

Study Title: Knowledge, attitude and practice regarding personal protective equipment among health care workers for the prevention of COVID-19

Supporting Information

Supplement Legends

Supplement 1

Questionnaire comprising the following sections- Sociodemographic information, work-related factors, knowledge, attitude, and practice

Supplement 2

Table S1. Content validity statistics of KAP questionnaire

Pearson's correlation test was done between individual question scores and total score of the corresponding section to determine each question's validity. P-value <0.05 was considered significant. A significant p-value implies that the instrument is valid.

Table S2. Reliability statistics of KAP questionnaire

Reliability statistic for the KAP questionnaire was conducted using Cronbach's Alpha. A score of ≥ 0.60 indicates acceptable reliability of the question set. However, a Cronbach's Alpha score is sensitive to the query range. Hence a dichotomous response variable with a skewed response might give a low alpha value. This was found in the 'knowledge' part of our questionnaire, where the response categories were- yes and no.

Supplement 3

Figure S1. Distribution of participants based on whether they read the WHO, CDC, or national guidelines on PPE use.

Table S3. Questions on knowledge of PPE with response

A set of ten questions was used to assess the knowledge of participants regarding PPE. There were two response categories- 'Yes' or 'No'. The table contains individual questions with their response proportions.

Table S4. Questions on attitude towards PPE with response

A set of eight questions was used to assess the attitude of participants regarding PPE. There were five response categories- 'strongly disagree', 'disagree', 'neutral', 'agree', and 'strongly agree'. The table contains individual questions with their response proportions.

Table S5. Questions on practice towards PPE with response

A set of fifteen questions was used to assess the practice of participants regarding PPE. There were two response categories- 'Yes' or 'No'. The table contains individual questions with their response proportions.

Supplement 4

STROBE statement-checklist of items that should be included in reports of observational studies.

Supplement 5

The data of this research is freely available as a supplementary excel file.

Supplement 1.

Questionnaire

Socio-demographic Information:

1. Age:
2. Sex:
 - 2.1. Male
 - 2.2. Female
3. Marital status:
 - 3.1. Married
 - 3.2. Unmarried
 - 3.3. Divorced
 - 3.4. Widowed
 - 3.5. Separated
4. Occupation:
 - 4.1. Physician (Specialist, Medical Officer, Intern Doctor)
 - 4.2. Nurse
 - 4.3. Pharmacist
 - 4.4. Laboratory technician
5. Year of experience:
6. Highest level of education:
 - 6.1. Bachelors
 - 6.2. Masters
 - 6.3. Diploma
 - 6.4. Fellow
 - 6.5. PhD
 - 6.6. Others (specify): _____
7. Household members:

Work related factors

1. Work place
 - 1.1. Indoor
 - 1.2. Outdoor
 - 1.3. Emergency

- 1.4. ICU
 - 1.5. Pharmacy
 - 1.6. Laboratory
 - 1.7. Others (specify)
2. Type of establishment you are working in
- 2.1. Government
 - 2.2. Private
3. Duty hour per week
- 3.1. 48 hours
 - 3.2. 24 hours
 - 3.3. Others (specify)
4. Place of living during duty
- 4.1. Home
 - 4.2. Hostel
 - 4.3. Hotel
 - 4.4. Others (specify)
5. Transportation to and from work place
- 5.1. By walk
 - 5.2. By office transport
 - 5.3. Private vehicle
 - 5.4. Public transport

Knowledge

1. Are you aware about the risks of COVID-19 pandemic for the patients and healthcare workers?
 - 1.1. Yes
 - 1.2. No
2. Do you understand how to protect yourself and your patients during COVID-19 pandemic?
 - 2.1. Yes
 - 2.2. No
3. Do you think all the following components are the parts of personal protective equipment (PPE): Surgical mask, N95 or equivalent mask, Gown, Apron, Gloves, Goggles, Face shield?
 - 3.1. Yes
 - 3.2. No
4. Do you think hand hygiene is necessary along with PPE for protection from COVID-19?
 - 4.1. Yes

4.2. No

5. Do you know how to put on (donning) and put off (doffing) PPE correctly?

5.1. Yes

5.2. No

6. Do you think all the components of PPE (Surgical mask, N95 or equivalent mask, Gown, Apron, Gloves, Goggles, Face shield) are necessary to wear while providing direct care to COVID-19 patients?

