck	79 (43.65)	44 (67.69)	4 (50)	2 (40)	19 (45.24)	6 (10.53)	4 (100)	<0.001
Cap covering the head only	102 (56.35)	21 (32.31)	4 (50)	3 (60)	23 (54.76)	51 (89.47)	0 (0)	<0.001
Eye protection	*n* = 241							
'Ski' googles	68 (28.22)	17 (23.29)	5 (22.73)	1 (10)	15 (23.44)	29 (48.33)	1 (8.33)	<0.001
Face shield	135 (56.02)	47 (64.38)	8 (36.36)	8 (80)	37 (57.81)	28 (46.67)	7 (58.33)	<0.001
Other	38 (15.77)	9 (12.33)	9 (40.91)	1 (10)	12 (18.75)	3 (5)	4 (33.33)	<0.001
Gloves	*n* = 274							
No gloves	8 (2.92)	3 (3.23)	1 (3.7)	0 (0)	3 (4.41)	1 (1.59)	0 (0)	0.22
Double gloving	48 (17.52)	28 (30.11)	1 (3.7)	1 (10)	14 (20.59)	2 (3.17)	2 (15.38)	<0.001
Single pair disposable	218 (79.56)	62 (66.67)	25 (92.59)	9 (90)	51 (75)	60 (95.24)	11 (84.62)	<0.001
Shoe cover	*n* = 275							
Shoe and lower leg cover	50 (18.18)	30 (32.26)	0 (0)	0 (0)	11 (16.18)	5 (7.81)	4 (30.77)	<0.001
Shoe cover	99 (36)	30 (32.26)	6 (22.22)	2 (20)	16 (23.53)	45 (70.31)	0 (0)	<0.001
No shoe cover	126 (45.82)	33 (35.49)	21 (77.77)	8 (80)	41 (60.29)	14 (21.87)	9 (69.23)	<0.001

COVID-19, coronavirus disease 2019; PAPR, powered air-purifying respirators.

suspected COVID-19 patients were invited to participate. Descriptive statistics were used to analyse the survey data. Differences between regions and income groups were tested using Pearson's χ^2 test for categorical variables.

3. Results and discussion

A total of 349 responses were received; 10 were excluded as no demographic information was provided. The 339 eligible responses were from 63 countries across six regions: Africa, 113 (33.3%); Europe, 92 (27.1%); Southeast Asia, 72 (21.2%); the Americas, 33 (9.7%); Eastern Mediterranean, 15 (4.4%); Western Pacific, 14 (4.1%). Based on the 2020 World Bank list of gross national income per capita, they represented 113 (33.3%) responses from high-income countries (HICs), 99 from upper-middle-income countries (UMICs) (29.2%), 71 from lower-middle-income countries (LMICs) (20.9%) and 56 from low-income countries (LICs) (16.5%) (https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups). Response rate by profession included 190 IPC physicians (56.0%);

113 IPC nurses (33.3%) and 36 other professionals, including pharmacists and public health specialists. Healthcare facilities represented in the survey were mostly tertiary care centres (46%). Of all participants, 66.6% were aware of the existence of national guidelines to prevent COVID-19 (Table 1). A shortage of personal protective equipment (PPE) supplies was reported by 48% (ranging from 64.2% in LICs to 27.4% in HICs). When asked about the availability of PPE supplies, 163 of 339 [48%; 95% confidence interval (CI), 42.7–53.4] respondents reported a shortage of supplies [64.2% (36/56; 95% CI, 51.7–76.8) in LICs compared with 27.4% (31/113; 95% CI, 19.2–35.6) in HICs]. A total of 41.5% of respondents considered that the media had an impact on guideline development and 63.6% believed that guidelines were based on maximum security rather than on evidence-based recommendations; thus, uncertainties regarding the transmission modes of COVID-19 continue to generate controversy [2,3].

The belief that opinions expressed by the media influenced the choices made for national/local guidelines or the preparedness plans for COVID-19 was confirmed by 41.5% (105/252; 95% CI, 35.4–47.5) of respondents. More than half of them (161/253; 63.6%; 95% CI, 57.7–69.5) also believed that national/local guidelines were based predominantly on maximum security, rather than on evidence-based recommendations. HICs were more likely than LICs to report sufficient preparedness (51/71; 71.8%; 95% CI, 61.3–82.2 vs. 14/45; 31%; 95% CI, 17.5–44.6; $P < 0.01$).

Participants reported that national or local COVID-19 guidelines recommended mainly the use of N95/FFP2 masks (120/267; 44.9%), followed by surgical masks (77/267; 28.8%) or a combination of the two in specific situations, respectively (39/267; 14.6%), and powered air-purifying respirators (PAPR) (21/267; 7.9%) (Table 2). A total of 74.3% (188/253; 95% CI, 68.9–79.6) believed that the use and heightened focus on wearing facemasks creates a misplaced feeling of safety, possibly reducing attention on other IPC measures, such as hand hygiene.

At the height of the outbreak, uncertainties about transmission led many institutions to impose airborne precautions while considerable variation was observed amongst international guidelines. The main transmission modes of COVID-19 virus occur via respiratory droplets and contact [4,5]. More uniformity is needed at the international level on PPE recommended for care of suspected or confirmed COVID-19 patients, based on available evidence and the most effective IPC strategies. The PPE doffing process is critical to keep HCWs safe, and further research on the science of human factors and HCW behaviour with respiratory protection safety is needed.

4. Conclusions

The COVID-19 global pandemic has shown the importance of building more resilient healthcare systems with effective IPC as key to avoid or mitigate outbreak impact. Health organizations should jointly evaluate the available evidence and develop a uniform policy on the appropriate PPE to be used. Strengthening of coordinated international efforts is urgent to address the challenges related to the major PPE shortage in healthcare facilities, particularly the lack of resources in low-income settings, and to improve reliable communication through the media. National health authorities should ramp up the implementation of IPC measures and focus on long-term preparedness and readiness for future pandemics, which likely requires government funds rather than reliance on healthcare institutions.

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Competing interests

None to declare.

Ethical approval

This study was exempted by the Radboud University Medical Center (The Netherlands) as it did not fall within the remit of the Medical Research Involving Human Subjects Act (NL2020-6262).

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