



Knowledge, Attitudes and Practices of COVID-19: A Case Study of Navakholo Sub-County, Kakamega, Kenya

Maximilla Wanzala¹, Elizabeth Omukunda², Stella Wanjala², Micky Olutende Oloo³

¹Department of Public Health, Masinde Muliro University of Science and Technology, Kakamega, Kenya

²Department of Biological Sciences, Muliro University of Science and Technology, Kakamega, Kenya

³Department of Physical Education, Exercise and Sports Science, Kenyatta University, Nairobi, Kenya

Email: micky.oloo.mf@gmail.com

How to cite this paper: Wanzala, M., Omukunda, E., Wanjala, S. and Oloo, M.O. (2024) Knowledge, Attitudes and Practices of COVID-19: A Case Study of Navakholo Sub-County, Kakamega, Kenya. *Open Access Library Journal*, 11: e11208.
<https://doi.org/10.4236/oalib.1111208>

Received: January 12, 2024

Accepted: February 26, 2024

Published: February 29, 2024

Copyright © 2024 by author(s) and Open Access Library Inc.

This work is licensed under the Creative Commons Attribution International License (CC BY 4.0).

<http://creativecommons.org/licenses/by/4.0/>



Open Access

Abstract

A viral illness called COVID-19 can be spread from one person to another. 2019 saw the first case of the virus reported in Wuhan, China, while 2020 saw Kenya record the first COVID-19 infection in Sub-Saharan Africa. To stop the virus from spreading, it is crucial to have the proper information, attitudes, and behaviors. There has been increased research on the impact COVID-19 had on the normal lives of people, however, studies of this effect on rural communities are scarce. Hence, the study was conducted to assess the level of knowledge, attitude, and practice, among residents of Navakholo sub-county, Kakamega, Kenya towards COVID-19. The study was a descriptive cross-sectional study and Quantitative methods were adopted. The study was carried out in Kakamega County in Kenya. The respondents were community-dwelling household members 18 years and above ($n = 278$). Data was analyzed through descriptive statistics, chi-square test of independence, and independent t-test which was used to check differences in knowledge and attitude between groups. Findings were considered significant at $p < 0.05$. The main outcome measures included knowledge, attitudes, and practices. From the analysis, 47% had a high level of knowledge of COVID-19. Almost three-quarters 74.2% reported that COVID-19 is transmitted through droplets from sneezing or coughing followed by through air 70.2%. Regarding who is at risk of contracting COVID-19, the elderly were reported by the majority to be at risk from COVID-19 94.4% followed by those with other underlying conditions 59.5%. The overall attitude was positive (65.6%). The majority of the respondents 82.5% were willing to do a voluntary COVID-19 test and 94.8% reported that COVID-19 is preventable with 65% reporting that it can be treated at home. Over three quarters 79.5% reported that they

have confidence that we can win the battle against the COVID-19 virus. With regards to practices, the majority of the respondents 89% reported that it is crucial to report a suspected case to health authorities, go for testing if they have fever and dry cough (79%), worn a mask when leaving home in recent days (99%) and avoided going to any crowded place including religious events in recent days (80%). An Independent t-test was conducted to establish whether mean age varied significantly by level of knowledge on COVID-19. Results indicated that there was a significant difference in mean age by level of knowledge on COVID-19 ($F = 13.19$, $p < 0.001$). A significant relationship was observed between religion, education level, marital status, employment status, and level of knowledge of COVID-19. Results indicated that there was no significant relationship between demographic characteristics and attitude toward COVID-19 (all $p > 0.05$). In conclusion, the overall computation revealed that generally majority of the respondents had high knowledge of COVID-19. The majority of the respondents showed positive attitudes and had good practices. The study recommends that the government should collaborate with telecom operators to disseminate COVID-19 messages promptly to their subscribers. Social media companies should enhance their fact-checking operations while search engines should limit information about COVID-19 from unverified websites.

Subject Areas

Public Health

Keywords

COVID-19, Kenya, Kakamega, Sub-Saharan Africa, Pandemic, Misconceptions, Outbreak, Knowledge, Attitude, Practice

1. Background

Coronavirus disease (COVID-19) is a newly found coronavirus-related infection. When an infected individual coughs or sneezes, the virus spreads mostly through saliva droplets or nasal discharge. The majority of people infected with the COVID-19 virus will develop mild to moderate respiratory symptoms and will recover without the need for special treatment. Older people and those with medical problems like cardiovascular disease, diabetes, chronic respiratory disease, and cancer are more likely to develop serious illnesses (Organization 2020) [1]. In December 2019, a new viral infection type appeared in Wuhan, China (Lu, Stratton *et al.* 2020) [2]; it has been called novel coronavirus disease (abbreviated COVID-19) by the World Health Organization. The unknown nature of the virus has caused an outburst of health systems generating alarming death rates in many countries worldwide (Hepburn, O'Callaghan *et al.* 2020) [3]. From reports of previous epidemics, studies reveal that the dispersal capacity of the COVID-19 virus is much wider than SARS or MERS (Petrosillo *et al.* 2020) [4].

This indicates the possibility of greater risk, the current coronavirus may be exceeding the ratios of infected persons and deaths previously reported (Wang, Xu *et al.* 2021) [5].

The coronavirus disease (COVID-19) has become an international health alarm (Organization 2020) [1]. Now, as the WHO reports, the number of people infected is around 148 million, and 3 million deaths across the globe by April 29, 2021 (Organization 2020) [1]. Because of Coronavirus disease has overcome geographical barriers, different countries started public health protocols to control the spread of the virus, much of them related to social distancing, hand washing, and lockdown of the cities (Zegarra-Valdivia, Vilca *et al.* 2020) [6]. Like other countries Ethiopia declared a state of health emergency and adopted public health measures that include the mandatory use of masks, contact tracing, self-isolation or quarantine, closure of workshop spacing, and the prohibition of gatherings (Beyene 2020) [7]. This critical condition has raised a variety of reactions among the population, causing distress, and massive fear.

The world community is fitting to slow down and finally stop the spread of COVID-19 that has claimed thousands of lives and sickened tens of thousands through improving the knowledge and practice of COVID-19 prevention methods, testing, and screening (Saqlain *et al.* 2020 [8], Defar, Molla *et al.* 2021 [9]). The battle against COVID-19 is continuing in China. To guarantee final success, people's adherence to these control measures is essential, which is largely influenced by their knowledge, attitudes, and practices (KAP) towards COVID-19 according to KAP theory (Zhong, Luo, *et al.* 2020) [10]. In Africa, the burden and impacts of the pandemic are less compared with Europe and the USA. This may be attributed to the late coming of the pandemic, low seeding rate, youthful demographics, and possible prior immunity to coronavirus-like infections (Njenga *et al.*, 2020) [11]. Still, the pandemic is accelerating in Africa and reached 5,637,942 million confirmed cases on July 4, 2021, according to the (Africa-CDC, 2020) [12] situation report.

In Kenya, since the announcement of its first case of COVID-19 in early March (Ministry of Health, 2020) [13], there has been a rise in COVID-19 cases, estimated at 320 at the start of this study rising to 607 within a week (NERC, 2020) [14]. In response, the Kenya government implemented a mix of public health response measures, including messaging to create awareness of preventive measures, such as the use of masks, practicing hand hygiene, and social distancing. Additionally, there were international travel bans and cessation of movements in and out of areas that exhibited high rates of infections. The government also implemented a dusk-to-dawn curfew in all 47 counties and shut down public places including schools, churches, and other social gatherings, to slow down the spread of the virus.

