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Original article

# Knowledge, perception and practices toward COVID-19 among care receivers attending a university medical center in Nigeria: A cross-sectional study

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**ABSTRACT**

**Background:** Knowledge is one of the contributing factors formulating the perception and attitude of people towards disease outbreaks, which in turn drives compliance to effective prevention and control measures. The current cross-sectional study assessed the knowledge, perception and practices (KPP) towards COVID-19 pandemic among care receivers attending Ahmadu Bello University medical center (ABUMC) in Zaria, Nigeria. **Methods**: Data were collected using self-administered questionnaires which covered demographic characteristics and related KPP questions. Responses were tabulated, frequencies and percentages were computed for descriptive purposes, while independent t-test and ANOVA were used to depict statistical differences between demographic groups. **Results**: Among the 150 participants who answered the questionnaires, 58.7% were female, 62.0% were undergraduate students at various level of studies, 25.5% held a bachelor degree, about half of them (52.7%) never married, and have mean age of 29.90 ±10.66 years. Majority of the participants, especially women are knowledgeable about COVID-19 with overall mean knowledge score of 4.91 ±1.68 (70.14%). Similarly, 16-25years age range, and higher educational status were found to possess significantly ($p$<0.05) higher mean knowledge score. They hold positive perceptions, and have correct practices towards COVID-19 prevention. However, significant proportion of the participants (12.0%) believed that the disease does not exist in Nigeria. **Conclusion**: This study has demonstrated that, majority of the care receivers attending ABUMC have good knowledge, perception and practices toward COVID-19. Nevertheless, certain knowledge gaps and bad practices toward the pandemic were equally identified, which highlight the need to reiterate targeted health awareness campaigns about the pandemic in Nigeria.

## Introduction

The pandemic novel coronavirus disease 2019 (COVID-19) is a highly contagious viral infection caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). The most commonly reportable symptoms of the disease ranged from mild (or asymptomatic) to severe illness characterized by fever, dry cough, dyspnea, sore throat, myalgia, fatigue, nausea, diarrhea, chest

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pain, and headache [1-3]. Rapid inter human transmission through infectious respiratory droplets has been established globally [3,4].

The disease has no specific therapy; prevention through vaccination and non-pharmacological means such as compulsory wearing of face masks in public, regular and thorough hand washing using soap and water or alcohol-based sanitizers, crowd avoidance, and maintaining physical distancing among others are known to be the only ways to avoid the spread of COVID-19 [5,6]. However, despite these precautionary measures being observed in several places, the battle against COVID-19 lingers with increased confirmed cases in many parts of the world [7].

Nigerian government like most countries in the world, have adopted the above-mentioned basic infection prevention and control measures used globally to fight previous outbreaks and pandemics. The government through Nigeria center for disease control (NCDC) has been very active in disseminating prevention messages on print and social media; and there are appreciable efforts for screening, quarantine, and providing more treatment centers for COVID-19 patients. Yet, at the time of the present study, precisely, February 28, 2021 Nigeria had about 1.22% COVID-19 mortality rate [8]. Similarly, as of May 27, 2021 the country has documented over 1.24% mortality rate; while globally, approximately 2.06% COVID-19 mortality rate was reported [9]. Therefore, there is an urgent need to assess the level of knowledge, beliefs and practices towards COVID-19 among general public, so as to curtail the persistent nationwide spread of the disease in Nigeria [10].

Moreover, in a developing country like Nigeria, which have ill-equipped healthcare system, limited trained medical personnel, economic crises, as well as widespread myths and misconceptions among general populace; the significance of preventing the rapid spread of COVID-19 cannot be over emphasized. However, people's behaviors and adherence to any disease preventive or control measures is affected by their knowledge, attitudes, perceptions, and practices towards the disease [11-14]. Central to this, are the ways and manners observed in hospitals being focal point of diseases. Furthermore, several similar KPP studies about COVID-19 have been done in Nigeria, however, high majority of them were online web-based surveys [10,15-17] hence, possible selection bias for only those having access to the internet exist, such surveys also lack information about the elderly and few have focused on health care receivers. Therefore, the present study assessed the knowledge, perceptions and practices (KPP) towards COVID-19 among care receivers attending Ahmadu Bello University Medical Centre (ABUMC) in Nigeria.

