GREEN PUBLICATION

Knowledge, Attitudes and Practices of Adolescents, Adults and Older Adults toward the Disease of Novel Coronavirus during its Outbreak in Matrouh, Egypt.

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Abstract

The novel coronavirus disease (COVID- 19) has become the major pathogen of merging respiratory disease outbreaks. Compliance with preventive measures is affected by populations' level of knowledge, attitudes, and practices (KAP) toward COVID- 19. **Aim**: The present study aimed to identify knowledge, attitudes, and practices of Adolescents, adults and older adults toward the disease of novel Coronavirus during its outbreak in Matrouh, Egypt. **Design**: A cross-sectional survey was utilized. **Setting:** The study was carried out virtually using a link of a Google form shared on social networking sites of the most popular Facebook and WhatsApp pages and groups in Matrouh governorate. **Subjects:** All adolescent, adults, and older adults of the general community in Matrouh, Egypt who respond to the study link during the first month of starting the partial lock down in Egypt (from the mid of March to a mid of April 2020) were recruited conveniently based on the following criteria: - aged 11 years and above, lived in Matrouh governorate and accepted to participate in the study. The sample comprised two thousand (2000) individuals. **Tools:** The data was collected through a survey questionnaire containing four parts, **part I:** Socio-demographic characteristics of participants**. Part II:** knowledge regarding COVID-19**. Part III:** Attitudes towards COVID-19**. Part IV:** Practices towards COVID-19. **Results**: The findings of the present study concluded that more than two thirds of the participants had "good" knowledge score and the majority of them had "positive" attitude score. While, more than half of the participants had "fair" practice score. Furthermore, there is a statistically significant association between different age groups and their knowledge, attitude, practice and the overall total score, where knowledge, attitude, practices and overall total scores were lowered among adolescents compared to adults and older adults. Additionally, there is a significant positive (Direct) correlation between total knowledge, attitude and practices score and overall total scores of participants. Finally, the total practice and total attitude scores of the participants were significant negative (inversed) correlated. **Recommendations**: The main recommendations of the current study were to raise the knowledge, attitude and practices of all populations in the Egyptian community regarding COVID- 19 and provide updated simplified Arabic posters about COVID-19 to help all populations in improving their awareness.

Key wards: KAP, Age-related differences, and COVID-19

Introduction:

Corona virus is a pandemic started at Wuhan city in China and spread all over the world **(Shi et al., 2020& Abuya et al., 2020)**. The first spotted case was suffering from pneumonia of unidentified cause. Since the pathogen identified was termed as novel corona virus (COVID-19) **(Saqlain et al., 2020& Modi et al., 2020)**. Corona virus has a droplet mode of transmission from a person to another with 4-14 days incubation period. World Health Organization (WHO) reported that older adults and people with chronic diseases as; cardiovascular diseases and diabetes are more probable to attain infection and deteriorate more rapidly **(Saqlain et al., 2020)**. Until now, there is no definite treatment or proved vaccination against COVID- 19. Strong preventive and control measures are the primary intervention to minimize the spread of the disease in the community (Li, J. Y., **et al., 2020)**.

Sufficient information about any disease has an affirmative impact on practice and attitude toward its prevention and control measures **(Wolf et al., 2020)**. This issue is going in line with corona virus. Population obedience to the corona virus control actions is the key of success to reduce the rate of transmission and spread of the disease especially during the outbreak period. **(Zhong et al., 2020)**

Pediatric, Medical surgical and Gerontological nurse can play a vital role in improving the awareness of population regarding COVID- 19 and in preventing the wide spread of the disease. This can be done through conducting an accurate assessment of their knowledge, attitudes, and practices regarding COVID- 19 as a first step for developing successful preventive nursing programs against the disease. On the other hands, assessment of knowledge, attitude and practice of the population regarding corona virus helps the organizations and formal institutions to take a step in the direction of risk assessment and take sound control measures **(Lohiniva et al., 2020)**. Various researches focused on assessment knowledge and attitude toward COVID- 19 among the health care workers. Little researches concerned about the global population even for various age groups. Age plays as a significant factor in information gain, acceptance and application **(Giao et al., 2020)**.

