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Health Care Workers Knowledge, Attitude, Practice and Risk Perception towards Covid-19 Disease, Prevention and Control in Taraba State, Nigeria: are There Gaps?

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Background: Coronavirus disease 2019 (*COVID-19*) is a communicable respiratory disease caused by a new strain of coronavirus that causes illness in humans. Knowledge, attitude, preventative practices, and risk perception regarding coronavirus- 2019 (COVID-19) are crucial in its prevention and control. This study sought to find out if there gaps in the knowledge, attitudes, preventative practices, and risk perception among health care workers in Taraba state.

Methods: An online-based cross-sectional study was conducted from April 15 to May 15, 2020, involving health care workers of Taraba state, recruited *via* social media. A semi-structured questionnaire was designed for the Google survey tool (Google Forms), and the generated link was shared on the different health care workers platforms *via* social media (WhatsApp). After consenting, participants completed an online survey assessing socio-demographic variables, KAP and risk perception towards COVID-19. Data analysis was conducted using Microsoft Excel and Epi Info version 3.5.3 to determine frequencies, proportions, and association factors.

Results: A total of 102 participants responded. Of the 102 survey respondents, 54(52.9%) were aged ≤ 40 years. The mean age of respondents was 41 years (Standard deviation ± 9 years). A majority were males, 75(73.4%) males. Almost all, 98(96.1%) had tertiary education while 78 (76.5%) were married. Eighty-one (79.4%) were Christians. By type of health care services, most of the respondents were Community Health Extension Officers, 68(66.7%) and living in central senatorial district areas, 37 (36.3). The survey revealed that, all the respondents have heard of Coronavirus or COVID-19. Most of the respondents, 100 (98%) of participants had good knowledge of COVID-19, gained mainly through the internet/social media, 38(37.8%) and Television 39 (38.2%). More than half, 64 (62.7%) had positive attitudes while 54 (52.9) % had more frequent practices regarding COVID-19 prevention. Majority, 99 (97.1%) of the participants agreed that they are at risk of COVID-19 disease. Eighty (80.4%) reported inadequate availability of Personal Protective Equipment (PPE) at their places of work, 33(67.6%) reported non-availability of running water and soap/hand sanitizers at their places of work, and 80 (78.4%) reported that their family members practice social distancing, hand wash with soap and water and use face masks in crowded places. In bivariate analyses, Sociodemographic factors such age in years, sex, educational level, marital status, and religion were found not have positive association with respondents having good knowledge on COVID-19, respondent having more positive attitudes and respondents having good preventive practices towards COVID-19 prevention at Odds ratio >1 and p value >0.005.

Conclusion: There are no gaps in the knowledge, attitude and practices among sampled health care workers in Taraba state as most respondent had good knowledge on COVID-19, more than half of the respondents had positive attitudes and good practices towards COVID-19 preventive measures. Most agreed that they were at risk to COVID-19 disease. Government should provide adequate personal protective clothing for health care workers and should implement policies that can enforce adherence of government Infection Prevention Control measures such practicing social distancing/self-isolation, improved personal hygiene and use of face mask respectively

Keywords: Knowledge; Attitudes; Practice; COVID-19; Taraba state

Introduction

The current Coronavirus Disease (COVID-19) outbreak is one of the largest respiratory disease outbreaks affecting several countries simultaneously and a novel strain of Coronavirus (SARS-CoV 2) has been identified as the causative agent [1-5].

Globally, the COVID-19 pandemic has become a major public health challenge with countries of the world including Nigeria,

adopting infection prevention and control (IPC) measures such as practicing social distancing/self-isolation, improved personal hygiene and use of face mask to urgently curtail the spread of the COVID-19 virus [6-8].

Nigeria has continued to experience an increase in the number of cases, which has spread across several states including Taraba State. Under the current circumstances, the Primary Health Care (PHC) remains the most likely port of call for community members who develop symptoms that could be suggestive of COVID-19. The Primary Health Care system remains the bedrock of the country's health system [9,10]. And the Health Workers (HWs) are its backbone for their contributions and roles they play towards successful routine immunization, maternal, newborn, child health and reproductive health services and other health care services [9,11,12].

