Egyptian Journal of Community Medicine

Influence of COVID-19-Related KAP on Daily Life, Social Stigma and Vaccine Intentions in Upper Egypt

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Submission Date:
2022-04-13

Revision Date:
2022-05-15

Acceptance Date:
2022-05-16

Key Words:
COVID-19, Stigma, Awareness, Vaccine acceptance, Egypt, Survey.

A B S T R A C T

Background: Studies assessing knowledge, attitude and practice (KAP) of coronavirus disease 2019 (COVID-19) are essential to support interventions and to resolve misconceptions about the disease. **Objective**: To assess KAP, measure the impact of COVID-19 on participants' lives, determine stigmatization, and identify intentions toward COVID-19 vaccination. **Method**: A cross-sectional study was conducted between December 2020 and February 2021 in Upper Egypt. Participants were recruited using social media (Facebook and WhatsApp) and data were collected using online questionnaire. **Results**: Among 512 participants completed the survey, 59.6% were aged 20–39 years, and 55.3% were women. Approximately 61.5% of the participants had a good knowledge level, 60.2% had a positive attitude, and 52.9% had a good practice score. Social media was the main (63.3%) source of information. Vaccine intention was poor in 42.0% of the participants, and the majority considered COVID-19 a source of stigma. Significant predictors of good knowledge were employment in the medical profession, aged 20–39 years and higher level of education (OR: 5.9, 3.02, and 3.1, respectively). Significant predictors of positive attitude were employment in the medical profession, marriage, and male gender (OR: 2.4, 2.0 and 2.03, respectively). Significant predictors of good practice were marriage, urban residency and female gender (OR: 2.9, 1.6 and 1.5, respectively). **Conclusions**: Social media and a lack of organized sources of knowledge have adversely impacted the public's COVID-19-related KAP in Upper Egypt. Well-organized community outreach programs led by health authorities are essential to raise public awareness, reduce COVID-19-related stigma, and increase vaccine uptake.

INTRODUCTION

Coronavirus disease 2019 (COVID-19) is a highly communicable and life-threatening disease that has been classified as a pandemic by the World Health Organization (WHO).[1] Strong infection control measures are the primary intervention to minimize the spread of COVID-19 in both healthcare settings and the community.[2] Public awareness of strategies for dealing with communicable respiratory diseases is essential for limiting their spread, especially in low- and middle-income countries, where health systems do not have robust outbreak control measures. In these countries, managing the COVID-19 pandemic depends mainly on the population's adherence to measures and behavioral changes recommended by health authorities, which in turn is determined primarily by community knowledge, attitude, and practice (KAP).[3]

Studies of KAP provide baseline information for developing interventions to correct misconceptions. The public's limited understanding of infectious diseases like COVID-19 can foster fear and hinder

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efforts to control their spread. The SARS outbreak in 2003 revealed that knowledge and attitudes toward infectious diseases determine the level of public panic. Panic can hinder disease prevention efforts,[4] by promoting the adoption of improper infection control measures, stigmatization, and emotions like anxiety[3]. Knowledge, worry, and media coverage of infectious disease outbreaks also shape health-protective behaviors and vaccination intentions.[5] Evaluating COVID-19-related KAP at this critical stage of the pandemic is important for continued pandemic management, including increasing vaccine uptake and planning appropriate post-pandemic strategies. [6-8]

As of November 2021, WHO had reported 332,889 confirmed cases and 18,769 confirmed deaths in Egypt.[9] The current study assessed the KAP of a population sample from Upper Egypt and evaluated the relationships between KAP and demographic factors. In addition, the impact of COVID-19 on the participants' lives was explored, and the stigmatization that the participants faced because of the pandemic and their intentions to receive the COVID-19 vaccine were evaluated.

METHOD

This cross-sectional study was conducted during the second wave of the COVID-19 pandemic in Egypt between December 2020 and February 2021. The researchers obtained the necessary official approval from Faculty of Medicine, Assiut University.

Data were collected from individuals 16–69 years of age currently living in Upper Egypt governorates, with a population size of approximately 20 million.[10] The investigators targeted participants using social media (Facebook and WhatsApp).

