E-ISSN:2349-4166
P-ISSN:2349-4158
Research Article
Face mask

Public Health Review - International Journal of Public Health Research

2021 Volume 8 Number 5 September October

Publisher
MEDRESEARCH
www.medresearch.in

Face mask usage during COVID-19 pandemic in rural population of Madhya Pradesh: A knowledge, attitude and practice study

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DOI: https://doi.org/10.17511/ijphr.2021.i05.03

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Introduction: A face mask is a perfect tool to control the spread of COVID-19 infection. The knowledge, attitudes and practices toward the use of face masks will be helpful to understand society's readiness to accept and follow preventive guidelines from the health authorities. Baseline information collected in this study can be used for the implementation of the COVID-19 control programme. Hence, this study was conducted. **Material and methods:** This is a cross-sectional study conducted in a rural area of Madhyapradesh. House to house survey was completed to collect the information on knowledge, attitude and practice regarding face masks. **Result:** Out of 400 participants, 318 (79.5%) participants know that COVID-19 can be transmitted by respiratory droplet and 253(63.3%) participants know that COVID-19 can be sent by contact route. Total 349(87.3%) participants responded that wearing a face mask can prevent COVID-19 transmission. Maximum participants know about cloth masks, i.e. 367(91.8%) and surgical masks, i.e.277 (69.3%). **Conclusions:** Maximum participants learn various types of face masks, and they also know that they can prevent COVID-19 disease. Maximum participants had a positive attitude towards wearing a face mask at crowded places. One crucial finding came out that some participants had shared their face masks with other people. Maximum participants had motivated their family members for wearing a face mask. IEC activities can be conducted by a health worker in a rural area on proper use, proper disposal and storage of face masks.

Keywords: Face mask use, COVID-19 pandemic

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How to Cite this Article

Harshal Kawanpure, Mahendra Gandhe, Face mask usage during COVID-19 pandemic in rural population of Madhya Pradesh: A knowledge, attitude and practice study. Public Health Rev Int J Public Health Res. 2021;8(5):78-85.
Available From
https://publichealth.medresearch.in/index.php/ijphr/article/view/171

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Manuscript Received	Review Round 1	Review Round 2	Review Round 3	Accepted
2021-09-04	2021-09-06	2021-09-13	2021-09-20	2021-09-27

Conflict of Interest	Funding	Ethical Approval	Plagiarism X-checker	Note
Nil	Nil	Yes	16%	

Introduction

Coronavirus Disease 2019 (COVID-19) is a respiratory disease caused by the SARS-CoV-2 virus, and on March 11, 2020, the World Health Organization (WHO) declared COVID-19 a pandemic. [1]. The incubation period of covid 19 is 2 to 14days, during which all infected patients can transmit the disease to a non-infected person.[1]. For prevention of COVID-19 spread, the public is required to follow some infection control practices [2]. and these include community-based measures such as self-isolation, use of alcohol-based hand sanitizer or hand-washing with soap, restriction of movements with lockdown measures, sanitization of surfaces and use of non-medical cloth mask or face covering. [3, 4]. The use of a face mask is a perfect tool to control the spread of COVID-19 infection. The main benefit of wearing a face mask is to reduce the amount of Coronavirus (or Influenza virus) being released to the environment by those with the infection, thereby reducing its spread through droplets. [2]. There are different types of face masks in use by the community, including N95, N99, surgical masks and cloth masks. [7]. The WHO states that incorrect use and disposal of face masks can increase the rate of transmission.[2]. Studies on knowledge, attitude and practices about measures to prevent the spread of the COVID-19 pandemic have reported a nonlinear relationship between the knowledge and practice of using face masks to prevent the spread of COVID-19 among different categories of participants. [6, 8, 9]. The knowledge, attitudes and practices toward the use of face masks will be useful to understand society's readiness to accept and follow preventive guidelines from the health authorities. This baseline information may be helpful to determine the type of intervention needed for the implementation of the COVID-19 control programme. [10,11]. Hence, this study was conducted to investigate the knowledge, attitude and practices in the rural population regarding the usage of face masks during the COVID-19 pandemic to limit the spread of the coronavirus disease.

