

KNOWLEDGE, RISK PERCEPTION AND PREVENTIVE PRACTICES OF COVID-19 AMONG STAFF OF PRIMARY AND SECONDARY SCHOOLS IN KADUNA STATE, NIGERIA

T. Dahiru¹, H. Bello-Manga², K.L. Hamza¹, Z.K. Muhammad-Idris³, A.M. Zakari⁴, O.T. Ayodeji⁵, S. Joseph⁶, A. Yahaya⁷, S.G. Ishaku⁸, J. Ejembi⁹, H. Sani², E. Garry⁶, B. Mohammed⁶, D.S. Emmanuel¹⁰, P. Unung¹¹, B. Tijjani¹², Z.O. Tijani¹³, S. Kase¹⁴, H. Bello¹², A.T. Usman¹² and A. John¹².

1. Department of Community Medicine, Ahamdu Bello University, Zaria
2. Department of Haematology and Blood Transfusion, Kaduna State University, Kaduna
3. Department of Community Medicine, Kaduna State University, Kaduna
4. Ministry of Health, Kaduna, Kaduna State
5. Department of Radiology, Ahmadu Bello University, Zaria
6. Department of Health Planning, Research and Statistics, Ministry of Health, Kaduna State
7. Department of Obstetrics and Gynaecology, Ahmadu Bello University, Zaria
8. World Health Organization, Kaduna
9. Department of Medical Microbiology, Ahmadu Bello University, Zaria
10. Health Secretary, Giwa LGHA, Kaduna State
11. National Eye Center, Kaduna.
12. Kaduna State AIDS Control Agency, Kaduna
13. Department of Family Medicine, 44 Nigerian Army Reference Hospital, Kaduna
14. Department of Medical Laboratory Science, Kaduna State University, Kaduna

Correspondence:

Prof. Tukur Dahiru

Dept. of Community Medicine,
Ahmadu Bello University,
Zaria
Email: tukurdahiru2012@mail.com

ABSTRACT

Introduction: Kaduna State is among the three States with the highest number of confirmed COVID-19 cases. The objective of this study was to assess the knowledge, risk perception and practices of staff towards prevention and control of COVID-19 infection in schools to provide policy makers, education and health managers required information to manage the epidemic as the schools prepare to re-open.

Methods: This was a school-based survey conducted using purposive sampling of 55 schools located in nine LGAs with the highest number of reported COVID-19 cases as at October 2020. Five schools with the highest students'/pupils' enrollment in each of the LGA were selected and all staff were interviewed. Information on knowledge, risk perception and practices of prevention was collected. Descriptive statistics were generated using Stata v14 software.

Results: A total of 1065 staff in 55 schools completed the interview. Major sources of information are television (73%), radio (61%), and social media (57%); and 76% indicated that a virus is the causative agent of COVID-19. Overall, 70%, 19%, 7%, 9.3% and 0% respectively had adequate knowledge of cause, preventive measures, respiratory hygiene, modes of transmission and symptoms of COVID-19; however only 14% ever attended a workshop on COVID-19. Eighty-two percent and 89% respectively believed in the efficacy of face masks and handwashing as means of prevention; 39% thought that they are likely to contract COVID-19. Ninety-nine percent and 90% have ever used face mask and hand sanitizer to prevent COVID-19; 96% and 85% respectively have used these methods in previous 24 hours. Between 42% and 73% of schools needed additional commodities/requirements/supplies to comply fully with COVID-19 prevention protocols.

Conclusion: While knowledge of COVID-19 is suboptimal, perception is positive and practice is high. Thus, teachers need to be well informed and encouraged to sustain current levels of preventive measures. Government needs to provide schools with adequate preventive commodities to ensure compliance.