A semi-structured questionnaire comprising 70 questions divided into seven sections was prepared based on the literature.[5,11,12] Section 1 included 10 items covering sociodemographic characteristics, education, employment, and sources. For items related to sources of COVID-19 information, including the main source, multiple responses were allowed. The participant scored their level of trust in each source as low, moderate or high. Section 2 included 15 items assessing knowledge of COVID-19, including its cause, methods of spread, incubation period, symptoms, treatment, protective measures, medical conditions that worsen the outcome, recovery and chance of reinfection. For some items, the possible responses were 'yes', 'no', and 'I don't know', and only one response was correct. For other items, multiple correct responses were possible. The total knowledge score ranged from 0 to 15. Section 3 included 9 items measuring attitude toward COVID-19. The possible responses to each statement were 'true', 'false' and 'no opinion'. The total attitude score ranged from 0 to 9. Section 4 assessed practice using 11 statements related to methods of disease spread and preventive measures. The possible responses to each statement were 'true', 'false' and 'no opinion'. The total practice score ranged from 0 to 11. For the items in sections 2–4, one point was given for each correct answer, and zero points were given to incorrect answers or responses of 'I don't know' or 'no opinion'. The points were summed to obtain the total score for each participant. The total scores for knowledge, attitude and practice were classified using Bloom's cut-off points: scores between 28 (80%) and 35 (100%) were classified as good; between 21 (60%) and 27 (79%) as moderate; and below 20 (60%) as poor.[12] Section 5 included 4 questions exploring the impact of COVID-19 on the participant's health and daily life, including the difficulties and feelings the participant experienced and changes in their life practices; multiple correct responses were possible. The participants scored their difficulties and feelings using quartiles between 0 and 100% (i.e., 0–24%, 25–49%, 50–74%, and 75–100%). Section 6 comprised 8 questions examining COVID-19-related stigma. For each item, responses were given on a 5-point Likert-type scale ranging from 1= 'strongly disagree' to 5= 'strongly agree'. The stigma scores were classified as follows: 0–33%, no or mild stigma; >33% to < 66%, moderate stigma; and ≥66%, severe stigma. This approach was suggested by Charles et al. due to the lack of universal cutoff points for stigma scores.[13] Section 7 included 13 questions assessing COVID-19 vaccination intentions and acceptance, including barriers to vaccination and factors influencing the participant's decision to receive the vaccine. For each item, responses were given on a 5-point Likert-type scale ranging from 1= 'very unlikely' to 5= 'very likely'. The scores were summed to obtain the overall intention score and converted to percentages of the total possible score. Greater scores indicated higher

vaccination intention: 80-100%, good intention; 60-79%, moderate intention; and <60%, poor intention.

Table (1): The distribution of participants' socio-demographic characteristics

Demographic data	No. (512)	%
Age: (years)		
< 20	122	23.8
20 - < 40	305	59.6
40 – 60	85	16.6
Sex:		
Male	229	44.7
Female	283	55.3
Residence:		
Rural	218	42.6
Urban	294	57.4
Level of education:		
Secondary	52	10.2
Technical institute	195	38.1
University	164	32.0
Post-graduate	101	19.7
Occupation:		
Medical	143	27.9
Non-medical	105	20.5
Student	203	39.6
Not working	61	11.9
Marital status:		
Single	294	57.4
Married	193	37.7
Divorced/ widowed	25	4.9

Tool validation: The clarity of the questions and completeness of the response sets were assessed in a pilot study using a sample of 20 participants. The data from the pilot study were excluded from analysis. Cronbach's alpha was 0.73, 0.78, 0.90, 0.77, and 0.86 for knowledge, attitude, practice, stigma, and vaccine intention, respectively, indicating internal reliability.

A sample size of 385 individuals was calculated using Epi-Info version 7 following previous studies.[14,15] and assuming a 50% probability of having good knowledge, a 95% confidence level, and a 5% margin of error. The sample size was increased to 580 to account for potential nonresponses.

An online version of the survey was created using Google form. The investigators distributed the questionnaire using social media (Facebook and WhatsApp) considering place of residence. In order to ensure the eligibility of the responders, the survey started by a sentence "if your age is 16-69 years old and live in Upper Egypt governorates". The participants provided informed consent, that was at the beginning of the survey and it was mandatory to complete the survey and were assured of the confidentiality of their responses. The questionnaire was accessible by clicking on a link. Responses were collected anonymously. The survey portal was closed when the number of participants reached 580, and 512 questionnaires were completed and deemed eligible for analysis.