Material and methods

This is a cross-sectional study conducted in a rural area of Madhyapradesh. House to house survey was conducted to collect information on knowledge, attitude and practice regarding the use of face Masks. Information was collected through a preformed questionnaire. The study was a cross-sectional study and was conducted during the period of 01 August to 31 August 2021. Data was collected by simple random sampling technique by doing house to house survey. The sample size was calculated by formula $4PQ/L_2$, assuming a 50% prevalence of knowledge of the use of face masks and taking 5% allowable error. After calculation final sample size was 400. Inclusion criteria were the person in the age group of 18 years and above and those residing in a rural area of Madhyapradesh. Exclusion criteria were those below 18 years of age and not residing in rural areas. The data tool was performed questionnaire. No ethical issues were involved as the study was a cross-sectional study and only those participants were included who gave prior consent. To assess the knowledge of the participant score was given from 0-12. The highest score was 12 and the lowest score was 0. Data were entered in Microsoft excel and analyzed on SPSS version 25. Mann-Whitney test and Kruskal Wallis test were utilized to determine the differences between groups for selected demographic variables. The statistical significance level was set at $P < 0.05$.

Result

Demographic characteristics: Table 1 showing out of a total of 400 participants, the average age was 32.73 ± 13.40 years (range 18-71 years). 222 (55.5%) were male and 178(44.5%) were female. Out of a total of 400(100%), participants the majority of them belongs to the younger age group (18-27 years) i.e. 186(46.5%) shown in figure 1. Out of total 355 (88.8%) were Hindu and 45(11.3%) were Muslim by religion. The majority of the participants have taken education up to primary school i.e 158(39.5%). The majority of the participants belong to socioeconomic status class 4 i.e.193 (48.3%) and class 5 i.e. 141(35.3%) according to the modified BG Prasad scale 2021 shown in figure 2. The majority of participants were housewives 116(29.0%) by occupation followed by 80(20.0%) who had business which is shown in figure 3.

Assessment of Knowledge: A total of seven questions were used to measure knowledge on mask usage during the COVID-19 pandemic. A score of 1 is given for the correct answer. The maximum score was 12 and the minimum was 0.

Table 1: Demographic characteristics of participants.

Variable	Frequency	Percentage
Sample size	400	100.00
Age groups in years		
18-27	186	46.5
28-37	88	22.0
38-47	58	14.5
>48	68	17.0
Gender		
Male	222	55.5
Female	178	44.5
Marital status		
Single	131	32.8
Married	269	67.3
Religion		
Hindu	355	88.8
Muslim	45	11.3
Education level		
Illiterate	49	12.3
Primary	158	39.5
Secondary	86	21.5
Preuniversity	62	15.5
Graduate	40	10.0
Postgraduate	5	1.3
Occupation		
Student	74	18.5
Business	80	20.0
Labour	20	5.0
Farmer	75	18.8
Housewife	116	29.0
Unemployed	35	8.8
Socioeconomic status		
Class 1(Upper class)	10	2.5
Class 2(Upper middle class)	33	8.3
Class 3(Middle class)	23	5.8
Class 4(Lower middle class)	193	48.3
Class 5(Lower class)	141	35.3

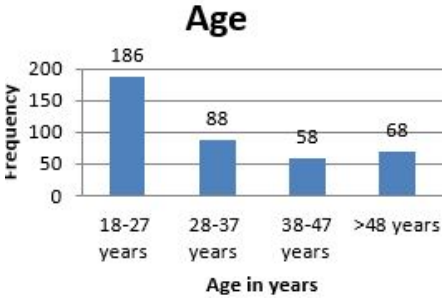

Table 2 shows the total of 318 (79.5%) participants who knew that COVID-19 can be transmitted by Respiratory droplet and 253(63.3%) participants knew that COVID-19 can be transmitted by contact route. Total 349(87.3%) participants responded that wearing a face mask can prevent COVID-19 transmission. Maximum participants knew about cloth masks i.e. 367(91.8%) and surgical masks i.e.277 (69.3%).

Table 2: Assessment of the knowledge.

Variable	Frequency	Percentage
Transmission by respiratory droplet		
Yes	318	79.5
No	82	20.5
Transmission by contact route		
Yes	253	63.3
No	147	36.8
Wearing a face mask can prevent COVID-19		
Yes	349	87.3
No	51	12.8
Know about cloth mask		
Yes	367	91.8
No	33	8.3
Know about the surgical mask		
Yes	277	69.3
No	123	30.8
Know about the N95 mask		
Yes	186	46.5
No	214	53.5
Know about the N99 mask		
Yes	58	14.5
No	342	85.5
Necessary to wear a face mask when you don't have COVID-19		
Yes	383	95.8
No	17	4.3
A cloth mask is effective as a surgical or N95 mask		
Yes	296	74.0
No	59	14.8
Do not know	45	11.3
Best face mask to protect from COVID-19		
Cloth face mask	135	33.8
Surgical mask	47	11.8
N95 mask	150	37.5
Do not know	68	17.0
A most important time to use a face mask		
At home	10	2.5
When talking to someone else	53	13.3
At crowded places	319	79.8
Do not know	18	4.5