Aim of the study

The present study aimed to;
- Identify knowledge, attitudes, and practices of adolescents, adults and older adults toward the disease of novel Coronavirus during its outbreak in Matrouh, Egypt.

Research question:
- What are the age-related differences in knowledge, attitudes, and practices of adolescents, adults and older adults toward the disease of novel coronavirus during its outbreak in Matrouh, Egypt?

MATERIALS AND METHODS

Materials

Design:

A cross-sectional survey was utilized.

Setting:

The study was carried out virtually using a link of a Google form shared on social networking sites of the most popular Facebook and WhatsApp pages and groups in Matrouh governorate.

Subjects:

All adolescents, adults, and older adults of the general community in Matrouh, Egypt who respond to the study link during the first month of starting the partial lock down in Egypt (from the mid of March to a mid of April 2020) were recruited conveniently based on the following criteria: - aged 11 years and above, lived in Matrouh governorate, accepted to participate in the study and have an access to the internet. The sample comprised two thousand (2000) participants.

Tools: -

The data was collected through a survey questionnaire that was developed by the researchers after reviewing the related literature (**Giao et al., 2020**& **Shi et al., 2020**& **Abuya et al., 2020**). It was written in a simple Arabic language to suit the understanding level of all the study subjects. The questionnaire containing four parts:

First part: Bio-sociodemographic characteristics of participants: This part consists of questions related to the participant's age, sex, level of education, marital status, working status, place of residence, name of the district, income, presence of chronic disease and source of information about COVID- 19.

Second part: knowledge regarding COVID-19: This part consists of fourteen statements to assess the knowledge of participants related to the cause of disease, methods of transmission, early signs and symptoms and protective measures to prevent cross infection of the disease. Participants' responses were graded as the following; two points for the correct answer and zero for the incorrect answer or don't know. The level of knowledge was based on the number of statements. Some statements were reversed (statements 5, 7, 8, 12 & 13), where the scores were calculated as: $0 = 2$ and $2 = 0$. The maximum score is 28. Participants' levels of knowledge towards COVID-19 were categorized as follows: poor (0-9), fair (10-18) and good (19-28).

Third part: Attitudes towards COVID-19: This part included 5 questions for identifying the participants' attitudes towards COVID-19. Responses to each item were graded as the following; two points for "Yes" answer and zero point for the "No" answer. The score of attitudes was based on the number of questions. The maximum score is 10. Participants' attitudes towards COVID-19 were categorized as follows: negative (0-5), and positive (6-10).

Fourth part: Practices towards COVID-19: This part included 3 questions to assess the participant's commitment to the protective measures against the disease. Responses to each

item were graded as the following; two points for "Yes" answer and zero point for the "No" answer. The score of practices was based on the number of questions. Some questions were reversed (question 2), where the scores were calculated as: 0 = 2 and 2 = 0. The maximum score is 6. Participants' levels of practices towards COVID-19 were categorized as follows: poor (0-2), fair (3-4) and good practice score (5-6).

Overall total scoring system: A higher score of this questionnaire represents a higher level of knowledge, attitude and practice towards COVID- 19. The maximum score is 44. The overall scores were based on the sum of the number of statements of the questionnaire. The Overall total scoring system was divided as follows: poor (0-14), fair (15-28) and good (29-44).

Method:

- An approval to carry out the study was obtained from the responsible authorities of the Faculty of Nursing Matrouh University after explaining of the purpose of the study and the date and time of data collection.

- The study tool was developed by the researchers after a thorough review of relevant literature **(Giao et al., 2020**& **Shi et al., 2020& Abuya et al., 2020**) and translated into Arabic language.

- The study tool was tested for content validity by five (5) experts in the field of the study namely; Gerontological nursing, Medical surgical nursing and Pediatric nursing. Their opinions elicited regarding the format, layout, consistency, accuracy, and relevancy of the tool.