## Materials and Methods

### *Ethical clearance*

Ethical approval for the study was obtained from the Research and Ethics Committee of ABUMC. Informed consent was gained from every participant after due explanation of the aim and objectives of the study. The principles of voluntary participation, privacy, confidentiality and anonymity of subjects were strictly considered and followed

### *Study location, period and participants*

The cross-sectional study was conducted at ABUMC, Zaria, Nigeria. Zaria is one of the two major cities in Kaduna State, occupying part of the central high plains of Northern Nigeria. It is located at about 670m above sea level on latitude 11.11°N and longitude 7.73°E. The study was done from February 16, 2021, the week immediately after the long Nigerian lockdown of schools and religious centers to March 3, 2021. All accessible care receivers attending the university medical center within the specified period were the target population for this study. The study was carried out through convenience sampling technique (i.e., only available care receivers who were willing to participate in the study were sampled).

### *Study instrument*

A self-administered questionnaire, designed based on the information derived from previously validated similar questionnaires [14, 18-20] was used to collect the participants' data while fully observing all COVID-19 prevention protocols. The questionnaires were distributed and monitored by the authors, and any participant who cannot accurately interpret any statement was clarified in the best language he/she understood. The questionnaire covered two main parts; the demographic characteristics of the participants such as age, gender, educational level, marital status and religion; and questions related to their KPP towards COVID-19. All the questions were closed-ended with the exception of one (Pc5) designed as semi-open to allow for incorporation of "others" category

for an opinion not explicitly captured by the available options.

The knowledge section consisted of seven questions (K1-K7) regarding the etiology, clinical manifestations, disease transmission, treatment and precautions/prevention of COVID-19 **(Table 1)**. Each of the knowledge questions had four related responses which were later collapsed to three as 'correct response', 'incorrect response' and 'no knowledge' during analyses. Assessments of the participants' perceptions towards COVID-19 comprised of eight questions (Pc1-Pc8) such as government efforts in curbing the spread of the disease, vaccines and vaccination acceptance. While the section that assessed the participants' practices towards COVID-19 has four questions (P1-P4) centered around adherence to prevention and control measures **(Table 1)**.

**Table 1.** Self-administered questionnaire on knowledge, perceptions, and practices toward COVID-19 among care receivers attending a university medical center in Nigeria.

| Questions | Options |
|---|---|
| **K1**. What is the cause of COVID-19? | Bacteria, Virus, 5G network, I don't know |
| **K2.** The main symptoms of COVID-19 are fever, difficulty in breathing, dry cough, and catarrh. | Strongly agree, Agree, Not agree, I don't know |
| **K3**. People with COVID -19 who do not have fever or coughing cannot infect others. | Strongly agree, Agree, Not agree, I don't know |
| **K4.** COVID -19 can be acquired through | Closed contact with infected person, Contaminated surfaces, waving infected persons, I don't know |
| **K5**. The most severe form of COVID -19 is seen among elderly people (over 60 years of age) in Nigeria | Strongly agree, Agree, Not agree, I don't know |
| **K6.** There is no effective/specific treatment for COVID -19 | Strongly agree, Agree, Not agree, I don't know |
| **K7.** The use of face masks, hand hygiene, social distancing, and restriction of movement through lock down does NOT reduce the spread of COVID -19 | Strongly agree, Agree, Not agree, I don't know |
| **Pc1.** Government has/is doing enough to prevent the spread of the disease | Strongly agree, Agree, Not agree, I don't know |
| **Pc2**. People who have contact with COVID -19 patients should be immediately isolated, investigated and managed. | Strongly agree, Agree, Not agree, I don't know |
| **Pc3.** Following the inception of the COVID-19 pandemic, how would you rate your awareness of the disease? | Highly aware, Aware, Partially aware, Not aware |
| **Pc4.** COVID-19 will soon be eliminated in Nigeria? | Strongly agree, Agree, Not agree, I don't know |
| **Pc5.** Please, why do you choose the above answer (Pc4)? | I believe in divine intervention, Good government policies & synergistic effect of stakeholders, Corruption and greed in managing the pandemic, Others |
| **Pc6**. As the Government is trying to acquire COVID-19 vaccines, do you wish to be vaccinated? | Yes. No. Not sure. Only when giving with incentives |
| **Pc7.** Would you buy the vaccine if available to vaccinate yourself or family member? | Yes, No, Not sure, When affordable |
| **Pc8.** Globally, some people have reservations regarding COVID-19. Please, how do you view the pandemic in Nigeria? | I believe COVID-19 is real and is claiming several lives. The disease is real, but few propagandas attached, The disease is real but many conspiracies attached, I believe it does not exist in Nigeria |
| **P1.** How often do you follow COVID-19 updates from national center for disease control (NCDC)? | Very Frequent, Frequent, Sometimes, Not at all |
| **P2.** As a preventive measure to COVID-19, how often do you wash your hands especially when you interact with others? | Very Frequent, Frequent, Sometimes, Not at all |
| **P3**. Do you wear face mask when going out of your home? | Yes, No, when reminded, only when compel to do so |
| **P4.** How often do you avoid crowd because of COVID-19? | Very Frequent, Frequent, Sometimes, Not at all |

