" Knowledge, Attitude, and Practice of Rural Population towards COVID 19 Control Measures."

Authors

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Abstract:

Official and international health organizations faced a huge pressure in combating COVID-19 pandemic. One method to control COVID 19 is adherence to the strict precautions to assess and to promote sound knowledge, positive attitude, and good response to minimize transmission. **Aim:** The study aimed to assess knowledge, attitude, and practice (KAP) of a sector of rural population to plan a roadmap to control and minimize transmission of COVID-19 disease. **Methods:** This cross-sectional study included 294 attendants to the primary health care (PHC) unit in Ismailia governorate, Egypt. All were inquired regarding their socio-demographic data and history of COVID-19 or contact to confirmed cases and responded to 40 questions to assess their KAP regarding COVID transmission, manifestations as well as measures to control and minimize transmission. The questionnaire included 24 questions for knowledge, (one point for each), 6 questions for attitude (5 points for each) and 10 questions for practice (5 points for each). The satisfactory response is considered if a participant's score exceeds the mean of the assessed total KAP scores. **Results:** The summation scores of knowledge, attitude, and practice responses of the studied participants represented 82.5%, 77.9% and 71.67% of the total scored points. However, satisfactory responses of knowledge, attitude, and practice were found in 64.3%, 42.85%, and 38.77%. The probability (odds ratio) of previous Covid-19 infection among the studied population was 3 (95% CI: 1.54-6.13) when the age >40 years, 1.2 (95% CI: 0.6-2.39) in married participants, 1.6 (95% CI: 0.73-3.4) associated with chronic illness, 8.2 (95% CI: 4.1-16.4) for those with previous COVID in the family, and 5.5 (95% CI: 2.7-11.1) for participants with >3 family members. Variables with lower chance of infection were education [OR: 0.92 (95% CI: 0.19-4.2)], not working (OR= 0.52 95% CI: 0.27-0.99)], satisfactory knowledge [OR: 0.2 (95% CI: 0.1-0.6)] and good practice [OR: 0.84 (95% CI: 0.1-0.6)]. By regression analysis marriage (p=0.022), previous COVID cases within the family (p=0.000) were independent predictors for infection while satisfactory knowledge was an independent protective variable (p=0.034). **Conclusion:** Despite the satisfactory knowledge found in two thirds of the studied participants, efforts should be directed to promote positive attitude and good practice in rural population to control and shorten the pandemic in Egypt.

Key Words: COVID 19, knowledge, attitude, practice, rural health care centers, Egypt

Introduction

COVID-19 disease is a pandemic caused by an emerging Coronavirus called "Severe Acute Respiratory Virus Coronavirus 2" (SARS CoV2) [1]. The disease had been first reported in December 2019 in Wuhan city (China) and then spread to 218 countries [2]. As of 2 January, nearly 289 million cases and 5.4 million deaths have been notified from countries all over the world [3]. In Egypt, the first case introduced was on 14th February from 2020 then it is spread throughout all governorates [4].

COVID-19 is characterized by rapid transmission after exposure to an infected person mainly through air droplets during coughing, sneezing or talking. It could be also transmitted by touching contaminated surfaces. Patients are infectious during the presymptomatic stage, during an illness of different severity, and even from asymptomatic cases. Compared to the influenza virus, SARS-CoV2 leads to rapid transmission and a considerable increase in the number of cases. COVID symptoms vary from minimal symptoms of fever, fatigue, dry cough, and diarrhea to severe pneumonia and or respiratory distress necessitating aggressive oxygen therapy techniques up to artificial ventilation [5].

Early before the declaration of COVID-19 as a pandemic, the media in Egypt paid attention to promoting awareness about the causative virus i.e. SARS-CoV2, methods of transmission, symptoms, isolation, and when to be admitted to hospital. The population appreciated the seriousness of the outbreak when the number of cases and mortality increased and the government closed the schools, minimizing gathering and stop flights. In addition to broadcasting daily updates, the health authority tracked contacts of confirmed cases and underwent community surveys using the nasal swab test. In addition to national TV, broadcasting, and newspaper, social media played a role in the promotion of facts about COVID-19. Occasionally, social media posted false knowledge and myths about the disease had a negative impact that may increase transmission, delay admission of severe cases, or refuse vaccination (6 EJO; 2020). Meanwhile, in rural areas of Egypt, a campaign was implemented by the government to increase awareness among agricultural workers. The program aimed at providing knowledge about COVID-19 and the preventive measures including healthy habits and control measures to minimize infection and lessen the negative impact of the pandemic on the economy and food security [7].

