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Research Article

Management of COVID-19 among Health Care Givers: An Afro-Asian Perspective

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Abstract

Background and Objective: Early screening may facilitate prompt detection and management of COVID-19 cases. Despite the growth in Medicare in the past years, the recent pandemic remains a global threat. This may be secondary, at least in part, to a negative attitude and inappropriate practices of health care professionals (HCPs). This study sought to assess the knowledge, attitudes and practices of HCPs concerning COVID-19. **Materials and Methods:** This was an online survey designed to determine the knowledge, attitudes and practices of HCPs about COVID-19. The study included HCPs in Nigeria and India. **Results:** A total of 1146 responses to the survey were obtained. Out of the surveyed HCPs, 65.4% routinely screened for COVID-19 using temperature check, relevant history and clinical manifestation, 91.6% were comfortable discussing the pandemic with patients, 64.9% were confident about diagnosing COVID 19 correctly and 54.5% were worried about the stigmatization of COVID-19 confirmed patients. Only 35.6% of the HCPs had ever received training on COVID-19 while about 95.8% were interested in such training. Most of the health workers showed positive attitudes towards the prevention and management of COVID 19. **Conclusion:** The authors identified a need for training on COVID-19 to improve and facilitate early detection and prompt management by HCPs. The training would reflect on the spread of the deadly infection.

Key words: SARS-CoV-2, COVID-19, severe acute respiratory syndrome, middle east respiratory syndrome, pneumonia, angiotensin receptor type II

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Data Availability: All relevant data are within the paper and its supporting information files.

INTRODUCTION

The novel coronavirus infection (COVID 19) outbreak in Wuhan, China has rapidly spread across the globe leading to a deadly pandemic with ripple effects. Before the COVID 19 pandemic, six strains of the coronavirus (CoVs) have been classified. The highly pathogenic CoVs include Severe Acute Respiratory Syndrome (SARS) and the Middle East Respiratory Syndrome (MERS) and the low pathogenic CoVs which include HCoV-229E, HCoV-HKU1, HCoV-OC43 and HCoV-NL63^{1,2}. The former accounts for lower respiratory tract infection causing fatal pneumonia, while the latter is responsible for about 15% of the common colds^{1,2}. Though the novel COVID 19 caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is yet to be well understood, there is an increasing number of studies that aim at demonstrating the genomics of the pathogenic virus, pathogenesis, prevention of the deadly infection and its management.

The index cases were observed to share a strong link with the Huanan South China Seafood Market in Wuhan³ with clinical manifestations such as pyrexia, acute respiratory distress, normal or declined white cell count and lymphopenia⁴. The current belief is that SARS-Cov-2 originated from bats, with human-to-human transmission. Although there was an outbreak of SARS in 2003 and MERS in 2012, COVID-19 is the first CoV to cause a pandemic⁵. CoVs are enveloped, single-stranded RNA viruses that belong to the family of Coronaviridae, a subfamily of Orthocoronavirinae and genus Betacoronavirus^{1,6,7}. SARS-Cov-2 shares about 79% of its genome with SARS-CoV; however, it is more transmissible with a lower case fatality rate⁸.

COVID-19 has been reported to be transmitted via inhalation of infected droplets and contact with infected individuals, even when they are asymptomatic^{9,10}. Pieces of evidence are suggesting that the virus can survive in the air for about 8 hrs and may travel less than 1 meter^{8,11}. The human Angiotensin receptor type II (ACE2) has been proposed to be the receptor for the entry of SARS-CoV-2¹². The receptor is widely expressed in the lungs and testes¹³. SARS-CoV-2 S protein binds to this receptor with a higher affinity than SARS-CoV S-protein^{14,15}. Although the incubation period varies, depending on host factors such as age and presence of comorbidities, it is usually about 14 days¹⁶. Early manifestations include fever, dry cough, shortness of breath, myalgia, nausea, vomiting, fatigue, headache, pharyngalgia and sometimes diarrhea^{17,18}. In severe cases, patients may present with acute respiratory distress syndrome (ARDS), multiple organ failure and death¹⁹⁻²².

Diagnosis is based on high suspicion, while clinical manifestations and possible contact history are helpful. Confirmation of suspected cases is via Nucleic Acid Amplification Tests (NAAT) such as Reverse Real-Time Polymerase Chain Reaction (RRT-PCR) by targeting a consensus E region of pan beta-CoV or other specific regions like RdRp or N region followed by nucleic acid sequencing when necessary¹¹. Cheaper and faster diagnostic tools are under development. Increasing studies have reported the success of some molecules like chloroquine, hydroxychloroquine^{23,24}, alpha-interferon, lopinavir/ritonavir, remdesivir^{20,25}, Favipiravir and Chinese Traditional Medicines²⁶.