**Data analyses**

All the data collected were entered into Microsoft Excel and cross checked for possible error to ensure its accuracy. Descriptive statistics was applied to calculate percentages and frequencies for the participants' demographics, KPP toward COVID-19 using IBM SPSS software version 26 (NY, USA). All correct responses in the knowledge section were assigned 1 point, while incorrect answers were assigned 0 point; and the total score ranged from 0-7 with higher score signifying better knowledge about COVID-19. The mean knowledge score was obtained from the summation of the correct responses, and results were expressed as mean ± standard deviation. The percentage knowledge scores were graded as excellent, good, fair, or poor for ≥ 80%, ≥ 60 but < 80%, ≥40 but < 60, and < 40%, respectively as similarly reported by some related studies [6, 21]. Independent t-tests or one-way analysis of variance (ANOVA) where appropriate, were employed to determine the statistical differences between groups for the selected demographic variables. The statistical significance level was set at $p < 0.05$

**Results**

***Demographic characteristics of the participants***

A total of 150 respondents participated in the study, out of which 58.7% were female, while 41.3% were male. The largest age range of the participants was 16-25 years old, while the overall mean age was 29.90 ±10.66years. In terms of occupation, majority of the participants (60.7%) were students at various levels of education, whereas significant quota of the participants was civil servants (24.7%). More than two-thirds of the participants (62.2%) were undergraduates, 25.5% held a bachelor degree or above, and about half of them (52.7%) never married. Greater portion of the participants (53. 3%) were Muslims, 40.7% were Christians, while smaller proportion (6.0%) neither believe in Islam or Christianity **(Table 2).**

***Knowledge of the participants towards COVID-19***

In general, the overall knowledge of COVID-19 among the study participants was good, with a mean knowledge score of 4.91 ±1.68. The participants' knowledge regarding the cause of COVID-19 was good (78.7%). Majority of the participants (93.3%) knew about the clinical manifestations of the disease, 78.7% rightly identified closed contact with infected persons and contaminated surfaces as the major source of acquiring COVID-19 (Table 2). However, large proportion of the participants erroneously understood that COVID-19 patients who do not have fever or coughing cannot infect others. Similarly, significant part of the participants (40.7%) thought that the use of face masks, hand hygiene, social distancing, and restriction of movement through lock down does not reduce the spread of COVID -19 **(Table 3).**

When the participant's knowledge was compared among the different demographics (Table 3), female participants (5.1 ±1.6) were found to be more knowledgeable about COVID-19 than male (4.6 ±1.7), however, the difference was not statistically significant ($p > 0.05$). The youths, particularly age range of 16-25 years (5.2 ± 1.5) and 26-35 years (5.1 ± 1.6) had significantly ($p < 0.05$) higher COVID-19 knowledge score as compared to the elderly who had the least COVID-19 knowledge score (2.3 ± 2.5). Undergraduate students were found to have significantly ($P < 0.05$) higher knowledge score (4.8 ± 1.6) than those at secondary (2.9 ± 1.8) and primary schools (3.3 ± 2.9). Likewise, there was a significant difference ($P < 0.05$) between Muslims (5.2 ±1.7) and Christian respondents (4.8 ±1.7) regarding the knowledge about COVID-19 **(Table 2).**