Only 186(46.5%) and 58(14.5%) participants knew about N95 and N99 face masks respectively (shown in table 2). Total 383(95.8%) participants think that it is necessary to wear a face mask when you don't have COVID-19. Total 15(37.5%) participants knew that the best face mask to protect from COVID-19 is N95. 319(79.8%) participants knew that the most important time to use a face mask is at crowded places (shown in table 2).

Table 3 shows, a comparison of total knowledge score with gender by applying the Mann Whitney test; it is found that the difference is statistically significant with a p-value of 0.003. Males are having better knowledge than females. When the total knowledge score is compared with religion by applying the Mann Whitney test, it is found that the difference is statistically significant with a p-value of 0.00. Hindus are having better knowledge than Muslims.

When the total knowledge score is compared with different classes of socioeconomic status by applying the Kruskal Wallis test which is shown in table 4, it is found that the difference is statistically significant with a p-value of 0.006 which is <0.05. Participants of classes 1and 2 had better knowledge than classes 4 and 5. When the total knowledge score is compared with the age group (shown in table 4) by applying the Kruskal Wallis test, it is found that the difference is statistically significant with a p-value of 0.00. The younger age group (18-27 years) is having better knowledge than the older age group (>48 years). When the total knowledge score is compared with different occupations by applying the Kruskal Wallis test, it is found that the difference is statistically significant with a p-value of 0.00. Students are having better knowledge than other participants. When the total knowledge score is compared with education by applying the Kruskal Wallis test, it is found that the difference is statistically significant with a p-value of 0.00. Graduates and postgraduates are having better knowledge than other participants.

Attitude: Table 5 shows a total of 359(89.8%) participants believe that wearing a face mask can protect them from COVID-19. Only 38(9.5%) participants shared their face masks with another person. Most of the participants 363(90.8%) believe that it is necessary to wear a face mask in this COVID-19 pandemic (shown in table 5). Maximum participants 337(84.3%) motivated their family members to wear a face mask whenever required.

Table 3: Comparison of gender and religion with knowledge.

Variable	Frequency	Mean score	Mean Rank	P-value
Gender				
Male	222	8.14	215.09	0.003
Female	178	7.42	182.30	
Religion				
Hindu	355	8.15	214.95	0.000
Muslim	45	5.22	86.50	

Table 4: Comparison of knowledge with demographic characteristics.

SES	Frequency	Mean score	Mean Rank	P value
Class 1	10	9.50	291.25	0.006
Class 2	33	9.00	240.36	
Class 3	23	7.30	166.30	
Class 4	193	7.82	202.99	
Class 5	141	7.52	186.90	
Total	400	7.82		
Age in years				
18-27	186	8.58	239.56	0.000
28-37	88	7.41	181.31	
38-47	58	7.59	183.35	
>48	68	6.49	133.12	
	400	7.82		
Occupation				
Student	74	10.58	334.81	0.000
Business	80	8.08	209.59	
Labour	20	6.25	105.38	
Farmer	75	7.27	177.52	
Housewife	116	6.90	158.98	
Unemployed	35	6.57	136.96	
Education				
Illiterate	49	5.33	93.43	0.000
Primary	158	6.82	149.08	
Secondary	86	8.28	219.65	
Preuniversity	62	9.58	291.14	
Graduate	40	10.63	330.14	
Postgraduate	5	12.00	384.50	

Total 229(57.3%) were comfortable with a face mask when wearing it for a longer time (shown in table 5).

Practice: In table 6, it is shown that most of the participants 375(93.8%) were used face masks during the COVID-19 pandemic. 316(79.0%) participants had reused face masks. 134(33.5%) participants had reused face masks for 2-5 days followed by 112 (28.0%) had used for 6-10 days (shown in table 6). 284(71.0%) participants

Were used to washing their hands before wearing and after removing face masks. Most of the participants 128(32.0%) were used to hang face masks on a wooden hanger (khuti) after the use and 70(17.5%0 participants were used to store face masks in their pocket (shown in table 6). 260(65.0%) participants were used to dispose of face masks in dust bean after the use. But 86(21.5%) participants were used to dispose of face masks in open places and by dumping which is an unhygienic method of disposal (shown in table 6). 317(79.3%) participants had used Rumal/Gamacha/Dupatta when the face mask is not available with them.