Although the government plays a crucial role in mitigating the spread of infectious diseases, the level of knowledge of any clinical condition including infectious diseases among Health Care Professionals (HCPs) is a significant factor that influences the rate of its transmission. The HCPs are in the frontline and play essential roles such as awareness and health education to limit spread. As the first point of contact, they are in a position to identify suspected cases based on clinical pictures and relevant medical histories such as travel history and contact^{27,28}. It is thus pertinent to assess the knowledge, attitude and practice of HCPs regarding COVID 19 because a dearth of a good understanding of this highly infectious disease will limit opportunities for COVID 19 prevention, diagnosis and prompt intervention²⁹.

The present study sought to explore the perceived knowledge, attitudes and practices of HCPs in Nigeria and India regarding COVID 19. The results of this study are intended to address the possible knowledge gap of the recent pandemic among HCPs. The findings of this study would also provide evidence-based recommendations to mitigate the spread of COVID 19.

MATERIALS AND METHODS

Study area and duration: This was a cross-sectional online survey carried out between April to May, 2020. Health care professionals were sent a weblink through various social media platforms and email. The covering letter of the survey contained information about the aim and objectives of the study. The contact details of the lead investigators have also included in case respondents need any form of clarification when participating in the survey. Online consent was obtained. The names and other personal details of respondents were not collected for confidential purpose.

Respondents and survey questionnaire: HCPs in the frontline of patient management amidst the COVID 19 pandemic were the targets of the present study. The weblink to the survey was sent to the various HCPs social media platforms. Recipients were requested to forward the survey weblink to other colleagues to achieve the maximum number of respondents possible.

A pilot study was conducted using representatives from each HCPs to validate the questionnaire. The questionnaire was modified based on the obtained feedback from the pilot survey. No data from the pilot study were included in the results of the final research to ensure accuracy and consistency. The first part of the questionnaire evaluated the socio-demographic distribution of the respondents and the duration of practice. The second section was adapted to evaluate the knowledge and experience of HCPs on COVID-19. For example, HCPs were asked whether they have been trained in COVID-19 management and if they are interested in such training. They were also asked whether or not they routinely screen for COVID-19 and how they do. Also, they were asked to assess their confidence in the diagnosis and management of COVID-19. The third section of the questionnaire assessed the attitude of the professionals to the prevention, diagnosis and management of COVID-19. The last part was an assessment of the preventive measures put in place by the government. These questions were aimed at gaining an insight into the perceived knowledge, experience and confidence levels of the professionals with regards to the recent pandemic. These will also help to identify the knowledge and inform the need for training and re-training of HCPs. Besides, these will help to evaluate the present preventive strategies put in place and determine whether or not a reformation is needed.

Data analysis: Data analysis was conducted using Statistical Software for Social Sciences (SPSS, versions 16). They were then summarized using frequency and percentage. Spearman correlation was done to assess the relationship between various HCPs and their knowledge, confidence level and attitude towards COVID-19 management. In evaluating if age, gender, occupation and years of practice, could determine their diagnosis confidence level, multivariate linear regression was done. Only valid responses were included. All the researchers reviewed the data for validity check and to reduce bias.

RESULTS

Socio-demographic distribution: There were a total of 1146 respondents in Table 1. A chunk (83.7%) of the respondents was below 45 years, while the remaining 16.2% were between 45 and 65 years. Most of the respondents (59.7%) had less than 10 years of experience as HCPs, 28.8% had between 10 and 20 years of practice experience, while 11.5% had above 20 years of experience. More than half of the respondents (67.0%) were female, while only 33.0% were male; 7.3% of the 1146 respondents were medical doctors, 73.3% were nurses, 10.5% were pharmacists, 7.9% were medical laboratory scientists and 1% were public health officers. Also, 38.2% of them were single, 60.2% were married, 1.0% was widowed and 0.5% was divorced.

Most (67.5%) of the respondents were Christians, 20.9% were Muslims and 11.5% practised other religion; 35.6% were staff members of private institutions, 44.0% were state

Table 1: Socio-demographic characteristics of respondents

| Characteristics | Frequency (n) | Percentage |
|------------------------------|---------------|------------|
| Age | | |
| <45 years | 960 | 83.8 |
| 45-65 years | 186 | 16.2 |
| Years of practice | | |
| <10 years | 684 | 59.7 |
| 10-20 years | 330 | 28.8 |
| >20 years | 132 | 11.5 |
| Gender | | |
| Male | 378 | 33.0 |
| Female | 768 | 67.0 |
| Occupation | | |
| Doctor | 84 | 7.3 |
| Nurse | 840 | 73.3 |
| Pharmacist | 120 | 10.5 |
| Medical laboratory Scientist | 90 | 7.9 |
| Public health officer | 12 | 1.0 |
| Marital status | | |
| Single | 438 | 38.2 |
| Married | 690 | 60.2 |
| Widowed | 12 | 1.0 |
| Divorced | 6 | 0.5 |
| Religion | | |
| Christianity | 774 | 67.5 |
| Islam | 240 | 20.9 |
| Others | 132 | 11.5 |
| Institution | | |
| Private | 408 | 35.6 |
| State government | 504 | 44.0 |
| Federal government | 234 | 20.4 |
| Country | | |
| Nigeria | 1014 | 88.5 |
| India | 66 | 11.5 |