***Participants perception towards COVID-19***

The inclusive participant's perceptions towards COVID-19 are presented in **table (4)**. Larger proportion of the participants (42.0%) was convinced that the Nigerian government is doing enough to prevent the spread of COVID-19; however, significant portion of the participants (34.7%) believed the opposite. Furthermore, nearly all the participants (84.0%) held positive views towards immediate quarantine of COVID-19 patients or people who had contact with the patients. Although, majority of the participants (56.0%) had confidence that COVID-19 will soon be eliminated in Nigeria, most of them cited their faith in divine intervention (36.7%), rather than good government policies and synergistic effects of stakeholders (17.3%) in curbing the disease. Similarly, about 16.0% of the participants thought otherwise citing inadequate government will, corruption and greed in managing the pandemic as their main reasons. Nearly half of the respondents (47.3%) did not wish to be vaccinated against COVID-19 even if the vaccines are freely available, 19.3% are unsure if they would accept the vaccines, whereas 6.0% are

likely to accept only when giving with incentives. However, despite the obvious negative economic impact with scoring morbidity of COVID-19, some of the participants (12.0%) believed that the disease does not exist in Nigeria.

***Participants practices toward COVID-19***

The participants attachment to Nigeria center for disease control concerning COVID-19 updates was low (41.4%), with approximately half of the respondents hardly following the national center for information regarding the pandemic. Nevertheless, majority of the participants (65.3%) regularly washed their hands with soap or alcohol-based sanitizer as a means to protect themselves from getting COVID-19. However, large share of the respondents (32.0%) rarely practiced this important preventive measure; while about 2.7% never observed hand hygiene even after interacting with others. The study also showed that, though a high majority of the participants (87.3%) wore face masks when going out of their homes, 7.3% of the participants wear the masks only when compel to do so. In addition, most of the participants (61.3%) regularly avoid crowd to protect themselves from COVID-19 while some (10.7%) still socialized in defiance to government directives of physical distancing **(Table 5).**

**Table 2.** Demographic characteristics and knowledge about COVID-19 among care receivers attending a university medical center in Nigeria.

| **Characteristics** | **No. of participants (%)** | **Mean knowledge score (SD)** | **t / F** | ***p* – value** |
|---|---|---|---|---|
| Gender | | | | |
| Male | 62 (41.3) | 4.6 (1.7) | -1.855 | 0.066 |
| Female | 88(58.7) | 5.1 (1.6) | | |
| Age (years) | | | | |
| 16-25 | 68(45.3) | 5.2 (1.5) | 3.139 | 0.016 |
| 26-35 | 42(28.0) | 5.1 (1.6) | | |
| 36-45 | 24(16.0) | 4.5 (1.9) | | |
| 46-55 | 13(8.7) | 4.4 (1.6) | | |
| Above 55 | 3(2.0) | 2.3 (2.5) | | |
| Occupation | | | | |
| Student | 91(60.7) | 5.1 (1.4) | 2.012 | 0.115 |
| Employed | 37(24.7) | 4.8 (1.9) | | |
| Entrepreneur | 18(12.0) | 4.4 (1.9) | | |
| Unemployed | 4(2.7) | 3.5 (2.6) | | |
| Marital status | | | | |
| Never married | 79(52.7) | 5.1 (1.6) | 1.686 | 0.189 |
| Married | 60(40.0) | 4.6 (1.9) | | |
| Others | 11(7.3) | 5.5 (1.0) | | |
| Educational status | | | | |
| Primary | 3(2.0) | 3.3 (2.9) | 5.983 | 0.000 |
| Secondary | 8(5.3) | 2.9 (1.8) | | |
| Undergraduate | 93(62.0) | 4.8 (1.6) | | |
| Postgraduate | 38(25.3) | 5.4 (1.3) | | |
| Others | 8(5.3) | 5.9 (1.5) | | |
| Religion | | | | |
| Islam | 80(53.3) | 5.2 (1.7) | 3.164 | 0.045 |
| Christianity | 61(40.7) | 4.8 (1.7) | | |
| Others | 9(6.0) | 3.8 (1.0) | | |

Note: The category "others" under educational status denotes people with informal education, they have no certificates but can read and write