6.1. Yes

6.2. No

7. Is N95 or equivalent mask mandatory with other protective equipment during aerosol-generating procedures (e.g., artificial ventilation, giving high flow oxygen through a face mask or nasal prong) on COVID-19 patients?

7.1. Yes

7.2. No

8. Do you think all the components of PPE except N95 mask are required while treating the patients with respiratory symptoms at the hospital outdoor?

8.1. Yes

8.2. No

9. Do you think the surgical mask is sufficient as a protective measure for the family members during providing care to COVID-19 patients in the person's own home?

9.1. Yes

9.2. No

10. Do you think general people should wear a surgical mask or a cotton mask and maintain hygiene practice to get protection from getting COVID-19 infection?

10.1. Yes

10.2. No

Attitude

1. N95 or equivalent mask is mandatory for all the frontline healthcare workers

1.1. Strongly disagree

1.2. Disagree

1.3. Neutral

1.4. Agree

1.5. Strongly agree

2. PPE must be used in combination with other precautionary measures such as hand hygiene.

2.1. Strongly disagree

2.2. Disagree

2.3. Neutral

2.4. Agree

2.5. Strongly agree

3. General population can prevent being infected by taking proper precautionary measures instead of wearing PPE.

3.1. Strongly disagree

3.2. Disagree

3.3. Neutral

3.4. Agree

3.5. Strongly agree

4. Using PPE will keep healthcare workers safe from getting COVID-19 .

4.1. Strongly disagree

4.2. Disagree

4.3. Neutral

4.4. Agree

4.5. Strongly agree

5. It is convenient to use PPE when taking care of patients with COVID-19.

5.1. Strongly disagree

5.2. Disagree

5.3. Neutral

5.4. Agree

5.5. Strongly agree

6. You are willing to treat and/or care for COVID-19 affected patients if you get proper PPE.

6.1. Strongly disagree

6.2. Disagree

6.3. Neutral

6.4. Agree

6.5. Strongly agree

7. You feel protected from COVID-19 wearing your PPE.

7.1. Strongly disagree

7.2. Disagree

7.3. Neutral

7.4. Agree

7.5. Strongly agree

8. You feel satisfied with your current PPE.

- 8.1. Strongly disagree
- 8.2. Disagree
- 8.3. Neutral
- 8.4. Agree
- 8.5. Strongly agree

Practice

- 1. Did you attend any training on the use of PPE?
 - 1.1. Yes
 - 1.2. No
- 2. Are you using PPE regularly during patient care?
 - 2.1. Yes
 - 2.2. No
- 3. Are you using reusable PPE?
 - 3.1. Yes
 - 3.2. No
- 4. Do you use surgical masks during patient care?
 - 4.1. Yes
 - 4.2. No
- 5. Do you use N95 or equivalent masks during patient care?
 - 5.1. Yes
 - 5.2. No
- 6. Do you do a fit test before using N95 or equivalent masks?
 - 6.1. Yes
 - 6.2. No
- 7. Do you use a gown/cover-all during patient care?
 - 7.1. Yes
 - 7.2. No
- 8. Do you use gloves during patient care?
 - 8.1. Yes
 - 8.2. No
- 9. Do you disinfect your gloves after each time you see a patient?
 - 9.1. Yes
 - 9.2. No

10. Do you use goggles and/or face-shield during patient care?
 - 10.1. Yes
 - 10.2. No
11. Do you use shoe-cover during patient care?
 - 11.1. Yes
 - 11.2. No
12. Do you practice proper donning/doffing methods?
 - 12.1. Yes
 - 12.2. No
13. Do you use a designated area/room for doffing of PPE?
 - 13.1. Yes
 - 13.2. No
14. Do you use biohazard bags during doffing?
 - 14.1. Yes
 - 14.2. No
15. Do you practice hand hygiene before wearing and after removing your PPE?
 - 15.1. Yes
 - 15.2. No

Additional questions

1. Have you ever read the WHO, CDC, or national guideline on the proper and rational use of PPE?
 - 1.1. Yes
 - 1.2. No
2. What other sources did you get information about PPE from?
 - 2.1. Senior and other colleagues
 - 2.2. Newspaper and magazine articles
 - 2.3. Poster and pamphlets
 - 2.4. Seminars and workshops
 - 2.5. Radio and televisions
 - 2.6. Social media
 - 2.7. Others
3. What are the barriers you feel while giving care to COVID-19 patients?
 - 3.1. Lack of proper knowledge about viral transmission among patients
 - 3.2. Patients and/or their attendance do not wear a mask
 - 3.3. Patients and/or their attendance do not maintain hand hygiene
 - 3.4. Lack of adequate infection control materials in the hospital
 - 3.5. Overcrowding of hospital

Supplement 2.