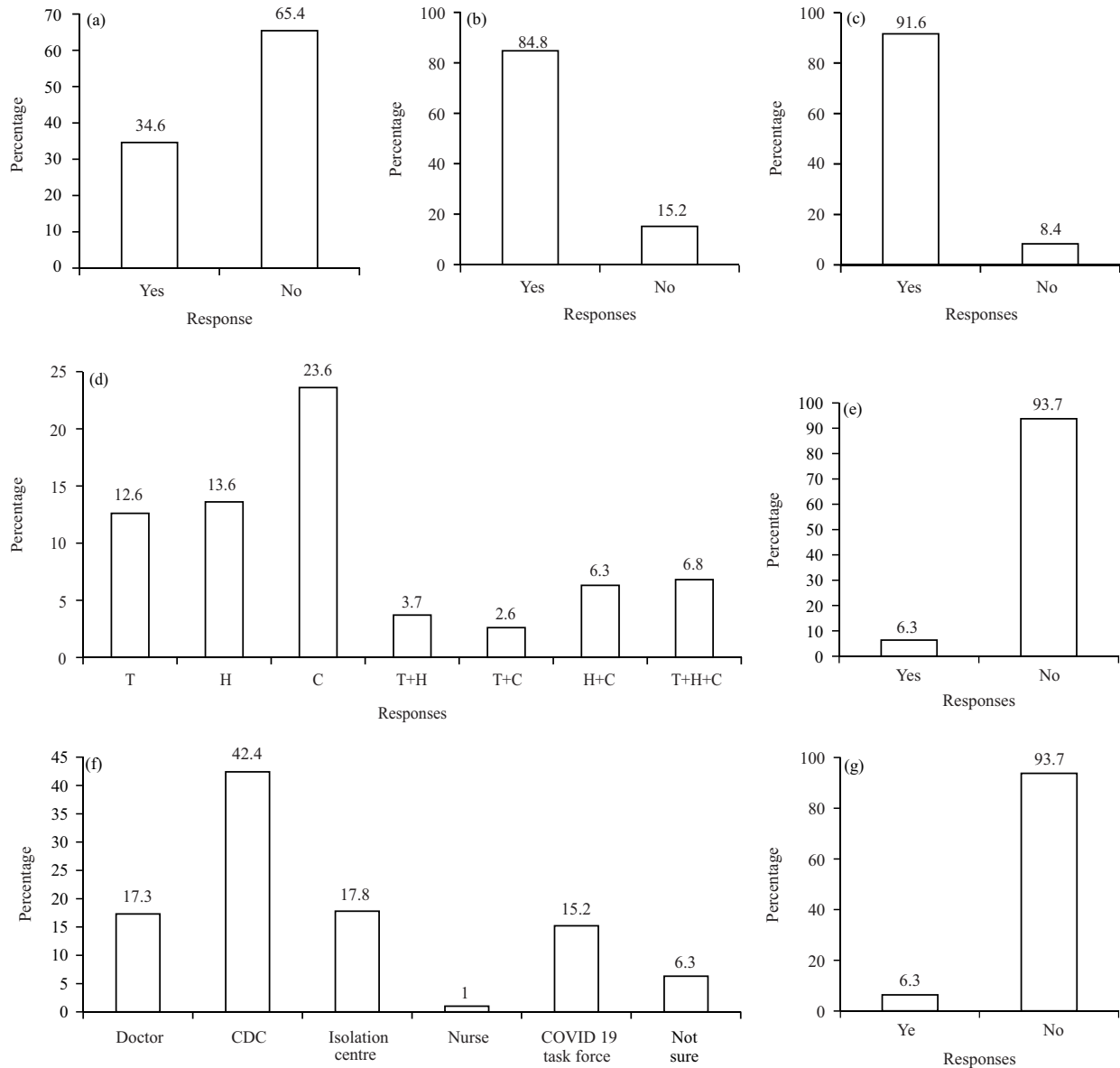


Fig. 1: Responses of healthcare professionals to clinical practice-related questions

T: Temperature check, H: History taking, C: Clinical manifestation, CDC: Centre for disease control

government workers and 20.4% were federal government workers. Most (88.5%) of the respondents were Nigerians, while the remaining 11.5% were Indians.