One of the first and recent studies analyzing attitudes and knowledge, about Coronavirus carried out in Hubei, conclude that attitudes towards government measures to contain the epidemic are highly associated with the level of knowledge about COVID-19 (Ferdous, Islam *et al.* 2020 [15], ZegarraValdivia, Vilca

et al. 2020 [6]). The authors detail that the higher the level of information, and education, the more the individuals would maintain a positive attitude towards COVID-19 preventive practices (Roy, Tripathy *et al.* 2020 [16], Zegarra-Valdivia, Vilca *et al.* 2020 [6]). A study conducted in the United States of America on awareness, attitudes, and actions related to COVID-19 revealed that seven out of ten participants (71.7%) correctly identified three COVID-19 symptoms and 69.8% were able to identify three prevention methods (Wolf, Serper *et al.* 2020) [17]. Another study in Bangladesh also indicated that 98.7% of students believed that hand washing with soap and water followed by avoiding touching your nose, mouth, and eyes with unwashed hands, the use of face mask/tissue when coughing or sneezing and wearing a clean surgical mask during their respiratory illness as the prevention methods for COVID-19 (Wadood, Mamun *et al.* 2020) [18].

It is also evident that besides their effect on human morbidity and mortality during the COVID-19 pandemic, there are equally troubling socio-economic consequences for affected countries and the whole world (Gopalan and Misra 2020) [19]. The government of Kenya is taking preventive measures but the number of people infected with COVID-19 has increased (Haftom *et al.* 2020) [20]. To strengthen prevention practice and restrict the spread of COVID-19, there is an urgent need to fill the knowledge, attitude, and practice gaps in terms of COVID-19 transmission mode and preventative techniques (Defar *et al.* 2021) [9]. In this study, we focused on the KAPs regarding COVID-19 specifically in the Navakholo sub-county community. Therefore, this study aimed to assess KAP towards vulnerable groups to inform Navakholo sub-county Public Health Institute's COVID-19 pandemic preparedness and response to daily situation reports, and thus contribute to the design of health strategies that consider population-specific needs. This study was also meant to give an overall image of Navakholo sub-county COVID-19 prevention practices and this can better prepare the government to statement future health emergencies involving infectious diseases. The results of this study will be important to inform future efforts focusing on societal readiness to comply with pandemic control measures.

2. Methods

This study focused on gathering quantitative information through the implementation of a cross-sectional study design. Participants were excluded because of an incomplete questionnaire and others due to lack of a consent form. The purpose of the study and the procedures of the questionnaire were explained to the participants. Those who agreed to participate completed an informed consent form and the questionnaire. The participants completed the questionnaires in person enabling them to ask questions or withdraw from the study at any time during the data collection. No incentive was provided to participants. All study protocols and the survey instrument were approved by the University Human Research Ethics committees and conducted following the ethical principles of the Declaration of Helsinki.

2.1. Participants

The population for this study will include all the households and caregivers that care for COVID-19 patients in Bunyala East of Navakholo sub-county, Kakamega County. A similar view was articulated by Feitsma (2007) [21] on issues of population in a study focusing on a population comprising of poverty-stricken people. There are various existing home-based care centers in Navakholo and surrounding villages. Then the targets, sets of measures, exercise procedures, sampling days, and details of the study which were conducted according to the study process, were explained to the subjects, and they were asked to hand in the consent form and study and sign the written pledge. The inclusion criteria participants aged 18 years and above who would understand the content of the study and agree to participate in the study. Researchers excluded potential participants who did not meet these criteria from the study. In this study, simple random sampling was used to determine the sample size of the target population.

2.2. Protocol

In assessing KAP, a questionnaire was used. The questionnaires were self-administered to overcome the difficulties arising from peer assistance and minimize the non-respondent prevalence. The knowledge section of the questionnaire consisted of several questions: regarding the characteristics of the disease, the symptoms of the disease, and the prevention and control of the disease these questions will either be in the form of yes, no or I don't know.

2.3. Statistical Analysis

The data collected was exported to Microsoft Excel 2016 for cleaning. All data were analyzed using IBM SPSS (statistical packages for social sciences) Statistics for Windows, version 26.0 (IBM Corp., Armonk, NY, USA). Statistical analysis that was used in this study was descriptive statistics such as a table (Frequency and Cross-tables) to describe the frequency and percentage. We assessed the distribution of continuous variables using histograms, probability distribution plots, and the Shapiro-Wilk test. Continuous variables with a normal distribution were described using means \pm standard deviations (SD) while the medians and interquartile ranges (IQR) were used for skewed variables. Categorical variables were reported as counts and percentages. The Chi-square test was used to compare categorical variables, while the Mann Whitney U and Kruskal Wallis tests were used for comparing medians of continuous variables between groups. Findings were considered significant at $p < 0.05$.

3. Results

The analysis was done based on the objectives of the research. Nine hundred and nineteen (919) respondents from 919 households were interviewed. Their median age (in years) was 40. The youngest was 14 years old while the eldest was 89

years old. The majority 653 (71%) were female and 861 (93.7%) were Christians. Five hundred and forty-six (59.4%) had attained a primary level of education and 716 (78%) were married. A higher proportion 449 (48.9%) were unemployed. The majority 689 (90.3%) reported having children as in **Table 1**.

3.1. Knowledge on COVID-19

Almost all the respondents interviewed 916 (99.7%) had heard about COVID-19.

The majority 865 (94.4%) reported having heard of COVID-19 from the radio, 476 (52%) from healthcare workers, and only 220 (24%) reported the source as print media. (**Figure 1**) COVID-19 was reported as a viral infection disease by 732 (79.9%) of the respondents, 81 (8.8%) bacterial with 103 (11.3%) reporting as don't know.

Table 1. Demographic information.

Characteristic	Frequency (%)
Gender	
Male	266 (29)
Female	653 (71)
Religion	
Christian	861 (93.7)
Muslim	57 (6.2)
Other	1 (0.1)
Highest education level	
None	10 (1.1)
Primary	546 (59.4)
Secondary	307 (33.4)
College/University	36 (3.9)
Other	20 (2.2)
Marital status	
Single	95 (10.3)
Married	716 (78)
Separated	8 (0.9)
Divorced	10 (1.1)
Widowed	90 (9.8)
Employment status	
Employed	40 (4.4)
Self-employed	398 (43.3)
Unemployed	449 (48.9)
Student	32 (3.5)
Have children	834 (90.8)

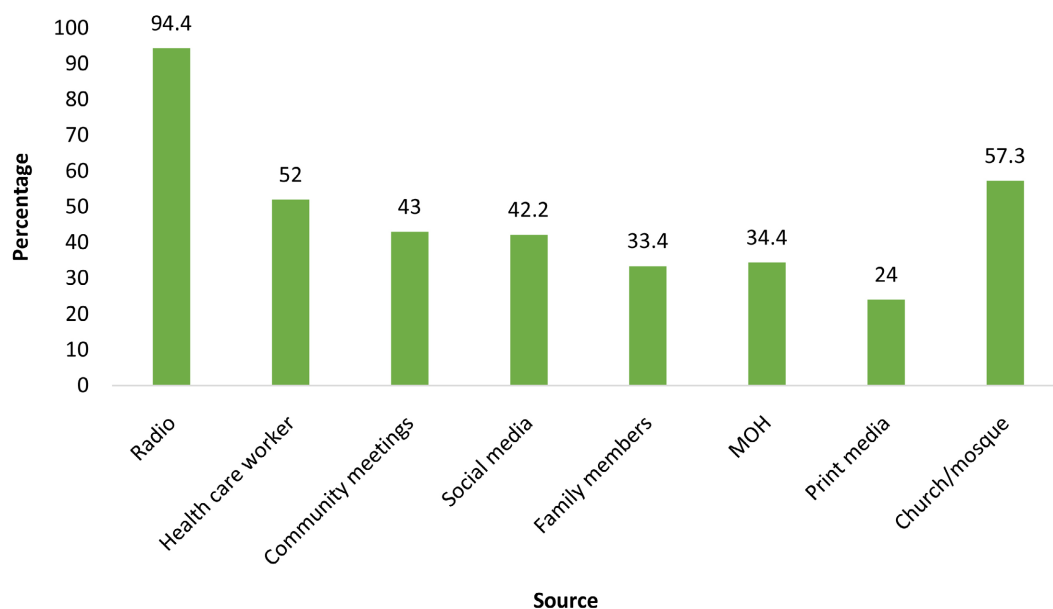


Figure 1. Source of information on COVID-19.