In northern region of Nigeria, the public opinion even among health care workers was that COVID-19 is a "disease of the highly influential persons". Knowledge Attitude and Practice (KAP) is an important cognitive key in public health regarding health prevention and promotion. It involves a range of beliefs about the causes of the disease and exacerbating factors, identification of symptoms, and available methods of treatments and consequences [13-16]. Beliefs about COVID-19 come from different sources, such as stereotypes concerning similar viral diseases, governmental information, social media and internet, previous personal experiences, and medical sources [17-21]. The accuracy of these beliefs may determine different behaviors about prevention and could vary in the population. In many cases, the absence of knowledge, or if most of the medical-related beliefs are misconstrued or false, these may carry a potential risk especially among health care workers [9,22]. Assessment of health care workers knowledge, attitudes, and practices (KAP) towards COVID-19 becomes very imperative to understanding the epidemiological dynamics of the disease and the effectiveness, compliance and success of IPC measures adopted in a country [23,7].

The study assessed knowledge, attitudes, and preventative practices towards COVID-19 disease among Health Care Workers in Taraba state. Findings from this study will aid and inform strategic planning, development and implementation of behavior change programs/campaigns and provision of needed infection prevention and control (IPC) interventions towards COVID-19 or any other public health emergency issue.

Methods

Study area

The study was conducted in Taraba state. Taraba state is in the Northeast geopolitical zone of Nigeria. Taraba state has total population of 3,035,153 people (2006 census projection), mainly rural settlers. It occupies an estimated land mass of approximately 51,000 sq. Km. Terrain is mostly mountainous and hilly. There are many tributaries of river Benue, Taraba, and Donga. Consequently, majority of the wards and settlements are hard to reach. Because of its lush vegetations and abundant water, the main occupations are farming, cattle rearing, fishing, and petty trading. The state shares international boundaries with the Republic of Cameroon along 5 LGAs (namely; Gashaka, Kurmi, Sardauna, Takum and Ussa LGAs). It also shares inter-state boundaries with Gombe, Bauchi, Adamawa, Plateau and Nasarawa states as shown in figure 1. The state is divided into 16 LGA and 168 Wards. Children between 0-11 months of age constitute 124,927 of the population (RI target), while 624,891 of the population are children 0-59 months of age (OPV target). Pregnant women have been estimated to be about 156,159 populations. The state has a total of 8,875 settlements, 1,058 Health facilities. Out of the 1,058 health facilities, 547 offer RI services. There are 120 AFP focal sites.

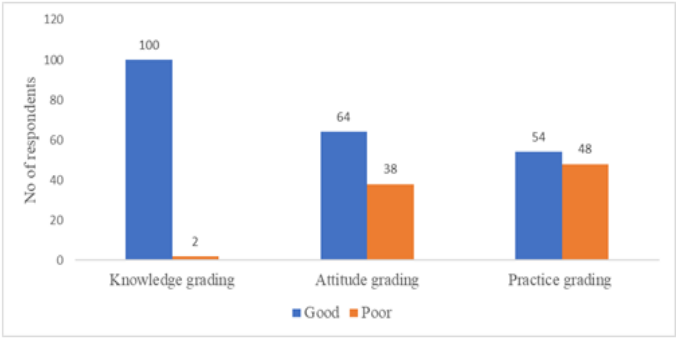

Figure 1: Grading of Health Care Workers' Knowledge, Attiude and Practice, Taraba State

Study population

The study population were health care workers with access to the internet. Health care workers who understood the English language and were 18 years old and above and could give informed consent were recruited for the study. Participation in this survey was anonymous, consensual, and voluntary with informed consent given by all respondents.

Study design and sampling technique

This study was designed as a cross-sectional survey using a convenient sampling technique.

Measures

The online self-reported questionnaire designed for this study contained questions assessing socio-demographics, knowledge, attitude, and practice (KAP) toward COVID-19 and risk perception toward COVID-19 infection among health care workers. The sociodemographic variables included age, sex, and marital status, level of education, religion, and senatorial districts.

The components of the knowledge section comprised 11 items and included the awareness of COVID-19 and the sources of information, cause and modes of transmission, symptoms, individuals at risk and preventive measures. Each item was assigned a score of 1 for respondents who answered correctly and 0 for respondents who answered incorrectly. Attitude section comprised 7 items including perception/beliefs towards the COVID-19 pandemic. The practice section included 7 items including practices towards COVID-19 preventive measures such

as social distancing, use of face mask, feelings, and other adaptive measures towards the pandemic. The risk perception section included 4 items including health care workers of their being at risk of being infected with COVID-19 and government response.