Keywords: COVID-19, Knowledge, Perception, Prevention, Staff School, Kaduna

INTRODUCTION

Human infection with severe acute respiratory syndrome–coronavirus 2 (SARS-CoV-2), the causative agent of COVID-19 disease was declared a pandemic and has remained a global public health emergency

reaching virtually every country and territory of the world.¹ The pandemic began sometime in late December of 2019, from Wuhan in Hubei province of China and it rapidly dispersed to other parts of

China. By February 2020, the virus reached the African continent when the first case was reported in Egypt, and the first suspected case in Nigeria was reported on February 27 in Lagos. As at June 10, 2021, Nigeria has tested 2,180,444 samples out of which 166,982 confirmed cases and 2117 deaths. In Kaduna State, there are 9103 confirmed cases with 65 deaths.²

To respond to this epidemic, the government instituted control measures with establishment of the Presidential Task Force on COVID-19 (PTF) to coordinate all the response activity of the country. Various specific measures were implemented at different times by the PTF and respective State Governments. These included the travel restriction within the country and with the outside world that began early, case identification, contact tracing and isolation, handwashing and hand hygiene, use of face masks, and several social distancing and stay-at-home measures with, in some cases, lockdowns of exceedingly high-risk areas which later involved large parts of the country as announced by various state governments. Additionally, all religious, social and cultural gatherings were banned; official government services and activities were also suspended indefinitely except essential services such medical, security and transportation of essential goods.³ By the middle of March 2020, it is estimated that 107 countries had implemented national school closures related to COVID-19, affecting 862 million children and young people, roughly half the global student population.^{4,7} In Kaduna State, the school closure due to COVID-19 pandemic affected 2,450,547 school pupils/students.

Recent literature has argued both for and against re-opening of educational institutions in the midst of surging COVID-19 cases across the globe^{4,7,8-13}. While the Nigeria Center for Disease Control and Prevention has issued a guideline on school re-opening, this document is not based on locally-generated empirical data. Therefore, in view of scarce information and pressure on countries to consider re-opening schools in the context of COVID-19 pandemic, there is the urgent need to conduct a research, albeit rapid to guide policy makers on course actions for school to re-open. The Kaduna State Government was quick to impose several restrictions on all forms of gatherings early during the pandemic: schools, markets, churches and mosques were closed indefinitely. However, after 6-7 months of schools' closure, schools were re-opened in a step-wise manner between October and November while strictly complying with COVID-19 prevention protocols such as temperature check at entrance for all staff and students/pupils, compulsory wearing of face masks, handwashing with soap and water and/or regular use of hand sanitizer as well as

all other guidelines against COVID-19 infection as stated by the NCDC and the Kaduna State COVID-19 Task Force¹⁴.

As the pandemic soars in Nigeria in general and Kaduna State in particular, and with mounting pressure from parents and students to re-open schools, there is urgent need to assess the readiness and willingness of school teachers, school administrators, parents and students alike towards re-opening schools. This readiness is in terms of knowledge, risk perception and practices of staff towards prevention and control of COVID-19 as well as what needed to be provided by the schools to implement COVID-19 prevention protocol such as availability of hand sanitizers, face masks, adequate water supply and hand washing equipment. Across the world, it has been documented that pupils and students alike have suffered psychologically from lock-down including sexual violence such as rape or attempted rape and domestic violence beside losing vital period of their education due to the COVID-19 lockdown^{15,16}. Parents are equally overwhelmed by increased household chores from continuous presence of children at home. Thus, the need to guide policy-makers on strategies/options available for school resumption necessitated the conduct of this study.

MATERIALS AND METHODS

Area of study

The study area is Kaduna State, northwestern Nigeria. Kaduna is a trade center and a major transportation hub for the surrounding agricultural areas, with its rail and road junction. The 2020 population estimates as used for planning in the state population is projected as 8,252,400¹⁷.

Currently, Kaduna State has 541 public secondary schools with 4,210 primary schools. A total of 1,823,583 primary school pupils were enrolled as at February 2020, based on the 2018/2019 Annual School Census¹⁸. There are 37,957 teachers giving a ratio of one teacher to 48 pupils. There are 2,923 private schools in the State, of which 960 have primary classes, 589 schools have Junior classes while 472 schools have Senior classes with total student enrollment of 255,181 in private primary school with 19,573 teachers giving a ratio of teacher to pupil of 1:13.

Study Design

We conducted a school-based cross-sectional descriptive study.