Despite the great efforts paid by the government of Egypt in combating the COVID outbreak, the outcomes depend largely on the public contribution and changing behavior [8]. In this setting, the public motivation to change practice is likely to be influenced by the public's knowledge and attitudes toward COVID-19 [9].

By assessing public awareness and knowledge about the SARS-CoV2, the health authority and media can help to identify attributes that motivate the public to implement healthy practices and responsive behavior [10]. This study aimed at assessment of the knowledge, attitudes, and practices of a subgroup of rural population; namely attendants of the family health care center, towards COVID-19 to lessen the number and severity of the cases. The findings of this survey would help to identify gaps and to implement a plan to minimize the transmission and control the pandemic.

Participants and Methods:

This cross-sectional study was conducted for assessment of the knowledge, attitude, and practice (KAP) of adult individuals attending the family health care unit (FHU) towards COVID- 19 in a rural area of Ismailia Governorate. The study was carried out between June and September 2020 in the course of late wave 1 and early wave 2. Based on the incidence of COVID-19 cases in Egypt and the estimate of the Ismailia population, the sample size was determined at 80% power with an alpha error of 5% be 295. The eligible participants were selected by a non-randomized convenience sampling. The inclusion criteria were adults (≥ 18 years), both sexes, with or without a history of previous COVID-19 illness or exposure to confirmed cases attendants with current infection or had psychiatric illness were excluded. Before starting the survey, a pilot study was carried out on 15 participants that were not included in the study. Accordingly, the questionnaire was re-edited to be simple, clear, and filled in less than 10 minutes. The interviewer was a well-trained nurse that underwent a face-to-face interview in a separate room at the health care unit. The first part of the interview inquired the sociodemographic characteristics of the selected participants including age, sex, marital status, number of family members, occupation, education, address, presence of chronic diseases, history of exposure to cases with confirmed COVID-19 and, and history of COVID 19 in the family. The second part of the KAP questionnaire included 40 questions and statements. The knowledge part included 24 questions; stressing the nature of COVID-19, the mode of transmission, the main symptoms, the incubation period, prevention, risky individual for severe COVID, and isolation of a patient or contact. The response of the knowledge questions was dichotomous; a score of one point for the right answer and zero for the incorrect

one. The attitude part included 6 statements regarding social distance, hand washing and sterilization, transmission from an asymptomatic COVID case, the possibility of control of the pandemic, value of vaccination, and wearing the mask. The practice part included 10 questions about social habits that favor infection, hand washing and sanitation, social distance, cough etiquette, wearing the mask, receiving guests at home. The survey of the attitude and practice items was done using a 5 point Likert scale (strongly agree, agree, neutral, disagree strongly disagree) that corresponded to scores of 5, 4, 3, 2, and 1 respectively. So the overall scores of the knowledge, attitude, and practice were 24, 30, and 50 points respectively. A satisfactory response was considered if the individual's score is higher than the mean of all the participants.

Statistical Analysis:

For quantitative variables of normal distribution, data were presented as a range, mean and standard deviation. The student t-test had been performed to compare between two or more groups. For qualitative variables, the data were expressed as frequency and percentage and the groups were compared using the Chi-square test. The likelihood of COVID to the other variables was estimated by the odds ratio and 95% confidence interval. Logistic regression analysis was used to detect the independent predictors of COVID illness among the studied participants. A p-value <0.05 is considered significant.

Ethical consideration:

The objectives of the study and its benefit were explained to the eligible individuals. After approval, informed consent from the participants was obtained. The study was approved by the Ethical Committee of Faculty of Medicine, Post-Said University with ethical code (ERN: MED (4/7/2021) s.no (20) FAM-001).

Results

This cross-sectional descriptive study was conducted in Elmahsma rural health care unit; 15 km away from Ismailia city. The participants who completed the questionnaire were 294, their age ranged from 18 to 65 years (mean=29.73±9.61) and the majority (80%) were less than 40 years. All were from a rural community, 77.6% were females, 66% were working, 65% were married and 68% of participants had three or more family members (Table 1).