**Table 3.** Knowledge about COVID-19 among care receivers attending a university medical center in Nigeria (n = 150).

| Question (hints) | Correct response (%) | Incorrect response (%) | No knowledge (%) |
|---|---|---|---|
| K1). Causes of COVID-19 | 118 (78.7) | 22 (14.7) | 10 (6.7) |
| K2). Symptoms of COVID-19 | 140 (93.3) | 1 (0.7) | 9 (6.0) |
| K3). Infectivity of patients without fever | 93 (62.0) | 38 (25.3) | 19 (12.7) |
| K4). Transmission of COVID-19 | 118 (78.7) | 8 (5.3) | 24 (16.0) |
| K5). Most severe form of COVID-19 | 105 (70.0) | 21 (14.0) | 24 (16.0) |
| K6). No effective treatment for COVID-19 | 92 (61.3) | 18 (12.0) | 40 (26.7) |
| K7). Status of non-pharmacologic preventions | 71 (47.3) | 61 (40.7) | 18 (12.0) |

**Table 4.** Perceptions about COVID-19 among care receivers attending a university medical center in Nigeria (n = 150).

| Question | Options | Responses | |
|---|---|---|---|
| | | Frequency | Percentage (%) |
| Pc1). Is Nigerian government trying to control COVID-19? | Strongly agree | 24 | 16.0 |
| | Agree | 54 | 36.0 |
| | Not agree | 52 | 34.7 |
| | I don't know | 20 | 13.3 |
| Pc2). Should COVID-19 patients be quarantined? | Strongly agree | 85 | 56.7 |
| | Agree | 41 | 27.3 |
| | Not agree | 18 | 12.0 |
| | I don't know | 6 | 4.0 |
| Pc3). How do you rate your awareness about COVID-19? | Highly aware | 70 | 46.7 |
| | Aware | 56 | 37.3 |
| | Partially aware | 15 | 10.0 |
| | Not aware | 9 | 6.0 |
| Pc4). COVID-19 will be controlled? | Strongly agree | 35 | 23.3 |
| | Agree | 49 | 32.7 |
| | Not agree | 24 | 16.0 |
| | I don't know | 42 | 28.0 |
| Pc5). Reasons for choosing Pc4? | Divine intervention | 55 | 36.7 |
| | Good government policies | 26 | 17.3 |
| | Corruption and greed | 53 | 35.3 |
| | Others | 16 | 10.7 |
| Pc6). Do you wish to be vaccinated? | Yes | 41 | 27.3 |
| | No | 71 | 47.3 |
| | Not sure | 29 | 19.3 |
| | Only with incentives | 9 | 6.0 |
| Pc7) Would you buy the vaccines? | Yes | 22 | 14.7 |
| | No | 63 | 42.0 |
| | Not sure | 31 | 20.7 |
| | When affordable | 34 | 22.7 |
| Pc8). How do you view COVID-19? | COVID-19 is real & lethal | 31 | 20.7 |
| | Is real with few propagandas | 50 | 33.3 |
| | Is real but many conspiracies | 51 | 34.0 |
| | It does not exist in Nigeria | 18 | 12.0 |

**Table 5.** Practices toward COVID-19 among care receivers attending a university medical center in Nigeria (n = 150).

| Question | Options | Responses | |
|---|---|---|---|
| | | Frequency | Percentage (%) |
| P1). How often do you follow NCDC for COVID-19 updates? | Very frequent | 16 | 10.7 |
| | Frequent | 46 | 30.7 |
| | Sometimes | 72 | 48.0 |
| | Not at all | 16 | 10.7 |
| P2). How often do you practice hand hygiene? | Very frequent | 35 | 23.3 |
| | Frequent | 63 | 42.0 |
| | Sometimes | 48 | 32.0 |
| | Not at all | 4 | 2.7 |
| P3). Do you wear face mask? | Yes | 131 | 87.3 |
| | No | 4 | 2.7 |
| | When reminded | 4 | 2.7 |
| | Only when compelled | 11 | 7.3 |
| P4). How often do you avoid crowd? | Very frequent | 42 | 28.0 |
| | Frequent | 50 | 33.3 |
| | Sometimes | 42 | 28.0 |
| | Not at all | 16 | 10.7 |

