

Predictors of coronavirus disease 2019 anxiety and coping among different age groups of Egyptian population

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Objectives

To determine predictors of anxiety and coping during coronavirus disease 2019 (COVID-19) pandemic among different age groups of Egyptian population.

Patients and methods

A cross-sectional study of 500 participants who completed an online questionnaire for anxiety and coping the following tools: COVID-19 Coping Responses Inventory, Coping Responses Inventory, COVID-19 Life Events–Anxiety Inventory, and the Arabic version of State-Trait Anxiety Inventory. Correlation between different variables, anxiety and coping related to COVID-19 was evaluated by Pearson's correlation coefficient. Regression analysis was performed to evaluate predictors for anxiety and coping.

Results

COVID-19 Life Events (C-19L) is the most important in predicting COVID-19 related Anxiety (C-19A) as it has *B* value of 0.568 followed by level of education (*B*=0.217), and, monthly family income (*B*=0.140).

Conclusion

This study shows the impact of sociodemographic factors in predicting COVID-19 anxiety and coping among various sectors in the Egyptian community.

Keywords:

aged, anxiety, coping, coronavirus disease 2019

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Introduction

Coronavirus disease 2019 (COVID-19) is related to higher levels of anxiety and distress (Rosen *et al.*, 2020). It could be assessed by different tools such as the State-Trait Anxiety Inventory (STAI) for adults (Spielberger, 1983). Various sociodemographic factors could be related to anxiety during the pandemic (Choi *et al.*, 2020). Coping is defined as the behaviors and thoughts of a person toward various stressful situations (Folkman and Moskowitz, 2004). There are different methods to monitor coping strategies using various coping scales such as Coping Strategies Questionnaire and Ways of Coping Questionnaire (Aust *et al.*, 2016). The study aims to identify predictors of anxiety and coping among various sectors in the Egyptian community.

Patients and methods

The data for this study were taken from COVID-19 Life Events–Anxiety Inventory (C-19LAI) Development, Reliability, and Validity Study on Egyptian Population (Madkor *et al.*, 2021).

Sample and setting

This research was conducted in various governorates. Within Egypt using an online survey in a convenience

sample. We used Google forms. Moreover, an offline survey was conducted for those who had no access to the online survey.

Ethics approval and consent to participate

Ethical approval for the study was granted by the Tanta University Ethical Committee, with approval Code 34394. Informed written consent for taking part in the study was obtained from each participant.

Tools

The survey included Four tools. Coping Responses Inventory (CRI) (Moos and Moos, 1988) has been designed and validated before (Moos *et al.*, 1990) and translated and validated into Arabic before (Madkor, 2007). It showed acceptable reliability ($\alpha=0.927$) in the total sample in our study (see supplementary material; Table S1). CRI comprises eight subscales (logical analysis, positive reappraisal, seek guidance and support, take problem-solving action, cognitive avoidance, acceptance/resignation, seek alternative

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rewards, and emotional discharge). The first set of four subscales measure approach coping, and the second set measures avoidance coping. The first two subscales in each set reflect cognitive coping, and the second two reflect behavioral coping.

COVID-19 Coping Responses Inventory (C-19C) is composed of four subscales (50 items) that measure different types of specific responses about coping with COVID-19 activities (eight items), behavioral phenomena (11 items), direct dealing with the problem (11 items), and positive reappraisal (20 items).

C-19C reflects method of coping domains (behavioral or cognitive).

Behavioral coping reflects efforts to master COVID-19 or to avoid thinking about it. Cognitive coping reflects cognitive attempts with COVID-19.

Respondents rate their reliance on each of 50 items on a four-point scale varying from 'not at all' to 'fairly often.'

We selected and categorized the items according to the method of coping with the help of a conceptual framework. Moreover, a pilot study was conducted for this aim, and then we did content analysis and expansion of the item pool to cover additional responses.

We established specific criteria to classify items and excluded items that were nonspecific, redundant, or too infrequent or complex. We rewrote words (see supplementary material for sample items in English; Table S3).

We studied validity and reliability of the inventory. Its Psychometric proprieties are shown in the supplementary material (Table S2). In brief, the Cronbach's alpha of internal consistency was 0.775 and each value of item-total correlation was in the range of 0.169–0.682. The total item degree was positive and significant ($P < 0.01$). The four subscales show acceptable internal consistencies that range from 0.75 to 0.94.