Statistical Analysis: Statistical analysis was performed using the statistical software package SPSS version 26. Data are presented as frequency and the mean $\pm$ SD. Correlations between quantitative variables were assessed using Pearson correlation. Chi squared or Fisher's exact test was used categorical variables, and regression analysis between the independent variables and the KAP score was performed. Values of $p<0.05$ were considered statistically significant. All data were coded, entered and analyzed anonymously.

RESULTS

Of the 512 individuals from seven governorates in Upper Egypt who completed the survey, 57.4% were living in an urban setting, 55.3% were female, and 59.6% were 20–39 years of age (Table 1). Social media was the most commonly reported source of COVID-19 information (63.3%), followed by Ministry of Health (MOH) /WHO guidelines (39.5%) and scientific articles (8.6%).

As shown in Figure 1, 61.5% had good knowledge, 60.2% had a positive attitude, and 52.9% had good practice. The percentage of correct answers was very high for knowledge questions regarding the cause of COVID-19, incubation period, symptoms, methods of spread, measures to avoid the spread, and possibility of reinfection. Most participants agreed that it was necessary to avoid contact with people with suspected or confirmed infections to avoid infection (95.5%), that the disease can spread from person to person (94.9%), and that infection control measures (e.g., cleaning hands) can help prevent transmission (91.6%).

A positive attitude was evident in the high percentage of correct ('true') answers for the following statements: the disease can be treated (83.4%); the

disease is curable (85.5%); the disease is serious (89.6%); appropriate precautions can help stop the

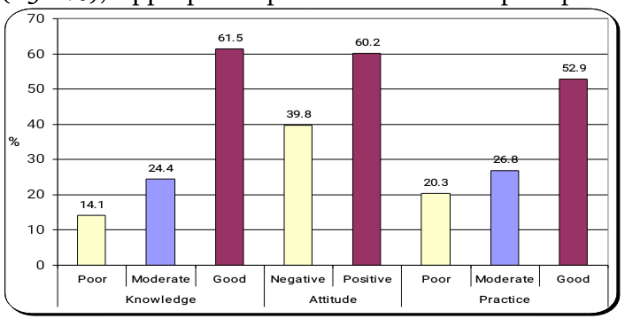

Figure (1): Participants' overall knowledge, attitude and practice score

disease (90.8%); and health education can help stop the disease (93.0%). A positive attitude towards vaccination was expressed by 53.3% of the participants. The MOH guidelines were considered adequate by 39.5%, and 18.9% followed these instructions. Most (81.2%) incorrectly believed that household animals such as pets can transmit COVID-19. The majority correctly practiced protective actions against COVID-19, with the highest percentages for measures and precautions to avoid disease transmission. The percentages of correct practice were lowest for avoiding public transportation (48.6%) and using herbal products and traditional medicine (39.1%).

The most common lifestyle changes due to COVID-19 were avoiding visiting family members and friends even when they did not have symptoms (58.8%), stockpiling cleaning supplies (48.2%), stockpiling medication (40.3%), stockpiling household items (39.4%), avoiding travel (43.6%), and avoiding doctor or dentist visits (35.0%). The participants reported that COVID-19 caused difficulties in accessing healthcare (43.0%), transportation (33.0%), medication (31.6%), sufficient work hours (29.5%), and cleaning supplies and other household items (26.2%). The participants expressed COVID-19-induced feelings of anxiety (87.1%), worry about family and friends (82.4%), and fear of getting sick (55.5%).

As shown in Figure 2, 22.8% and 71.9% reported severe or moderate social stigma, respectively; only 5.3% reported that they had not experienced COVID-19-related stigma. With respect to the eight statements, strong agreement or agreement was expressed by 73.6% for "If I had COVID-19, people would treat me differently"; 52.2% for "When I had COVID-19, people treated me differently"; 49.6% for "If I had COVID-19, people would think badly of me";

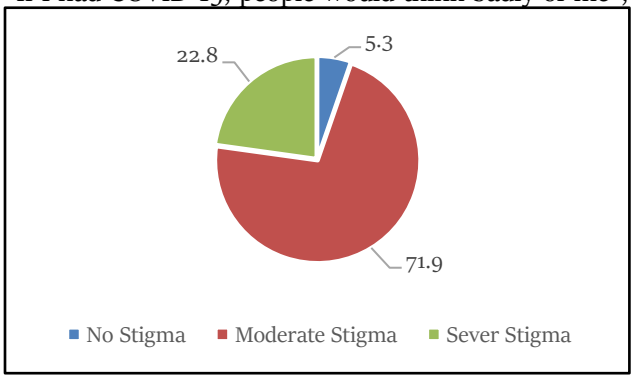

Figure (2): The distribution of participants' stigma level towards COVID-19

35.6% for "When I had COVID-19, people thought badly of me"; 27.8% for "If I had COVID-19, I would be embarrassed"; 26.8% for "When I had COVID-19, I was embarrassed"; 17.0% for "When I had COVID-19, I did not tell anyone"; and 12.3 % for "If I had COVID-19, I would not tell anyone".