- The study tool was tested for reliability using Cronbach's coefficient alpha reliability method. The reliability result was = 0.781.

- The pilot study was carried out on 50 participants from all age groups selected from the outpatient clinics of Matrouh general hospital in order to test the clarity and applicability of the constructed tool and were excluded from the study. The pilot study has also served to estimate the time needed for each subject to fill in the questionnaire.

- A Google Form based on the study tool was created.

- A link of an online survey portal was shared on social networking sites of the most popular Facebook and WhatsApp pages and groups in Matrouh governorate.

- Participants were invited to complete and submit the survey. The process of recruiting participants to share in the survey was conducted through convenient sampling. It started from four starting points simultaneously (El Hammam, Matrouh, Sidi Barrani and Siwa district) which represent the main districts in Matrouh governorate, i.e. East (El Hammam) Central (Matrouh), West (Sidi Barrani), and South (Siwa). From these four starting points, participants continued to spread and were expected to cover most of the districts in Matrouh governorate.

- For enhancing the process of recruiting participants and ensuring the accessibility to the target age groups, each participant who used the study link were asked to repeat completing the associated Google Form for all their family members who fulfill the study inclusion criteria.

- Data collection started from the mid of March to a mid of April 2020.

Ethical considerations: -

The privacy and anonymity of the participants and confidentiality of the collected data were maintained. The submission of the answered survey was considered as a participant's consent to participate in the study.

Statistical Analysis:

Data collected from the studied sample was revised, coded and entered using Personal Computer (PC). Computerized data entry and Statistical analysis were fulfilled using the Statistical Package for Social Sciences (SPSS) version 22. Data were presented using descriptive statistics in the form of number and percentages were used for describing and summarizing qualitative data. While mean, mean percentages and standard deviation (**SD**) were used for measuring the degree of variability in a set of scores. Using Anova test and Chi square test to compare means and test the significance between quantitative groups,

RESULTS

Table 1 shows distribution of the studied participants according to their bio-sociodemographic characteristics. It was found that less than half of the participants were aged from 20 to less than 40 years old (43.2%), while more than one third of them were aged from 11 to less than 20 years old (37.7%) and 13.0% were in the age group from 60 to 75 years old. In addition, slightly less than two thirds of the participants were females (62.2%). It is clear from the same table that few percentages of them were either illiterate or read and write (5% for each), while 54%, 16.0% and 10.2 % had university, post graduate studies, and basic education respectively. About sixty one percent of the participants were non-working and 68.5% of were single. Furthermore, more than three quarters of them were lived in urban areas and being from Marsa Matrouh district (76. 2 % and 75.5% respectively). Nearly two thirds of the participants had insufficient income and suffer from chronic diseases (63.3% and 64.4% respectively), as well as the majority of them reported obtaining information related to COVID-19 either from social media or T.V (79.4% and 80.5% respectively)

Table 1: Distribution of the Studied Participants According to Their Bio-sociodemographic Characteristics.

Socio-demographic Characteristics	No. (2000)	%
Age (Years)		
▪ 11- <20	754	37.7
▪ 20- <40	865	43.2
▪ 40- <60	120	6.0
▪ 60-75	261	13.1
Sex		
▪ Male	755	37.8
▪ Female	1245	62.2
Education		

Socio-demographic Characteristics	No. (2000)	%
▪ Illiterate	100	5.0
▪ Read and write	100	5.0
▪ Basic education	204	10.2
▪ Secondary	197	9.9
▪ University	1080	54.0
▪ Post graduate studies (Master- Doctorate)	319	15.9
Occupation		
▪ Not-working (Housewives-Retired- Students)	1236	61.8
▪ Working	764	38.2
Marital status		
▪ Married	604	30.2
▪ Single/ Divorced	1370	68.5
▪ Widow	26	1.3
Residence		
▪ Rural	475	23.7
▪ Urban	1525	76.3
Name of district		
▪ El-Hammam district	115	5.7
▪ Marsa Matrouh district	1507	75.4
▪ Sidi-Barani district	265	13.2
▪ Siwa district	113	5.7
Income		
▪ Enough	725	36.3
▪ Not enough	1275	63.7
Presence of chronic disease		
▪ Yes	1288	64.4
▪ No	712	35.6
Source of information*		
▪ Social media (Facebook- WhatsApp)	1588	79.4
▪ T. V	1601	80.5
▪ Friends	978	48.9
▪ Health personnel	1300	65.0
▪ Newspaper	135	6.4
▪ School personnel	102	5.1