Table 5: Assessment of Attitude.

Variable	Frequency	Percentage
Believe that wearing a face mask can protect from COVID-19		
Agree	359	89.8
Disagree	41	10.3
Ever shared a face mask		
Yes	38	9.5
No	362	90.5
Believe that it is necessary to wear a face mask in this COVID-19 pandemic		
Yes	363	90.8
No	37	9.3
Motivated family member to wear a face mask		
Yes	337	84.3
No	63	15.8
Comfortable with a face mask when wearing for a longer time		
Yes	229	57.3
No	171	42.8

Table 6: Assessment of the practice.

Variable	Frequency	Percentage
Ever used the face mask		
Yes	375	93.8
No	25	6.3
Reused face mask		
Yes	316	79.0
No	84	21.0
Reused for how many days		
Not Reused face mask	84	21.0
<1 day	41	10.3
2-5 days	134	33.5
6-10 days	112	28.0
>10 days	29	7.3
Use to wash your hands before wearing and after removing the face mask		
Yes	284	71.0
No	116	29.0
Storage of face mask		
Bag	35	8.8
Box	49	12.3
Khuti	128	32.0
Not Used mask	84	21.0
pocket	70	17.5
Table	34	8.5
Disposal of face mask		
Not used face mask	25	6.3
Dust bean	260	65.0
Dumping	86	21.5
Burning	29	7.3
Ever used Rumal/Gamacha/Dupatta when a face mask is not available		
Yes	317	79.3
No	83	20.8

Discussion

The majority of the 318 (79.5%) participants knew about transmission by respiratory and contact route. Similar findings were found by Sikakulya FK et al [13] with knowledge of respiratory route (56.9%) and contact route (39.6%) of transmission for the spread of COVID-19. Total 349(87.3%) participants responded that wearing a face mask can prevent COVID-19 transmission, similar findings i.e (90.3%) seen in a study conducted by Sikakulya FK et al. [13]. Total 383(95.8%) participants think that it is necessary to wear a face mask when you don't have COVID-19. Similar findings (86.4%) can also be seen in a study conducted by Sikakulya FK et al. [13]. Total 15(37.5%) participants knew that the best face mask to protect from COVID-19 is N95, similar findings i.e (72.17%) seen in a study conducted by Sayare B et al. [12]. 319(79.8%) participants knew that the most important time to use a face mask is at crowded places, similar findings i.e (16.7%) seen in a study conducted by Sayare B et al [12].

In this study, it is found that there is a significant difference in the knowledge of males and females, similar findings seen in a study conducted by Sayare B et al [12]. Lee et al [8]. and Hager et al [17]. Males are having better knowledge than females. Opposite findings were found in a study conducted by Agarwal Prachi et al [15]. females have better knowledge than males. When the total knowledge score is compared with religion, it is found that the difference is statistically significant with a p-value of 0.00. Hindus are having better knowledge than Muslims, similar findings seen in a study conducted by Sayare B et al [12].

In this study, we found that socioeconomic status is having a significant impact on knowledge, class 1 and 2 are having better knowledge as compared to classes 4 and 5. Similar findings are seen in a study conducted by Al Hanafi et al. [14] Younger age group (18-27 years) is having better knowledge than the older age group (>48 years). Most of the young people are actively involved with social media sites which are the reason for better knowledge. Students are having better knowledge than other participants. Graduates and postgraduates are having better knowledge than participants having education up to primary and secondary school. Similar findings were seen in a study conducted by Sayare B et al [12]. Lee et al [16]. and al Hanafi et al[14].

Total 359(89.8%) have a positive attitude that wearing a face mask can protect them from COVID-19. Similar findings were seen in a study conducted by Sayare B et al. [12]. 38(9.5%) participants have shared their face masks with another person which can transmit COVID-19 infection. Higher findings are seen in a study conducted by Sikakulya FK [13]. i.e 24% of participants had shared their face masks. In our study most of the participants were from lower socioeconomic status and lack of knowledge about transmission of COVID-19, this could be the reason for sharing the mask. Most of the participants 363(90.8%) believe that it is necessary to wear a face mask in this COVID-19 pandemic which is a good attitude towards preventing COVID-19 infection. Similar findings were seen in a study conducted by Sayare B et al [12]. Maximum participants 337(84.3%) had motivated their family members to wear a face mask whenever required. This kind of attitude is necessary to control COVID-19 spread among family members. Total 229(57.3%) were Comfortable with a face mask when wearing it for a longer time.