In this study, the knowledge scores of the studied participants represented 82.5% of the total compared to 77.94% and 71.67% for the attitude and practice. The mean values of the assessed scores were 19.79, 23.38, and 35.83 points for knowledge, attitude, and practice. Participants' scores above the mean values are considered satisfactory; being 189 (64.3%) for the knowledge, 126 (42.85%) for the attitude, and 114 (38.77%) for practice.

In this study, most of the participants claimed awareness of the COVID-19 (99.6%) and its infectious origin (98%). The majority of participants correctly recognized the routes of transmission of SARS-CoV2; by respiratory droplets in 98% and touching contaminated surfaces in 89%. Of all, 96% of participants reported that a healthy diet and exercise can ameliorate the disease and 92% agreed that washing hands for 20-40 seconds could prevent infection. However, poor knowledge was observed regarding the occurrence of fever during the course of COVID-19 (17.35%) and the probability of having an infection without clinical manifestations (21.43%). Furthermore, 53.4% incorrectly claimed that pets can transmit infection (53.4%). Regarding dealing with COVID patients or contacts, 92.86% correctly agreed that contacts of confirmed COVID patients should be isolated while 89.45% showed

awareness about the method to isolate a case or contact at home. The majority of participants correctly agreed that chronic disease, being elderly, immunosuppressed, or pregnant is risky for severe COVID, respectively in 96.6%, 96.6%, 95.92%, and 92.18% (Table 2).

Regarding the attitude, most of the participants agreed that regular hand washing or the use of alcohol-based hand sanitizers is important (89.32%), and wearing the mask could prevent the disease (87.96%). However, 64% and 70.41% thought that the COVID pandemic could be controlled and the vaccine could prevent the disease respectively. The least attitude response (67.28%) was about the necessity of isolation when suffering from any of the symptoms of COVID-19 (Table 3).

Concerning the practice results, most of the participants responded positively when asked about distancing (73%), hand washing for adequate time (79%), cough etiquette (84%), and use of masks outside doors (79.5%). The other responses regarding social behavior that favor infection are shown in table 4.

In this study, the significant factors associated with deficient knowledge were age >40 years (p= .002) and being married (p=.021). The negative attitude was significantly more frequent among females (p=.000) and married participants (p=.000). The inappropriate practice was significantly more frequent among participants who were married (p=.017) and had more than three family members (p=.000) (Table 5).

In this study, the likelihood of previous COVID-19 infection increased in participants >40 years [OR:3.0 (95% CI:1.54-6.13)], among males [OR: 1.3 (95% CI:0.6-2.7)], married [OR: 1.2 (95% CI: 0.6-2.39)], in participants with chronic illness [OR: 1.6 (95% CI:0.73-3.4)], in participants with previous COVID in the family [OR: 8.2 (95% CI:4.1-16.4) and among participants with > 3 family members [OR: 5.5 (95% CI: 2.68-11.13)]. Meanwhile, the odds of previous COVID was high in participants with negative attitude [OR: 1.4 (95% CI: 0.7-2.7)]. Variables with less likelihood of infection were education [OR 0.92 (95% CI: 0.19-4.2)], not working [OR: 0.52 (95% CI: 0.27-0.99)], satisfactory knowledge [OR: 0.2 (95% CI: 0.1-0.55)] and good practice [OR: 0.84 (95% CI: 0.44-1.6)] (table 6).

By logistic regression analysis, being married (p=.022), presence of previous COVID cases within the family (p=.000) were independent predictors for infection of the studied participants while satisfactory knowledge was an independent protective variable (p=0.34). (Table 7).

Table 1: Characteristics of the studied of the studied population

	Frequency
Age ≤40: >40	236:58
Male: Female	66: 128
Educated	280 (95.2%)
Working	105: 99
Married	192 (65.3%)
Chronic illness	57 (10.38%)
Family members >3	95 (32.3%)

Table 2: The total and mean scores of knowledge of the studied groups toward COVID-19