*More than one answer

Distribution of the studied participants according to their knowledge is represented in **Table 2 (Supp)**. It was observed from the table that almost all of the studied participants were having correctly knowledge regarding that, "to prevent infection with COVID-19, the person should avoid crowding as train station" (97.2%). Furthermore, the majority of them were also having correct knowledge concerning that "wearing mask, and hand washing can prevent corona virus", "Fever, dry cough, and fatigue are considered the classical

manifestations of COVID-19", "only those who are elderly, have chronic diseases are more likely to be severe cases", "currently there is no effective cure for COVID- 19, but early symptomatic and supportive treatment can help most patients recover from infection", and "COVID-19 transmits through inhalation of respiratory droplet from the infected person" (94.8%, 92.6%, 91.3%, 91.0%, and 90.0% respectively). On the other hand, more than half of the studied participants were having incorrect knowledge/ unknown regarding that "Eating or contacting with wild animals would result in infection by the COVID-19 virus" and " COVID -19 is caused by bacterial infection that affects the lungs" (56.8% and 53.4% respectively). In addition to, more than one third of the studied participants were having incorrect knowledge/ unknown concerning that unlike the common cold, stuffy nose is less common in COVID-19 (34.8%). However, 31.0% and 25.3 % of them were also having incorrect knowledge/unknown regarding that contact persons should be isolated for at least three days, this is the incubation period of the virus and the person should sneeze or cough in a cloth paper the clean, dry and reuse respectively.

Table 3 (Supp) illustrates distribution of the studied participants according to their attitude. It was clear from the table that 98.8% and 97.6% of the studied participants had positive attitude regarding transmitting the infection to anyone of their family members and accepting isolation in health care facilities if they get COVID-19 respectively. Additionally, the majority of them had positive attitude concerning taking COVID-19 vaccine if it was available (93.0%). On The other hand, one third of the studied population had negative attitude as regards Egypt can win the battle against the COVID-19 virus (33.4%), while 19.0% of them only had negative attitude about COVID-19 will finally be successfully controlled

Table 4 (Supp) represents distribution of the studied participants according to their level of practice during the outbreak of COVID- 19. It was revealed from the table that almost all of the studied participants were doing hand washing frequently in the correct manner (96.4%) and 66.3% gone to any crowded place. While, 53.5% of them were not worn the mask when leaving home.

Distribution of the studied participants according to their total percent scores, mean and mean percent scores of knowledge, attitude, and practice are represented in **Table 5**. It was obvious from the table that more than two thirds of the participants had "good" knowledge score (69.1%) and the majority of them had "positive" attitude score (85.1%). Furthermore, more than half of the participants had "fair" practice score (51.0%), as well as 71.9 of them had "good" overall total scores with mean percent scores (87.3 ±15.6, 79.8 ±9.3, 79.2 ±12.4 and 69.7 ±23.6 respectively).

Table 5: Distribution of the studied Participants According to Their Total Percent Scores, Mean and Mean Percent Scores of Knowledge, Attitude, and Practice.