Most of the participants 375(93.8%) were used a face mask during the COVID-19 pandemic which is similar to the findings of Sikakulya FK [13]. 95.2% of participants had used a face mask. This is because of intensive IEC activities by health authorities and Govt. of India for the prevention of COVID-19. 316(79.0%) participants had reused face masks. Similar findings 55.8% had reused face masks seen in a study conducted by Sayare B et al [12]. In our study most of the participants were belong to a lower socioeconomic class and have lower education status, this could the reason for reusing masks. 134 (33.5%) participants had reused face masks for 2-5 days followed by 112 (28.0%) had used for 6-10 days. Most of the participants 284 (71.0%) were used to wash their hands before wearing and after removing face masks similar findings were seen in a study conducted by Sikakulya FK et al [13]. The remaining 29% of participants never washed their hands before wearing and after removing face masks. Lack of knowledge and ignorance could be the reason for this. Most of the participants 128(32.0%) were used to hang their face masks on a wooden hanger (khuti) after the use and 70(17.5%) participants were used to store face masks in their pocket. Storing face masks on wooden hangers and in the pocket can contaminate them by pathogenic microorganisms. These contaminated face masks can transmit a lot of infectious diseases. Most of the 260(65.0%) participants were used to dispose of face masks in dust bean after the use. But 86(21.5%) participants were used to dispose of face masks in open places and by dumping which is an unhygienic method of disposal. This is because of a lack of knowledge on the proper disposal of face masks. 317(79.3%) participants had used Rumal/Gamacha/Dupatta when the face mask is not available with them.

Conclusions

This is the study to investigate KAP for the COVID-19 outbreak, among the rural population of Madhya Pradesh. Our findings suggest that rural residents, especially men, have good knowledge of COVID-19 and face mask use. Most of the participants know about the route of transmission. Maximum participants have good knowledge of various types

Of face masks and they also know that it can prevent COVID-19 disease. Maximum participants had a positive attitude towards wearing a face mask at crowded places. Upper classes of socioeconomic status have better knowledge than lower classes. In this study, we found that education is a very important determinant of knowledge about face mask use. Those who are having higher education levels were having better knowledge than lower education levels. In our study, one important finding came out that some participants had shared their face masks with other people. This kind of practice can be dangerous and can transmit COVID-19 in the community. Maximum participants had motivated their family members for wearing a face mask. This reflects the responsibility of preventing COVID-19 in the family. Most of the participants had reused face masks for 2-5 days, which could be a harmful practice. Because repeated use of the same face mask can result in the transmission of not only COVID-19 but also other respiratory diseases. Participants do not have proper knowledge of the storage of face masks, they use to store them on wooden hangers and pockets. On wooden hangers and in pocket face masks can get contaminated with pathogenic microorganisms. Some participants disposed of used face masks in open places which can result in the spread of COVID-19 in the community. Rumal/Gamaccha/Dupatta is used as an alternative to face masks by some participants. This is the new finding found in the study. IEC activities and small group sessions can be conducted by a health worker in a rural area on proper use, proper techniques of disposal and storage of face masks. Behaviour, change, communication activities for motivating and encouraging people of rural areas for using face masks need to be conducted.

Reference

01. Cucinotta D, Vanelli M. WHO Declares COVID-19 a Pandemic. Acta Biomed. 2020 Mar 19;91(1):157-160. *doi: 10.23750/abm.v91i1.9397 [Crossref] [PubMed][Google Scholar]*

02. Javid B, Weekes MP, Matheson NJ. Covid-19: should the public wear face masks? BMJ. 2020 Apr 9;369:m1442. doi: 10. *1136/bmj.m1442 [Crossref] [PubMed][Google Scholar]*

03. World Health Organization. Coronavirus disease (COVID-19) outbreak: rights, roles and responsibilities of health workers, including Key considerations for occupational safety and health: interim guidance, 19 March 2020. No. WHO/2019-nCov/HCW_advice/2020. *2. World Health Organization, 2020 [Crossref][PubMed] [Google Scholar]*