Table S1. Content validity statistics of KAP questionnaire

Individual questions*	Pearson's r	P value**
<i>Knowledge</i>		
K1	0.006	0.900
K2	0.199	<0.001
K3	0.109	0.030
K4	0.013	0.800
K5	0.458	<0.001
K6	0.289	<0.001
K7	0.236	<0.001
K8	0.616	<0.001
K9	0.567	<0.001
K10	0.366	<0.001
<i>Attitude</i>		
A1	0.251	<0.001
A2	0.380	<0.001
A3	0.340	<0.001
A4	0.746	<0.001
A5	0.578	<0.001
A6	0.508	<0.001
A7	0.739	<0.001
A8	0.609	<0.001
<i>Practice</i>		
P1	0.526	<0.001
P2	0.569	<0.001
P3	0.377	<0.001
P4	-0.021	0.672
P5	0.474	<0.001
P6	0.542	<0.001
P7	0.449	<0.001
P8	0.348	<0.001
P9	0.341	<0.001
P10	0.399	<0.001
P11	0.612	<0.001
P12	0.642	<0.001
P13	0.558	<0.001
P14	0.571	<0.001
P15	0.357	<0.001

*Pearson's correlation between individual question and total score of the corresponding section.

**P value <0.05 was considered significant. A significant p value implies that the instrument is valid.

Table S2. Reliability statistics of KAP questionnaire

Sections	Number of items	Cronbach's Alpha
Knowledge	10	0.181*
Attitude	8	0.643
Practice	15	0.735

*The low score was due to dichotomous response categories ("yes" and "no") and an average unique ("yes") response of >90%

Supplement 3.

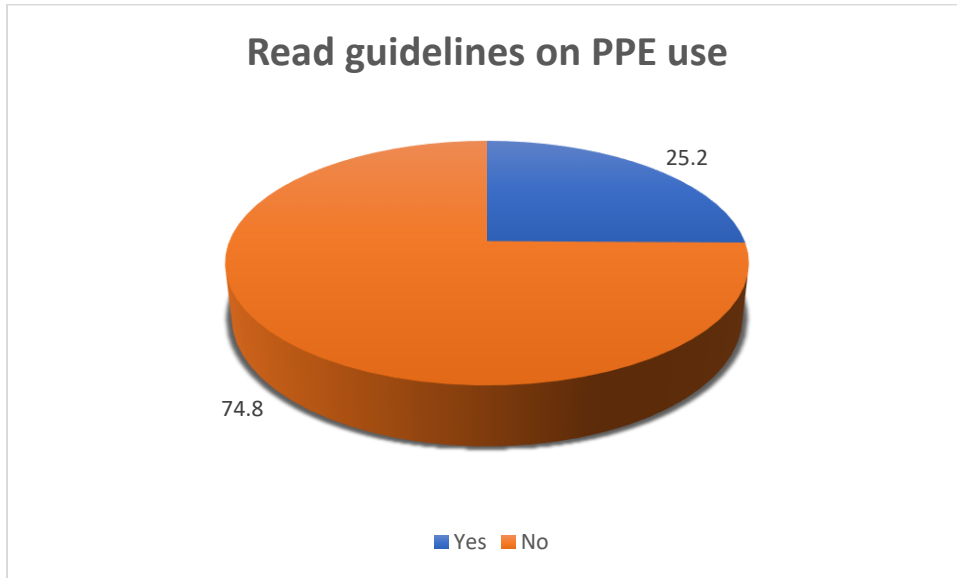


Figure S1. Distribution of participants based on whether they read the WHO, CDC, or national guidelines on PPE use.