Variable	Total Percent Scores		Mean ± SD	Mean percent ± SD
	No.	%		
Total knowledge Score				
Poor	54	2.7	22.2 ±3.4	79.2 ±12.4
Fair	564	28.2		
Good	1382	**69.1**		
Total attitude score				
Negative	299	15.0	8.7 ±1.5	87.3 ±15.6
Positive	1701	**85.1**		
Total practice score				
Poor	391	19.6	4.1 ±1.4	69.7 ±23.6
Fair	1019	**51.0**		
Good	590	29.5		
Overall total scores				
Poor	29	1.4	35.1 ±4.1	79.8 ±9.3
Fair	533	26.6		
Good	1438	**71.9**		

Table 6 portrays the association between the total knowledge, attitude, practice score and overall total scores of the participants and their socio-demographic characteristics. It was noticed from the table that there is a statistically significant association between different age groups and their total knowledge, total attitude, total practice and the overall total score (F: 76.362with P value 0.001, F: 9.177with P value 0.001, F: 2.991with P value <0.030, and F: 72.478with P value <0.001 respectively).

Table 6: The Association between the Total Knowledge, Attitude, Practice Score and Total overall Percent Scores of Participants and Their Socio-demographic Characteristics.

Socio-demographic characteristic	Total knowledge percent score		Total attitude percent score		Total practice percent score		Overall percent scores	
	Mean + SD	F P (Sig)	Mean + SD	F P (Sig)	Mean + SD	F P (Sig)	Mean + SD	F P (Sig)
Age (Years)								
Less than 20	74.2±12.1		85.6±16.8		68.8±22.9		76.1±9.0	
20 to less than40	82.0±12.0	F:76.362	87.5±15.7	F:9.177	71.1±24.1	F:2.991	81.7±9.2	F:72.478
40 to less than60	79.7±16.2	P:<0.001*	88.3±15.2	P:<0.001*	71.6±28.5	P:0.030*	80.6±11.7	P:<0.001*
60 and more	84.2±6.2		91.4±9.9		66.7±21.1		83.5±4.9	

F: ANOVA test   P: P value of ANOVA test   *Significance at p value ≤0.05

The association between the studied participants and their knowledge, attitude, practice, and overall total percent scores related to the outbreak of COVID- 19 are presented in **Table 7**. It was observed from the table that that there is a nearly three quarters of participants had "good" total knowledge score and "negative" total attitude score (73.2%). A highly statistically significant difference was found between them (χ^2: 80.136 with P value <0.001). Additionally, the majority of participants had "good" total knowledge score and "good" overall total score (89.1%). A highly statistically significant difference was found between them   (χ^2: 1959.498 with P value <0.001). Finally, there is no statistically significant difference between total knowledge score and total practice score.

Table 7: Association between the Studied Participants and their Knowledge, Attitude, Practice, and Overall Total Percent Scores Related to the Outbreak of COVID-19

Variables	Total Knowledge score								Test of sig.
	Poor		Fair		Good		Total		
	No.	%	No.	%	No.	%	No.	%	
Total attitude score									
Negative	29	9.7%	51	17.1%	219	73.2%	299	100.0%	χ^2: 80.136
Positive	25	1.5%	513	30.2%	1163	68.4%	1701	100.0%	P:<0.001*
Total practice score									
Poor	10	2.6%	108	27.6%	273	69.8%	391	100.0%	χ^2: 5.043
Fair	34	3.3%	296	29.0%	689	67.6%	1019	100.0%	P:0.283
Good	10	1.7%	160	27.1%	420	71.2%	590	100.0%	
Overall total score									
Poor	29	100.0%	0	0.0%	0	0.0%	29	100.0%	χ^2: 1959.498
Fair	25	4.7%	407	76.4%	101	18.9%	533	100.0%	P:<0.001*
Good	0	0.0%	157	10.9%	1281	89.1%	1438	100.0%	

χ^2: Chi-square test   P: P value of Chi-square test   * Significance at P value ≤0.05

Table 8 portrays correlation between the studied participants and their knowledge, attitude, practice, and overall total percent scores related to the outbreak of COVID- 19. It obviously noted from the table that overall total scores and total knowledge score of participants were found to be strong positively (direct) correlated, where the higher the overall total scores, the higher the total knowledge score of participants (where r = 0.872and, p = < 0.001). While, the overall total scores of participants was weak positively (direct) correlated with total attitude and practice scores, where the positive the attitude they have and the good the care they provide, the higher the total scores of population (where r = 0.385and 0.343, p = <0.001 for each respectively). It was clear from the same table that there was a weak negative (inversed) correlation between total attitude and total practice scores of the participants, where the negative the attitude they have, the good the care they provide. The differences were highly statistically significant, where r = - 0.083, P= <0.001.

