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# Compliance, Public Knowledge, Perceptions, and Attitude of Egyptians people Towards COVID-19: A cross-sectional study

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**Abstract**

Background**:**
The world is facing a terrible challenge to overcome the COVID-19 global outbreak. The spread of COVID-19 pandemic disease has put global health, life and work style, social and economic growth at high risk. The current study was aimed at extracting COVID-19 related information, attitudes and behaviors commitment level from the general population and healthcare workers in the central region of Egypt.
Method:
A cross-sectional online survey of 1312 Egyptian residents was conducted between 11th May and 15th June 2020. A questionnaire containing 28 knowledge and 56 attitude items was completed by all the participants. Stratified random sampling was applied to select the study participants. In this analysis, data was collected using a questionnaire that was developed and validated. The questionnaire included demographic variables and items relating to COVID-19 awareness, attitudes and practices. Descriptive and inferential experiments were carried out.
Results:
In total, 1312 participants completed the questionnaire; 80.2% of the participants have good knowledge about different modes of transmission of COVID-19, 5.6% obtain their knowledge from WHO website and 60.5% from multiple sources. The results showed positive attitude from the participants towards COVID-19 protective measures as 81.0% wearing masks, 85.2% washing their hands, 76.6% using alcohol and hand gel hygiene, and 64.5% using surface disinfectants.
Conclusion:
The findings highlight the value of clear communications from health authorities and the government, as well as the need for targeted health education programs to promote awareness, behaviors and practice levels.
**Keywords:** COVID-19; Egypt; Cross-Sectional; Attitude; Practice.

## Introduction

In December 2019, a quickly worldwide spreading of communicable disease appeared in Wuhan city in China. This epidemic disease is called briefly as coronavirus ( COVID-19) which is related to a family called coronaviruses which is finally named as acute respiratory syndrome 2 (SARS-CoV-2). The disease begin to spread outside the china and become a global crises pandemic disease [1, 2]. The coronaviruses family is single positive-stranded, enveloped RNA viruses which can causes fatal problems in the lung known as pneumonia or respiratory distress syndrome. The symptoms are very similar clinically to those reported for SARS-CoV and MERS-CoV. The severity of the disease ranges from mild to severe symptoms of respiratory distress and the patients who are admitted to the intensive care unit could not breath in normal way also, some neurological signs may appear such as headache, vomiting and nausea and this ensure that the coronaviruses not only affect the respiratory tract pathway but also invade the central nervous system as well [3, 4].

This pandemic disease appeared when WHO was informed by the government of the Chinese by different cases with pneumonia with unknown causes. The news was initiated from the Hunan seafood market which sold various kinds of animals like (bats, snakes, birds, frogs, rabbits) and this leads to infection of more than 50 people with this disease due to human close contact with the infected persons through sneezing, coughing, respiratory droplets and aerosols via inhalation through the nose or mouth so the virus was transmitted in more than 100 countries worldwide. The common symptoms and signs included fever malaise, cough, fatigue, shortness of breath, myalgia, headache, diarrhea, shivering [5].

The risk of this disease is that it is easily transmitted throughout the world. It cannot differentiate between poor or rich countries. It can affect all people of all ages. WHO said that elderly people or people with chronic conditions (such as cardiovascular disease, diabetes, chronic respiratory disease, and cancer) are more liable to be easily infected and everyone in all ages should protect themselves in order to avoid the spread of COVID-19 to others [6]. According to WHO guidelines, there is no approved treatment or vaccine for the novel coronavirus disease (COVID -19) however there is only treatment for the symptoms depending on the patient's clinical condition [7]. The knowledge of the public by the means of prevention of the virus will help to increase their compliance. the WHO recommended that washing hands frequently with soap or alcohol (70%) and use the facial masks and public isolation or social distance with (1-2) meters away and covering your nose and mouth with bent elbow or tissue during sneezing or cough is from the ways to limit the spread of the virus [8].