Table S3. Questions on knowledge of PPE with response

Sl no	Question	Response	Frequency (percentage)
1.	Are you aware about the risks of COVID-19 pandemic for the patients and healthcare workers?	Yes	392 (99.7)
		No	1 (0.3)
2.	Do you understand how to protect yourself and your patients during COVID-19 pandemic?	Yes	387 (98.5)
		No	6 (1.5)
3.	Do you think all the following components are the parts of personal protective equipment (PPE): Surgical mask, N95 or equivalent mask, Gown or cover-all, Gloves, Goggles, Face shield?	Yes	383 (97.5)
		No	10 (2.5)
4.	Do you think hand hygiene is necessary along with PPE for the protection from COVID-19?	Yes	389 (99.0)
		No	4 (1.0)
5.	Do you know how to put on (donning) and put off (doffing) PPE correctly?	Yes	336 (85.5)
		No	57 (14.5)
6.	Do you think all the components of PPE (Surgical mask, N95 or equivalent mask, Gown or cover-all, Gloves, Goggles, Face shield) are necessary to wear while providing direct care to the COVID-19 patients?	Yes	376 (95.7)
		No	17 (4.3)
7.	Is N95 or equivalent mask mandatory with other protective equipment during aerosol-generating procedures (e.g., artificial ventilation, giving high flow oxygen through a face mask or nasal prong) on COVID-19 patients?	Yes	379 (96.4)
		No	14 (3.6)
8.	Do you think all the components of PPE except N95 mask are required while treating the patients with respiratory symptoms at the hospital outdoor?	Yes	257 (65.4)
		No	136 (34.6)
9.	Do you think the surgical mask and hygiene practice are sufficient as a protective measure for the family members during providing care to COVID-19 patients in the person's own home?	Yes	306 (77.9)
		No	87 (22.1)
10.	Do you think general people should wear a surgical mask or a cotton mask and maintain hygiene practice to get protection from getting COVID-19 infection?	Yes	377 (95.9)
		No	16 (4.1)

Table S4. Questions on attitude towards PPE with response

Sl no	Question	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1.	N95 or equivalent mask is mandatory for all the frontline healthcare workers.	8 (2.0)	10 (2.5)	4 (1.0)	94 (23.9)	277 (70.5)
2.	PPE must be used in combination with other precautionary measures such as hand hygiene.	3 (0.8)	4 (1.0)	6 (1.5)	80 (20.4)	300 (76.3)
3.	General population can prevent being infected by taking proper precautionary measures instead of wearing PPE.	9 (2.3)	7 (1.8)	10 (2.5)	124 (31.6)	243 (61.8)
4.	Using PPE will keep healthcare workers safe from getting COVID-19.	19 (4.8)	33 (8.4)	60 (15.3)	146 (37.2)	135 (34.4)
5.	It is convenient to use PPE when taking care of patients with COVID-19.	9 (2.3)	43 (10.9)	51 (13.0)	141 (35.9)	149 (37.9)
6.	You are willing to treat and/or care for COVID-19 affected patients if you get proper PPE.	4 (1.0)	4 (1.0)	15 (3.8)	95 (24.2)	275 (70.0)
7.	You feel protected from COVID-19 by wearing your PPE.	25 (6.4)	53 (13.5)	107 (27.2)	130 (33.1)	78 (19.8)
8.	You are satisfied with your current PPE.	49 (12.5)	68 (17.3)	81 (20.6)	140 (35.6)	55 (14.0)

Table S5. Questions on practice towards PPE with response

Sl no	Question	Response	Frequency (percentage)
1.	Did you attend any training on the use of PPE?	Yes	164 (41.7)
		No	229 (58.3)
2.	Are you using PPE regularly during patient care?	Yes	95 (24.2)
		No	298 (75.8)
3.	Is your PPE disposable?	Yes	229 (58.3)
		No	164 (41.7)
4.	Do you use surgical masks during patient care?	Yes	345 (87.8)
		No	48 (12.2)
5.	Do you use N95 or equivalent masks during patient care?	Yes	279 (71.0)
		No	114 (29.0)
6.	Do you do a fit test before using N95 or equivalent masks?	Yes	147 (37.4)
		No	246 (62.6)
7.	Do you use a gown/cover-all during patient care?	Yes	310 (78.9)
		No	83 (21.2)
8.	Do you use gloves during patient care?	Yes	370 (94.1)
		No	23 (5.9)
9.	Do you disinfect or dispose your gloves after each time you see a patient?	Yes	330 (84.0)
		No	63 (16.0)
10.	Do you use goggles and/or face-shield during patient care?	Yes	337 (85.8)
		No	56 (14.2)
11.	Do you use shoe-cover during patient care?	Yes	243 (61.8)