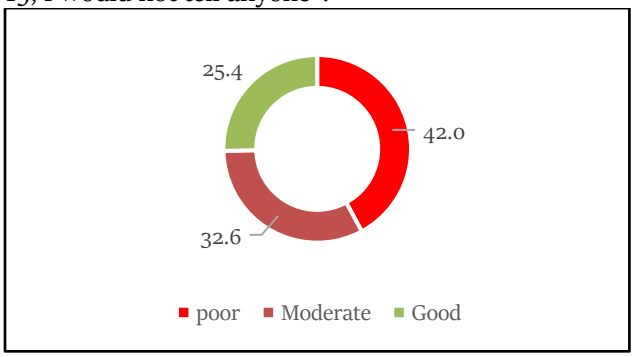

Figure (3): The study population intentions towards COVID-19 vaccination

With respect to vaccine acceptance, 10.2 and 20.3% of the participants responded that they were likely or very likely, respectively, to receive the seasonal flu vaccine. Similarly, 14.6 and 22.7% responded that they were likely or very likely, respectively, to receive the COVID-19 vaccine. Half of the participants responded that they would receive the vaccine if the government or healthcare provider recommended it. More than one third (35.1%) doubted that the vaccine would be available at hospitals and clinics, and 32.6% expected to become infected if they did not receive the COVID-19 vaccine. Half (49.6%) supported compulsory vaccination. The most important factors influencing vaccine acceptance were vaccine safety (62.9%), possible side effects (47.3%), and duration of protection (43.6%). The participants' main motivations for vaccination were to protect their

Table (2): Correlation between participants stigma, vaccine intention and knowledge, attitude and practice

	Stigma score		Vaccine intention score	
	r- value	P-value	r- value	P-value
Knowledge score	**-0.198**	**0.000***	0.051	0.253
Attitude score	0.008	0.864	**0.398**	**0.000***
Practice score	-0.006	0.886	**0.182**	**0.000***
Vaccine intention score	0.002	0.956	--	--

Table (3): The relationship between participants 'socio-demographic characteristics and the overall knowledge level

Personal data	The overall knowledge level						*P*-value
	Poor		Moderate		Good		
	No.	%	No.	%	No.	%	
Age: (years)							
< 20	31	25.4	45	36.9	46	37.7	
20 - < 40	30	9.8	65	21.3	210	68.9	0.000*
40 - 60	11	12.9	15	17.6	59	69.4	
Sex:							
Male	46	20.1	49	21.4	134	58.5	0.002*
Female	26	9.2	76	26.9	181	64.0	
Residence:							
Rural	46	21.1	59	27.1	113	51.8	0.000*
Urban	26	8.8	66	22.4	202	68.7	
Level of education:							
Secondary	24	46.2	15	28.8	13	25.0	
Technical institute	24	12.3	55	28.2	116	59.5	0.000*
University	19	11.6	37	22.6	108	65.9	
Post-graduate	5	5.0	18	17.8	78	77.2	
Occupation:							
Medical	10	7.0	16	11.2	117	81.8	
Non-medical	17	16.2	28	26.7	60	57.1	0.000*
Student	29	14.3	60	29.6	114	56.2	
Not working	16	26.2	21	34.4	24	39.3	
Marital status:							
Unmarried	50	15.7	86	27.0	183	57.4	0.045*
Married	22	11.4	39	20.2	132	68.4	
Total	72	14.1	125	24.4	315	61.5	

personal health (51.6%), their family's health (58.8%), and the health of the community (56.8%). As shown in Figure 3, 42.0% of the participants had poor vaccination intention; 32.6% reported moderate intention, and only 25.4% had good intention.