Study Population

All the teachers, school administrators and other staff (office assistants, account staff, security, matrons etc.)

of public and private educational institutions in Kaduna State (Primary and Secondary) constituted the study population.

Sampling

We adopted a non-probability sampling technique by purposively selecting schools with highest students'/pupils' enrollment as well as most popular in each of the three senatorial zones in the State. Thus, both public and private schools were selected provided they satisfied these criteria. Based on the 2018/2019 Annual School Census, lists of schools, students'/pupils' enrolment were obtained from the Kaduna State Ministry of Education for the purpose of this selection¹⁸. In each senatorial zone (North, Central and South) five schools were purposively selected based on the following algorithm:

1. Secondary:
 - a. Public: Urban and Rural
 - b. Private: Urban
2. Primary: Public: Urban and Rural

At the end, there were 5 schools selected in each LGA:

1. One Public Secondary in Urban Area (preferably located at LGA headquarters)
2. One Public Secondary in Rural Area (preferably in the second biggest town/village in the LGA)
3. One Private Secondary in Urban Area (preferably located at LGA headquarters)
4. One Public Primary (preferably located at LGA headquarters)
5. One Public Primary in Rural Area (preferably in the second biggest town/village in the LGA)

Survey Questionnaire

We developed two set of questionnaires: one was administered to all teachers and other staff to assess their knowledge, risk perception and level of practice of prevention of COVID-19. This questionnaire was developed from various COVID-19 questionnaires used in Saudi Arabia, Pakistan, Iran, Ethiopia and Egypt that interviewed general population to a large extent and the questions were further contextualized for the Nigerian settings.¹⁹⁻²³ The questionnaire was divided into the following sections: i) knowledge; questions about knowledge included knowledge of the nature of the causative agent, transmission modes, symptoms of the disease, prevention, respiratory hygiene and source of information on the knowledge; ii) perception; perception about efficacy of preventive measures such as use of face of face masks, handwashing, use of hand sanitizers, level of risk of contracting the disease, self-perception of severity of disease if one contacts the disease; iii) practice of prevention; frequency of complying with preventive measures such face mask, complying with physical

distancing, social/religious gatherings. The second questionnaire was developed to assess the schools' readiness to provide facilities to implement anti-COVID-19 measures. This questionnaire was administered to schools' administrators and information collected included their demographics, availability of regular supply of water, sanitation facilities, other materials/supplies such face masks, soap and water, hand sanitizers, handwashing points for students/pupils and staff.

Data Collection

The two sets questionnaires were administered as a verbal structured interview using a field-adapted electronic data collection tool, Kobo Toolbox.²⁴ Each interviewer downloaded the scripted questionnaire onto his/her android mobile and/or electronic device.

Data Analysis

The collected data were collated and analyzed using Stata 14.¹⁵ Descriptive statistics such as frequency, mean, median, standard deviation and proportions were used to summarize results across socio-demographic characteristics, knowledge and adherence to preventive measures of COVID-19. Sixteen questions were asked about symptoms of COVID-19; those who knew all are considered to have adequate knowledge of symptoms while those that knew fifteen or less are considered to have inadequate knowledge of symptoms.

Ethical Consideration

Kaduna State Ministry of Health Ethical and Research Committee provided the approval for this research (NHREC/17/03/2018; dated 25th August 2020). Operational approval was granted by the Directorate of Schools, Kaduna State Ministry of Education and all the selected schools were informed ahead of time before the arrival of the research team. Verbal informed consent was obtained from the respondents before commencement of interview. Cultural, religious and traditional sensitivities of the respondents were respected. Participant confidentiality was respected during interview and analysis of survey results. Data were collected anonymously, and all results were presented in aggregate so that no individual participant can be identified.

RESULTS

The results are presented in Tables 1-5. In all, 1065 staff comprising of teachers (75.8%), school administrators (4.8%), nurse/midwife (0.6%), security guards, matrons/hall wardens (5.5%), account officers (1.2%) and other categories of staff (6.1%) were interviewed in 55 schools across the nine selected local government areas (LGAs) of the State. Seven hundred

and thirty-nine (or 59%) of the respondents are aged 30-49 years with average age of 40 years. Five hundred and eighty-four (or 55%) are female; 86% are either currently married (84%) or previously married (2%) and 90% have higher degrees. Four hundred and eleven (38.6%) are in public primary schools followed by those in public senior secondary schools (28.5%) then those in public junior secondary schools (13.0%).