The aim of this study is to measure Egyptian citizens' level of commitment or adherence to the precautionary measures and guidelines recommended by WHO and Egyptian ministry of health and population. This study also aims that it would catch the eye of authorities to how people act in such a situation, defects of the plans put to face the virus, problems that people are suffering from during the epidemic. Hoping that could help them to find a more and better solutions, suggestions, and plans to limit the spread of COVID -19 in Egypt. Generally, this study can be used as a reference for the local government in case of re-occurrence of any similar conditions as it would guide the authorities to the real attitude of Egyptian people in the critical times far away from expectations. And a part of that attitude is related with some factors like place of residence and monthly income.

## Methods

### *Study Design and Population*

This study was designed as a cross-sectional online survey conducted within Egypt. A semi-structured online questionnaire was designed using google forms, which was appended with a respondent's consent form. Through emails, Facebook, WhatsApp and other social media, the link of the questionnaire was sent to prospective respondents by the investigators. On sending the link, prospective respondents were encouraged to roll out the survey to their contacts and online platforms. Thus, the link was forwarded to people apart from the first point of contact and so on. The online survey was conducted during 11$^{th}$ May and 15$^{th}$ June 2020.

### *Study Tool*

The study population was individuals with access to the internet. The survey constructed in Arabic language, the native language in Egypt, to allow many population levels to respond it easily. It covered the socio-demographic characteristics, knowledge regarding COVID-19, and adherence to precautionary measures recommended by WHO and Egyptian ministry of health and population. Respondents were 18 years old and above, from different regions either upper or lower Egypt governments, and from various educational levels. Been an online study it allowed large number of respondents to conduct. No offline interviews or papers used to collect the responses aiming to limit the spread of the virus. Participation in this survey was anonymous, consensual and voluntary with informed consent given by all prospective respondents.

### *Measures*

Before hosting it online, the online questionnaire used in this study was initially drafted and validated. Public health and epidemiology experts were asked to evaluate the instrument and offer their expert opinion on the validity and correctness of the knowledge, attitude and practice regarding COVID-19, and also the relativity and simplicity of the instrument keeping in mind the study population. The questionnaire was pre-tested in a pilot study on 30 participants who were subsequently removed from the study. In reshaping the questionnaire into an easier, simpler and shorter method that could be filled in within 10 minutes, expert opinions were used. In the final review, the data produced from the initial pilot study were omitted.

The online self-reported and a respondent-friendly questionnaire designed for this study contained questions assessing socio-demographics, source, knowledge, attitude and practice toward COVID-19 and perception toward national and community responses. The sociodemographic variables included age, gender, marital status, level of education, state of residence, residential location, profession, monthly income, smoking, and the presence of any chronic diseases.

The components of the knowledge section included the awareness of COVID-19 and the source of information, cause and modes of transmission, symptoms, and preventive measures like using face masks, dealing with ATM, animals, availability of sanitation and disinfectants tools, using home delivery or not. Attitude, practice and compliance were also evaluated towards COVID-19 preventive measures, adherence to local government and WHO disease prevention orders such as social distancing, use of face mask, washing hands regularly, using hand sanitation and surface disinfection, animals and ATM handling, calling 105 hotline, and home isolation. All the

sections mentioned in the survey were from the official websites of WHO Egyptian Ministry of Health and Population (MOHP), therefore, a validity test is not required (According to the statistical point of view) [9].

***Statistical Analysis***

Analysis of data was performed using SPSS v. 25 (Statistical Package for Social science) for Windows (IBM Corp. Released 2017. IBM SPSS Statistics for Windows, Version 25.0. Armonk, NY: IBM Corp.)

Description of quantitative variables was presented in the form of mean, standard deviation (SD), median (for non-parametric variables). Description of qualitative variables was presented in the form of numbers (No.) and percent's (%). Independent T-test was used to detect the difference between two subgroups regarding scale variables. Chi-Squared test was used to detect the difference between groups regarding the categorical variables.

Binary logistic regression analysis was used to predict different predictors of optimal adherence score to infection control measures.

The significance of the results was assessed in the form of P-value that was differentiated into; Non-significant when P-value > 0.05 and significant when P-value ≤ 0.05.

**Results and Discussion**

Egypt is one of the Arab region's biggest countries, the Middle East and Africa. It contains more than 100 million citizens which make it one of the most populous countries in Africa [9]. This large number of people could be connected to with a high risk of spread and mortality, particularly the elderly and others with chronic diseases.