Clinical practice-related questions: Responses of HCPs to clinical practice-related questions are shown in Fig. 1. Many (65.45%) of the respondents surveyed in the study did not routinely screen for COVID-19 while only 34.6% of them did in Fig. 1a. About 84.8% of the studied subjects take the relevant history of risk factors from patients in Fig. 1b. Almost all the HCPs (91.6%) felt comfortable discussing COVID-19 with

patients in Fig. 1c. Only 23.6% of the HCPs based their judgments on clinical manifestations, 12.6 and 13.6% relied on temperature check and history taking respectively, 3.7% of the HCPs preliminarily screened for COVID-19 using temperature level and relevant history, 2.6% used temperature and clinical manifestations, 6.3% used relevant history and clinical manifestation and 6.8% used a combination of temperature check, relevant history and clinical manifestation in Fig. 1d. About 6.3% of the HCPs had suspected that the diagnosis was COVID-19 but did not refer to in Fig. 1e. About 17.3% of the HCPs would refer confirmed cases to the medical doctor on

Table 2: Correlation observed between years of practice, occupation and attitude towards COVID 19

| Variables | B | SEM | Beta | t | p-value |
|-------------------|--------|-------|--------|--------|---------|
| Age | -0.172 | 0.164 | -0.112 | -1.050 | 0.295 |
| Years of practice | 0.141 | 0.086 | 0.172 | 1.631 | 0.105 |
| Gender | 0.044 | 0.100 | 0.036 | 0.438 | 0.662 |
| Occupation | 0.011 | 0.037 | 0.025 | 0.302 | 0.763 |

call, 42.4% would refer to the local Center for Disease Control (CDC), 17.8% would refer to the isolation ward directly, 1% would refer to the ward nurse on duty, 15.2% would refer to the local COVID-19 task force, while 6.3% were not sure whom or where to refer cases to in Fig. 1f. About 6.3% of the HCPs were convinced that the diagnosis was COVID-19 but did not refer to in Fig. 1g.

Knowledge-related questions: A little above average of the respondents (64.9%) was fairly confident, 26.2% were very confident, while 8.9% were not confident about diagnosing COVID 19 in Fig. 2a. This high level of confidence in diagnosis was corroborated with a correspondingly high level of confidence (93.2%) in identifying the clinical manifestation of the pandemic disease in Fig. 2b. Few of the surveyed HCPs (34.6%) would suspect COVID 19 when the body temperature is above 38.0°C, 25.1% at a temperature higher than 39.0°C and 11% at a temperature above 40.0°C in Fig. 2c. Interestingly, 54.5% of the HCPs were worried about the stigmatization of patients in Fig. 2d. Surprisingly, there was a low level of training on COVID 19 among the HCPs as only 35.6% of the participants had ever received any training on COVID 19 in Fig. 2e, Fig. 3a-b. This was associated with a high level of interest in further training on COVID 19 (95.8%) in Fig. 2f, Fig. 3a-b.

Multiple logistic regression analysis showed that the confidence level in the diagnosis of COVID-19 is not determined by age, years of practice, gender and occupation ($p > 0.05$) in Table 2.

Attitude-related questions: As the initial screening using temperature check, clinical manifestations and history checking taking are essential prior confirmation using the nucleic acid-based PCR for patients who visit the hospital, HCPs opinions were sought to assess their attitude in Table 3. Almost all HCPs were advocates of routine screening (91.6%) and history taking especially on exposure (96.3%). The attitude was corroborated with a high level of comfort in seeking permission from patients for screening (93.7%) and referring family members if they were suspected of having contracted COVID 19 (96.3%). Strikingly, only 58.15% of the HCPs

advocated that the identity of COVID 19 confirmed patients be confidential. Almost all the HCPs who participated in the study had a good attitude towards the use of hand gloves (94.2%), nose mask (93.7%) and alcohol-based hand sanitisers (96.8%). However, just 22.5% of them would wash their hands after attending to a patient while 77% would after each procedure. Although 75.4% of the HCPs get their PPEs from the health facility for free, 92.1% feel their take-home pay is poor. Only 42.4% of the respondents advocated for outright exposure of the populace to stimulate immunity, 58.6% of the HCPs were worried more about the family tie, 24.1% about career progression/promotion and 17.3% about research.

Assessment of the present control measure: Amidst the global pandemic, national policies have been instituted in most countries to limit the spread of the novel coronavirus. HCPs were requested to assess the control strategies put in place by most nations in Table 4. Only 49.2% adjudged flight ban and border closure very adequate, 47.6% adjudged social distancing very adequate, 31.9% adjudged health workers allowance very adequate, 29.3% adjudged screening practices very adequate and 56.5% adjudged awareness on social media very adequate.