Data Collection methods

According to the guidelines recommended for the awareness and prevention of COVID-19 by the Nigeria Center for Disease Control and Prevention (NCDC) (1), a pre-tested semi-structured online questionnaire was designed using Google forms which was appended with a respondent's consent form. Through WhatsApp, the link of the questionnaire was sent to prospective respondents by the investigator. Respondents were encouraged to roll out the survey to their contacts and online platforms. Thus, the link was forwarded to other health care workers apart from the first point of contact and so on. The online survey was conducted during the period of the strict lockdown imposed by the Nigerian government aimed at mitigating against the spread SARS-CoV-2, hence a population-based survey was not feasible during the period of lock down.

Data analysis

Data were analyzed using Epi Info version 3.5.3 (US Centers for Disease Control and Prevention) and Microsoft Excel version 2007. Descriptive summary statistics such as median, minimum, and maximum range were computed for continuous variables and proportions for categorical variables.Bivariate analysis was conducted to assess the effects of socio-demographic on knowledge of COVID-19 and effects of knowledge of COVID-19 on attitude and prevention practices among health care worker at 95% con idence interval (CI). Only variables which showed a signi icant association in the bivariate analysis were included in multiple logistic regression models.

Results

Sample characteristics of the health care workers in Taraba State

A total of 102 health care workers were included in the analysis. The mean age of respondents was 41 years (Standard deviation ± 9 years).

A majority were males, 75(73.4%) males. Almost all, 98(96.1%) had tertiary education while 78 (76.5%) were married.

Eighty-one (79.4%) were Christians. By type of health care services, most of the respondents were Community Health Extension Officers, 68(66.7%) and living in central senatorial district areas, 37 (36.3) (Table 1).

Table 1: Sample characteristics of respondents in taraba state.

Characteristics	Frequency (n=102)	Percent
Age in years		
≤40	54	52.9
≥40	48	47.1
Mean age 41 years (SD ± 9 years)		
Sex		
Female	27	26.5
Male	75	73.5
Educational Level		
Secondary	4	3.9
Tertiary	98	96.1
Marital status		
Married	78	76.5
Not Married	24	23.5
Religion		
Christianity	81	79.4

Islam	21	20.6
Senatorial District		
Central	37	36.3
Northern	31	30.4
Southern	34	33.3
Type of Health Care Services		
Health Administrator	1	1
Community Health Extension Worker	68	66.7
Environmental Health Officers	8	7.8
Health Attendant	2	2
Logisticians	1	1
Medical Doctors	6	5.9
Medical Laboratory Technician	3	3
Nurse	4	3.9
Pharmacist	1	1
Psychologist	1	1
Public Health Officer	5	2
Veterinary Doctors	5	4.9

Knowledge of health care workers in Taraba state about COVID-19

All the respondents, 102 (100%) have heard of Coronavirus or COVID-19. Almost all, 100 (98%) of respondents had good knowledge of COVID-19, with most of the respondents 38 (37.8%) and 39 (38.2%) stating the internet/social media and Television (TV) as their major source of knowledge. Forty-five (44.1) reported direct contact as the major means *via* which COVID-19 can be spread while 92 (90.2%) agreed to the fact that the clinical signs of COVID-19 include fever, fatigue, dry cough, and myalgia. Seventy-three (71.6%) had the knowledge that COVID-19 can affect both humans and animals. Almost all, 101(99%) reported that there is an effective cure for COVID-19 disease, isolation and treatment of infected persons and avoidance of crowded places are effective ways to reduce the spread of COVID-19, while 98(96.1%) agreed to the fact that wearing of medical masks is a way of preventing COVID-19 infection.All, 102 (100) of the respondents agreed that people who have contact with someone infected with the COVID-19 should be isolated and observed for 14 days (Table 2).

Table 2: Knowledge of respondents on COVID-19 infection, Taraba State.