***Sociodemographic characteristics***

A total of 1312 had participated in the present study through online survey; 616 from upper Egypt (46.9%) and 696 from lower Egypt (53.1%). The largest percent of the studied participants were residing in rural communities 75.8%. More than one half of the studied participants were 22-40 years old 62.3%. Around two thirds of them were males and single 65.6, 64.6 %, respectively. Nearly all of them were non-smokers and had not chronic diseases 90.7, 91.8%. The most frequently reported chronic diseases were bronchial asthma 25%, diabetes mellitus 22.1% and hypertension 17.3%.

About 81% of the participants using face masks with different types as shown in **(Figure 1).** More than one half of participants reported shortage of masks and alcohol 58.5%. Also, more than one half reported that their salary is not adequate for masks and alcohol and mask caused dyspnea for them 53.7 and 53.5% respectively. While the large percent of participants did not get allergy from alcohol or detergents 70.9%. These results impose on the government to provide face masks and alcohol in suitable quantity and reasonable prices that allow for the citizens to acquire without any obstacles.

***Adherence to general preventive measures during the pandemic:***

Regarding adherence to general infection precautions during the pandemic, the largest percent of participants had an optimal adherence score 93.8%, **(Figure 2).** Univariable analysis of independent variables that may affect the adherence score demonstrated that sex, occupation, marital status and income significantly affected the adherence score among participants. The prevalence of optimal adherence score was higher among females, occupied as a health care worker, widow or divorced and with higher monthly income at p value 0.001, 0.026, 0.049 and 0.001 respectively, **(Table 1).** Multivariable binary logistic analysis for independent variables demonstrated that being female, with monthly income more than 5000 and not single; married, widow or divorced had significantly higher adherence score **(Table 2).** The findings showed the good adherence of the Egyptian citizens to general preventive measures of COVID-19 disease which reflects the effectiveness of the message provided by the different media platforms and the outstanding role of the Egyptian Ministry of Health and Population (MOHP) to spread the culture of adherence to preventive measures.

***Knowledge about the spread, prevention and treatment of the disease***

In our participants, 60.5% gain our knowledge from multiple sources including TV, WHO website, MOHP website, newspapers, and social media platforms like Facebook, and Whatsapp as shown in **(Figure 3).** Only 6.6% of the participants do not follow news which presents the perfect perception and perusal of the Egyptian people. The good knowledge and positive attitude of the Egyptian people prevented the rapid outbreaking of the COVID-19 pandemic despite huge number of citizens and lack of people living standard.

***ATM using and adherence to preventive measures while using ATM:***

Regarding adherence to infection precautions during the pandemic among ATM users, the largest percent of participants had an optimal adherence score 81.2 % **(Figure 2).** Univariable analysis of independent variables that may affect the adherence score demonstrated that residence sex and monthly income significantly affected the adherence score. Regarding residence, the prevalence of optimal adherence score among ATM users was higher among participants residing urban communities than rural communities 83.1 and 71.9 %, respectively at p value 0.005.

As regards sex, the prevalence of optimal adherence score among ATM users was higher among female participants than male participants 85.0 and 76.1 % respectively at p value 0.004. As regards monthly income, the prevalence of optimal adherence score among ATM users was higher participants with monthly income more than 1000 at p value 0.024. While there was no statistically significant difference in adherence score among participants as regards age, education, occupation, marital status, smoking history, and chronic diseases **(Table 3).**

**Table (1): Association between Sociodemographic Characteristics of the Studied Participants and their Total Adherence Score to General Preventive Measures during COVID 19 Pandemic; n=1312**