Almost three-quarters 680 (74.2%) reported that COVID-19 is transmitted through droplets from sneezing or coughing followed by air 643 (70.2%). Still, 233 (25.4%) reported that it is transmitted through body fluids. (Figure 2) Over three-quarters reported symptoms of COVID-19 as fever of 702 (76.6%), dry cough 693 (75.7%) and difficulty in breathing 706 (76.6%) (Figure 3).

The majority 847 (92.5%) reported that it takes 2 - 14 days before the COVID-19 symptoms appear after infection. (Figure 4)

Regarding who is at risk of contracting COVID-19, the elderly were reported by the majority to be at risk from COVID-19 865 (94.4%) followed by those with other underlying conditions 545 (59.5%). (Figure 5) The least at-risk reported were pregnant women at 329 (35.9%). Table 2 shows the results of COVID-19 prevention measures.

3.2. Overall Knowledge Level on COVID-19

Respondents were asked several questions to gauge their understanding/knowledge of several aspects of COVID-19. The overall score of knowledge was computed as total correct responses on COVID-19 questions out of the total expected correct responses and expressed as a percentage. The percentage was later categorized as high (75% to 100%), Moderate (50% - 74.9%), and low (below 50%).

From the analysis, as indicated in Figure 6, 432 (47%) had a high level of knowledge of COVID-19 while 113 (12.3%) had a low level of knowledge. Analysis of variance (ANOVA) test was conducted to establish whether mean age varied significantly by level of knowledge on COVID-19. Results in Table 3 indicated that there was a significant difference in mean age by level of knowledge on COVID-19 ($F = 13.19$, $p < 0.001$). The level of knowledge decreased with an increase in age.

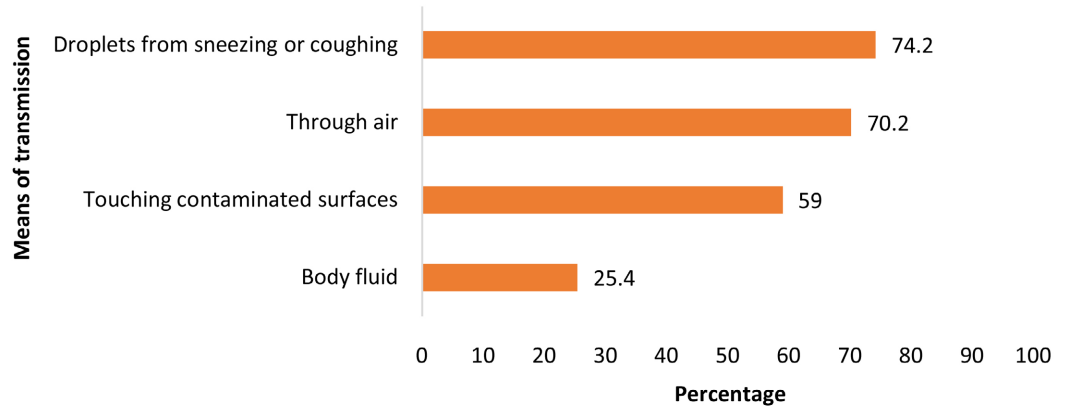


Figure 2. COVID-19 transmission mode.

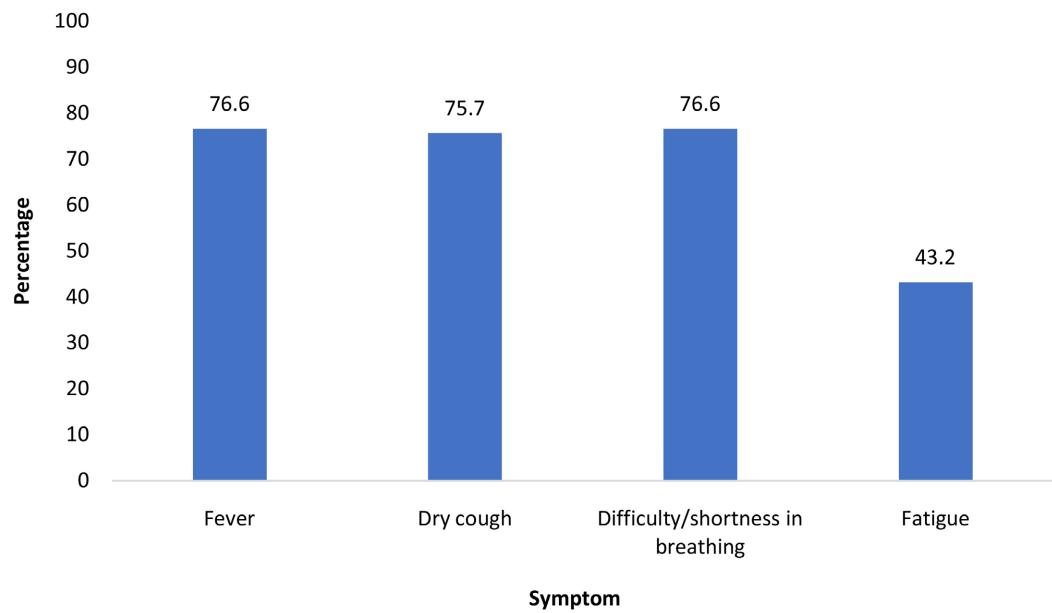


Figure 3. Symptoms of COVID-19.

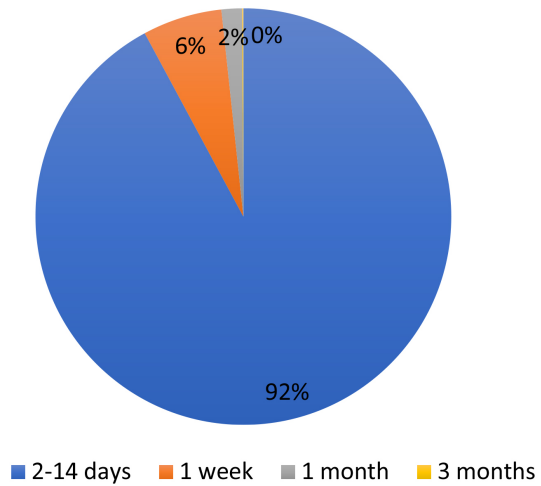


Figure 4. Incubation period for COVID-19.