There were significant positive correlations between knowledge and attitude (r=0.328), between knowledge and practice (r=0.320) and between attitude and practice (r=0.415) (p=0.000). There were also significant positive correlations of positive attitude and good practice with vaccine acceptance (r=0.398 and 0.182, respectively), while there was a significant negative correlation between good knowledge and stigma (r=-0.198) (p=0.000) (Table 2). A good knowledge level was significantly related to an age of 20–39 years, female gender, urban residency, employment in the medical profession, current enrollment as a student, marriage, and a high level of education (p<0.05) (Table 3).

Table (4): The relationship between participants' socio-demographic characteristics and the overall Attitude level

Personal data	Negative Attitude		Positive Attitude		*P* value
	No.	%	No.	%	
Age: (years)					
< 20	55	45.1	67	54.9	
20 - < 40	116	38.0	189	62.0	0.396
40 - 60	33	38.8	52	61.2	
Sex:					
Male	97	42.4	132	57.6	0.296
Female	107	37.8	176	62.2	
Residence:					
Rural	87	39.9	131	60.1	0.980
Urban	117	39.8	177	60.2	
Level of education:					
Secondary	30	57.7	22	42.3	
Technical institute	74	37.9	121	62.1	0.052
University	61	37.2	103	62.8	
Post-graduate	39	38.6	62	61.4	
Occupation:					
Medical	45	31.5	98	68.5	
Non-medical	44	41.9	61	58.1	0.074
Student	85	41.9	118	58.1	
Not working	30	49.2	31	50.8	
Marital status:					
Unmarried	138	43.3	181	56.7	0.042*
Married	66	34.2	127	65.8	
Total	204	39.8	308	60.1	

By contrast, none of the demographic variables except marriage ($p<0.05$) had a significant impact on positive attitude (Table 4). The percentage of good practice was significantly influenced by an age of 20–39 or 40–60 years, urban residency, a high level of education, marriage and employment in the medical profession ($p<0.05$) (Table 5).

Stigma was significantly related to male gender, a lower educational level, employment in nonmedical jobs, unemployment, single (unmarried) status, and urban residency ($p<0.05$) (Table 6). Vaccine intention was highest for participants with a high level of education and those with medical jobs ($p<0.05$) (Table 7).

Significant predictors of good knowledge about COVID-19 were age 20–39 or 40–60 years, technical, university or postgraduate education, current enrollment as a student, and employment in the medical profession, with OR (95%CI) values of 3.02 (1.7–5.3), 3.2 (1.4–7.3), 3.1 (1.4–6.7), 4.0 (1.6–9.9), 4.1 (1.5–11.3), 5.2 (2.2–12.5), and 5.9 (2.8–12.2), respectively. The overall predictive power of the model incorporating these factors was 68.9% ($p<0.05$). Significant predictors of a positive attitude about COVID-19 were marriage (OR: 1.97, 95%CI: 1.2–3.3), employment in the medical profession (OR: 2.4, 95%CI: 1.2–4.7), and technical education (OR: 2.4, 95%CI: 1.2–4.8). The overall predictive power of the model incorporating these factors was 60.2% ($p<0.05$). Female gender, urban residency and marriage were significant predictors of good practice, with OR (95%CI) values of 1.5 (1.02–2.2), 1.6 (1.08–2.37), and 2.88 (1.71–4.85), respectively. The overall predictive power of the model incorporating these factors was 63.3% ($p<0.05$).

The only significant predictor of COVID-19 stigma was male gender (OR: 2.03, 95%CI: 1.3–3.2). The overall predictive power of the corresponding model was 76.8% ($p<0.05$). Significant predictors of vaccine intention were university education (OR: 3.5, 95%CI:

Table (5): The relationship between participants' socio-demographic characteristics and the overall practice level

Personal data	The overall practice level						P-value
	Poor		Moderate		Good		
	No.	%	No.	%	No.	%	
Age: (years)							
< 20	38	31.1	37	30.3	47	38.5	
20 - < 40	60	19.7	81	26.6	164	53.8	0.000*
40 - 60	6	7.1	19	22.4	60	70.6	
Sex:							
Male	53	23.1	68	29.7	108	47.2	0.062
Female	51	18.0	69	24.4	163	57.6	
Residence:							
Rural	52	23.9	72	33.0	94	43.1	0.001*
Urban	52	17.7	65	22.1	177	60.2	
Level of education:							
Secondary	14	26.9	19	36.5	19	36.5	
Technical institute	56	28.7	50	25.6	89	45.6	0.000*
University	19	11.6	49	29.9	96	58.5	
Post-graduate	15	14.9	19	18.8	67	66.3	
Occupation:							
Medical	13	9.1	42	29.4	88	61.5	
Non-medical	16	15.2	28	26.7	61	58.1	0.000*
Student	60	29.6	57	28.1	86	42.4	
Not working	15	24.6	10	16.4	36	59.0	
Marital status:							
Unmarried	84	26.3	98	30.7	137	42.9	0.000*
Married	20	10.4	39	20.2	134	69.4	
Total	104	20.3	137	26.7	271	52.9	

1.2–10.1) and current enrollment as a student (OR: 2.6, 95%CI: 1.01–6.6). The overall predictive power of the model incorporating these factors was 74.6% (p<0.05).