Variables	**Frequency (n=102)**	**Percent**
Have you heard of Coronavirus or COVID-19?		
Yes	102	100
Through which of the following means		
Church	3	2.9

Family members	1	1
Friends	1	1
Newspaper	1	1
Radio	10	9.8
Social Gathering	1	1
Social Media	38	37.3
Television	39	38.2
Workplace	8	7.8
COVID-19 can be spread by?		
Airborne	2	2
Animals	1	1
Direct Contact	45	44.2
Droplets by people	43	42.2
Indirect Contact	10	10
Clinical signs include fever, fatigue, dry cough, and myalgia		
Yes	92	90.2
No	10	9.8
Unlike the common cold, stuffy nose, runny nose, and sneezing are less common in persons infected with COVID-19 virus		
TRUE	85	83.3
FALSE	17	16.7
Are you aware that COVID-19 can affect both humans and animals?		
Yes	73	71.6
No	29	28.4
There is effective cure for COVID-19		
Yes	101	99
No	1	1
People who have contact with someone infected with the COVID-19 should be isolated and observed for 14 days		
Yes	102	100
Isolation and treatment of people who are infected with the COVID-19 virus are effective ways to reduce spread?		
Yes	101	99

No	1	1
To prevent the infection of COVID-19, one should avoid going to crowded places		
Yes	101	99
No	1	1
Wearing of medical masks is a way of preventing COVID-19 infection		
Yes	98	96.1
No	4	3.9

Attitudes/Belief of he alth care workers towards COVID-19 prevention in Taraba State

Only 6 (5.9%) did not believe that COVID-19 can be controlled by the Nigeria Government in Nigeria. Seventy-eight (76.5%) did not believe that people are immune to COVID-19 virus infection because of genetic make-up and climatic factors. Sixty-seven (65.7%) did not believe that COVID-19 was fashioned to reduce human population. Seventy-nine (77.5%) did not believe that COVID-19 is a curse from God. Almost all, 97(95.1%) did not believe that COVID-19 is a supers i ion. Seventy (68.6%) did not believe that prayer is the only remedy for COVID-9 preven ion. Sixty-four (62.7%) did not believe that ea ing of garlic and drinking plenty of water prevents COVID-19 diseases (Table 3).

Table 3: Attitudes/belief of respondents towards COVID-19 prevention, Taraba State.

Variables	Frequency (n=102)	Percent
Can COVID-19 be controlled in Nigeria		
Yes	96	23.5
No	6	76.5
Are people immuned to COVID-19 virus infection because of genetic makeup and climate		
Yes	24	23.5
No	78	76.5
COVID-19 virus was fashioned to reduce human population?		
Yes	35	34.3
No	67	65.7
COVID-19 is a curse from God?		
Yes	23	22.5
No	79	77.5
Is COVID-19 a superstition?		
Yes	5	4.9
No	97	95.1
Is prayer the only remedy for COVID-19 prevention and care		
Yes	32	31.4

No	70	68.6
Eating of garlic and drinking plenty of water prevents COVID-19 disease?		
Yes	38	37.3
No	64	62.7

Preventive practices towards COVID-19 prevention among health care workers in Taraba state

Of the 102 respondents, 99 (97.1%) reported that they wash their hands with soap and water or use hand sanitizer after handling patients. Ninety-five (93.1%) wash their hands with soap and water or use hand sanitizer after handling pet or any animal. Seventy-nine (77.5%) wear protective clothing when handling specimen. Forty-seven (46.1%) recently visited crowded places. Sixty-seven (65.7%) wear medical masks when leaving their homes. Less than half, 31 (30.4%) touch their eyes, mouths, and nose with unwashed hands. While coughing, fifty-three (52.0%) cover their mouth with elbow, 14(13.7%) cover their mouths with the palm of their hands, while 35 (34.3%) cover their mouths with tissue paper and dispose used tissues immediately (Table 4).

Table 4: Practices of respondents towards COVID-19 prevention, Taraba State.

Variables	Frequency (n=102)	Percent
Wash hands with soap and water or use hand sanitizer after handling patients		
Yes	99	97.1
No	3	6.9
Wash hands with soap and water or use hand sanitizer after handling pet or any animal		
Yes	95	93.1
No	7	6.9
Wear protective clothing when handling specimen		
Yes	79	77.5
No	23	23.5
Visited crowded places recently		
Yes	47	46.1
No	55	53.9
Wear medical masks when leaving their home		
Yes	67	65.7
No	35	34.3
Touch eyes, mouth and nose with unwashed hands		
Yes	31	30.4
No	71	69.6
How do you do when you cough?		
Cover mouth with bent elbow	53	52
Cover mouth with the palm of the hand	14	13.7
Cover mouth with tissue paper and dispose	35	34.3

Risk perception a bout COVID-19 infection among health care workers in Taraba state

Most of the respondents, 99 (97.1%) knew they are at risk of COVID-19 infection. Eighty-two reported adequate provision of PPE at their places of work. Sixty-seven (67.6%) reported availability of running water and soap/hand sanitizers at their places of work. Eighty (78.4%) reported that family members practice social distancing, hand wash with soap and water or hand sanitizers and use face masks (Table 5).