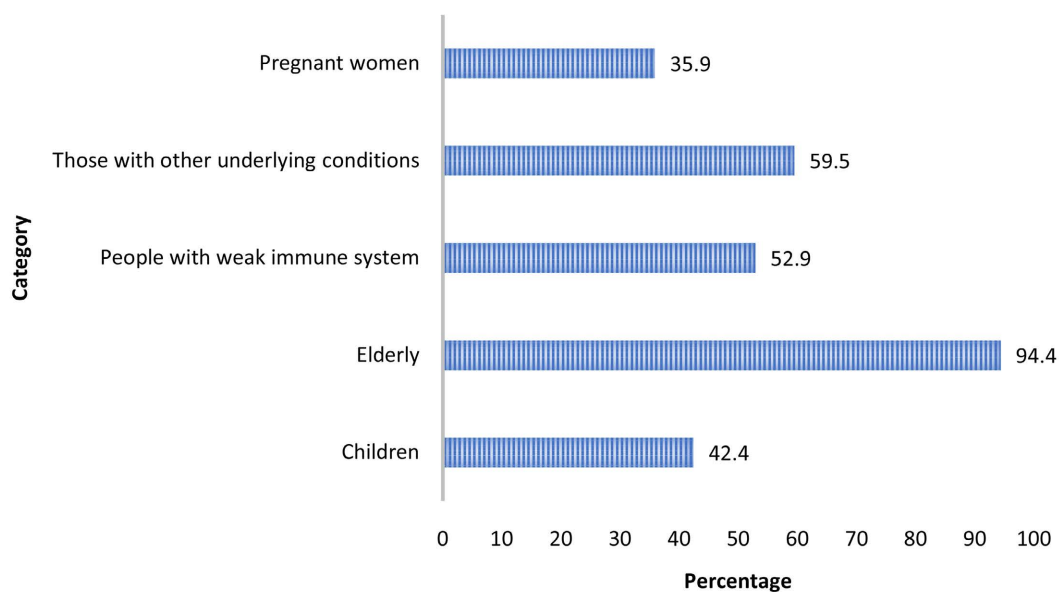


Figure 5. Those at risk from COVID-19.

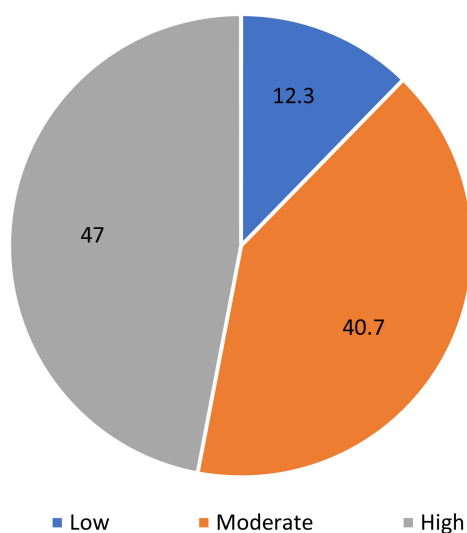


Figure 6. Level of knowledge on COVID-19.

Table 2. COVID-19 prevention measures.

Prevention measure/method	Frequency (%)
Hand wash with water only	75 (8.2)
Hand washing with running water and soap	867 (94.7)
Wearing masks	801 (87.4)
Drinking plenty of hot fluids and taking vitamins	265 (28.9)
Using hand sanitizers	563 (61.5)
Avoid touching mouth/nose/eyes	401 (43.8)
Avoiding crowds	529 (57.8)

Table 3. Analysis of variance between age and level of knowledge on COVID-19.

Knowledge level	Mean age	F-value	p-value
Low	47.2 ± 16.7		
Moderate	40.8 ± 14.1	13.19	<0.001
High	39.5 ± 13.5		

To determine exactly between which knowledge levels the mean age varies significantly a Post hoc analysis using the Turkey method was done. The results in **Table 4** indicated that the mean difference in age existed between those with high level and low level ($p < 0.001$) as well as those with low level vs moderate ($p < 0.001$).

A chi-square test was done to establish if there was a significant relationship between demographic variables/characteristics and level of knowledge on COVID-19. A significant relationship was observed between religion, education level, marital status, employment status, and level of knowledge on COVID-19 (all $p < 0.05$). A higher proportion of Muslims (63.2%) had a high level of knowledge of COVID-19 compared to 46% of Christians. The level of knowledge on COVID-19 increased with an increase in the level of education (primary (42%), secondary (56%), and college/university (63.9%). However, no significant relationship was observed between having children and the level of knowledge of COVID-19 ($p = 0.598$). A higher proportion of those who were single (53.5%) had a high level of knowledge compared to 46.5% of those married and 53.1% of the divorced/separated/widow. The majority of the employed (77.5%) had a high level of knowledge compared to students (53.1%), unemployed (45.2%), and self-employed (45.5%)

3.3. Multivariate Analysis (Multiple Linear Regression)

Multivariate multiple linear regression was conducted to identify demographic characteristics significantly associated with knowledge of COVID-19 controlling for confounders at a 95% confidence interval *i.e.* demographic characteristics that were significant at the bivariate level were run together in one model.

Findings in **Table 5** indicated that respondent's religion, level of education, and employment status were significant demographic characteristics influencing knowledge on COVID-19 ($p < 0.05$). Muslims were associated with a higher level of knowledge of COVID-19 compared to Christians ($p = 0.003$). Those with no education were associated with a lower level of knowledge of COVID-19 ($p < 0.001$). Those with secondary level education were associated with a higher level of knowledge on COVID-19 ($p < 0.001$) compared to those with primary. Students and those employed were associated with higher levels of knowledge on COVID-19 compared to the self-employed ($p < 0.001$ and $p = 0.044$) for employed and students respectively.

Table 4. Correlation between demographic characteristics and level of knowledge on COVID-19.

Characteristic	Level of knowledge			χ^2 -value	p-value
	Low	Moderate	High		
Gender					
Male	89 (13.6%)	271 (41.5%)	293 (44.9%)	5.814	0.055
Female	24 (9%)	103 (38.7%)	139 (52.3%)		
Religion					
Christian	110 (12.8%)	355 (41.2%)	396 (46%)	15.045	0.005
Muslim	2 (3.5%)	19 (33.3%)	36 (63.2%)		
Other	1 (100%)	0 (0%)	0 (0%)		
Education level					
None	5 (50%)	5 (50%)	0 (0%)	49.279	<0.001
Primary	75 (13.7%)	239 (43.8%)	232 (42.5%)		
Secondary	26 (8.5%)	109 (35.5%)	172 (56%)		
College/university	0 (0%)	13 (36.1%)	23 (63.9%)		
Other	7 (35%)	8 (40%)	5 (25%)		
Marital status					
Single	5 (5.3%)	39 (41.1%)	51 (53.5%)	17.634	0.007
Married	83 (11.6%)	300 (41.9%)	333 (46.5%)		
Others (Div, sep, widowed)	25 (23.2%)	35 (32.4%)	48 (44.4%)		
Employment status					
Employed	1 (2.5%)	8 (20%)	31 (77.5%)	22.065	0.001
Self-employed	60 (15.1%)	157 (39.5%)	181 (45.5%)		
Student	1 (3.1%)	14 (43.8%)	17 (53.1%)		
Unemployed	51 (11.4%)	195 (43.4%)	203 (45.2%)		
Have children					
No	8 (9.4%)	38 (44.7%)	39 (45.9%)	1.029	0.598
Yes	105 (12.6%)	336 (40.3%)	393 (47.1%)		

Table 5. Multiple linear regression.