**Discussion**

The high level of theoretical knowledge about COVID-19 recorded in the present study denotes good awareness of the disease among the study participants, and is in line with the findings of similar surveys conducted in different parts of the country [21-23]. Likewise, the significant difference in COVID-19 knowledge scores observed in the present study among different educational backgrounds is generally consistent with previous studies on COVID-19 in several parts of the world [6,24,25]. Similarly, the significantly higher knowledge score reported among youths, particularly those within the age range of 16-25years, and 26-35years old might not be far from the fact that these active age brackets are relatively more exposed to information regarding COVID-19 through both print and social media as earlier noted by **Ladiwala et al.** [6], **Gohel et al.** [20], **Bekele et al.** [26], and **Yue et al**. [27] in Pakistan, India, Ethiopia, and China, respectively. Thus, health education intercession would be most effective if it targets certain socio-demographics like elderly men and people with informal education. Conversely, the commonly reported significant difference between male and female gender was not observed in the present study. This could be chiefly due to the high share of male students in the current study as compared to the relatively larger proportion of older females in the previous studies [6, 17, 25].

Broadly, knowledge regarding COVID-19 directly influenced people's perceptions such as perceived risk, government policies, and efficacy belief towards COVID-19 [14]. Therefore, it can be presumed that most of those who possessed poor knowledge about the disease would have negative perceptions and risky practices toward COVID-19. However, it is worth noting that in some instances, acquisition of knowledge has not vividly influenced practices towards COVID-19; possible action gap in applying the acquired knowledge into practices has been documented [26]. Consequently, we encourage Nigerian government and concerned stakeholders to set priorities in information campaigns about COVID-19, and go beyond the rhetoric of lectures and presentation. There should be a resolute, targeted and continuous public health education focusing on providing awareness about the disease while stressing on the implementation of the acquired prevention knowledge into good practices.

Non-pharmacologic methods of COVID-19 prevention have been widely employed as the major means of preventing COVID-19. Their significance as the most critical approach for decreasing the risk of COVID-19 transmission has been well elucidated [5, 20, 28, 29]. Although, the

present study reveals regular use of face mask, hand washing, and social distancing among majority of the participants, appreciable proportion of the participants did not practice these simple, yet effective measures to reduce the spread of the pandemic. Similarly, in spite of the few controversies surrounding COVID-19 vaccines, vaccination remains the only way to acquire long lasting immunity to the virus; hitherto majority of the participants were not willing to be vaccinated against the disease, and this calls for immediate and resolute enlightenment.

The strength of the current study lies in the fact that it has covered the KPP of an understudied community of public which played a critical role in the fight against COVID-19. Moreover, data presented in the study were self-reported, hence, the issue of possible demographic selection bias of those having access to internet only, as seen in web-based surveys was avoided. However, the study has few limitations which cannot be ignored. This includes the use of convenience sampling technique with limited sample representativeness, as well as failure to subject the adopted validated questionnaire to additional (dual) validation to increase the reliability of the study.

## Conclusions

The current study has established that while majority of the care receivers attending ABUMC showed high level of knowledge and fairly good practices towards COVID-19 prevention and control measures; it is apparent that some people do not consider the danger posed by the pandemic serious, and are not following the government recommendations regarding the disease. The study has also highlighted the specific aspects of the KPP where incorrect responses were documented, and need to be improved. Similarly, in contrast to the high knowledge score among relatively young female care receivers; the study has equally unraveled serious misconceptions among the participants regarding the existence of COVID-19 in Nigeria. Thus, synergistic and concerted efforts from government, religious bodies and concerned stakeholders are recommended to correct the wrong perceptions, and improve the knowledge of the care receivers toward controlling the pandemic. Special preference should be giving to elderly males, unemployed individuals, people with low educational levels and unmarried because of their relatively poor knowledge scores about COVID-19.

## Conflict of interest

The authors have no conflicts of interest to declare that are relevant to the content of this article.

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## Authors' contributions

Bala Ningi Umar conceived and designed the study, and wrote the original draft of the manuscript; Nuhu Muhammad administered the project, collected and analyzed the data; while Kabiru Haliru Ahmad, Khadijah Usman, and Rahman Khaleequr participated in administering the questionnaires, revised the article critically and approved its intellectual content. All authors have reviewed and approved the final version of the manuscript.

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## Data availability

The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request

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