In addition to the CRI and C-19C, we administered C-19LAI (Madkor *et al.*, 2021) and S-STAI (Abdel-khalek, 1983). C-19LAI shows acceptable reliability and moderate validity. The COVID-19 anxiety scale (C-19A) correlates in a positive, moderate, and significant way ($P \leq 0.01$) with the Arabic S-STAI (Abdel-khalek, 1983) ($r = 0.407$). It has been used in several studies and shows high internal consistency reliability and high construct validity.

Procedure and data analysis

The first phase of the study was designing a tool specifically to assess C-19C. For this phase, a pilot study was conducted online in a convenience sample of 33 Egyptians, with 78% females, 18 years old and above (from 8/4 to 10/4/2020). Based on the data obtained from this pilot study and in line with the theoretical framework, an item pool of C-19C was developed.

The second phase included the Psychometric testing of C-19C. It was conducted in a total sample of 500 participants throughout the time-period from April, 21 to May, 16 including a well-prepared battery for C-19C and CRI.

Descriptive statistics were used to summarize information of the total sample. We computed Cronbach's alpha for internal consistency and reliability. Pearson correlations were used to test item-total correlation as internal consistency validity for the aforementioned two inventories (C-19C and CRI) and concurrent validity between C-19C and other variables.

Pearson's correlation coefficient (r) was conducted to assess correlations between variables. Significance was adopted at P value less than 0.05 for interpretation of results of tests of significance.

Stepwise regression analysis was conducted to evaluate the risk factors for anxiety and coping during COVID-19 pandemic.

The explanatory power of the overall regression model (R^2) was reported using the F test of significance. Once this was significant, individual explanatory power testing of various independent variables was conducted and then we did a comparison of their relative importance.

All statistical analyses were performed with the SPSS 23 (SPSS, IBM Corp. Released 2017. IBM SPSS Statistics for Windows, Version 25.0. Armonk, NY: IBM Corp).

Results

A total of 500 individuals completed the questionnaire online, comprising 182 males and 318 females. The most responsive governates were Cairo ($n = 158$ participants) followed by Gharbia ($n = 116$), and Giza ($n = 85$). Overall, 260 (52%) participants were less than 40 years, 170 (34%) were between 40 and 59 years, and 70 (14%) participants were 60 years and older. Overall, 34.4% of the sample worked in the health sector.

Moreover, 259 (51.8%) individuals lived with an elderly person. In addition, 134 (26.8%) participants presented with chronic illnesses, and only 11 (2.2%) participants presented with physical disability. Overall, 4.2% of the sample was diagnosed with a psychiatric disorder.

Stepwise regression analysis was done to evaluate the risk factors for anxiety during COVID-19 pandemic. Our results showed that age is an important risk factor of anxiety. The increase in age was accompanied by increase in anxiety in both scales, anxiety related to COVID-19 scale ($P < 0.01$, $\beta = 0.324$) and Spielberger scale ($P < 0.05$, $\beta = 0.093$), which makes the geriatric group the most vulnerable age group. Moreover, increase in age is a risk factor for predicting deterioration of coping responses as shown in Table 1, which again confirms the vulnerability of the Geriatric population during this crucial era.

Other demographic variables such as monthly income, level of education, and occupation have shown to be important risk factors that share in the prediction of anxiety and proper coping mechanisms. The decrease in the monthly income was associated with an increase in the level of anxiety related to COVID-19 and decrease in the coping responses, as shown in Tables 2 and 3. Moreover, results showed that education can predict -0.217% of anxiety related to COVID-19, which means that individuals with a higher level of education were less prone to anxiety, as shown in Table 2.

Moreover, negative life events that occurred during COVID such as morbidity, mortality, social, financial, and occupational negative events had strong contributes and can highly predict the increase in the level of anxiety ($R^2 = 0.568$), and again, this was shown in its direct positive correlation with both anxiety scales. Moreover, the predictive regression analysis showed that emotional discharge and seeking alternative rewards can significantly explain anxiety related to COVID. Overall, 0.314% of anxiety related to COVID-19 was predicted through emotional discharge, whereas 0.194% predicted via seeking alternative rewards ($P \leq 0.01$).