Table 8: Correlation between the Studied Participants and their Knowledge, Attitude, Practice, and Overall Total Percent Scores Related to the Outbreak of COVID-19

Variables	Total knowledge percent score		Total attitude percent score		Total practices percent score		Overall total percent score	
	r	p	r	p	r	p	r	p
Total knowledge percent score			0.042	0.063	0.036	0.104	0.872	<0.001*
Total attitude percent score	0.042	0.063			-0.083	<0.001*	0.385	<0.001*
Total practices percent score	0.036	0.104	-0.083	<0.001*			0.343	<0.001*
Overall total percent score	0.872	<0.001*	0.385	<0.001*	0.343	<0.001*		

r: Pearson Correlation   P value: P value of Pearson Correlation
*Significance at p value ≤0.05

Discussion:

Corona virus (COVD-19) is a pandemic respiratory disease that requiring collaboration of persons at the social and governmental levels all over the world to take immediate actions in order to minimize the risk for infection and spread of the disease (**Wolf et al., 2020**). KAP is an important cognitive key in public health regarding health prevention and promotion. It involves a range of beliefs about the causes, exacerbating factors, symptoms, methods of treatment and complications of a certain disease. The accuracy of these beliefs may determine different behaviors about prevention and control **(Islam et al., 2020, Szymona-Pałkowska et al., 2016 & Zhou et al., 2020).**

Age plays as an important determinant in the rate of acquiring knowledge, developing positive attitude and compliance with practices especially in epidemics and crisis. Little researches are conducted to assess the differences between the age groups regarding this special sensitive health issue, therefore this study is the first study aimed to identify knowledge, attitude, and practice of adolescents, adults and older adults toward the disease of Novel Coronavirus (COVID- 19) during its outbreak in Matrouh, Egypt.

In relation to the **participant's knowledge** about COVID-19, the results of the present study showed that the overall score were almost good. Incorrect answers were noticed in the questions related to Novel Corona Virus causative agent, clinical manifestations, incubation period, role of animals in transmission of infection, and possibility of reusing a cloth paper. This finding may be owed to the large proportion of educated participants and the availability of social media and internet where; several guidelines and information on COVID-19 has been available and easily accessible online.

Results of the present study are congruent with **(Abdelhafz er al., 2020)** and **(Reuben et al., 2020)** who concluded that there was a good knowledge toward COVID-19 among the study participants. Also, this finding is in consistent with the Nigerian study done by **(Olapegba et al., 2020)**, that have shown a satisfactory level of knowledge among the study

participants regarding COVID-19. While the finding of the present study was in disagreement with the findings of the studies done by (**Labban et al., 2020, Nemati et al., 2020 and Akalu et al., 2020),** who reported that the majority of their study participants have little awareness, poor knowledge and practices about COVID-19 and its preventive measures.

As for level of knowledge and age groups differences, it was noticed that there was a statistically significant differences between the various age groups regarding their knowledge about COVID-19. Participants who aged from 60 years and more showed a higher level of knowledge. This finding could be interpreted in the light of many reasons. First, the major source of information about the disease as reported by the study participants were social media and T.V. In Egypt during the outbreak of COVID- 19, the main focus of social media and T.V was on the idea that older adults, and those with comorbidities, are at particular risk of having severe infection and are at higher risk of dying as a result of COVID-19. This reason was confirmed by the presence of high level of knowledge and compliance to partial lookdown among older adults. Second, this finding may be related to the characteristics of the study subjects as; the majority of the study participants had university and advanced education. Third, the younger participants are more likely to be engaged in risk- taking behaviors and always being dependable on their parents.