Only 29.3% of the HCPs recommended mass screening of the populace, 13.1% recommended enforcement of the established preventive measures and 11% recommended intensifying the awareness in Fig. 4.

DISCUSSION

This is perhaps the first survey among Afro-Asians to assess the knowledge, attitudes and practices of HCPs in response to COVID-19. The findings of the present study give us a clearer insight into the perceived knowledge, clinical practices and attitudes of the major HCPs in the frontline of combating the deadly coronavirus. Although some studies have reported the knowledge and attitude of HCPs regarding COVID 19, this seems to be the first cross-country study involving two countries. The data reported would be valuable for policymakers in addressing the gap in the management of COVID 19.

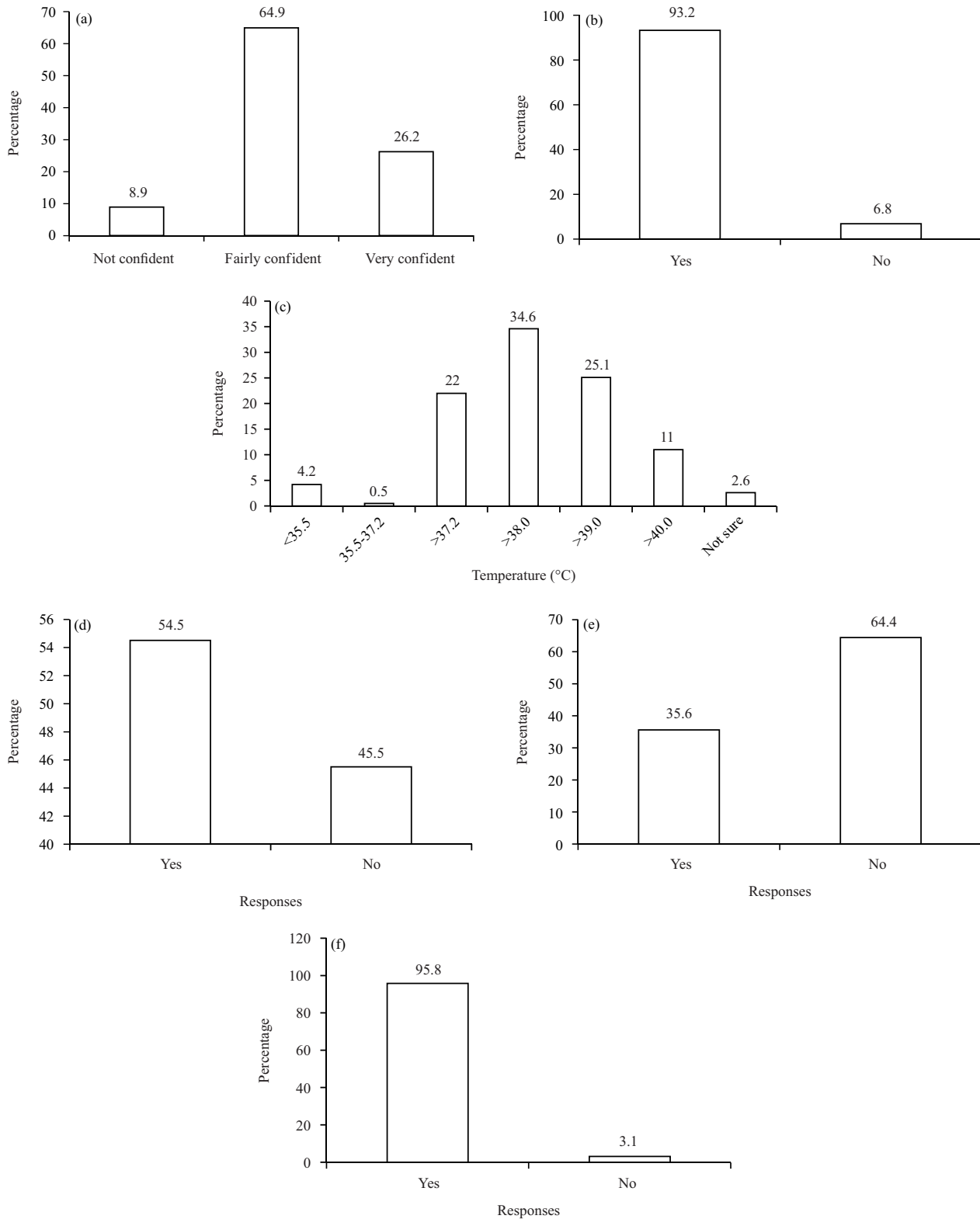


Fig. 2(a-f): Responses of health care professionals to knowledge-related questions

(a) How confident are you about diagnosing COVID 19 correctly? (b) Do you feel confident about identifying clinical manifestation and complications of COVID 19? (c) At what temperature would you suspect COVID 19? (d) Do you feel worried about stigmatization of patient with COVID 19? (e) Have you received any training on COVID 19 and (f) Are you interested in further training on COVID 19?