Variable	Unstandardized Coefficients		t	p-value	95% CI	
	B	Std. Error			Lower Bound	Upper Bound
(Constant)	69.694	1.109	62.845	0.000	67.518	71.871

Continued

Gender (Male)	0.646	1.349	0.479	0.632	-2.001	3.293
Religion (Muslim)	7.390	2.457	3.007	0.003	2.567	12.213
Religion (Other)	-35.779	18.376	-1.947	0.052	-71.843	0.285
Marital status (Other)	-1.380	1.889	-0.731	0.465	-5.088	2.327
Marital status (Single)	1.559	2.704	0.577	0.564	-3.747	6.865
Education (College)	5.579	3.278	1.702	0.089	-0.855	12.012
Education (None)	-21.121	5.678	-3.720	<0.001	-32.264	-9.978
Education (other)	-7.839	4.217	-1.859	0.063	-16.115	0.436
Education (Secondary)	6.141	1.289	4.764	<0.001	3.611	8.670
Employment (employed)	11.963	3.102	3.857	<0.001	5.876	18.050
Employment (student)	8.154	4.045	2.016	0.044	0.216	16.092
Employment (unemployed)	1.878	1.236	1.519	0.129	-0.548	4.304
Have children (No)	-5.521	2.844	-1.941	0.053	-11.103	0.062

3.4. Attitude towards COVID-19

The majority of the respondents 756 (82.5%) were willing to do a voluntary COVID-19 test and 868 (94.8%) reported that COVID-19 is preventable with 596 (65%) reporting that it can be treated at home. Regarding rating personal chances (risk) of infection with COVID-19, 368 (40.1%) rated as moderate, 231 (25.2%) as high (Figure 7). Figure 8 shows the likelihood that COVID-19 will continue in the country.

Over three quarters 805 (79.5%) reported that they have confidence that we can win the battle against the COVID-19 virus. However, 97 (10.5%) disagreed that we can win the battle against the COVID-19 virus. (Figure 9) The scores for the eight items measuring attitude were summed and calculated as a percentage of the total. The percentage was then classified as positive attitude ($\geq 75\%$) and negative attitude ($< 75\%$). Over half of the respondents 603 (65.6%) scored a positive attitude towards COVID-19 as in Figure 10.

A chi-square test was conducted to establish if there was a significant relationship between demographic variables/characteristics and respondents' attitudes towards COVID-19. Results in Table 6 indicated that there was no significant relationship between demographic characteristics and attitude towards COVID-19 (all $p > 0.05$).

Independent samples t-test was conducted to establish whether there is a significant difference in age between those with positive attitudes and those with negative attitudes. The results as in Table 7 indicated that the mean age for those with positive attitudes was 40.9 ± 0.6 while for those with negative attitudes was 41.2 ± 0.8 . However, the difference in the mean age between the two groups was not statistically significant ($t = 0.382$, $p = 0.703$). This means that the age of the respondents did not significantly influence their attitude towards COVID-19.

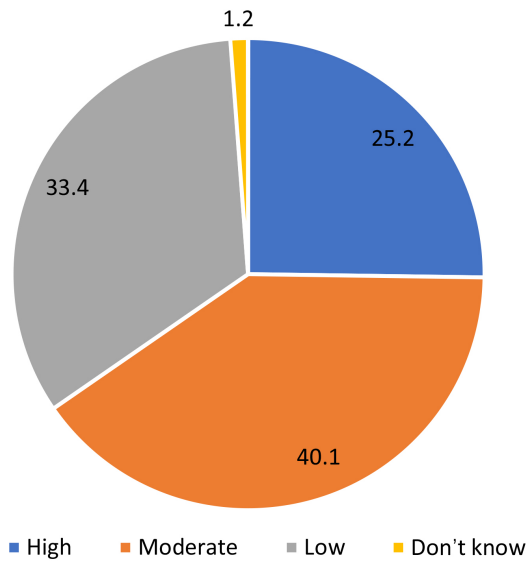


Figure 7. Rating chances of infection with COVID-19.

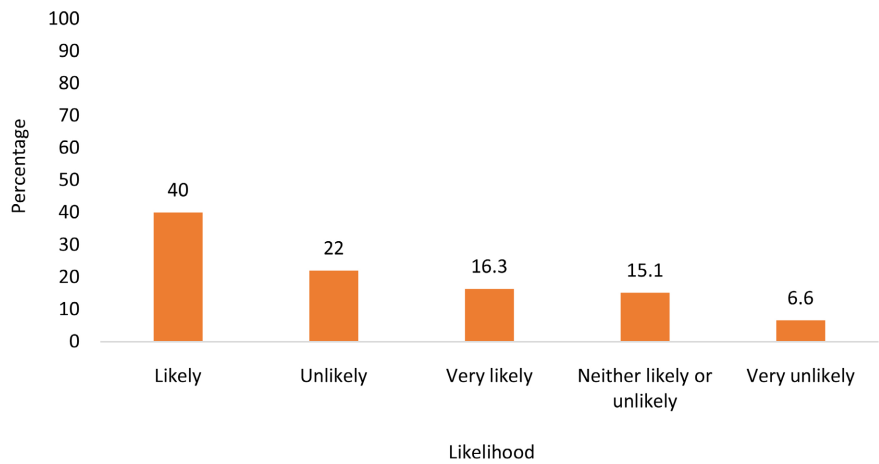


Figure 8. Likelihood that COVID-19 will continue in the country.

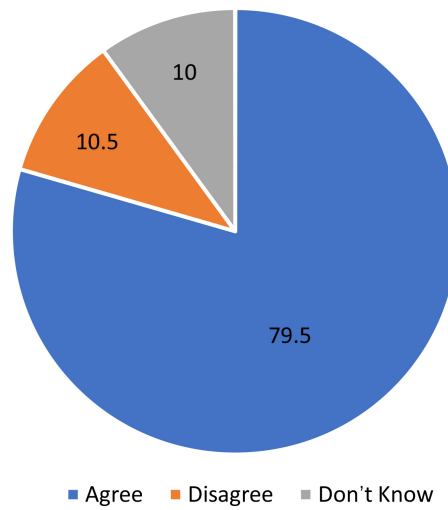


Figure 9. Whether COVID-19 will finally be successfully controlled.

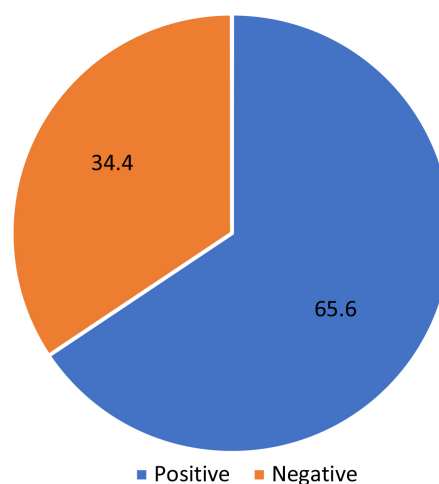


Figure 10. Attitude towards COVID-19.

Table 6. Correlation between demographic characteristics and attitude toward COVID-19.

Characteristics	Attitude		χ^2 -value	p-value
	Negative	Positive		
Gender				
Male	219 (33.5%)	434 (66.5%)	0.719	0.397
Female	97 (36.5%)	169 (63.5%)		
Religion				
Christian	299 (34.7%)	562 (65.3%)	2.960	0.228
Muslim	16 (28.1%)	41 (71.9%)		
Other	1 (100%)	0 (0%)		
Education level				
None	5 (50%)	5 (50%)	7.566	0.109
Primary	199 (36.5%)	347 (63.6%)		
Secondary	91 (29.6%)	216 (70.4%)		
College/university	11 (30.6%)	25 (69.4%)		
Other	10 (50%)	10 (50%)		
Marital status				
Single	37 (38.5%)	58 (61.5%)	5.225	0.156
Married	233 (32.5%)	483 (67.5%)		
Others (Div, sep, widowed)	46 (42.6%)	62 (57.4%)		
Employment status				
Employed	13 (32.5%)	27 (67.5%)	3.596	0.309
Self-employed	125 (31.4%)	273 (68.6%)		
Student	10 (31.3%)	22 (68.8%)		
Unemployed	168 (37.4%)	281 (62.6%)		
Have children				
No	35 (41.2%)	50 (58.8%)	1.915	0.166
Yes	281 (33.7%)	553 (66.3%)		

Table 7. Comparison of mean age by attitude.