| Sociodemographic Characteristics | Adherence Score | | Total =n (%) | P value |
|---|---|---|---|---|
| | Sub-optimal | Optimal | | |
| **Residence** | | | | |
| Urban | 55 (5.5) | 939 (94.5) | 994 (100.0) | 0.08 |
| Rural | 26 (8.2) | 292 (91.8) | 318 (100.0) | |
| **Age in years** | | | | |
| ≤21 | 22 (5.7) | 364 (94.3) | 386 (100.0) | 0.100 |
| 22-40 | 57 (7.0) | 760 (93.0) | 817 (100.0) | |
| ≥41 | 2 (1.8) | 107 (98.2) | 109 (100.0) | |
| **Sex** | | | | |
| Male | 51 (11.3) | 400 (88.7) | 451 (100.0) | 0.001 |
| Female | 30 (3.50) | 831 (96.5) | 861 (100.0) | |
| **Educational Level** | | | | |
| Graduate | 43 (7.3) | 545 (92.7) | 588 (100.0) | 0.070 |
| Post graduated | 4 (2.4) | 161 (97.6) | 165 (100.0) | |
| Student | 34 (6.1) | 525 (93.9) | 559 (100.0) | |
| **Occupation** | | | | |
| Unemployed | 13 (5.6) | 220 (94.4) | 233 (100.0) | 0.026 |
| Student | 29 (6.5) | 414 (93.5) | 443 (100.0) | |
| Pharmacist | 6 (2.6) | 221 (97.4) | 227 (100.0) | |
| Doctor | 1 (2.0) | 49 (98.0) | 50 (100.0) | |
| Nurse | 0 (0.0) | 10 (100.0) | 10 (100.0) | |
| Others | 32 (9.2) | 317 (90.8) | 349 (100.0) | |
| **Marital Status** | | | | |
| Single | 43 (5.1) | 805 (94.9) | 848 (100.0) | 0.049 |
| Married | 38 (8.6) | 403 (91.4) | 441 (100.0) | |
| Widow | 0 (0.0) | 4 (100.0) | 4 (100.0) | |
| Divorced | 0 (0.0) | 19 (100.0) | 19 (100.0) | |
| **Monthly Income (n=899)*** | | | | |
| Less than 1000 | 40 (13.9) | 247 (86.1) | 287 (100.0) | 0.001 |
| 1000-2000 | 5 (2.5) | 199 (97.5) | 204 (100.0) | |
| 3000-5000 | 6 (3.5) | 166 (96.5) | 172 (100.0) | |
| 5000-10000 | 4 (3.1) | 123 (96.9) | 127 (100.0) | |
| More than 10000 | 3 (3.7) | 78 (96.3) | 81 (100.0) | |
| 6 | 1 (3.6) | 27 (96.4) | 28 (100.0) | |
| **Smoking History** | | | | |
| No | 73 (6.1) | 117 (93.9) | 1190 (100.0) | 0.853 |
| Yes | 8 (6.6) | 114 (93.4) | 220 (100.0) | |
| **Chronic Diseases** | | | | |
| Present | 78 (6.5) | 1127 (93.5) | 107 (100.0) | 0.131 |
| Absent | 3 (2.8) | 104 (97.2) | 1205 (100.0) | |

Multivariable binary logistic regression analysis for prediction of optimal adherence score of preventive measures among ATM users showed that being male, residing in urban communities significantly affected the score **(Table 4).**

***History of COVID-19 infection and adherence to isolation restrictions***

When participants were asked about their history of having respiratory symptoms suggesting COVID-19 infection, 128 participants answered with yes 9.8%. And the largest percent of them 86.7% had not called the MOHP emergency line for COVID-19 (105 line). These results are significant since they may denote that more efforts should be exerted to make the people aware of the importance of calling the MOHP emergency line for COVID-19 (105 line) when feeling of such respiratory symptoms.

About 68 patients had isolated themselves 53.1%. When isolated patients were asked about dealing with delivery system, more than one half had not deal with delivery 52.9%. Among patients who deal with delivery (n=32), 90.6% reported presence of healthy person in their home for contact with delivery person. Regarding adherence to isolation precaution for isolated patients, the largest percent of them had optimal adherence score 75.0% **(Figure 2).** And there was no statistically significant difference between patients with different sociodemographic

characteristics regarding their adherence score, **(Table 5).** Internal reliability was agreed and the "Cronbach alpha" test was assessed [10].

