Knowledge, Attitudes and Practices Regarding COVID-19 in N'Djamena, Chad

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Abstract

The first African COVID-19 case was reported in Egypt in February 2020. Since then, Sub-Saharan countries have struggled to respond to the pandemic. Among them, Chad is characterized by a high rate of poverty and mortality, a high burden of infectious diseases, insufficient epidemiological surveillance and underdeveloped infrastructure. In this study, we explore the knowledge, attitudes and practices (KAPs) regarding COVID-19 within the Chadian population, to determine whether there are more vulnerable groups of the population that require greater attention from authorities. This study was designed as a cross-sectional survey conducted in N'Djamena, Chad, using a convenience sampling technique that included 2269 participants. The study was conducted in May and August 2020. Questions regarding technical concepts were answered incorrectly by most participants (83.65%). The population had better knowledge about concrete aspects of the pandemics, such as prevention measures and contagion. Regarding attitudes, 34.55% participants were very concerned about the possibility of being infected, 81.27% were unsatisfied/very unsatisfied with their social relationships after the pandemic began, and 68.44% thought that the pandemic was a disturbing/very disturbing issue. As for practices, 49.41% of men followed all preventive measures compared to 32.07% of women, and 3.04% of people with vulnerable jobs did not respect any of preventive measures compared to 1.19% of people without this condition. Gender, job conditions and educational level impact KAPs within the Chadian population. It is suggested that local authorities in Chad should consider these variables when developing health strategies.

Keywords COVID-19 · Chad · Africa · Public health · Knowledge · Attitude · Practices

Background

In December 2019, an outbreak of unusual pneumonia cases was reported in Wuhan, China [1]. By January 11, 2020, the etiologic agent was identified as SARS-CoV-2 and the clinical syndrome was named COVID-19 [2, 3]. Two months later, on March 11, 2020, the WHO declared COVID-19 a *pandemic* that had already reached 114 countries, affecting 118,000 people and causing 4291 deaths [4]. On February 14, 2020, the first African case was reported in Egypt. By April 2020, COVID-19 had already affected 10,000 people in 52 African countries [5]. Dr Matshidiso Moeti, the WHO Regional Director for Africa, asked then for "a decentralized response, which is tailored to the local context".

Since then, Sub-Saharan countries have struggled to respond to the pandemic, taking into account the particularities of their context [6]. On the one hand, the following factors may be considered *positive* and may have worked in their favor: A lower risk of importation and transmission due to a lower flow of transport and trade [7]; a younger demographic distribution [8], which is associated with lower mortality rates [9]; the experience accumulated from other recent epidemic outbreaks [10]; and other less obvious factors such as specific genetic variations and

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the continent's climatic characteristics [11]. On the other hand, many other factors suggested *greater vulnerability* in African countries, namely: Packed unregulated urban areas along with cultural practices that value social cohesion and social gatherings [6, 12]; higher levels of respiratory diseases [13]; concomitance with immunocompromising conditions such as AIDS, diabetes or malnutrition [14]; weak healthcare structures that are too dependent on private or external financing [15]; low human resources capacity, lack of critical equipment and vulnerable supply chains [16]; and other factors such as weak public administration, infrastructure patchiness, political instability and armed conflicts, less educated populations who are more permeable to potentially harmful misinformation, among others [12].

Given these particularities, it seems necessary to carry out tailored actions that consider the specific context of different countries [17]. In this regard, an evaluation of the knowledge, attitudes and practices (KAPs) regarding COVID-19 has proven useful to identify the most vulnerable communities to which health promoters should pay special attention [18].

To the best of our knowledge, no study of COVID-19 related KAPs has been conducted in the Republic of Chad. With an estimated population of 16 million [19], Chad is among the most vulnerable countries when it comes to coping with COVID-19 [11]. It has an understaffed, fragmented, and uncoordinated health system [20]. The country is characterized by a high rate of poverty and mortality, a high burden of infectious diseases, insufficient epidemiological surveillance and underdeveloped infrastructure [21]. Like other countries in the region, Chad declared a state of health emergency and adopted public health measures that included the mandatory use of masks, contact tracing, self-isolation or quarantine, closures of worship spaces, the prohibition of gatherings of more than 50 people, closures of airports and public transport limitations. Authorities also made public health recommendations, such as hand washing, breathing practices, and social distancing, while preparing the health systems for specific diagnoses and treatments [22, 23].