The findings of the present study are in line with (**Al-Hanawi et al., 2020**), who reported that older adults are likely to have better knowledge and practices, than younger people. On the other hand, the finding of the present study was in disagreement with the findings of the study done by (**Labban et al., 2020), who** found a statistical significance difference among the studied age groups as; the highest percentages of correct answer were in the age group 35-50 years followed by age group 51-65 years.

As for assessing the participants' attitude; it was noticed that the majority of the studied subjects have a positive attitude toward COVID-19. This result is regular with the results of the study performed by (**Zhong et al., 2020),** who reported a profound positive attitude toward the disease control measures. On the other hands, it may be far away from results of the study done by (**Zegarra-Valdivia., et al**), who reported that there is a lack of the study participants' confidence to health national authorities on the sanitary responses, preparedness for the disease, and the adequate measures to deal with it that reflecting a negative attitude toward the disease of COVID-19.

Also, the study results showed a significance difference between the age groups in relation to attitude toward measures taken in order to control and prevention of COVID-19. The positive attitude was frequently reported by the age groups 60-75 years. The findings of the present study are supported by the results of studies done by (**Peng et al.,2020**) and (**Ferdous et al., 2020),** who documented that there was a statistically significant correlation between the positive attitude and increasing age. From other point of view, (**Giao et al., 2020) and (Albarrak et al., 2019),** found that attitude regarding COVID-19 did not present any significant association with age. In this regards, in Egypt, it is important to note that there has been a great deal of efforts at all levels by the government especially the Egyptian Ministry of Health, which has conducted an intensive awareness campaign, communicated via its website, television and various social media. These early actions in engaging the public in prevention and control measures, as well as preventing misinformation have been greatly expanded. All of these efforts reflecting a positive attitude among the population.

Regarding practices, it was observed that more than half of participants have fair level of practices. This result was in opposite with the results of a Nigerian study done by (**Reuben et al., 2020**), which indicates that the optimism and willingness of the Nigerian population in effecting behavioral changes is relevant in the fight against the COVID-19 pandemic. Also, the results of the current study showed a significance difference between the age groups in relation to practices directed toward control and prevention of COVID-19. These preventive practices were frequently done by the age groups 20-39 years and 40- 59 years. This finding may be related to the characteristics of the study subjects as; the large proportion of the study subjects where adults, with low income and still working. On the other hands, this result is in disagreement with the study done by (**Al-Hanawy et al., 2020**) who found that older adults are likely to have better practices than the other younger age groups.

Also, the results of the present study showed a significant association between the participant's level of knowledge, practice and attitude. This finding is fitting with the results of studies done by (**Peng et al.,2020**), (**Islam et al., 2020), (Zhou et al., 2020) (Lithander et al., 2020**), (**Zhong et al., 2020),** and (**Ferdous et al., 2020),** who documented that there was a statistically significant correlation between higher level of knowledge, positive attitude and good practice. So, the present study put a spot of light on the gap between level of knowledge, practice, attitude in different age groups in order to guide the government and authorized persons to advance and innovate different tools to communicate with different age groups and motivate to apply a good practice.

Conclusion and Recommendations

According to the findings of the present study, it can be concluded that more than two thirds of the participants had "good" knowledge score and the majority of them had "positive" attitude score. While, more than half of the participants had "fair" practice score. Furthermore, there is a statistically significant difference between age groups and their knowledge, attitude, practice and the overall total score. While knowledge, attitude practices and overall total scores were lowered among adolescent age group compared to adults and older adults. Finally, the study findings may be useful to inform policymakers and health care professionals, on further public health interventions, awareness raising, policies, and health education programs.

Based on the previous findings the following recommendations are suggested:

1. Education sessions about safety precautions for all participants in the community adolescent as a particular vulnerable group in order to raise their knowledge and practices regarding COVID- 19
2. Updated simplified Arabic posters about COVID-19 must be emphasized to the entire participants in public spaces and transportation aids to help in improving their awareness, which in turn alleviating their stress.
3. Mass media should emphasize the physical, psychological and social needs of all participants to raise society awareness regarding the novel coronavirus disease (COVID-19).
4. Supplies for preventive practices should be available in the work areas and public places.