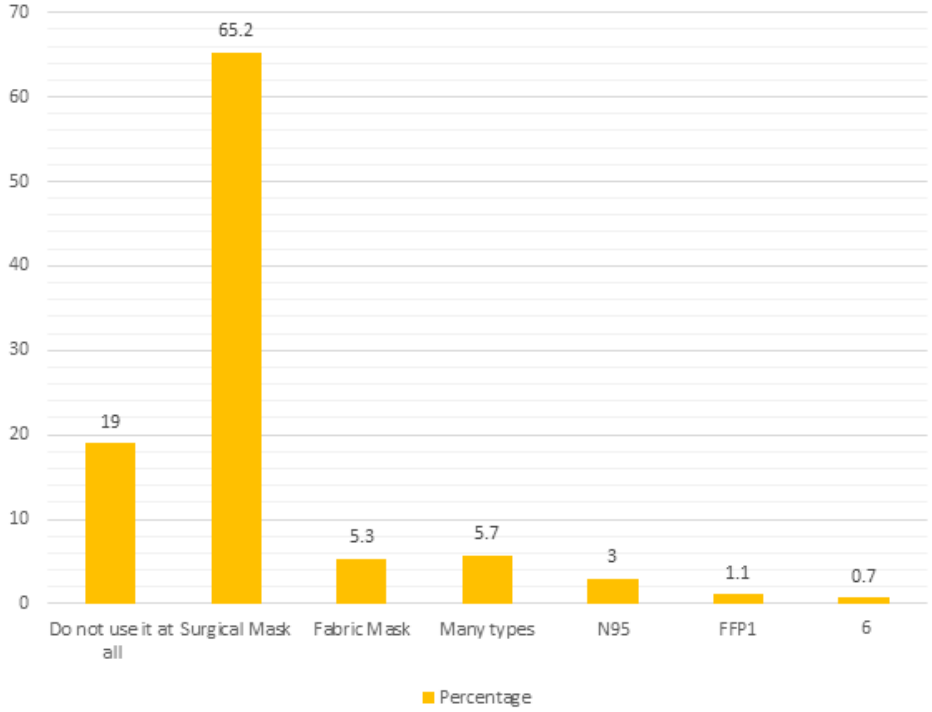


**Figure (1): Distribution of the studied participants regarding type of mask used; n=1312**

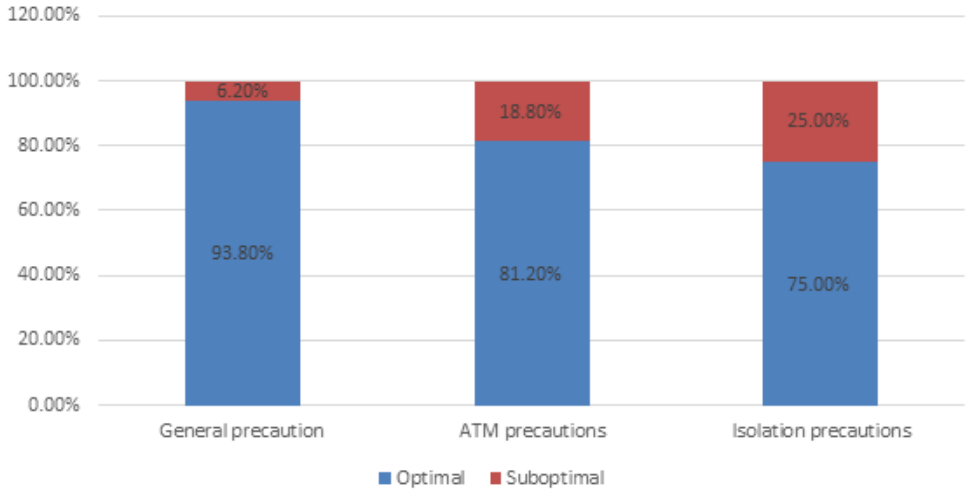


**Figure (2): Adherence score among participants to infection precautions during COVID pandemic**

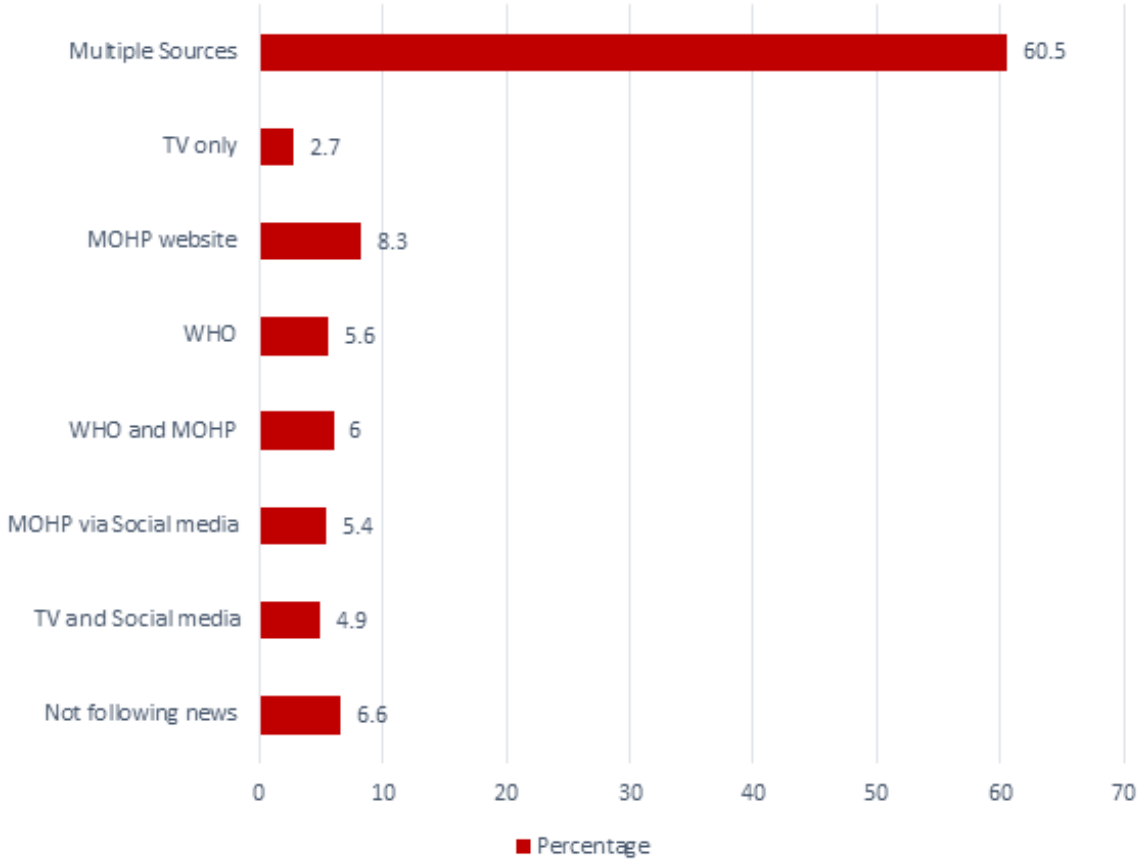


**Figure (3): Source of information of the participants about COVID-19; n=1312**

**Table (2): Multivariable binary logistic regression analysis for prediction of optimal commitment (adherence) score of general preventive measures of COVID 19**

| Independent variables | P-value | OR | 95% C.I.for OR | |
|---|---|---|---|---|
| | | | Lower | Upper |
| **Age groups** | | | | |
| **22-40** | 0.996 | 0.998 | 0.464 | 2.146 |
| **≥41** | 0.075 | 4.589 | 0.858 | 24.552 |
| **Male sex** | **<0.001**** | **0.255** | **0.154** | **0.422** |
| **Rural residence** | 0.205 | 0.713 | 0.422 | 1.203 |
| **Educational Level** | | | | |
| **Post graduated** | 0.062 | 2.771 | 0.950 | 8.079 |
| **Not educated/ still student** | 0.862 | 0.931 | 0.417 | 2.078 |
| **Smoking** | 0.231 | 1.651 | 0.726 | 3.754 |
| **Chronic diseases** | 0.477 | 1.561 | 0.458 | 5.323 |
| **Income≥5000** | **<0.001**** | **3.337** | **2.037** | **5.469** |
| **Working** | 0.614 | 1.166 | 0.642 | 2.121 |
| **Not single** | **0.001** | **2.957** | **1.586** | **5.510** |