By December 11, 2020, Chad counted 1,655 confirmed cases and 102 deaths [24]. These relatively low figures need to be interpreted in the light of a low testing capacity and a fatality rate that goes over 6.1% [25]. Additionally, one must consider the social and economic impact, along with other long-standing health issues such as malaria, AIDS and tuberculosis, as well as from recent outbreaks of measles and Chikungunya that have affected the country [26].

In this study, we focused on the KAPs regarding COVID-19 specifically in N'Djamena, the capital of Chad. Our goal was to identify vulnerable social groups so as to inform policy makers in Chad, and thus contribute to the design of health strategies that consider population-specific needs.

Method

Study Design and Population

This study was designed as a cross-sectional survey using a convenience sampling technique. A structured questionnaire and the consent form given to respondents were designed by a group of health professionals at the University Hospital Complex "Le Bon Samaritain", N'Djamena. The study was conducted through May and August 2020, a period in which the government of Chad had recently implemented numerous social distancing policies in efforts to mitigate the spread of SARS-CoV-2 [22].

The study population included individuals from N'Djamena who understood French, were 18 or older, and could provide informed consent. Participation in this study was anonymous, consensual and voluntary, for which informed consent was provided by all prospective respondents.

Measures

The survey instrument used in this study was designed according to the recommendations for awareness and prevention of COVID-19 described by WHO guidelines [27]. The questionnaire was drafted and validated by a group of health professionals before being used in the study. Health experts were asked to assess the instrument and make suggestions regarding the accuracy of the test in evaluating KAPs relative to COVID-19, as well as the appropriateness of the questions based on the study population. In a pilot study, the questionnaire was administered by 10 health professionals to a sample of 18 people. Their opinions were used in reshaping the questionnaire into an easier and simpler instrument.

The final questionnaire designed for this study contained questions assessing socio-demographics, sources of information, as well as general knowledge, attitudes and practices (KAPs) regarding COVID-19. Sociodemographic variables included age, gender, marital status, level of education, occupation and work situation. Occupation was analyzed independently, and was transformed into a dichotomous variable (precarious job) following the advice of local experts.

The "knowledge" section included 5 items surveying awareness of COVID-19, sources of information, causes, modes of transmission, symptoms, individuals at risk and preventive measures. The "attitudes" section comprised 3 items including attitudes towards COVID-19 preventive measures, feelings and adaptive measures towards the pandemic, and perceptions towards the COVID-19

pandemic. The "practices" section included 4 items such as adherence to government disease prevention orders, use of face masks, and the appropriate ways for coughing and sneezing.

Statistical Analysis

Data on demographic variables is presented using mean and standard deviations. Associations between variables were analyzed with t-tests. STATA v.13 (StataCorp, 4905 Lakeway Dr. College Station, TX 77845) was used to carry out the statistical analysis.

Results

2269 participants accepted and completed the survey. The mean age of the participants was 31.04 (SD 10.96). 38.48% were female, 46.14% were married, 45.61% were protestants and 40.55% had vulnerable jobs. More demographic characteristics of the participants are shown in Table 1.

Knowledge

Questions regarding technical concepts, such as what COVID-19 is or what typical symptoms it causes, were mostly answered incorrectly. Only 371 (16.35%) answered correctly to both questions. Nevertheless, the study population had greater knowledge regarding concrete aspects of the pandemic, such as prevention measures and contagion, probably due to the fact that communication campaigns extensively informed upon these topics. Hence, only those 3 questions were further considered in the statistical analysis. 356 participants (15.69%) did not answer any of those questions correctly, 636 (28.03%) had one answer correct, 792 (34.91%) had two answers correct, and 485 (21.38%) answered all questions regarding knowledge correctly Table 2.

Attitudes

784 (34.55%) participants were very concerned about the possibility of being infected, 1844 (81.27%) were unsatisfied/very unsatisfied with their social relationships after the pandemics began, and 1553 (68.44%) thought that the pandemic was a disturbing/very disturbing issue.

Practices

44 participants (1.94%) did not correctly answer questions surveying everyday actions to prevent the contagion, 327 (14.41%) answered one question correctly, 366 (16.13%) answered two correctly, 688 (30.32%) answered three

Table 1 Demographic characteristics

Age (years); mean (SD)	31.04 (10.96)
Gender; n (%)	
Female	873 (38.48)
Male	1396 (61.52)
Marital status; n (%)	
Married	1047 (46.14)
Single	1018 (44.87)
Widowed	109 (4.8)
Divorced	95 (4.19)
Educational level; n (%)	
Never attended	228 (10.05)
Primary	274 (12.08)
Secondary	789 (34.77)
Higher education	978 (43.1)
Religion; n (%)	
Catholic	877 (38.65)
Protestant	1,035 (45.61)
Muslim	256 (11.28)
Animist	36 (1.59)
Other	65 (2.86)
Occupation; n (%)	
Student	999 (44.03)
Trader	312 (13.75)
Employee	260 (11.46)
Executive	90 (3.97)
Peasant	55 (2.42)
Housekeeper	175 (7.71)
Unemployed	215 (9.48)
Craftsperson	163 (7.18)
Precarious job (yes); n (%)	920 (40.55)