5. If a vaccine or a treatment is approved for the disease, we recommend that it should be available for developing countries for affordable prices.

AUTHOR CONTRIBUTIONS:

ACKNOWLEDGMENT:

FUNDING:

Conflict of interests:

None declared

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(Supp) Table 2: Distribution of The studied Participants during the Outbreak of COVID- 19 According to Their Knowledge

Knowledge Items	Participant's Response (No.2000)			
	Incorrect/ Unknown		Correct	
	No.	%	No.	%
− Fever, dry cough, and fatigue are considered the classical manifestations of COVID-19.	149	7.5	1851	92.6
− Unlike the common cold, stuffy nose is less common in COVID-19.	696	34.8	1304	65.2
− There currently is no effective cure for COVID- 19, but early symptomatic and supportive treatment can help most patients recover from infection.	180	9.0	1820	91.0
− Not all persons with COVID- 19 will develop to severe cases, only those who are elderly, have chronic diseases are more likely to be severe cases.	174	8.7	1826	91.3
− Covid-19 is caused by bacterial infection that affects the lungs. (-)*	1068	53.4	932	46.6
− Eating or contacting with wild animals would result in infection by the COVID-19 virus.	1135	56.8	865	43.3
− COVID-19 can't transmit through respiratory droplets, if fever is not present. (-)*	240	12.0	1760	88.0
− No presence of symptoms means that the person is not infected. (-)*	317	15.9	1683	84.2
− COVID-19 transmits through inhalation of respiratory droplet from the infected person.	201	10.1	1799	90.0
− Wearing mask, and hand washing can prevent corona virus	103	5.2	1897	94.9
− To prevent infection with COVID-19, the person should avoid crowding as train station.	56	2.8	1944	97.2
− Contact persons should be isolated for at least three days; this is the incubation period of the virus. (-)*	620	31.0	1380	69.0
− The person should sneeze or cough in a cloth paper the clean, dry and reuse. (-)*	505	25.3	1495	74.8
− Shaking hands, unnecessary touching of surfaces may transmit the infection	361	18.1	1639	82.0

*Negative statements denote poor practices (revered scoring)

(Supp)Table 3: Distribution of The studied Participants during the Outbreak of the Novel Coronavirus Disease COVID- 19 According to Their Attitude

Attitude items	Participant's Response (No.2000)			
	Negative		Positive	
	No.	%	No.	%
− Do you agree that COVID-19 will finally be successfully controlled?	379	19.0	1621	81.1
− Do you have confident that Egypt can win the battle against the COVID-19 virus?	669	33.5	1331	66.6
− Do you afraid of transmitting the infection to anyone of your family members?	25	1.3	1975	98.8
− Do you accept isolation in health care facilities if you get COVID-19?	49	2.5	1951	97.6
− Do you take COVID-19 vaccine if it was available?	141	7.1	1859	93.0

(Supp)Table 4: Distribution of The studied Participants during the Outbreak of COVID- 19 According to Their Practice

Practices Items	Participant's Response (No.2000)			
	Not done		Done	
	No.	%	No.	%
− In recent days, have you gone to any crowded place? (-)*	674	33.7	1326	66.3
− In recent days, have you worn the mask when leaving home?	1070	53.5	930	46.5
− Do you practice hand washing frequently in the correct manner?	72	3.6	1928	96.4

*Negative statements denote poor practices (revered scoring)

Scoring

Knowledge	
Poor	Less than 50%
Fair	50% to less than 75%
Good	75% and more
Attitude	
Negative	Less than 60%
Positive	60% and more
Practice	
Poor	Less than 50%
Fair	50% to less than 75%
Good	75% and more
Overall total	
Poor	Less than 50%
Fair	50% to less than 75%
Good	75% and more