	Total scores	Mean score
Have you heard about the emerging COVID disease?	293 (99.66)	0.996
Is COVID disease contagious?	288 (97.96)	0.98
Do you know the method of transmission of infection?	224 (76.19)	0.76*
Do you know the symptoms of the emerging COVID disease?	232 (78.91)	0.79*
Does a COVID patient suffer from fever?	51 (17.35)	0.17*
Should a COVID patient suffer from respiratory diseases?	190 (64.62)	0.65*
Can pets transmit the disease?	157 (53.40)	0.54*
Do you know when the symptoms appear after catching infection?	242 (82.31)	0.82*
Is there a vaccination against the emerging Coronavirus?	264 (89.79)	0.9
Can the infection be transmitted if a contaminated hand touches the eyes?	262(89.11)	0.89
Is the disease transmitted if contact with person on distance less than 1 meter?	258 (87.75)	0.88
Can the infection be transmitted if a contaminated hand touches the nose or mouth?	286 (97.28)	0.97
Is the infection transmitted if a person with contaminated hands touches his or her eyes?	251 (85.37)	0.85
Should you wash your hands for at least 20-40 seconds to prevent infection?	273 (92.86)	0.93
Do most people with the infection have no symptoms?	63 (21.43)	0.21*
Can a COVID patient who does not show symptoms be able to transmit the disease?	268 (91.16)	0.91
Is healthy eating and exercise important to prevent severe disease?	284 (96.60)	0.97
Are the elderly more vulnerable to complications of the disease?	284 (96.60)	0.97
Are COVID patients with chronic diseases more likely to have complications?	284 (96.60)	0.97
Are pregnant women with COVID more prone to complications?	271 (92.18)	0.92
Are COVID patients who take medications that affect immunity or have low immunity more likely to have complications?	282 (95.92)	0.96
Should anyone in contact with a confirmed COVID case be isolated?	273 (92.86)	0.93
For an individual with COVID disease, the probability of transmission to the contacts increases if the distance is less than one meter	258 (87.75)	0.88
Do you know how the way of isolation at home for a patient or contact?	263 (89.45)	0.89
Interviewed Knowledge score (total and mean)	5820 (82.5%)	19.8
Maximum knowledge Score (total and mean)	7056 (100%)	24

**The response scores of 7 of 24 questions of the knowledge were less than the mean, and satisfactory knowledge was found in 179 (60.9%).

Table 3: The total and mean scores of attitude of the studied population toward COVID-19

	Total response	Mean score
During talking to a person, leaving a distance of at least one meter can prevent disease transmission	1304 (88.71%)	4.44
Regular hand washing or sterilization can prevent infection	1313 (89.32%)	4.45
A person can catch infection when mixing with an infected individual who does not manifest any symptom	989 (67.28%)	3.36*
The COVID pandemic can be controlled	941 (64.01%)	3.3*
In the near future, vaccination will protect against disease	1035 (70.41%)	3.52*
Wearing masks is important to reduce disease transmission	1293 (87.96%)	4.4
Total interviewed attitude score	6875 (77.94%)	23.28
Total Attitude score	8820 (100%)	30

*The response scores of 3 of 6 items of the attitude were less than the mean, and positive attitude was found in125 (42.5%).

Table 4:-Total and mean scores of practice of the studied population toward COVID-19

	Total scores	Mean scores
Have you attended any gatherings in the last 6 months?	1024 (69.65%)	3.48*
Have you been in crowded places in the last 6 months?	1029 (70%)	3.4*
Do you practice hand shaking or kissing when greeting someone?	960 (65%)	3.27*
Do you constantly wash and sanitize your hands?	1171 (79.65)	3.98
Do you leave a distance of at least one meter between you and others?	1078 (73%)	3.64
Do you wash your hands for 20-40 seconds?	1162 (79%)	3.95
Do you cover your nose and mouth when you cough or sneeze?	1237 (84%)	4.2
Do you wear a mask when leaving the house?	1169 (79.5%)	3.98
Do you receive guests in your home or attend family gatherings?	1005 (68.4%)	3.42*
Do you require guests to wear a mask?	701 (47.68%)	2.48*
Interviewed practice score	10536 (71.67%)	35.83
Maximum practice score	14700 (100%)	50

*The scores of 5 of 10 items of the practice were less than the mean, and good practice was found only in 114 (38.78%).