Table 2 Knowledge, attitudes and practice

	Number of correct answers (%)					Total
	0	1	2	3	4	
Knowledge	356 (15.69%)	636 (28.03%)	792 (34.91%)	485 (21.38%)	–	2269 (100%)
Attitudes*	157 (6.92%)	590 (26%)	975 (42.97%)	547 (24.11%)	–	2269 (100%)
Practice	44 (1.94%)	327 (14.41%)	366 (16.13%)	688 (30.32%)	844 (37.19%)	2269 (100%)

*For attitudes negative-emotion responses are reported

correctly, and 844 (37.2%) answered all questions correctly Table 2.

Social Factors on Knowledge, Attitudes and Practices

Among the factors associated with KAPs, gender, education and job vulnerability stand out. Regarding knowledge, 16.15% of women correctly answered all questions compared to 24.64% of men (p = 0.000). 4.82% of people without education correctly answered all questions compared to 21.38% of respondents with university education (p = 0.000). 14.57% of people with vulnerable jobs correctly answered all questions compared to 26.02% of people without this condition (p = 0.000). More results on knowledge based on social factors can be found in Table 3.

When analyzing attitudes, some interesting features emerged. Gender did not significantly influence attitudes, for which 24.63% of women negatively assessed all

questions exploring this dimension compared to 23.78% of men (p = 0.302). Education and work were associated to general attitudes, as 13.16% of people without education assessed the pandemic in a more positive way compared to 4.09% of university educated people (p = 0.000). 9.67% of people with vulnerable jobs assessed the pandemic in a more positive way compared to 5.04% of people without this condition (p = 0.000). More data on attitudes can be seen in Table 4.

Finally, when exploring the association between practices and the abovementioned social factors, similar results were found. 49.41% of men follow all preventive measures compared to 32.07% of women (p = 0.000). 14.91% of people without education follow all the preventive measures compared to 48.16% of university educated people (p = 0.000). 3.04% of people with vulnerable jobs do not respect any of the surveyed preventive measures compared to 1.19% of people without this condition (p = 0.000). Table 5 presents complete information on practices based on social factors.

Table 3 Knowledge by social factor

Factor	Correct answers; n (%)				Total
	0	1	2	3	
Gender*					
Male	171 (12.25)	359 (25.72)	522 (37.39)	344 (24.64)	1396
Female	185 (21.19)	277 (31.73)	270 (30.93)	141 (16.15)	873
Education*					
No education	107 (46.93)	70 (30.70)	40 (17.54)	11 (4.82)	228
Primary	98 (35.77)	88 (32.12)	62 (22.63)	26 (9.49)	274
Secondary	104 (13.18)	285 (36.12)	289 (36.63)	111 (14.07)	789
Higher education	47 (4.81)	193 (19.73)	401 (41.00)	337 (34.46)	978
Occupation*					
Precarious job	252 (27.39)	277 (30.11)	257 (27.93)	134 (14.57)	920
Unprecarious job	104 (7.71)	359 (26.61)	535 (39.66)	351 (26.02)	1349

*p = <0.05

Table 4 Attitudes by social factor

Factor	Negative assessment answers (%)				Total
	0	1	2	3	
Gender					
Male	89 (6.38)	356 (25.50)	619 (44.34)	332 (23.78)	1396
Female	68 (7.79)	234 (26.80)	356 (40.78)	215 (24.63)	873
Education*					
No education	30 (13.16)	77 (33.77)	80 (35.09)	41 (17.98)	228
Primary	23 (8.39)	75 (27.37)	110 (40.15)	66 (24.09)	274
Secondary	64 (8.11)	217 (27.50)	320 (40.56)	188 (23.83)	789
Higher education	40 (4.09)	221 (22.59)	465 (47.55)	252 (25.77)	978
Occupation*					
Precarious job	89 (9.67)	260 (28.26)	375 (40.76)	196 (21.30)	920
Unprecarious job	68 (5.04)	330 (24.46)	600 (44.48)	351 (26.02)	1349