DISCUSSION

The current study assessed COVID-19-related KAP among participants residing in governates in Upper Egypt. Assessments of the general public's COVID-19-related KAP are important for developing programs to improve awareness, prevention and health.[16] The three pillars of KAP are linked: improving knowledge promotes positive attitudes about communicable disease prevention, which in turn motivates better practices.[17]

On average, 60% of the survey participants exhibited good knowledge, particularly about causative agents, signs and symptoms, transmission methods, and protective measures. The level of knowledge among the participants is consistent with the findings of multiple studies in various countries. [15,18,19] Excellent levels of knowledge regarding disease transmission (99%) and disease symptoms (86%) were reported in Iran.[20] By contrast, poor knowledge of COVID-19 symptoms and disease transmission was evident among two thirds of healthcare workers (HCWs) in the United Arab Emirates,[21] and ~75% of HCWs in a survey in Thailand had poor knowledge of preventive measures.[22]

Positive attitudes toward protective measures against COVID-19 were reported by 60% of the survey participants. The public's awareness of health risks plays a vital role in the acceptance of general measures to prevent the spread of COVID-19 and can help create positive attitudes and responsible behavior among the public. [23,24] Kumar et al., 2020 and Khasawneh et al, 2020 noted that knowledge of the role of face mask usage in disease control was poor among Indian HCWs and medical students. [25,26] By contrast, recent studies

Table (6): The relationship between participants' socio-demographic characteristics and the overall stigma level

Personal data	The overall stigma level						P-value
	No stigma		Moderate		Severe		
	No.	%	No.	%	No.	%	
Age: (years)							
< 20	3	2.5	93	76.2	26	21.3	
20 - < 40	19	6.2	222	72.8	64	21.0	0.116
40 - 60	5	5.9	53	62.4	27	31.8	
Sex:							
Male	13	5.7	144	62.9	72	31.4	0.000*
Female	14	4.9	224	79.2	45	15.9	
Residence:							
Rural	8	3.7	150	68.8	60	27.5	0.050*
Urban	19	6.5	218	74.1	57	19.4	
Level of education:							
Secondary	0	0.0	31	59.6	21	40.4	
Technical institute	8	4.1	155	79.5	32	16.4	0.001*
University	9	5.5	111	67.7	44	26.8	
Post-graduate	10	9.9	71	70.3	20	19.8	
Occupation:							
Medical	8	5.6	105	73.4	30	21.0	
Non-medical	8	7.6	69	65.7	28	26.7	0.005*
Student	7	3.4	161	79.3	35	17.2	
Not working	4	6.6	33	54.1	24	39.3	
Marital status:							
Unmarried	13	4.1	243	76.2	63	19.7	0.018*
Married	14	7.3	125	64.8	54	28.0	
Total	27	5.3	368	71.9	117	22.8	

in China reported that nearly all participants acknowledged wearing masks outdoors.[3,27] This discrepancy between countries may reflect differences in education levels, rule enforcement, and previous pandemic experience.[26]

There were significant positive associations of KAP with younger age (20–40 years), higher educational level, female gender, and urban residency, consistent with several previous studies. [3,18] By contrast, studies in Malaysia found that knowledge levels were higher among those 50 years of age or older, possibly due to greater perceptions of a high risk of disease complications. [28] Higher knowledge scores have also been reported for HCWs.[29]

Social media was the primary source of knowledge about COVID-19 for the majority of participants (63.3%). Most considered medical experts the most reliable source of information about COVID-19 (79.3%) and wanted greater availability of information about COVID-19 (77.0%). These results are similar to previous findings in Egypt and elsewhere. [18,26,30] Social media is not a recommended source of information due to the risk of fabrication.[31] Only 9% of our survey participants consulted HCWs as a source of information. By contrast, 75% of participants in a study in the US considered health experts a trustworthy source of information.[32] Establishing groups of health professionals for public communication and community education would help increase awareness, confidence and acceptance of the COVID-19 vaccine.[33]

An unexpected misconception reported frequently by the participants was that the coronavirus is transmitted by household animals and by consumption of contaminated dairy and meat products.