Knowledge level	Mean age	t-value	p-value
Negative	41.2 ± 0.8		
Positive	40.9 ± 0.6	0.382	0.703

3.5. Practice towards COVID-19 Prevention/Control

Majority of the respondents (89%) reported that It is crucial to report a suspected case to health authorities, will go for testing if they had fever and dry cough (79%), worn a mask when leaving home in recent days (99%), avoided going to any crowded place including religious events in recent days (80%), been washing your hands with soap and running water for at least 20 seconds each time in recent days (86%), been avoiding touching eyes, nose, and mouth with hand/fingers in recent days (77%), been covering mouth and nose when coughing or sneezing, and washing your hands after in recent days (90%), been avoiding close contact with anyone who is sick, especially those with flu or cold symptoms such as fever, cough, or sneezing in recent days (86%), been cleaning and disinfecting frequently touched objects and surfaces (83%), been staying at home if sick, except to get medical care (80%), been avoiding shaking hands with others (83%) and maintaining social distance (90%) among others as in **Table 8**.

4. Discussion

The objective of this study was to assess KAP among respondents on the COVID-19 pandemic. The majority of respondents know that there is a pandemic and COVID-19 is caused by a virus according to research done by (Qutob and Awartani, 2021 [22]; Wu and Munthali, 2021 [23]). Almost all of the respondents knew the means of reducing the transmission rates, ways of preventing the disease, the mode of transmission, and the causative agent of COVID-19 aligning with the works of (Gebretsadik *et al.*, 2021 [24]; Shrestha *et al.*, 2021 [25]) where the majority had similar knowledge. This can be credited to the efforts of various Government and Private Establishments in the circulation of information on COVID-19 in Africa. Sub-Saharan African countries used the invested responses to similar outbreaks in the past to sensitize and raise awareness of COVID-19 (Massinga Loembé *et al.*, 2020) [26].

The research showed that a high number of the respondents had a sufficient level of knowledge about COVID-19. This aligns with the reports of (Hager *et al.*, 2020 [27]; Lee *et al.*, 2021 [28]) who disagree with the findings of (Desalegn *et al.*, 2021) [29] who had a lower level of knowledge. The high level of knowledge can be attributed to the level of alertness the world gave COVID-19 during the pandemic period. In addition, the median age of the respondents was 40 years, this age bracket has the highest internet usage (Chiedozie *et al.*, 2021 [30]; Pew Research Center, 2021 [31]) and the Internet is a common source of COVID-19 information (Erinoso *et al.*, 2021 [32]; Olaimat *et al.*, 2020 [33]). A

Table 8. Practices towards COVID-19.

Practice	Frequency (%)
It is crucial to report a suspected case to health authorities	816 (89.1)
Action if had a fever and dry cough	
Go for testing	729 (79.5)
Buy medicine from the counter	40 (4.3)
Avoided going to any crowded place including religious events in recent days	729 (79.5)
worn a mask when leaving home in recent days	820 (99.3)
Been washing your hands with soap and running water for at least 20 seconds each time in recent days	792 (86.4)
Been avoiding touching my eyes, nose, and mouth with my hand/fingers in recent days	700 (76.5)
Been covering your mouth and nose when coughing or sneezing, and washing your hands in recent days	822 (89.7)
Been avoiding close contact with anyone who is sick, especially those with flu or cold symptoms such as fever, cough, or sneezing in recent days	786 (85.8)
Been cleaning and disinfecting frequently touched objects and surfaces	764 (83.4)
Been staying at home if sick, except to get medical care	730 (79.7)
Avoiding shaking hands with others	761 (83.1)
Maintain social distance	720 (89.5)
Procured mask and possibly sanitizer	795 (86.8)
Traveled outside the home in recent days using public transport	488 (53.3)
Practice prevention measures given by local health care authorities	824 (90)
Encouraging others in contact to observe the basic prevention strategies suggested by the MOH	857 (93.5)

significant relationship was observed between religion, education level, marital status, employment status, and level of knowledge on COVID-19 (all $p < 0.05$) hence this also supports this assumption.

Assessment of the level of Attitude towards COVID-19 showed that the respondents had a high attitude towards COVID-19. 79.5% of them believe that COVID-19 can be successfully controlled, agreeing with the findings of (Pal *et al.*, 2020) [34]. This can be attributed to the various information that has been passed across on the various means of transmitting COVID-19. 94.8% reported that COVID-19 is preventable with 65% reporting that it can be treated at home. This belief can be ascribed to the successful control of recent outbreaks such as Ebola in Africa. Similar research in Nigeria (Isah *et al.*, 2020) [35], Ethiopia

(Aynalem *et al.*, 2021) [36], and Tanzania (Rugarabamu *et al.*, 2020) [37] also showed the belief of the respondents in the control of COVID-19. Regarding rating personal chances (risk) of infection with COVID-19, 40.1% rated it as moderate, 25.2% as high, and many believed that the climate in Africa helped reduce spread. Chitungo *et al.* (2020) [38] reckoned that low testing and under-reporting of cases should not be strictly taken as the major causes of low cases in Africa because most African governments showed the political will to put measures in place at the onset of the pandemic. Chitungo *et al.* (2020) [38] also agreed with Hopman *et al.* (2020) [39] that climatic conditions can affect the low cases though there is no evidence backing it.

The level of practice among the respondents was high. This high level of practice towards COVID-19 is good as there is also a high level of knowledge and Attitude towards COVID-19. This high level of practice is inconsistent with studies in Malawi (Li *et al.*, 2021) [40] and Nigeria (Habib *et al.*, 2021) [41]. The majority of the respondents wear facemasks always in public. However, washing hands after touching surfaces was ignored by the majority of respondents, this can be due to behavioral patterns and inadequate Water Sanitation Hygiene (WASH) facilities in the region. The availability of water affects the rate of handwashing (Dagne *et al.*, 2018) [42]. Most of the respondents continue with their normal activities when they have flu-like symptoms. This aligns with (Tartari *et al.*, 2020) [43], a global survey carried out before the COVID-19 pandemic.

The study also explored the relationship between sociodemographic characteristics and knowledge and attitude. Gender, religion, marital status, level of education, occupation, and employment status were the significant predictors of Knowledge. This corresponds with similar research on COVID-19 (Desalegn *et al.*, 2021 [29]; Ngwewondo *et al.*, 2020 [44]). As stated by Ngwewondo *et al.* (2020) [44], these factors will be essential for health workers and policymakers in identifying the target population. The mean level of knowledge among respondents who have started or finished tertiary level of education was higher than those who have not reached tertiary level corresponding with (Al-Hanawi *et al.*, 2020) [45]. People who have started or finished tertiary level of education are expected to be more exposed and knowledgeable, hence the higher level of knowledge.

5. Conclusion

In conclusion, the overall computation revealed that generally majority of the respondents had high knowledge of COVID-19. The study also found that there was a significant difference in mean age by level of knowledge on COVID-19. A significant relationship was observed between religion, education level, marital status, employment status, and level of knowledge of COVID-19. The majority of the respondents showed a positive attitude. Moreover, results indicated that there was no significant relationship between demographic characteristics and

attitudes toward COVID-19. With regards to practices, the majority of the respondents reported that it was crucial to report a suspected case to health authorities, would go for testing if they had a fever and dry cough, and had worn a mask when leaving home in recent days. Limitations of the study were that during the data collection process, some persons were unwilling to click on the link to the online form as they expressed the fear of clicking on scam links thus reducing the number of respondents. Also, the use of an online form of survey prevented people without internet service or smartphones from participating in the survey. The strength of this research can be seen in its target population as it is among the first to investigate the knowledge, attitude, practice, and misconception towards COVID-19-related research in Kenya.