*p = <0.05

Table 5 Practices by social factor

Factor	Compliance with measures (%)					Total
	0	1	2	3	4	
Gender*						
Male	26 (1.86)	193 (13.83)	209 (14.97)	404 (28.94)	564 (40.40)	1396
Female	18 (2.06)	134 (15.35)	157 (17.98)	284 (32.53)	280 (32.07)	873
Education*						
No education	13 (5.70)	76 (33.33)	44 (19.30)	61 (26.75)	34 (14.91)	228
Primary	8 (2.92)	66 (24.09)	60 (21.89)	84 (30.66)	56 (20.44)	274
Secondary	16 (2.03)	108 (13.69)	144 (18.25)	238 (30.16)	283 (35.87)	789
Higher education	7 (0.72)	77 (7.87)	118 (12.07)	305 (31.19)	471 (48.16)	978
Occupation*						
Precarious job	28 (3.04)	199 (21.63)	174 (18.91)	290 (31.52)	229 (24.89)	920
Unprecarious job	16 (1.19)	128 (9.49)	192 (14.23)	398 (29.50)	615 (45.59)	1349

*p = <0.05

Discussion

The emergence of COVID-19 in China and its rapid global spread has resulted in the largest pandemic in recent times, creating unprecedented public health challenges. As one of the poorest countries in the world [28], the population of Chad could be at greater risk of higher morbidity and mortality due to COVID-19.

To the best of our knowledge, this study is the first epidemiological survey aimed at assessing KAPs of individuals regarding COVID-19 in Chad. Collecting such information is necessary for the design and promotion of tailored public health measures. The objective of this study was, first, to estimate the population's knowledge, attitudes and practices relative to COVID-19, and second, to identify vulnerable groups that require special attention from local authorities.

Regarding *knowledge*, our study reports a lower level of awareness compared to similar studies carried out worldwide. Greater knowledge about COVID-19 was found in American [29], Asian [18, 30–32] and African countries [33–38]. For instance, the great majority of Nigerian respondents (99.5%) showed good levels of knowledge about COVID-19, which were significantly related to positive attitudes towards preventive measures [39]. Another study among Ugandan health care workers showed that, overall, 69% had sufficient knowledge, 21% had positive attitudes, and 74% followed good practices relative to COVID-19 [40]. Factors associated with knowledge were age (> 40 years old) and access to news media. Factors associated with good practices were age (> 40 years old) and level of education. Some discrepancies between our work and the abovementioned studies can be explained, at least partially, by substantial differences in the instruments used to assess KAPs. Discrepancies could also be due to lower educational levels in Chad compared to other African countries [28]. In addition, the majority of the Chadian population has limited access to television, social networks and the Internet, considering that media access should have a positive effect on levels of COVID-19 awareness [39, 41].

Results more similar to ours were found in a study of KAPs among chronic disease patients in North West Ethiopia [42]. Levels of poor knowledge and poor practices were 33.9% and 47.3%, respectively. Age, educational level, rural residency, and monthly income were significantly associated with poor knowledge levels. Being unmarried, as well as illiteracy, rural residency, low income, and poor knowledge were significantly related to poor practice levels.

As for *attitudes*, our study shows that more than a third of the participants (34.55%) were very concerned about the possibility of being infected. However, an Ethiopian study revealed that being infected with COVID-19 was highly threatening for nearly half of the study participants [42]. On the other hand, an American study reported that only 24.6% of respondents were highly worried about being infected with COVID-19 [43]. Such notable differences could be explained by different sociosanitary contexts in each country. People in highly developed countries may be more confident due to better-qualified health systems. Populations in African countries may tend to express more concern due to misinformation, lack of confidence in political measures and a sense of unpreparedness [36, 39]. It is worth noting that differences in how attitudes and risk perceptions were assessed can also make results difficult to compare.

In our study, only 37.2% of participants answered all questions regarding *practices* toward COVID-19 correctly. A similar prevalence of poor practices was found in an Ethiopian study [38], although not in studies conducted in Iran [44] and China [18]. A binational African survey reported that the majority of respondents (96%) practiced self-isolation and social-distancing, but only 36% followed *all* health recommendations [36]. Similarly, the majority of respondents in a Nigerian survey (79.5%) reportedly

followed precautionary measures including social distancing, improving personal hygiene, and wearing face masks during the lockdown period [39]. These results sharply contrast from those found among Sudanese residents, who reported low levels of compliance with proper practices towards COVID-19: Only 34.1% of those surveyed wore face masks, and 57.9% avoided shaking hands in recent days [37]. An Ethiopian study showed that hand washing (77.3%) and avoidance of shaking hands (53.8%) were dominant practices. Older ages and unemployment negatively predicted hand washing and avoidance of handshaking [38]. These results may reveal different levels of awareness and concern in study participants, leading to variation in the application of actions and behaviors. However, such disparities might also be influenced by cultural diversity, differences in outbreak phases within study areas, as well as divergences in government recommendations and policies.