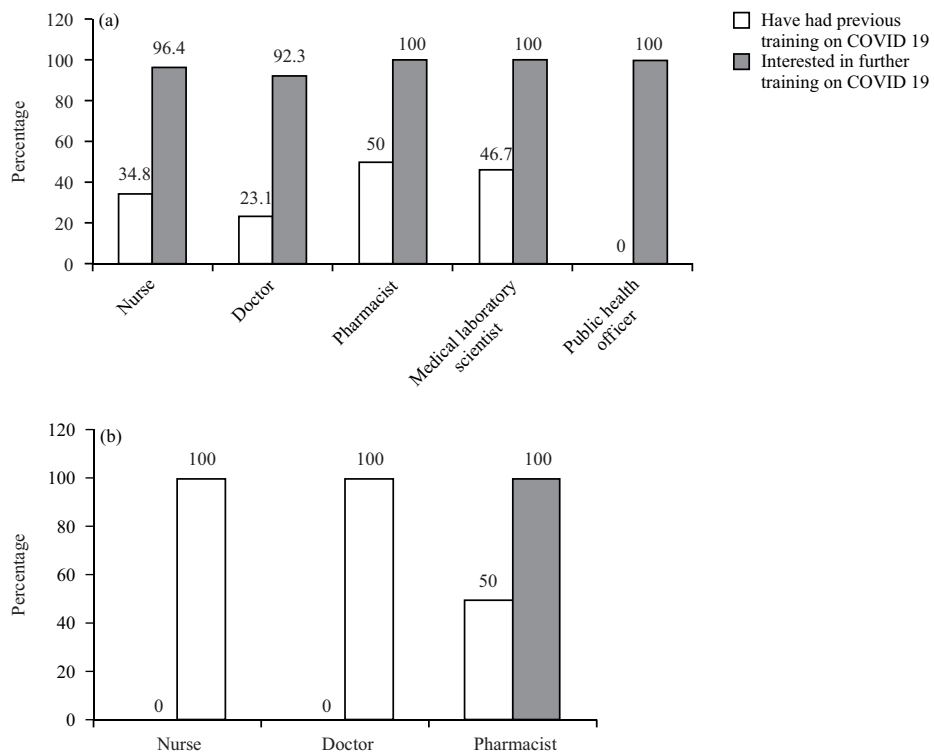


Fig. 3(a-b): Previous training and interest in further training among HCPs

(a) Previous training and interest in further training among Nigerian HCPs and (b) Previous training and interest in further training among Indian HCPs