6. Recommendation

The study recommends that the government should collaborate with telecom operators to disseminate COVID-19 messages promptly to their subscribers. Social media companies should enhance their fact-checking operations while search engines should limit information on COVID-19 from unverified websites. In addition, Governments should distribute COVID-19 information promptly and widely to prevent misinterpretation of the information by rumor mongers.

Ethics Approval

Ethical clearance was obtained from the Masinde Muliro University of Science and Technology Ethics Committee. Consent.

Funding

This study was funded by the university research fund (URF) of Masinde Muliro University of Science and Technology

Conflicts of Interest

The authors declare that they have no competing interests.

Disclaimer

The findings and conclusions presented in this manuscript are those of the authors and do not necessarily reflect the official position of Masinde Muliro University.

References

- [1] World Health Organization (2020) Coronavirus Disease 2019 (COVID-19): Situation Report, 60.
- [2] Lu, H.Z., Stratton, C.W. and Tang, Y.W. (2020) Outbreak of Pneumonia of Unknown Etiology in Wuhan, China: The Mystery and the Miracle. *Journal of Medical Virology*, **92**, 401-402. <https://doi.org/10.1002/jmv.25678>
- [3] Hepburn, C., O'Callaghan, B., Stern, N., Stiglitz, J. and Zenghelis, D. (2020) Will

- COVID-19 Fiscal Recovery Packages Accelerate or Retard Progress on Climate Change? *Oxford Review of Economic Policy*, **36**, S359-S381. <https://doi.org/10.1093/oxrep/graa015>
- [4] Petrosillo, N., *et al.* (2020) COVID-19, SARS and MERS: Are They Closely Related? *Clinical Microbiology and Infection*, **26**, 729-734. <https://doi.org/10.1016/j.cmi.2020.03.026>
- [5] Wang, Q., Xu, R. and Volkow, N.D. (2021) Increased Risk of COVID-19 Infection and Mortality in People with Mental Disorders: Analysis from Electronic Health Records in the United States. *World Psychiatry*, **20**, 124-130. <https://doi.org/10.1002/wps.20806>
- [6] Zegarra-Valdivia, J., Chino-Vilca, B.N. and Ames-Guerrero, R. (2020) Knowledge, Perception and Attitudes in Regard to COVID-19 Pandemic in Peruvian Population. <https://doi.org/10.31234/osf.io/kr9ya>
- [7] Beyene, S. (2020) Country Case Studies of the Impact of COVID-19 in Ethiopia, Kenya, Somalia and Sudan-Volume II. <https://www.africaportal.org/documents/21001/Country-Case-Studies-of-the-Impact-of-COVID-19-VOL-II.pdf>
- [8] Saqlain, M., *et al.* (2020) Knowledge, Attitude, Practice and Perceived Barriers among Healthcare Workers Regarding COVID-19: A Cross-Sectional Survey from Pakistan. *Journal of Hospital Infection*, **105**, 419-423. <https://doi.org/10.1016/j.jhin.2020.05.007>
- [9] Defar, A., *et al.* (2021) Knowledge, Practice and Associated Factors towards the Prevention of COVID-19 among High-Risk Groups: A Cross-Sectional Study in Addis Ababa, Ethiopia. *PLOS ONE*, **16**, e0248420. <https://doi.org/10.1371/journal.pone.0248420>
- [10] Zhong, B.L., *et al.* (2020) Knowledge, Attitudes, and Practices towards COVID-19 among Chinese Residents during the Rapid Rise Period of the COVID-19 Outbreak: A Quick Online Cross-Sectional Survey. *International Journal of Biological Sciences*, **16**, 1745-1752. <https://doi.org/10.7150/ijbs.45221>
- [11] Njenga, M.K., *et al.* (2020) Why Is There Low Morbidity and Mortality of COVID-19 in Africa? *American Journal of Tropical Medicine and Hygiene*, **103**, 564-569. <https://doi.org/10.4269/ajtmh.20-0474>
- [12] Centers for Disease Control and Prevention (2020) Africa CDC Launches Continent-Wide Response. <https://africacdc.org/news-item/africa-cdc-establishes-continent-wide-task-force-to-respond-to-global-coronavirus-epidemic/>
<https://www.cdc.gov/globalhealth/healthprotection/fieldupdates/fall-2020/africa-cdc-covid.html>
- [13] Ministry of Health (2020) First Case of Coronavirus Disease Confirmed in Kenya. <http://www.health.go.ke/first-case-of-coronavirus-disease-confirmed-inkenya/>
- [14] NERC (2020) COVID-19 Outbreak in Kenya Daily Situation Report-51.
- [15] Ferdous, M.Z., *et al.* (2020) Knowledge, Attitude, and Practice Regarding COVID-19 Outbreak in Bangladesh: An Online-Based Cross-Sectional Study. *PLOS ONE*, **15**, e0239254. <https://doi.org/10.1371/journal.pone.0239254>
- [16] Roy, D., *et al.* (2020) Study of Knowledge, Attitude, Anxiety & Perceived Mental Healthcare Need in Indian Population during COVID-19 Pandemic. *Asian Journal of Psychiatry*, **51**, Article ID: 102083. <https://doi.org/10.1016/j.ajp.2020.102083>
- [17] Wolf, M.S., *et al.* (2020) Awareness, Attitudes, and Actions Related to COVID-19 among Adults with Chronic Conditions at the Onset of the US Outbreak: A