**Table (3): Association between Sociodemographic Characteristics of the Studied ATM Users Participants and their Total Adherence Score to Infection Prevention Precautions during COVID 19 Pandemic; n=659**

| Sociodemographic Characteristics | Adherence Score | | Total =n (%) | P value |
|---|---|---|---|---|
| | Sub-optimal | Optimal | | |
| **Residence** | | | | |
| Urban | 92 (16.9) | 453 (83.1) | 545 (100.0) | 0.005 |
| Rural | 32 (28.1) | 82 (71.9) | 114 (100.0) | |
| **Age in years** | | | | |
| ≤21 | 22 (23.2) | 73 (76.8) | 95 (100.0) | 0.117 |
| 22-40 | 92 (19.3) | 385 (80.7) | 477 (100.0) | |
| ≥41 | 10 (11.5) | 77 (88.5) | 87 (100.0) | |
| **Sex** | | | | |
| Male | 68 (23.9) | 217 (76.1) | 285 (100.0) | 0.004 |
| Female | 56 (15.0) | 318 (85.0) | 374 (100.0) | |
| **Educational Level** | | | | |
| Graduate | 70 (19.4) | 291 (80.6) | 361 (100.0) | 0.175 |
| Post graduated | 18 (13.5) | 115 (86.5) | 133 (100.0) | |
| Student | 36 (21.8) | 129 (78.2) | 165 (100.0) | |
| **Occupation** | | | | |
| Unemployed | 20 (16.9) | 98 (83.1) | 118 (100.0) | 0.548 |
| Student | 28 (22.6) | 96 (77.4) | 124 (100.0) | |
| Pharmacist | 25 (17.7) | 116 (82.3) | 141 (100.0) | |
| Doctor | 8 (22.2) | 28 (77.8) | 36 (100.0) | |
| Nurse | 3 (37.5) | 5 (62.5) | 8 (100.0) | |
| Others | 40 (17.2) | 192 (82.8) | 232 (100.0) | |
| **Marital Status** | | | | |
| Single | 72 (20.6) | 277 (79.4) | 349 (100.0) | 0.136 |
| Married | 52 (17.9) | 238 (82.1) | 290 (100.0) | |
| Widow | 0 (0.0) | 3 (100.0) | 3 (100.0) | |
| Divorced | 0 (0.0) | 17 (100.0) | 17 (100.0) | |
| **Monthly Income (n=899)*** | | | | |
| Less than 1000 | 18 (24.0) | 57 (76.0) | 75 (100.0) | 0.024 |
| 1000-2000 | 15 (13.0) | 100 (87.0) | 115 (100.0) | |
| 3000-5000 | 27 (21.8) | 97 (78.2) | 124 (100.0) | |
| 5000-10000 | 13 (12.9) | 88 (87.1) | 101 (100.0) | |
| More than 10000 | 10 (15.9) | 53 (84.1) | 63 (100.0) | |
| 6 | 9 (37.5) | 15 (62.5) | 24 (100.0) | |
| **Smoking History** | | | | |
| No | 113 (19.7) | 460 (80.3) | 573 (100.0) | 0.125 |
| Yes | 11 (12.8) | 75 (87.2) | 86 (100.0) | |
| **Chronic Diseases** | | | | |
| Absent | 116 (19.7) | 472 (80.3) | 588 (100.0) | 0.085 |
| Present | 8 (11.3) | 63 (88.7) | 71 (100.0) | |

**Table (4): Multivariable binary logistic regression analysis for prediction of optimal commitment (adherence) score of preventive measures while using ATM during COVID 19 pandemic**

| Independent variables | P-value | OR | 95% C.I.for OR | |
|---|---|---|---|---|
| | | | Lower | Upper |
| **Age groups** | | | | |
| **22-40** | 0.803 | 1.103 | 0.509 | 2.391 |
| **≥41** | 0.311 | 1.749 | 0.593 | 5.158 |
| **Male sex** | **0.005*** | **0.564** | **0.377** | **0.845** |
| **Rural residence** | **0.047*** | **0.612** | **0.377** | **0.992** |
| **Educational Level** | | | | |
| **Post graduated** | 0.202 | 1.455 | 0.818 | 2.589 |
| **Not educated/still student** | 0.951 | 1.023 | 0.495 | 2.115 |
| **Chronic diseases** | 0.325 | 1.492 | 0.672 | 3.310 |
| **Income≥5000** | 0.489 | 1.240 | 0.674 | 2.283 |
| **Working** | 0.862 | 0.957 | 0.579 | 1.579 |
| **Not single** | 0.970 | 0.991 | 0.616 | 1.594 |