Finally, correlations between knowledge levels and attitudes towards COVID-19 on the one hand, as well as preventive practices followed by the population on the other hand, have been well established in various studies [18, 36, 45–47]. Hence, an effective starting point for preventive measures seems to be to increasing knowledge and awareness about the disease. Furthermore, Burström and Tao reported that many of the potential risk factors for COVID-19 (e.g., disadvantaged socioeconomic groups, overcrowding, general poor health and underlying diseases, unviable conditions for social distancing, difficult access to healthcare facilities, etc.) tend to cluster around the same individuals and areas [48]. It is therefore important to identify vulnerable social groups for the design and implementation of effective preventive measures.

Identifying Vulnerable Groups

In order to control the spread of COVID-19, it is essential that public health officials know which groups are the most vulnerable [49]. There can be a tendency in the field of health education and promotion to think of infectious diseases from a biomedical viewpoint. As such, prevention and treatment of infectious diseases can sometimes be perceived to be solely within the clinical domain. Yet, the reality is that both nonclinical and clinical public health responses are required [50]. Not only physical vulnerability, but also social vulnerability has been associated with increased risk of COVID-19 detection and death rates [51]. Therefore, this pandemic confirms the call to redefine vulnerability in broader terms than strictly biological ones [52].

Vulnerable groups are those particularly exposed to a certain risk. Not only the elderly or patients with ill health and comorbidities are vulnerable to COVID-19, "but also people from a gradient of socioeconomic groups that might struggle to cope financially, mentally, or physically with the crisis" [52]. The Lancet continues as follows: "if vulnerable groups are not properly identified, the consequences of this pandemic will be even more devastating. Although WHO guidance should be followed, a one-size-fits-all model will not be appropriate. Each country must continually assess which members of society are vulnerable to fairly support those at the highest risk".

In efforts to answer this call, our study identifies particular social groups that are especially vulnerable as they face this pandemic. According to our findings, gender, job conditions and educational level significantly affect our population regarding health risks associated with COVID-19. Levels of KAPs are lower in women with lower levels of education and more precarious jobs. Therefore, health strategies designed by local authorities in Chad should consider those variables to generate specific interventions focused on groups at the highest risk.

Strengths and Limitations

According to the HDI, Chad ranks third among the least developed countries in the world [28]. It is, therefore, a critical context that needs to be analyzed by following strict scientific methods that allow for evidence-based health measures. Very few epidemiological studies have been conducted in Chad due to technical limitations, lack of local conditions, etc. All of this has resulted in some kind of scientific isolation [11, 20]. This study intends to fill this gap, and brings the particular concerns of a Sub-Saharan country to the global dialogue on health measures facing the COVID-19 pandemic.

The main limitation of this work is related to sample representativeness of Chadian community inhabitants within N'Djamena. Our study was dominated by respondents living in the city who were male (61.52%), single (53.86%), and who reached secondary education or higher (77.87%), therefore, findings for this survey among uneducated and rural populations in Chad might be quite different. Even if these figures are not representative of the Chadian population [28] and these results may not be extrapolated to the general population, a comparable gap has been described in other studies conducted in the region. [37, 39]. Nevertheless, despite this issue, it was possible to carry out an analysis comparing social groups with different characteristics, identifying some groups from the surveyed population, for whom measures against COVID-19 should be reinforced.

Conclusion

This study provides a comprehensive assessment of KAP levels observed from residents of N'Djamena, Chad, with regards to COVID-19. Given that a high level of awareness

has been shown to be a positive predictor of success in curtailing COVID-19, the vulnerable population (in our study, uneducated women with underprivileged jobs) would require special attention.

Efforts toward assessing KAP levels of underprivileged and vulnerable populations, as well as the dissemination of health education among these groups should be intensified. Considering the unique factors observed in different groups of the Chadian population would constitute a holistic and viable approach toward facing COVID-19.

Compliance with Ethical Standards

Conflict of interest The authors declare that they have no conflict of interest.

Ethics Approval Approval for this research was granted by the Institutional Review Board of the University Hospital Complex "Le Bon Samaritain" (N'Djamena, Chad). Furthermore, data obtained from each respondent were anonymous and treated confidentially.

Consent to Participate Participation in this survey was anonymous, consensual and voluntary with informed consent provided by all prospective respondents.

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