Table 2 show information on knowledge of respondents regarding source of information, causative agent, mode of transmission, symptoms of COVID-19, knowledge of preventive measures and their assessment either adequate or inadequate. Three commonest sources of information on COVID-19 are the television (72.5%), radio (61.1%) and social media platforms (56.8%). With regard to knowledge

Table 1: Sociodemographic characteristics of respondents in a school survey on COVID-19, Kaduna State, November 2020

Characteristics	N (%)
Age (years)	
Mean±SD	40.8±9.2
Age categories s(years)	
20-29	96 (9.0)
30-39	419 (39.3)
40-49	320 (19.8)
50-70	230 (21.6)
Sex	
Female	584 (54.8)
Male	481 (45.2)
Marital status	
Currently married	898 (84.3)
Not married	146 (13.7)
Previously married	21 (2.0)
Education	
No formal education	7 (0.7)
Primary	29 (2.7)
Secondary	56 (5.3)
Higher	962 (90.3)
Others (e.g. Masonry, artisan)	11 (1.0)
Position of respondent	
Administrator	51 (4.8)
Teacher	807 (75.8)
Administrator/Teacher	64 (6.0)
Nurse/Midwife	6 (0.6)
Security/guard/matron/hall warden	59 (5.5)
Account officer	13 (1.2)
Others (Messengers, grounds men, cleaners)	65 (6.1)
LGA Location of Staff	
Igabi	116 (10.9)
Chikun	133 (12.5)
Zangon Kataf	78 (7.3)
Jaba	60 (5.6)
Jema'a	109 (10.2)
Kaduna North	63 (5.9)
Kaduna South	114 (10.7)
Sabon Gari	240 (22.5)
Zaria	152 (14.3)
Type of school	
Public primary	411 (38.6)
Private primary	71 (6.7)
Public JSS	138 (13.0)
Public SSS	303 (28.5)
Private SSS	74 (7.0)
Others (Faith-based, e.g. Islamiyyah, Catholic)	68 (6.4)

Table 2: Knowledge of respondents in a school survey on COVID-19, November 2020

Item	Yes n (%)
Heard of COVID-19?	1059 (99.4)
Source of information	
Television	768 (72.5)
Radio	647 (61.1)
Newspaper	312 (29.5)
Social Media	601 (56.8)
Handbill/Leaflets	56 (5.3)
Neighbors/Friends	160 (15.1)
Health care workers	100 (9.4)
All of above	8 (0.8)
What is the causative agent/cause of COVID-19?	
Germs	79 (7.4)
Evil spirit	6 (0.6)
Curse for gods	33 (3.1)
Virus	808 (75.9)
Plague	24 (2.3)
5G Network	13 (1.2)
Bacteria	42 (3.9)
Divine punishment from god	45 (4.2)
Created by China	107 (10.1)
Created by America	8 (0.8)
Breathing bad air	18 (1.7)
Don't know	56 (5.3)
How is COVID-19 transmitted?	
Coughing	928 (87.1)
Sneezing	843 (79.2)
Contaminated surfaces	683 (64.1)
Singing aloud	122 (11.5)
Contaminated hands	450 (42.3)
Handshakes	632 (59.3)
Hugging/embracing	447 (42.0)
What are the symptoms of COVID-19?	
Dry cough	865 (81.2)
Fever	858 (80.6)
Sneezing	559 (52.5)
Runny nose	86 (8.1)
Tiredness	38 (3.6)
Difficult breathing	316 (29.7)
Abdominal pain	12 (1.1)
Stooling	5 (0.5)
Vomiting	18 (1.7)
Thirstiness	12 (1.1)
Bleeding	8 (0.8)
Sore throat	47 (4.4)
Excessive sweating	4 (0.4)
Body aches	15 (1.4)
Weakness	43 (10.8)
Headache	115 (10.8)
Knows how to prevent COVID-19?	1013 (95.1)
How do you ensure respiratory hygiene?	
Coughing into elbow	845 (79.3)
Coughing into handkerchief	395 (37.1)
Coughing into the air	25 (2.4)
Covers mouth with hands	87 (8.2)
Coughing into tissue paper	213 (20.0)
Is there a treatment/cure for COVID-19?	
Yes	403 (37.8)
Is there an effective vaccine against COVID-19?	
Yes	1013 (95.1)
Recommended duration of time to wash your hands:	
20 seconds	140 (13.2)
Others	925 (86.8)
Knowledge of cause of COVID-19:	
Adequate	647 (70.0)
Inadequate	278 (30.0)
Knowledge of prevention of COVID-19:	
Adequate	209 (19.2)
Inadequate	882 (80.8)
Knowledge of respiratory hygiene against COVID-19:	
Adequate	76 (7.0)
Inadequate	1015 (93.0)
Knowledge of transmission of COVID-19:	
Adequate	101 (9.3)
Inadequate	990 (90.7)
Knowledge of symptoms of COVID-19:	
Adequate	0 (0.0)