		No	150 (38.2)
12.	Do you practice proper donning/doffing methods?	Yes	235 (59.8)
		No	158 (40.2)
13.	Do you use a designated area/room for doffing of the PPE?	Yes	272 (69.2)
		No	121 (30.8)
14.	Do you use bio-hazard bags during doffing?	Yes	147 (37.4)
		No	246 (62.6)
15.	Do you practice hand hygiene before wearing and after removing your PPE?	Yes	371 (94.4)
		No	22 (5.6)

Supplement 4.

STROBE Statement—checklist of items that should be included in reports of observational studies

	Item No	Recommendation	Where found in the manuscript
Title and abstract	1	(a) Indicate the study's design with a commonly used term in the title or the abstract	In the abstract, paragraph 2
		(b) Provide in the abstract an informative and balanced summary of what was done and what was found	In the abstract.
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	Introduction, paragraphs 1, 2.
Objectives	3	State specific objectives, including any prespecified hypotheses	Abstract, paragraph 1
			Introduction, paragraph 3.
Methods			
Study design	4	Present key elements of study design early in the paper	Methods, paragraph 1
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	Methods, paragraph 1
Participants	6	(a) <i>Cohort study</i> —Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up	Methods, paragraph 1
		<p><i>Case-control study</i>—Give the eligibility criteria, and the sources and methods of case ascertainment and control selection. Give the rationale for the choice of cases and controls</p> <p><i>Cross-sectional study</i>—Give the eligibility criteria, and the sources and methods of selection of participants</p>	
		(b) <i>Cohort study</i> —For matched studies, give matching criteria and number of exposed and unexposed	

Case-control study—For matched studies, give matching criteria and the number of controls per case

Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	Methods, paragraph 2,3
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	Methods, paragraph 2
Bias	9	Describe any efforts to address potential sources of bias	Discussion, paragraph 11
Study size	10	Explain how the study size was arrived at	Methods, paragraph 1
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	Statistical Analysis, paragraphs 1, 2.
Statistical methods	12	(a) Describe all statistical methods, including those used to control for confounding	Statistical analysis
		(b) Describe any methods used to examine subgroups and interactions	Statistical analysis
		(c) Explain how missing data were addressed	Statistical analysis
		(d) <i>Cohort study</i> —If applicable, explain how loss to follow-up was addressed	Methods, paragraph 2
		<i>Case-control study</i> —If applicable, explain how matching of cases and controls was addressed	
		<i>Cross-sectional study</i> —If applicable, describe analytical methods taking account of sampling strategy	
		(e) Describe any sensitivity analyses	

Continued on next page

Results

Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed (b) Give reasons for non-participation at each stage (c) Consider use of a flow diagram	
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders (b) Indicate number of participants with missing data for each variable of interest (c) <i>Cohort study</i> —Summarise follow-up time (eg, average and total amount)	Table 1
Outcome data	15*	<i>Cohort study</i> —Report numbers of outcome events or summary measures over time <i>Case-control study</i> —Report numbers in each exposure category, or summary measures of exposure <i>Cross-sectional study</i> —Report numbers of outcome events or summary measures	Table 1
Main results	16	(a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included (b) Report category boundaries when continuous variables were categorized (c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	Tables 1, 2, 3
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	
Discussion			
Key results	18	Summarise key results with reference to study objectives	Discussion, paragraphs 1, 2, 3, 4, 5, 6, 7
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or	Discussion, paragraph 11

imprecision. Discuss both direction and magnitude of any potential bias

Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	Discussion, paragraph 2,3,4,5,6,7,8,9
Generalisability	21	Discuss the generalisability (external validity) of the study results	Discussion, paragraph 11

Other information

Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	Disclosure section
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*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at <http://www.plosmedicine.org/>, Annals of Internal Medicine at <http://www.annals.org/>, and Epidemiology at <http://www.epidem.com/>). Information on the STROBE Initiative is available at www.strobe-statement.org.