**Table (5): Association between Sociodemographic Characteristics of the Studied Isolated Participants and their Total Adherence Score to Infection Prevention Precautions during COVID 19 Pandemic; n=68**

| Sociodemographic Characteristics | | Adherence Score | | Total =n (%) | P value |
|---|---|---|---|---|---|
| | | Sub-optimal | Optimal | | |
| **Residence** | Urban | 15 (30.6) | 34 (69.4) | 49 (100.0) | 0.086 |
| | Rural | 2 (10.5) | 17 (89.5) | 19 (100.0) | |
| **Age in years** | **≤21** | 7 (38.9) | 11 (61.1) | 18 (100.0) | 0.179 |
| | **22-40** | 10 (21.7) | 36 (78.3) | 46 (100.0) | |
| | **≥41** | 0 (0.0) | 4 (100.0) | 4 (100.0) | |
| **Sex** | Male | 6 (22.2) | 21 (77.8) | 27 (100.0) | 0.668 |
| | Female | 11 (26.8) | 30 (73.2) | 41 (100.0) | |
| **Educational Level** | Graduate | 4 (13.8) | 25 (86.2) | 29 (100.0) | 0.125 |
| | Post graduated | 2 (22.2) | 7 (77.8) | 9 (100.0) | |
| | Student | 11 (36.7) | 19 (63.3) | 30 (100.0) | |
| **Occupation** | Unemployed | 2 (33.3) | 4 (66.7) | 6 (100.0) | 0.361 |
| | Student | 8 (32.0) | 17 (68.0) | 25 (100.0) | |
| | Pharmacist | 3 (20.0) | 12 (80.0) | 15 (100.0) | |
| | Doctor | 1 (100.0) | 0 (0.0) | 1 (100.0) | |
| | Nurse | 0 (0.0) | 1 (100.0) | 1 (100.0) | |
| | Others | 3 (15.0) | 17 (85.0) | 20 (100.0) | |
| **Marital Status** | Single | 16 (30.8) | 36 (69.2) | 52 (100.0) | 0.139 |
| | Married | 1 (6.7) | 14 (93.3) | 15 (100.0) | |
| | Divorced | 0 (0.0) | 1 (100.0) | 1 (100.0) | |
| **Monthly Income (n=899)*** | < 1000 | 6 (40.0) | 9 (60.0) | 15 (100.0) | 0.673 |
| | 1000-2000 | 5 (29.4) | 12 (70.6) | 17 (100.0) | |
| | 3000-5000 | 2 (22.2) | 7 (77.8) | 9 (100.0) | |
| | 5000-10000 | 1 (33.3) | 2 (66.7) | 3 (100.0) | |
| | > 10000 | 0 (0.0) | 4 (100.0) | 4 (100.0) | |
| | 6 | 0 (0.0) | 1 (100.0) | 1 (100.0) | |
| **Smoking History** | No | 14 (26.4) | 39 (73.6) | 53 (100.0) | 0.612 |
| | Yes | 3 (20.0) | 12 (80.0) | 15 (100.0) | |
| **Chronic Diseases** | Present | 5 (45.5) | 6 (54.5) | 11 (100.0) | 0.087 |
| | Absent | 12 (21.1) | 45 (78.9) | 57 (100.0) | |

## Conclusion and Recommendations

This study provides a detailed assessment of the awareness, attitude, and practice for COVID-19 among Egyptian residents. Generally, Egyptians participating in our questionnaire had clear knowledge about COVID-19 disease, and a constructive attitude and good adherence towards the use of protective measures, which is essential to limit the outbreak of the disease. The findings showed that urban people, elderly people, and women have better COVID-19-related behaviors than rural, young people, and men, respectively. Education level and high income are effective on COVID-19 knowledge. Social media platforms, TV and WHO website are the primary sources of gaining information. Although the government has taken drastic measures to restrict the spread of the disease, it needs to counteract wrong information about COVID-19 especially between rural groups. The government needs to ensure that protective products such as masks and sanitizers are available at reasonable prices of accessible quality.

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