Table 5: Relation of the participants' socio-demographic characteristics with the knowledge, attitude and practice

	Knowledge			Attitude			PRACTICE		
	Not accepted	Accepted	P value	Not Accepted	Accepted Score	P Value	Not accepted	Accepted	P value
<40 years	106 (44.9)	130 (55.1)	.002	139 (58.9)	97 (41.1)	.92	146 (61.9)	90 (38.1)	.44
≥ 40 years	9 (16.3)	49 (83.7)		30 (51.7)	29 (48.3)		34 (58.6)	24 (41.6)	
Male	15 (23)	51 (77)	.29	20 (30)	46 (70)	.000	30 (45)	36 (55)	.072
Female	100 (44)	128 (56)		149 (65)	79 (35)		150 (66)	78 (44)	
Non-educated	5 (36)	9 (64)	.46	6 (43)	8 (57)	.877	8 (57)	6 (43)	.844
Educated	110 (39)	170 (61)		163 (58)	117 (42)		172 (62)	107 (38)	
Not Working	23 (23)	76 (76)	.09	47(47)	52 (53)	.891	51 (51)	48 (49)	.609
Working	92 (47)	103 (53)		122 (62)	73 (38)		129 (66.2)	66 (35.8)	
Non married	31 (30)	71 (70)	.021	41 (40)	61 (60)	.000	51(50)	51 (50)	.017
Married	84 (44)	108 (56)		128 (66.7)	64 (33.3)		129 (67)	63 (33)	
Contacts ≤3	54 (56)	41 (44)	.010	69 (73)	26 (31)	.003	77 (81)	18 (19.9)	.000
Contacts>3	61 (31)	138 (69)		100 (50.3)	99 (49.7)		103 (51)	98 (49)	
Previous COVID	7 (15.6)	38 (84.4)	<0.001	29 (64.4%)	16 (35.6)	0.3	26 (57.8)	19 (42.2)	0.7
No previous COVID	108 (43.4)	141(56.6)		140 (56.2)	109 (43.8)		154 (61.8)	95 (38.2)	

Table 6: Study variables associated with previous Covid-19 infection among 294 studied participants (by univariate analysis)

		Recently infected	Not infected	P-value	OR (95% CI)
Age	<40	28 (11.86%)	208 (80.14%)	0.0014	3.0 (1.54-6.13)
	>40	17(29.3%)	41(70.7%)		
Sex	Male	12 (18.1%)	54 (81.9%)	0.46	1.3 (0.6-2.7)
	Female	33 (14.47%)	195 (85.63%)		
Education	Not	2 (14.2%)	12 (58.8%)	0.92	0.92 (0.19-4.2)
	Educated	43 (15.3%)	237 (84.7%)		
Job	Not working	21 (21.1%)	78 (80.9%)	0.047	0.52 (0.27-0.99)
	Working	24 (12.3%)	171 (87.7%)		
Marital	Not	14 (13.7%)	88 (86.3%)	0.58	1.2 (0.6-2.39)
	Married	31 (16.1%)	161 (83.9%)		
Chronic diseases	Yes	12 (21.05%)	45 (88.95%)	0.18	1.6 (0.73-3.4)
	No	33 (9.8%)	204 (91.2%)		
Covid-19 in family member	yes	29 (37.1%)	49 (62.9%)	<0.001	8.2 (4.1-16.4)
	no	16 (7.4%)	200 (92.6%)		
No. of family member	1-3 member	12 (12.6%)	83 (87.4%)	<0.001	5.5 (2.7-11.1)
	>3 member	33 (16.58%)	166 (83.42%)		
Total Knowledge	deficient	7 (6.1%)	108 (93.9%)	0.0009	0.24 (0.1-0.6)
	satisfactory	38 (21.2%)	141 (80.8%)		

Total attitude	negative	29 (17.2%)	140 (82.8%)	0.3	1.4 (0.7-2.7)
	positive	16 (12.8%)	109 87.2%)		
Total practice	Poor	26 (14.4%)	154 (85.6%)	0.6	0.84 (0.44-1.6)
	Good	19 (16.67%)	95 (83.33%)		

Table 7: Study variables associated with previous Covid-19 infection among 294 studied participants (by logistic regression analysis analysis)

	B	Std. Error	Sig.	95% Confidence Interval for Exp(B)	
				Lower Bound	Upper Bound
Age	-.144	.365	0.692	.423	1.769
Sex	-.004	.482	0.994	.387	2.562
Education	-.169	.207	0.413	.563	1.267
Job	-.383	.239	0.109	.427	1.089
Marital	.783	.341	0.022	1.122	4.270
Chronic diseases	.143	.106	0.180	0.936	1.421
Covid-19 in family member	-2.037	.389	0.000	0.061	0.280
Total Knowledge	.245	.116	0.034	1.018	1.602
Total attitude	-.122	.067	.067	0.776	1.008
Total practice	.000	.040	.999	0.925	1.081
No. of family member	.030	.448	.946	0.428	2.480

Discussion

In the present study, a satisfactory level of knowledge was evident in 61% of the studied sample compared to 42.5% and 38.8% for the attitude and practice domains. In Egypt, better responses were described 70.2%, 75.9%, and 49.2% of the participants respectively for knowledge, attitude and practice as tested by an online questionnaire during the evolving wave one, the participants were from all over Egypt including from urban and rural areas [11].