Table 1 Results of simple linear regression analyses of age in predicting Coping Responses Inventory as dependent variable in participants (N=500)

	Estimate	SE	P value	R ²
Constant	124.691	2.260	<0.001**	0.068
Age	-7.706	1.275	<0.001**	

**Significant at 0.01 level.

Anxiety related to COVID-19 showed a significant positive correlation ($P \leq 0.01$) with Spielberger anxiety scale ($r = 0.407$) and life event scale ($r = 0.666$). Our results also showed that anxiety negatively affects the coping strategies and vice versa. This was evident through the negative significant correlation between anxiety related to COVID-19 on one side and coping inventory scale ($P \leq 0.01$, $r = 0.119$) and two of its subscales, which are seeking support/information ($P \leq 0.05$, $r = -0.96$) and acceptance/resignation subscales ($P \leq 0.01$, $r = -0.197$) on the other side.

This significant negative correlation between anxiety and coping was also more evident between the two scales related to the pandemic: anxiety related to COVID-19 and coping with COVID-19 ($P \leq 0.05$, $r = 0.098$), as shown in Table 4. Anxiety shows a significant decrease with the increase in the two subscales of coping: (a) positive reappraisal way of coping such as arranging priorities, re-evaluation of family relations, etc. ($P \leq 0.01$, $r = -0.139$) and (b) direct dealing with the problem such as following the measures of safety and social distance ($r = -0.093$). On the contrary, there is a positive correlation between anxiety related to COVID-19 and negative behaviors related to COVID-19 ($r = 0.124$), such as insisting on gatherings, hypersomnia, or substance abuse, which reflect the negative way of coping during the pandemic.

Discussion

COVID-19 and its consequences resulted in many physical and Psychological health concerns. Its negative effect on the mental health in different

Table 2 Results of stepwise regression analyses of monthly family income, level of education, and life events in predicting C-19A as dependent variable in participants (N=500)

	SE	Estimate	P value	R ²
Constant	2.751	56.683	<0.001**	0.522
Monthly family income	0.788	-2.973	<0.001**	
Level of education	1.292	-7.866	<0.001**	
C-19L	0.124	2.132	<0.001**	

**Significant at 0.01 level.

Table 3 Results of stepwise liner regression analyses of monthly family income and level of occupation as independent variables and COVID-19 Coping Responses Inventory as a dependent variable in participants (N=500)

	SE	Estimate	P value	R ²
Constant	3.239	103.181		0.070
Monthly family income	0.829	4.172	<0.001**	
Occupation	0.251	0.503	0.046	

**Significant at 0.01 level.

Table 4 Correlations of variables in the sample (N=500)

Scale	Comparison instruments										
C-19L	0.289**	-0.027	-0.021	0.006	-0.082	-0.066	0.026	-0.056	-0.006	0.019	
C-19A	0.407**	-0.119**	-0.041	0.035	-0.096*	-0.013	-0.026	-0.197**	0.011	-0.022	
C-19C	0.198**	0.884**	0.063	0.000	0.781**	0.058	0.015	0.752**	-0.103*	0.738**	
COVID-19 activities	0.204**	0.825**	0.046	0.025	0.578**	0.074	0.054	0.572**	-0.078	0.546**	
COVID-19 behavioral phenomena	-0.145**	-0.913**	-0.024	-0.009	-0.674**	-0.006	-0.010	-0.663**	0.054	-0.682**	
COVID-19 direct dealing with the problem	0.178**	0.008	0.034	-0.009	0.660**	0.011	0.008	0.689**	-0.111*	0.647**	
COVID-19 positive reappraisal	0.168**	0.885**	0.060	0.001	0.830**	0.045	0.000	0.772**	-0.076	0.796**	

C-19C, COVID-19 Coping Responses Inventory; COVID-19, coronavirus disease 2019.

communities is growing more and more with the rapid spread of the virus. A recent meta-analysis study that included 17 studies with a sample size of 63 439 showed that the prevalence of anxiety has reached 31.9% (Salari *et al.*, 2020). Thus, it is essential to predict the different risk factors of anxiety during the pandemic to try to protect the most vulnerable groups and decrease the prevalence of anxiety and other Psychological disorders among these groups. In our study, there were a number of demographic factors that were predictive of anxiety during COVID-19 pandemic, including age, monthly income, and education. It was found that the mental health state of different age groups was not the same during the pandemic. It appeared that elder people were more likely to experience anxiety. Our results showed that increase in age is a risk factor in increasing anxiety and deterioration of the coping mechanisms.