of cause of COVID-19, as much as 76% are aware that COVID-19 is a virus while up to 10% declared that China created the virus (or COVID-19). As much as 865 (81%) knew that both dry cough and fever are symptoms while 559 (53%) knew that sneezing is a symptom and 316 (30%) knew that difficult breathing

is equally a symptom. Other symptoms were mentioned by less than 10% of respondents (Table 2). Overall, 1013 (95%) knew how to prevent the infection. Specifically, as shown in Figure 1, 930 (92%) mentioned regular washing of hands, 840 (83%) mentioned social

vaccine for COVID-19. Approximately 70%, 5%, 7% and 9% respectively have adequate knowledge of the cause of COVID-19, prevention, respiratory hygiene and prevention; all the respondents have inadequate knowledge of symptoms. Table 4 shows

Table 3: Characteristics of knowledge of COVID-19 among respondents, November 2020

Item	Yes (%)
The information you received is sufficient:	
Strongly disagree	42 (3.9)
Disagree	24 (2.3)
Neutral	91 (8.5)
Agree	754 (70.8)
Strongly agree	154 (14.5)
Are you confused about the information you received?	
Never	692 (65.0)
Rarely	70 (6.6)
Sometimes	162 (15.2)
Usually	76 (7.1)
Always	65 (6.1)
How do you rate yourself on the level of knowledge of COVID-19?	
Very poor	30 (2.8)
Poor	70 (6.6)
Average	405 (38.0)
Good	364 (34.2)
Very good	196 (18.4)

distancing, 730 (72%) mentioned use of face mask and 537 (53%) mentioned physical distancing. Furthermore, 845 (79%) knew that coughing into the elbow is an aspect of respiratory hygiene. Also, 403 (38%) believed that there is a cure for COVID-19, while 1013 (95%) also believed that there is an effective

Table 4: Perception about COVID-19 among respondents, November 2020

Item	N (%)
Perceive efficacy of use of face mask?	
Effective	880 (82.7)
Neutral/Even	89 (13.3)
Ineffective	24 (4.0)
Perceive efficacy of handwashing?	
Effective	952 (89.4)
Neutral/Even	89 (8.4)
Ineffective	24 (2.3)
Perceive your risk of contracting COVID-19?	
Very unlikely	148 (13.9)
Unlikely	345 (32.4)
Even/Neutral	158 (14.8)
Likely	355 (33.3)
Very likely	59 (5.5)
Perceive your severity of COVID-19?	
Very mild	135 (12.7)
Mild	357 (33.5)
Moderate	325 (30.5)
Severe	168 (15.8)
Very severe	80 (7.5)
Confident in taking measures to prevent COVID-19 infection?	
Strongly agree	29 (2.7)
Agree	922 (86.6)
Neutral	67 (6.3)
Disagree	7 (0.7)
Strongly disagree	40 (3.8)