Table 5: Exposure factors for respondents to COVID-19 prevention, Taraba State

Variables	Frequency (n=102)	Percent
Is PPE adequate at your place of work		
Yes	20	19.6
No	82	80.4
Running water and soap/hand sanitizer available at place of work		
Yes	67.6	67.6
No	34.4	32.4
Family members practice social distancing, hand wash with soap and water or hand sanitizer, and use face masks		
Yes	80	78.4
No	22	21.6
As a HCW are you at risk of COVID-19 infection?		
Yes	99	97.1
No	3	2.9

Level of Knowledge, attitude, and preventive practices among health care workers in Taraba state. Most of the respondents, 100 (98%) were graded as having good and accurate knowledge on COVID-19 infection.

Sixty-four (62.7%) were graded as having positive attitudes towards COVID-19 pandemic. Fifty-four (52.9%) were graded as having positive practices on preventive measures against COVID-19 disease (Figure 1).

Association between socio-demographics and knowledge on COVID-19 disease among health care workers in Taraba state. Sociodemographic factors such age in years, sex, educational level, marital status, and religion were found not have positive association with respondents having good knowledge on COVID-19 infection (Table 6).

Table 6: Bivariate analysis between socio-demographics of respondents and respondents' knowledge on COVID-19 infection, Taraba State

Characteristics	**Knowledge**				
	Good (%)	**Poor (%)**	***OR**	**Confidence Interval**	**ρ value**
Age group (years)					
≤ 40 years	53 (51.96)	1(0.98)			
≥ 40 years	47 (46.08)	1 (0.98)	1.13	0.06-18.58	0.72
Sex					
Female	26 (25.49)	1 (0.98)			
Male	74 (72.55)	1 (0.98)	0.35	0.02-5.82	0.46
Educational Level					
Secondary	4 (3.92)	0 (0.00)	Undefined	Undefined	Undefined
Tertiary	96 (94.12)	2 (1.96)			
Marital status					
Married	76 (74.51)	2 (1.96)			
Not Married	24 (23.52)	0 (0.00)	0	Undefined	Undefined
Religion					
Christianity	80 (78.43)	1 (0.98)			
Islam	20 (19.61)	1 (0.98)	4	0.23-66.76	0.37

Association between knowledge on COVID-19 infection and preventive practices towards COVID-19 infection among health care workers in Taraba state. Knowledge on COVID-19 infection was found not to have positive association with respondents' attitudes/belief in COVID-19 infection (Table 7)

Table 7: Bivariate analysis between socio-demographics of respondents and respondents' attitudes/beliefs towards COVID-19 infection, Taraba State

Characteristics	Attitude/Belief				
	Positive	Negative	*OR	Confidence Interval	ρ value
Age group (years)					
≤ 40 years	32 (59.3)	22 (40.7)			
≥ 40 years	32 (66.9)	16 (33.1)	1.34	0.61-3.09	0.22
Sex					
Female	16 (59.3)	11 (40.7)			
Male	48 (64.0)	27 (36.0)	1.22	0.49-3.01	0.33
Educational Level					
Secondary	1 (25.0)	3 (75.0)			

Tertiary	63 (64.3)	35 (35.7)	5.4	0.34-53.89	0.08
Marital status					
Married	50 (64.1)	28 (35.9)			
Not Married	14 (58.3)	10 (41.7)	0.78	0.31-1.99	0.31
Religion					
Christianity	49 (60.5)	32 (39.5)			
Islam	15 (71.4)	6 (28.6)	1.63	0.57-4.65	0.19

Association between knowledge on COVID-19 infection and preventive practices towards COVID-19 infection among health care workers in Taraba state. Knowledge on COVID-19 infection was found not to have positive association with respondents' practices towards COVID-19 preventive measures such as social distancing, use of face mask, feelings, and other adaptive measures towards the pandemic (Table 8).