04. Cheng, Vincent Chi-Chung, et al. Multipronged infection control strategy to achieve zero nosocomial coronavirus disease 2019 (COVID-19) cases among Hong Kong healthcare workers in the first 300 days of the pandemic. Infection Control & Hospital Epidemiology (2021): 1-10. *[Crossref][PubMed] [Google Scholar]*

05. Feng S, Shen C, Xia N, Song W, Fan M, Cowling BJ. Rational use of face masks in the COVID-19 pandemic. Lancet Respir Med. 2020 May;8(5):434-436. *doi: 10.1016/S2213-2600(20)30134-X [Crossref][PubMed][Google Scholar]*

06. Kumar J, Katto MS, Siddiqui AA, Sahito B, Jamil M, Rasheed N, Ali M. Knowledge, Attitude, and Practices of Healthcare Workers Regarding the Use of Face Mask to Limit the Spread of the New Coronavirus Disease (COVID-19). Cureus. 2020 Apr 20;12(4):e7737. *doi: 10.7759/cureus.7737. P [Crossref][PubMed][Google Scholar]*

07. ECDC. Using face masks in the community. Eur Cent Dis Prev Control. 2020;(April):1–6. *[Crossref] [PubMed][Google Scholar]*

08. Lee, Linda Yin-king, et al. "Practice and technique of using face mask amongst adults in the community: a cross-sectional descriptive study. " BMC Public Health 20. 1 (2020): 1-11. *[Crossref] [PubMed][Google Scholar]*

09. Mohamad, Emma MW, et al. "Public knowledge, attitudes and practices towards COVID-19: A cross-sectional study in Malaysia. " medRxiv (2020). *[Crossref][PubMed][Google Scholar]*

10. Person B, Sy F, Holton K, Govert B, Liang A; National Center for Inectious Diseases/SARS Community Outreach Team. Fear and stigma: the epidemic within the SARS outbreak. Emerg Infect Dis. 2004 Feb;10(2):358-63. *doi: 10.3201/eid1002.030750 [Crossref][PubMed] [Google Scholar]*

11. Zhong BL, Luo W, Li HM, Zhang QQ, Liu XG, Li WT, Li Y. 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. Int J Biol Sci. 2020 Mar 15;16(10):1745-1752. *doi: 10.7150/ijbs.45221 [Crossref][PubMed][Google Scholar]*

12. Sayare Bhawna & Bhardwaj Vinay & Fotedar Shailee & Vashisth Shelja & Thakur Arun & Rawat Saurabh & Gurung Deepak. (2021). Knowledge attitude and practices regarding mask usage during COVID-19 pandemic in general population of India: a qualitative study. International Journal Of Community Medicine And Public Health. *8. 1857. 10.18203/2394-6040.ijcmph20211245 [Crossref] [PubMed][Google Scholar]*

13. Sikakulya FK, Ssebuufu R, Mambo SB, Pius T, Kabanyoro A, Kamahoro E, et al. use of face masks to limit the spread of the COVID-19 among western Ugandans: Knowledge, attitude and practices. PLoS One. 2021 Mar 24;16(3):e0248706. *doi: 10.1371/journal.pone.0248706 [Crossref][PubMed] [Google Scholar]*

14. Al-Hanawi MK, Angawi K, Alshareef N, Qattan AMN, Helmy HZ, Abudawood Y, et al. Knowledge, Attitude and Practice Toward COVID-19 Among the Public in the Kingdom of Saudi Arabia: A Cross-Sectional Study. Front Public Health. 2020 May 27;8:217. *doi: 10.3389/fpubh.2020.00217 [Crossref][PubMed][Google Scholar]*

15. Agarwal, Prachi, et al. Knowledge, attitudes, and practices (KAP) about COVID-19 among Indian population: A cross-sectional study. Available at SSRN 3658195 (2020). *[Crossref][PubMed][Google Scholar]*

16. Lee M, Kang BA, You M. Knowledge, attitudes, and practices (KAP) toward COVID-19: a cross-sectional study in South Korea. BMC Public Health. 2021 Feb 5;21(1):295. *doi: 10.1186/s12889-021-10285-y [Crossref][PubMed][Google Scholar]*

17. Hager E, Odetokun IA, Bolarinwa O, Zainab A, Okechukwu O, Al-Mustapha AI. Knowledge, attitude, and perceptions towards the 2019 Coronavirus Pandemic: A bi-national survey in Africa. PLoS One. 2020 Jul 29;15(7):e0236918. *doi: 10.1371/journal.pone.0236918 [Crossref][PubMed] [Google Scholar]*