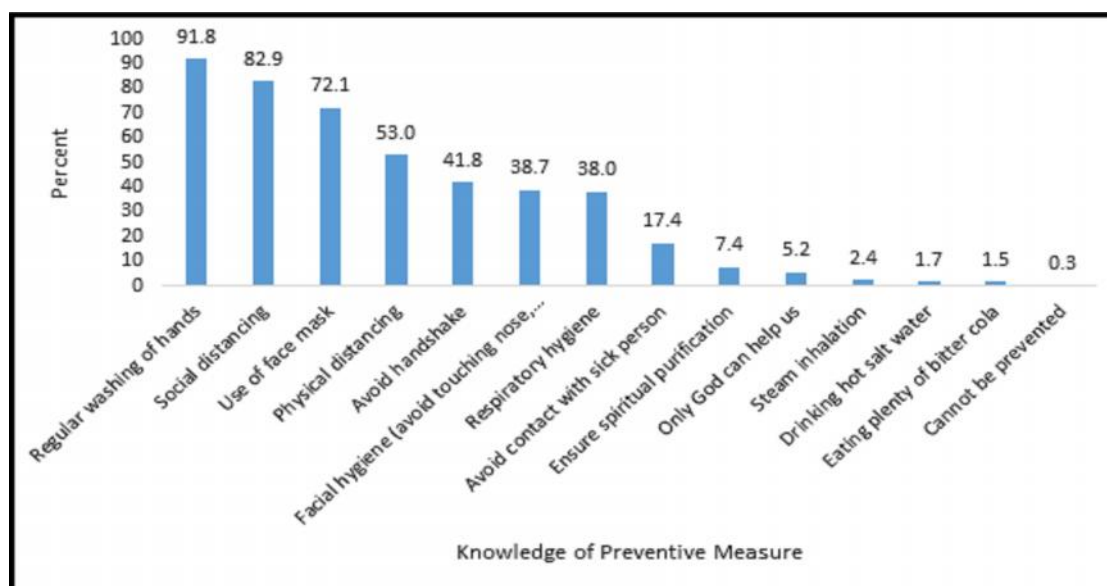


Figure 1: Percent distribution of knowledge of preventive measures

Table 5: Practice of prevention against COVID-19 among respondents in a survey, November 2020

Item	N (%)*
Ever used soap and water to wash hands to prevent COVID-19 infection?	
Yes	1031 (96.8)
Ever used hand sanitizer to prevent COVID-19 infection?	
Yes	954 (89.6)
Ever used a face mask to prevent COVID-19 infection?	
Yes	1063 (99.8)
Used a face mask to prevent COVID-19 infection in previous 24hours?	
Yes	1019 (95.6)
Used hand sanitizer to prevent COVID-19 infection in previous 24hours?	
Yes	906 (85.1)
Attended a mass gathering in previous 24hours?	
Yes	413 (38.8)
If attended a mass gathering in previous 24hours, did you wear a face mask?	
Yes	375 (90.8)
Face masks available at your school?	
Yes	947 (88.9)

*Indicates multiple responses

different aspects of perception of COVID-19. Approximately, 83% (880) perceived that face masks are effective in preventing COVID-19 transmission while 89% (952) indicated that handwashing is efficacious. About 39% (414) indicate that their level of self-perceived risk of contracting COVID-19 is likely/very likely. Further, 23% believed that it will be severe/very severe infection if they contract the disease. Table 5 is about practice of prevention in which 97% (1031) have ever used soap and water to wash hands; 90% (954) have ever used hand sanitizer; 99% (1063) have ever use face mask; 96% (1019) have used face mask in previous 24 hours and 906 (85%) have ever hand sanitizer in previous 24 hours. In the previous 24hours, 39% (423) have attended a mass gathering out of which 91% (375) used face mask. Nine hundred and forty-seven (89%) of the respondents declared that face masks are available in the schools but only 147 (14%) have ever attended workshop/seminar on COVID-19.