Table 8: Bivariate analysis between socio-demographics of respondents and respondents' practices towards COVID-19 preventive measures, Taraba State.

Characteristics	Practice				
	Good	Poor	*OR	Confidence Interval	ρ value
Age group (years)					
≤ 40 years	29 (53.7)	25 (46.3)			
≥ 40 years	25 (52.1)	23 (47.9)	1.07	0.48-2.32	0.43
Sex					
Female	15 (55.6)	12 (44.4)			
Male	39 (52.0)	27 (48.0)	1.15	0.47-2.80	0.38
Educational Level					
Secondary	3 (75.0)	1 (25.0)			
Tertiary	51 (52.0)	47 (48.0)	2.76	0.28-27.51	0.22
Marital status					
Married	42 (53.8)	36 (46.2)			
Not Married	12 (50.0)	12 (50.0)	1.17	0.47-2.92	0.37
Religion					
Christianity	39 (48.1)	42 (51.9)			
Islam	15 (71.4)	6 (28.6)	0.37	0.13-1.05	0.03

Discussion

Our study found all the respondents have heard of Coronavirus or COVID-19 and almost all the respondents had good knowledge of COVID-19, with most of the respondents stating the internet/social media and Television (TV) as their major source of knowledge. This finding correlates with findings from a study conducted in North Central Nigeria [10,12]. And

findings from a study conducted in Northern Nigeria, Kano state [24].

Less than half of the respondents were aware of direct contact as the major means *via* which COVID-19 can be spread while majority agreed to the fact that the clinical signs of COVID-19 include fever, fatigue, dry cough, and myalgia. More than half had the knowledge that COVID-19 can affect both humans and animals. Almost all were aware that there is an effective cure for COVID-19 disease, and that isolation and treatment of infected persons and avoidance of crowded places is effective ways to reduce the spread of COVID-19. All, of the respondent's belief that people who have contact with someone infected with the COVID-19 should be isolated and observed for 14 days. Similarly, overall knowledge of personal prevention such as hand washing with soap and water, using facemasks and avoiding touching one's face was good.

From our study, most of the respondents were found to have good and accurate knowledge on COVID-19 infection. More than half of the respondents were found to have positive attitudes towards COVID-19 pandemic and good practices on preventive measures against COVID-19 disease. This is consistent with findings from a study conducted in Northern Nigeria by [13].

Most of the respondents, knew they are at risk of COVID-19 infection. Less than half of the respondents reported adequate provision of PPE at their places of work while more than half reported availability of running water and soap/hand sanitizers at their places of work. However, most reported that family members practice social distancing, hand wash with soap and water or hand sanitizers and use face masks.

Our study found out that, sociodemographic factors such age in years, sex, educational level, marital status, and religion had no positive association with respondents having good knowledge on COVID-19 infection. Therefore, being a male or female, being educated or not, being married or not married and respondents religious background did not influence respondent's knowledge on COVID-19 infection and is consistent with the findings from a study conducted in Northern Nigeria, Kano state [24].

From our study, knowledge on COVID-19 infection was found not to have positive association with respondents' attitudes/ belief in COVID-19 infection and practices towards COVID-19 preventive measures such as social distancing, use of face mask, feelings, and other adaptive measures towards the pandemic [10].

The primary limitations of our study were a small sample size, a researcher-developed questionnaire with minimal reliability and validity testing and moreover, lockdown measures were instituted during data collection, hence the creation of the online format of the questionnaire which may have changed the respondents' approach to answering questions. However, we do not feel this bias is likely to change the conclusion.

Conclusions

In conclusion, most respondent had good knowledge on COVID-19. Half of the respondents had positive attitudes and good practices towards COVID-19 preventive measures. Most agreed that they were at risk to COVID-19 disease. The findings from this study revealed that there are no gaps in knowledge, attitudes, and practices among sampled health care workers in Taraba state. However, the modes of transmission of COVID-19 infection should be emphasized during sensitization of health care workers as less than half of the respondents were aware of direct contact as the major means *via* which COVID-19 can be spread. Government should provide adequate personal protective clothing for health care workers and should implement policies that can enforce adherence of government Infection Prevention Control measures such practicing social distancing/self-isolation, improved personal hygiene and use of face mask respectively.

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