This was consistent with a study done in Germany on 15 308 participants, which showed that COVID-19-related fear was more evident in elderly participants. They suggested that the high individual risk of infection in elderly and its possible complication justifies the intense COVID-19-related fear (Schweda *et al.*, 2021). Another study showed that the prevalence of anxiety in the elderly was 4.95% before the COVID-19 pandemic and 10.10% during the outbreak which showed that there was a double increase in anxiety among the elderly population (Wang *et al.*, 2020). Another important factor that may contribute in increasing anxiety among geriatrics was the loneliness and separation from other family members. Studies showed that loneliness during periods of lockdown during the outbreak was an additional important factor for both depression and anxiety (Jaspal and Breakwell, 2020), but its effect on the elderly population in particular needs further research.

However, the relation between increased anxiety and increased age has not appeared in a study done in

Canada on 8267. They found that the highest levels of anxiety according to GAD-7 scales were evident among young people aged less than or equal to 25 years and lowest among the elderly population aged more than 60 years old (Nwachukwu *et al.*, 2020). This was shown also in another study in which females aged 18–29 years were at a higher risk for increased anxiety (Solomou and Constantinidou, 2020). This may be contributed in part to the differences in Psychological support services available for the elderly population between different countries.

In our study, the results showed that decrease monthly income increases the risk of anxiety. Any pandemic can create survival uncertainty owing to the health complications, unemployment, and different economic sequelae, and as a developing country, these factors are very important in Egypt especially in the presence of millions of temporary workers. Overall, 45.4% of the sample reported that their monthly income is only sufficient for basic needs, whereas 18.4% reported their need for help. This means that further decrease in the monthly income during the pandemic and the periods of lockdown is considered a real threat for the basic human needs for this part of the Egyptian community. This was consistent with an American study on 514 participants, which raised the importance of detecting economic anxiety and determining the more vulnerable and affected groups (Mann *et al.*, 2020).

Moreover, education was one of the predictors of anxiety in this study. The significant differences in state anxiety among people with different education levels showed that people with higher education showed better management of anxiety and Psychological stress better than lower literacy. One of the important results shown to us was the negative significant correlation between anxiety scale and certain coping mechanisms such as acceptance/resignation, seeking information and support, in

addition to direct dealing with the problem. Coping mechanisms are considered as cornerstones in facing anxiety in the presence of different inevitable negative life events in the form of increased mortality, morbidity, financial, and social burdens during the outbreak. Different studies denoted that even simple coping behaviors such as balanced diet, avoiding overindulgent of knowing updates about the outbreak may help in protection against anxiety (Fullana *et al.*, 2020). Moreover, strategies such as maintaining social contacts, the concept of self-efficacy, acceptance of negative emotions, and seeking enough information about simple steps of management and how to obtain medical advice when needed may be associated with decrease in Psychological burden (Petzold *et al.*, 2020). There are some limitations in our study, which included the need for a larger sample of elderly people for further detailed assessment of the geriatric vulnerability for anxiety. Moreover, we need more statistical data about anxiety and coping in the medical staff, which represented about 34% and also about the caregivers of the elderly population in our sample.

Conclusion

To develop a predictive model for anxiety and coping, a reliable and valid tool is needed. The C-19C inventory has been developed in this study. It demonstrated preliminary reliability evidence, good internal consistency, and convergent validity. There is a need to test C-19C (Arabic version) in a larger sample of elderly in both normal and psychiatric patients, to use it in a full-scale clinical research. That is why, we must establish as a community and health providers a therapeutic target based on coping responses with the most vulnerable groups to protect them.

As is shown in Table 1, the predictive regression coefficient demonstrates that age can explain CRI significantly ($P < 0.01$) and by considering R^2 coefficient, 0.07% of CRI is predicted through age.

As shown in Table 2, monthly family income, level of education, and C-19L could predict C-19A. Table 2 shows that monthly family income has a beta value that is predictive of C-19A (B coeff. = -2.973, $P < 0.01$). It means further increase in monthly family income resulted in decreased C-19A among individuals. Level of education was a predictor (B coeff. = -7.866, $P < 0.01$). C-19L was a predictor (B coeff. = 2.132, $P < 0.01$). According to R^2 value (0.568) the model explains about 57% of the fitted data in the regression

model, and This value indicates that 57% of the variance in C-19A can be predicted from the three variables. According to the standardized coefficient β , it seems that the variable C-19L is the most important in predicting C-19A as it has the largest B value (0.568), then level of education (0.217), and finally, monthly family income (0.140).

As shown in Table 3, We can conclude that According to R^2 value (0.07) the model explains about 7% of the fitted data in the regression model, and This value indicates that 7% of the variance in C-19C scores can be predicted from the three variables.

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Conflicts of interest

There are no conflicts of interest.

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