DISCUSSION

We conducted this study at the peak of the COVID-19 pandemic in Kaduna State, Nigeria at a time when the Government was contemplating re-opening schools following 7 – 8 months (April –November 2020) of school closure to control the spread of COVID-19. The purpose was to assess the knowledge, risk perception and practices of prevention of COVID-19 among staff of selected schools in Kaduna State and to use the information gathered to advise the Government on how to re-open schools. Our study presents uniqueness since it focused on school teachers and other support staff in primary and secondary schools in Kaduna State. Similar studies have been

conducted but among different populations: health care workers²⁵⁻²⁸ or general population.¹⁹⁻²³

Regarding source of information on COVID-19, television, radio and social media are the three commonest sources of information. Using knowledge of fever and dry cough (81% in both situations) as indicators of sufficient knowledge of COVID-19, it is safe to declare that teachers and other support staff have good knowledge of COVID-19. However, in this study we also assessed knowledge in terms of knowledge of causative agent, knowledge of prevention, knowledge of respiratory hygiene, knowledge of transmission and knowledge of symptoms and categorized as adequate or inadequate. Using this benchmark, only knowledge of causative agent can be considered to be good. In general population in Iran, Honarvar and his colleagues reported similar findings. They concluded that the overall knowledge of their participants as regards preventive measures, common symptoms of COVID-19, severe symptoms requiring medical attention and phone numbers to call when in need was inadequate.²¹ Other researchers from China reported different findings with respect to knowledge of COVID-19. Chen reported that residents of Anhui province of China have high levels of awareness of symptoms, routes of transmission, using masks, hand washing, and treatment of COVID-19 with low awareness of atypical symptoms.²⁹ In terms of sources of information, our study showed that television, radio and social media platforms are the three commonest sources, in that order. This finding is similar to what Honarvar reported.²¹ However, an online survey among general population in Nigeria and Egypt

showed that the internet (social media platforms) and television are the two commonest sources of information with 84% and 44% of the participants utilizing them as sources.³⁰ Similar results of preponderance of internet (social media platforms) as sources of COVID-19 information are reported by Abdelhafiz and Chen.^{31,29}

Attitudes and risk perceptions serve as mediators between knowledge and practices; the two have important role in adoption of healthy practices in preventing diseases. They also serve as facilitators of health behaviour change.^{32,33} Our study shows that about 83% and 89% believed that use of face mask and proper and regular handwashing are efficacious in preventing the infection while up to 39% believed that they are likely to contract the disease respectively; and that 23% perceived that the infection would be severe in them. In a Thai study, as much as 70% considered the disease to be serious and dangerous and a further 75% considered themselves at risk of contracting the disease³⁴ while less than half (44 %) considered themselves at risk of contracting the disease in another study.²¹ Our study further showed that as much 89% are confident in adopting preventing measures against COVID-19. This is much higher than the levels reported by Honarvar and Sirchan.^{21,34} These researchers reported 75% and 15% being responsible or confident in abiding with COVID-19 prevention protocols.

Our study reported on use of soap and water to wash hands, hand sanitizers, face masks, and avoidance of mass gathering/social gathering. We also reported knowledge of the following preventive measures: social distancing, physical distancing, regular hand washing, use of face mask, facial and respiratory hygiene, avoidance handshakes etc. (Table 2). From literature, COVID-19 prevention practices vary widely between geographic areas and demographic groups. For instance, in our study, we reported that approximately 97%, 90% and 100% had ever used soap and water to wash hands, hand sanitizers and face mask respectively. Furthermore, in the previous 24hours, we reported that 96% of our respondents had used face mask while 85% had used hand sanitizer; 39% had attended mass gathering in previous 24hours of which 91% had used face masks. Among the Chinese, 98% used face masks when going for outdoor activities compared to 24% of US population.^{35,36} Similarly, from North Central of Nigeria, Reuben and colleagues reported 93%, 96% and 82% practice of social distancing, personal hygiene and face masks respectively.³⁷

CONCLUSION

While knowledge of COVID-19 is suboptimal, perception is positive and practice is high. Thus, teachers/staff need to be well informed through targeted and tailored-made education and encouraged to sustain current levels of preventive measures. Schools need to be provided with adequate preventive commodities to ensure compliance to COVID-19 prevention protocols.

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