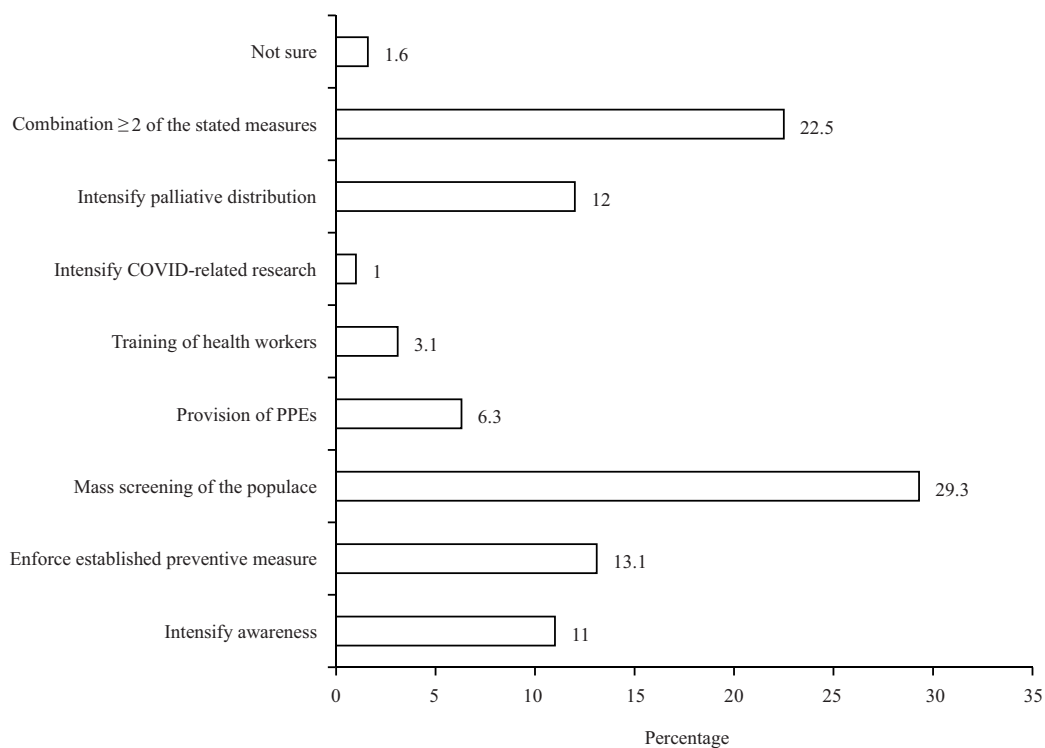


Fig. 4: Recommendations by the health care professionals

Table 3: Responses of healthcare professionals to attitude-related questions

| Characteristics | Frequency (n) | Percentage |
|--|---------------|------------|
| Should patient be routinely screened? | | |
| Yes | 1050 | 91.6 |
| No | 84 | 7.3 |
| Would you feel comfortable seeking permission from patient to screen for COVID 19? | | |
| Yes | 1074 | 93.7 |
| No | 60 | 5.2 |
| Is it important to take exposure history? | | |
| Yes | 1104 | 96.3 |
| No | 30 | 2.6 |
| Do you routinely use hand gloves? | | |
| Yes | 1080 | 94.2 |
| No | 54 | 4.7 |
| Do you routinely use nose mask? | | |
| Yes | 1074 | 93.7 |
| No | 54 | 4.7 |
| Do you routinely use alcohol-based hand sanitizers? | | |
| Yes | 1110 | 96.9 |
| No | 24 | 2.1 |
| Do you routinely use liquid hand wash? | | |
| Yes | 1110 | 96.9 |
| No | 24 | 2.1 |
| How often do you wash your hands? | | |
| After attending to a patient | 258 | 22.5 |
| After each procedure | 882 | 77.0 |
| Twice daily | 6 | 0.5 |
| Would you be comfortable referring family members/relatives with a high index of suspicion? | | |
| Yes | 1104 | 96.3 |
| No | 30 | 2.6 |
| Should the identity of COVID 19 confirmed patients be confidential? | | |
| Yes | 666 | 58.1 |
| No | 474 | 41.4 |
| How do you source for PPEs? | | |
| I buy | 282 | 24.6 |
| My facility provides | 864 | 75.4 |
| Do you feel your take-home pay is poor? | | |
| Yes | 1056 | 92.1 |
| No | 48 | 4.2 |
| Would you prefer outright exposure of the populace to stimulate immunity? | | |
| Yes | 486 | 42.4 |
| No | 660 | 57.6 |
| How long do you think the pandemic would last? | | |
| <3 months | 450 | 39.3 |
| 3-6 months | 456 | 39.8 |
| 6-12 months | 198 | 17.3 |
| Ø 12 months | 42 | 3.7 |
| Do you think that COVID 19 is related to 5G network? | | |
| Yes | 228 | 19.9 |
| No | 918 | 80.1 |
| How would this pandemic affect you most? | | |
| Career promotion/progression | 276 | 24.1 |
| Research | 198 | 17.3 |
| Family bond | 672 | 58.6 |

Training on COVID-19 was an urgent need identified by all the HCPs surveyed both in Nigeria and India. The low level of training on COVID-19 observed in Nigeria and India across all health care professionals explains their low diagnosis confidence level. The observed training gap may rub off on

the prompt identification of COVID-19 patients and rapid management. Interestingly, the HCPs demonstrated a high level of knowledge despite the low or lack of training. Although this seems to be the first study that assessed the training levels of HCPs and their interest in further training

Table 4: Assessment of the present control measures

| Characteristics | Frequency (n) | Percentage |
|----------------------------------|---------------|------------|
| Flight ban and border | | |
| Closure | 564 | 49.2 |
| Very adequate | 186 | 16.2 |
| Adequate | 264 | 23.0 |
| Fair | 96 | 8.4 |
| Inadequate | 36 | 3.1 |
| Social distancing | | |
| Very adequate | 546 | 47.6 |
| Adequate | 240 | 20.9 |
| Fair | 252 | 22.0 |
| Inadequate | 78 | 6.8 |
| Very inadequate | 30 | 2.6 |
| Health workers allowance | | |
| Very adequate | 366 | 31.9 |
| Adequate | 66 | 5.8 |
| Fair | 300 | 26.2 |
| Inadequate | 168 | 14.7 |
| Very inadequate | 246 | 21.5 |
| Screening practices | | |
| Very adequate | 336 | 29.3 |
| Adequate | 294 | 25.7 |
| Fair | 276 | 24.1 |
| Inadequate | 102 | 8.9 |
| Very inadequate | 138 | 12.0 |
| Awareness on social media | | |
| Very adequate | 648 | 56.5 |
| Adequate | 294 | 25.7 |
| Fair | 168 | 14.7 |
| Inadequate | 30 | 2.6 |
| Very inadequate | 6 | 0.5 |