Although most of the sample had good awareness regarding many items concerning COVID transmission and prevention, a knowledge gap was faced about the source of infection, infectivity from asymptomatic cases. Unawareness about important manifestations of COVID as fever and/or respiratory symptoms was also frequently met. Modification of all these remarks is important to control the spread of infection by early recognition of new cases for subsequent isolation, keeping the social distance, and wearing masks. The satisfactory

knowledge in our study was comparable to other reports from India, China, Saudi Arabia, and Egypt [12-14].

   The study showed a significantly higher prevalence of COVID among participants with an accepted level of knowledge; both variables were more frequent in participants over 40 years. Previous experience of COVID-19 could be the underlying reason for increased awareness. The other factors could be the increasing number new cases and deaths among relatives and neighbors of the studied participants and the role of the national TV and broadcasting channels in propagating news and awareness.

The study revealed a positive attitude in only 42.5% of the studied sample with good responses concerning keeping social distance, wearing masks, and hand hygiene. However, nearly third did not agree that socializing with asymptomatic cases can transmit infection. A less optimism was recognized about the possibility of control of the pandemic and the expected protective effect of the vaccines under trial which were not available at the time of the study. Improvement of these gaps could motivate people for more support and collaboration with the official effort to speed the end of the pandemic. The prevalence of the optimistic participants who gave the confidence to control the pandemic (64%) was less than 90.8% in a Chinese study and more than 43.8 % reported in another study from Egypt [13,15]. The latter one was conducted early during the outbreak when data were still evolving. It is worth noting that the change in the level of KAP responses in different studies, in the same country, is possibly due to a significant shift to better awareness and healthy habits overtime during the pandemic. Optimism possibly increased when effective drugs were available and the news of vaccination trials was disseminated in the media.

   In this study, good practice was found in 38.78%. Unfortunately, more than two-thirds of the participants did not maintain social distance during the public gathering and crowded places and about half asked their guests to wear a mask during their visit. In Egypt, a previously worse practice was also reported during the Avian Flu in 2009 [16]. However, better practice responses toward COVID prevention were described in China and Saudi Arabia, and Egypt [13, 14, 11], in these two Asian countries, the high compliance of the population was authorized by the governments to prohibit public gatherings and monitor social isolation. The gap between levels of knowledge and that of the attitude and practice was also perceived in other studies that observed the poor and slow change from knowledge to practice [17, 18]. In the background of the rural setting of the study, education played a contradictory role in the outcomes of KAP assessment. The level of KAP was a little better in non-educated than educated and the history of COVID was very close in both groups; probably due to the small number of non-educated participants (4.8%).

   By univariate analysis, our study highlighted the role of older age ($p=0.0014$), working ($p=0.047$), COVID in the family ($p<0.001$), and the large family ($p<0.001$) in increasing the odds of COVID among the studied participants. Participants with satisfactory knowledge were a significantly associated COVID ($p=0.009$). On the other hand, by logistic regression analysis, being married ($p=0.022$), history of COVID in the family ($p<0.001$), and satisfactory knowledge ($p=0.034$) were independent predictors for the previous COVID among the studied population. The association of family gathering with COVID among the studied participants was also reported in more than half of the confirmed cases in the capital of China [19]. Although the odds of COVID were more among the male participants of this study (OR: 1.3), a similar susceptibility to COVID between males and females were reported [20].

Conclusion:

This study revealed an average level of knowledge and poor attitude and practice in a cluster of populations attending a rural health care unit during the study. Correction of the gaps is important to motivate people to support the official efforts to speed the end of the COVID epidemic in Egypt. Health education, close monitoring of the behavior in addition to the availability of vaccination are important steps.

Limitation of the study:

The study missed a control group from the urban areas; a recommendation that should be considered in further studies. The small proportion of non-educated participants does not reflect the real-life situation of the rural community in Egypt (32.2%) [21]. History of COVID-19 among the participants relied on recalling that might be a subject of bias.

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