- Cross-Sectional Survey. *Annals of Internal Medicine*, **173**, 100-109. <https://doi.org/10.7326/M20-1239>
- [18] Wadood, M.A., et al. (2020) Knowledge, Attitude, Practice and Perception Regarding COVID-19 among Students in Bangladesh: Survey in Rajshahi University. *MedRxiv*. <https://doi.org/10.1101/2020.04.21.20074757>
- [19] Gopalan, H.S. and Misra, A. (2020) COVID-19 Pandemic and Challenges for Socio-Economic Issues, Healthcare and National Health Programs in India. *Diabetes & Metabolic Syndrome: Clinical Research & Reviews*, **14**, 757-759. <https://doi.org/10.1016/j.dsx.2020.05.041>
- [20] Haftom, M., et al. (2020) Knowledge, Attitudes, and Practices towards COVID-19 Pandemic among Quarantined Adults in Tigray Region, Ethiopia. *Infection and Drug Resistance*, **13**, 372-3737. <https://doi.org/10.2147/IDR.S275744>
- [21] Feitsma, A.T., Koen, M.P., Pienaar, A.J. and Minnie MCur, C.S. (2007) Experiences and Support Needs of Poverty-Stricken People Living with HIV in the Potchefstroom District in South Africa. *Journal of the Association of Nurses in AIDS Care*, **18**, 55-64. <https://doi.org/10.1016/j.jana.2007.03.006>
- [22] Qutob, N. and Awartani, F. (2021). Knowledge, Attitudes and Practices (KAP) towards COVID-19 among Palestinians during the COVID-19 Outbreak: A Cross-Sectional Survey. *PLOS ONE*, **16**, e0244925. <https://doi.org/10.1371/journal.pone.0244925>
- [23] Wu, X.L. and Munthali, G.N.C. (2021) Knowledge, Attitudes, and Preventative Practices (KAPs) towards COVID-19 among International Students in China. *Infection and Drug Resistance*, **14**, 507-518. <https://doi.org/10.2147/IDR>
- [24] Gebretsadik, D., Gebremichael, S. and Belete, M.A. (2021) Knowledge, Attitude and Practice toward COVID-19 Pandemic among Population Visiting Dessie Health Center for COVID-19 Screening, Northeast Ethiopia. *Infection and Drug Resistance*, **14**, 905-915. <https://doi.org/10.2147/IDR>
- [25] Shrestha, A., Thapa, T.B., Giri, M., Kumar, S., Dhobi, S., Thapa, H., et al. (202). Knowledge and Attitude on Prevention of COVID-19 among Community Health Workers in Nepal-a Cross-Sectional Study. *BMC Public Health*, **21**, Article No. 1424. <https://doi.org/10.1186/s12889-021-11400-9>
- [26] Massinga Loembé, M., Tshangela, A., Salyer, S.J., Varma, J.K., Ouma, A.E.O. and Nkengasong, J.N. (2020) COVID-19 in Africa: The Spread and Response. *Nature Medicine*, **26**, 999-1003. <https://doi.org/10.1038/s41591-020-0961-x>
- [27] Hager, E., Odetokun, I.A., Bolarinwa, O., Zainab, A., Okechukwu, O. and Al-Mustapha, A.I. (2020) Knowledge, Attitude, and Perceptions towards the 2019 Coronavirus Pandemic: A Bi-National Survey in Africa. *PLOS ONE*, **15**, e0236918. <https://doi.org/10.1371/journal.pone.0236918>
- [28] Lee, M., Kang, B.A. and You, M. (2021) Knowledge, Attitudes, and Practices (KAP) toward COVID-19: A Cross-Sectional Study in South Korea. *BMC Public Health*, **21**, Article No. 295. <https://doi.org/10.1186/s12889-021-10285-y>
- [29] Desalegn, Z., Deyessa, N., Teka, B., Shiferaw, W., Hailemariam, D., Addissie, A., et al. (2021) COVID-19 and the Public Response: Knowledge, Attitude and Practice of the Public in Mitigating the Pandemic in Addis Ababa, Ethiopia. *PLOS ONE*, **16**, e0244780. <https://doi.org/10.1371/journal.pone.0244780>
- [30] Chiedozie, A.P., Chukwuebuka, O.J., Chidimma, C F., Gabriel, O.C. and Chioma, U.B. (2021) Willingness to Accept a Potential COVID-19 Vaccine in Nigeria. *American Journal of Medical Sciences and Medicine*, **9**, 1-5.
- [31] Pew Research Center (2021) Internet Use by Age.

- <https://www.pewresearch.org/internet/chart/internetuse-by-age>
- [32] Erinoso, O., Wright, K.O., Anya, S., Kuyinu, Y., Abdur-Razzaq, H. and Adewuya, A. (2021) Predictors of COVID-19 Information Sources and Their Perceived Accuracy in Nigeria: Online Cross-Sectional Study. *JMIR Public Health and Surveillance*, **7**, e22273. <https://doi.org/10.2196/22273>
- [33] Olaimat, A.N., Aolymat, I., Shahbaz, H.M. and Holley, R.A. (2020) Knowledge and Information Sources about COVID-19 among University Students in Jordan: A Cross-Sectional Study. *Frontiers in Public Health*, **8**, Article 254. <https://doi.org/10.3389/fpubh.2020.00254>
- [34] Pal, R., Yadav, U., Grover, S., Saboo, B., Verma, A. and Bhadada, S.K. (2020) Knowledge, Attitudes and Practices towards COVID-19 among Young Adults with Type 1 Diabetes Mellitus amid the Nationwide Lockdown in India: A Cross-Sectional Survey. *Diabetes Research and Clinical Practice*, **166**, Article ID: 108344. <https://doi.org/10.1016/j.diabres.2020.108344>
- [35] Isah, M.B., Abdulsalam, M., Bello, A., Ibrahim, M.I., Usman, A., Nasir, A., et al. (2020) Coronavirus Disease 2019 (COVID-19): Knowledge, Attitudes, practices (KAP) and Misconceptions in the General Population of Katsina State, Nigeria. *MedRxiv*. <https://doi.org/10.1101/2020.06.11.20127936>
- [36] Aynalem, Y.A., Akalu, T.Y., Gebresellassie, B., Sharew, N.T. and Shiferaw, W.S. (2021) Assessment of Undergraduate Student Knowledge, Practices, and Attitude towards COVID-19 in Debre Berhan University, Ethiopia. *PLOS ONE*, **16**, e0250444. <https://doi.org/10.21203/rs.3.rs-28556/v1>
- [37] Rugarabamu, S., Ibrahim, M. and Byanaku, A. (2020) Knowledge, Attitudes, and Practices (KAP) towards COVID-19: A Quick Online Cross-Sectional Survey among Tanzanian Residents. *MedRxiv*. <https://doi.org/10.1101/2020.04.26.20080820>
- [38] Chitungo, I., Dzobo, M., Hlongwa, M. and Dzinamarira, T. (2020) COVID-19: Unpacking the Low Number of Cases in Africa. *Public Health Practice*, **1**, Article ID: 100038. <https://doi.org/10.1016/j.puhip.2020.100038>
- [39] Hopman, J., Allegranzi, B. and Mehtar, S. (2020) Managing COVID-19 in Low- and Middle-Income Countries. *JAMA*, **323**, 1549-1550. <https://doi.org/10.1001/jama.2020.4169>
- [40] Li, Y., Liu, G., Egolet, R.O., Yang, R., Huang, Y. and Zheng, Z. (2021) Knowledge, Attitudes, and Practices Related to COVID-19 among Malawi Adults: A Community-Based Survey. *International Journal of Environmental Research and Public Health*, **18**, Article 4090. <https://doi.org/10.3390/ijerph18084090>
- [41] Habib, M.A., Dayyab, F.M., Iliyasu, G. and Habib, A.G. (2021) Knowledge, Attitude and Practice Survey of COVID-19 Pandemic in Northern Nigeria. *PLOS ONE*, **16**, e0245176. <https://doi.org/10.1371/journal.pone.0245176>
- [42] Dagne, H., Bogale, L., Borchia, M., Tesfaye, A. and Dagne, B. (2019) Hand Washing Practice at Critical Times and Its Associated Factors among Mothers of under Five Children in Debarq Town, Northwest Ethiopia, 2018. *The Italian Journal of Pediatrics*, **45**, Article No. 120. <https://doi.org/10.1186/s13052-019-0713-z>
- [43] Tartari, E., Saris, K., Kenters, N., Marimuthu, K., Widmer, A., Collignon, P., et al. (2020) Not Sick Enough to Worry? “Influenza-Like” Symptoms and Work-Related Behavior among Healthcare Workers and Other Professionals: Results of a Global Survey. *PLOS ONE*, **15**, e0232168. <https://doi.org/10.1371/journal.pone.0232168>
- [44] Ngwewondo, A., Nkengazong, L., Ambe, L.A., Ebogo, J.T., Mba, F.M., Goni, H.O., et al. (2020) Knowledge, Attitudes, Practices of/towards COVID-19 Preventive

Measures and Symptoms: A Cross-Sectional Study during the Exponential Rise of the Outbreak in Cameroon. *PLOS Neglected Tropical Diseases*, **14**, e0008700. <https://doi.org/10.1371/journal.pntd.0008700>

- [45] Al-Hanawi, M.K., Angawi, K., Alshareef, N., Qattan, A.M.N., Helmy, H.Z., Abudawood, Y., *et al.* (2020) Knowledge, Attitude and Practice toward COVID-19 among the Public in the Kingdom of Saudi Arabia: A Cross-Sectional Study. *Frontiers in Public Health*, **8**, Article 217. <https://doi.org/10.3389/fpubh.2020.00217>