Table (7): The relationship between participants 'socio-demographic characteristics and the overall vaccine intention score

Personal data	The overall vaccine intention level						P-value
	Poor		Moderate		Good		
	No.	%	No.	%	No.	%	
Age: (years)							
< 20	48	39.3	44	36.1	30	24.6	
20 - < 40	121	39.7	105	34.4	79	25.9	0.099
40 - 60	46	54.1	18	21.2	21	24.7	
Sex:							
Male	98	42.8	70	30.6	61	26.6	0.654
Female	117	41.3	97	34.3	69	24.4	
Residence:							
Rural	82	37.6	73	33.5	63	28.9	0.160
Urban	133	45.2	94	32.0	67	22.8	
Level of education:							
Secondary	28	53.8	16	30.8	8	15.4	
Technical institute	67	34.4	72	36.9	56	28.7	0.009*
University	64	39.0	53	32.3	47	28.7	
Post-graduate	56	55.4	26	25.7	19	18.8	
Occupation:							
Medical	67	46.9	51	35.7	25	17.5	
Non-medical	47	44.8	26	24.8	32	30.5	0.036*
Student	71	35.0	73	36.0	59	29.1	
Not working	30	49.2	17	27.9	14	23.0	
Marital status:							
Unmarried	129	40.4	112	35.1	78	24.5	0.302
Married	86	44.6	55	28.5	52	26.9	
Total	215	42.0	167	32.6	130	25.4	

Similarly, previous studies have reported perceptions that wild animals spread the virus.[34] Such misconceptions highlight the need for policy makers to recognize the importance of social media in broadcasting information to the public, particularly during pandemics.[26] We found that the websites of WHO and other medical organizations, despite being reliable sources of information, were less frequently used. This finding demonstrates the importance of increasing the visibility of trustworthy sources of information, which are vital for delivering correct, detailed, and judicious information in a timely manner.[35,36] The creation and dissemination of appropriate content through online networks clearly should be supervised by the Ministry of Health and Universities.

The majority of the survey participants described feelings of anxiety, worry about family and friends, and fear of becoming ill due to COVID-19. A global survey of students found similar feelings of tedium and worry.[37] The pandemic increased the importance of particular hygienic behaviors (e.g., wearing masks and washing hands) while prohibiting some regular practices (e.g., leaving home and shaking hands).[37] Other studies have also indicated significant impacts of lockdown policies on daily life.[29] Many of the survey participants reported that they avoided visiting family and friends, even when they did not have symptoms of disease; stockpiled cleaning supplies, medications, and other household goods; and avoided travelling and visiting the doctor or dentist. Similar behaviors were reported in Saudi Arabia.[38] Recent studies also suggest that the COVID-19 pandemic has reduced spiritual health and well-being and increased posttraumatic stress disorder, depression and anxiety. [39,40] Fear of infection and social isolation may also cause stress responses that can lead to other psychological disorders or mental issues.[41]

Outbreaks of new infections with unknown outcomes are often met with fear in the community.[16] In the

present study, 55% of the participants expressed fear about getting sick and about the diagnostic and therapeutic approaches available at their local hospital for COVID-19. Similar levels of fear have been observed in previous outbreaks of coronavirus, SARS, MERS, HIV and tuberculosis.[13,42]

In addition, the majority of the survey participants expressed moderate to severe stigma. In particular, 17% responded that 'When they had COVID-19, they did not tell anyone', and 12.3% indicated that 'If they had COVID-19, they would not tell anyone'. Consistent with these results, a study of medical students in Jordan found that most believed that cases of COVID-19 should not be identified.[26] Male gender, single (unmarried) status, a lower education level, and unemployment were significantly associated with higher stigma in the present study. On the contrary, Koh D, et al., 2005 and Yuan et al 2020 found that married HCWs perceived greater social stigma than their single peers,[43,44] and other studies have found no significant association between marital status and stigma during infectious disease outbreaks.[45]