regarding COVID-19, current findings on the knowledge base are similar to previous reports. Olum *et al.*³⁰ also reported a high rate of COVID-19 knowledge even among Chinese residents who were not health workers. Zhang *et al.*³¹ also reported a sufficient high knowledge among health care workers at Makerere University Teaching Hospital in Uganda. Also, in a cross-sectional survey by Zhang and his colleagues across ten hospitals in Henan, China³², 89% of the health care workers had sufficient knowledge of COVID-19. Similarly, Huynh and his colleagues observed good knowledge among healthcare workers at District 2 Hospital in Ho Chi Minh City. The knowledge level observed in the present study may be attributed to the high level of awareness and possible personal interest in researching COVID-19-related topics since most of the HCPs surveyed lacked sufficient training on COVID 19.

It is worth noting that the high level of knowledge observed was found to be corroborated by a higher level of good practices and positive attitudes towards the global pandemic. This demonstrates the need to further improve HCPs knowledge through training and awareness, which would lead to further improvement of their practices and attitude towards the deadly infectious disease. This finding

agrees with previous studies that reported a significant association between knowledge and positive attitude towards COVID-19²⁸⁻³². Results from this study revealed that the majority of the health workers were worried about their families amidst this pandemic, yet they demonstrated positive attitudes and good clinical practices. This explains that despite their positive attitudes, the health workers have their challenges. Zhang *et al.*³² observed that 85% of the surveyed health workers in Henan were afraid of contracting the virus at work. The health facilities including the isolation ward and Intensive Care Unit (ICU) where patients are being managed, HCPs are involved in patient consultation, dressing changes, surgeries, dispensing drugs, investigations on samples and lots more thus predisposing HCPs to COVID-19. Their study also revealed that HCPs with 5-9 years of experience were less likely to feel tired due to overwork compared with those with less than five years of working experience.

Multiple logistic regression analysis showed that age; years of practice, gender and occupation were not determinants for the confidence level in the diagnosis of COVID 19. This is not in agreement with the report of Olum *et al.*³⁰ that documented that male gender and occupation were determining factors of knowledge score.

As observed in this study, Huynh *et al.*³² also inferred that the positive attitudes demonstrated by HCPs are likely associated with the relief materials and government policies regarding frontline support evident by the provision of PPEs and adequate control measures put in place as well as health care workers' allowances. Although less than 50% of the surveyed HCPs adjudged the control measures put in place as very adequate, most of them felt it was fair, adequate or very adequate and a small fraction of them adjudged these strategies as inadequate or very inadequate. A fraction of the surveyed health workers (29.3%) recommended mass screening of the populace, 13.1% recommended enforcement of the established preventive measures, whereas 11% recommended intensifying the awareness and 22.5% suggested a combination of at least two of these: mass screening of the populace, enforcement of the established preventive measures, training of health workers, intensifying the awareness on COVID-19, COVID-19 related research and distribution of palliative measures including provision of PPEs.

A significant drawback of this study is that it only documented information from Nigeria and India. Although this is a progressive step when compared with previous studies, the present study was designed to collect data from at least a country from each continent through corresponding professional governing bodies to have a global perspective of the subject. The size of the respondents was also quite small

and might not truly represent the HCPs of both countries surveyed. Also, the response rate could not be calculated since the number of HCPs invited to participate in the study could not be ascertained. Also, this study is prone to the general limitations of questionnaire-based studies such as truthful responses, personal agendas and bias, subjective variation in understanding and interpretation of questions. Further studies involving one or more countries from each continent using qualitative methods such as focus-group and interviews would address these limitations. However, the strength of this study lies in the recruitment of respondents from two major developing countries on different continents. The health care professionals were also well represented.

CONCLUSION

Although, the findings in this study revealed that HCPs surveyed had positive attitudes and appropriate practices towards SARS-Cov-2 caused COVID-19, a gap was identified in the training of HCPs on COVID 19. Since the highly contagious viral respiratory infection remains a global threat, efforts should be enmassed to bridge this gap through continuing medical education, seminars and educational campaigns targeted at educating HCPs and possibly the public on COVID-19 related issues.

SIGNIFICANCE STATEMENT

The study discovered that the surveyed HCPs had positive attitudes and appropriate practices towards SARS-Cov-2 caused COVID-19 that might be beneficial in the management of COVID 19. The identified gap in the training of HCPs on COVID 19 if bridged through continuing medical education, seminars and educational campaigns would greatly help in containing this deadly disease.

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