Social stigma may hinder participation in disease screening, testing, quarantine, isolation, and treatment and can hinder local efforts to contain the outbreak and provide medical help to those in need.[26] Delayed diagnosis is associated with greater medical complications, especially among the elderly and vulnerable groups, while delayed reporting of infect ious disease can promote community spread.[46] Recent findings suggest that some COVID-19 patients and their families have been ostracized by their neighbors, landlords and even employers Those with COVID-19 have faced social exclusion, stereotyping and insults.[47] Victims of social stigma may experience embarrassment, self-accusing behavior, or persistent fear of communicating with relatives and friends.[47,48] To reduce COVID-19-related stigma, health authorities and academic associations in many countries have advised against stigmatizing at-risk groups, including COVID-19 survivors and those released from quarantine. [49]

Increasing vaccine acceptance has the potential to reduce the stigma and discrimination associated with COVID-19 infection.[50-52] Among the survey participants, 26% reported good COVID-19 vaccination intentions, while 32.0% and 42% had moderate and poor intentions, respectively. Previous studies in Egypt reported higher levels of acceptance among medical students (35%) and HCWs (45.9%).[30,52] The divergent findings of these studies can be attributed to differences in the ages of the study populations. A systematic review found that only 29.4% of respondents in the Middle East claimed that they would get vaccinated against COVID-19. This acceptance rate is alarming and among the lowest globally. Vaccine hesitancy is a significant problem for ongoing efforts to contain the COVID-19 pandemic. It is recommended to do further studies in Africa of COVID-19 vaccine hesitancy and its potential consequences locally and globally. [53]

Worldwide, COVID-19 vaccination willingness is 66%,[53] but vaccine acceptance rates vary around the world. A systematic review of 63 surveys from around the world found that positive attitude and good practice were positively correlated with vaccine intentions.[53] Studies in Europe, Saudi Arabia and Malaysia found higher vaccine acceptance than that reported here and noted significant effects of gender, marital status, and education. [54-56] In the UK, the vast majority (82%) of adults are willing to be vaccinated against COVID-19, with lower uncertainty among the elderly and men.[57] Earlier studies found vaccine uncertainty of 35%, 31% and 15% among populations in Ireland, the UK and the US, respectively; vaccine intention was higher among older people, the college educated, and those vaccinated against influenza during the 2019–2020 flu season.[57,58] A study in Kuwait found that past influenza vaccination was positively associated with the probability of receiving the COVID-19 vaccine.[51] A survey in Arab countries revealed that education and age were significant determinants of vaccine acceptance.[59,60] In addition to influenza vaccine uptake and education, vaccination intention has been linked to political views. [59,61] On the contrary, a study in Indonesia found no significant association between vaccine acceptance and sociodemographic characteristics except employment as a HCW.[61] These divergent conclusions may reflect differences in the sociodemographic characteristics of the participants and study methodology.[57] Further research is required to understand regional and cultural differences in vaccine hesitancy. [60]

Half of the survey participants in the present study supported compulsory vaccination and agreed to get vaccinated if the government or healthcare providers recommended the vaccine, consistent with previous studies.[30,61] The majority of the participants expressed

concerns about vaccine efficiency, safety, and side effects, similar to other studies in Egypt.[30] These findings emphasize the need for effective vaccine-acceptance awareness campaigns targeting older people and vulnerable groups who are at higher risk of acquiring severe COVID-19 disease.

CONCLUSION

This study found average levels of COVID-19-related KAP in Upper Egypt. Anxiety, worry, fear of getting sick, social stigma, and low acceptance of COVID-19 vaccination were expressed by the majority of participants. Consistent with prior surveys, most participants acquired information from social media rather than scientific sources. Community interventions addressing the public apprehensions and providing correct information are essential to increase public awareness, reduce COVID-19-related stigma, and promote vaccine uptake.

Ethical Consideration

The study was reviewed and approved by the faculty of Medicine, Assiut University, Egypt (No.18/743-2020).

Funding source: The authors received no financial support related to this research

Conflict of interest: All authors have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Author contributions: Wafaa Hamza: Idea, methodology, data curation, statistical analysis, writing the original draft, critical review and revision; Sahar Hassany: literature search, data collection and revision; Safaa Mahmoud: literature search, data collection, critical review, and revision.

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Cite this article as: Wafaa S. Hamza Influence of COVID-19-Related KAP on Daily Life, Social Stigma and Vaccine Intentions in Upper Egypt. *Egyptian Journal of Community Medicine*, 2022;40(4): 300-312
DOI: **10.21608/ejcm.2022.133102.1213**