Depression and its Relationship with Precaution Practices of Coronavirus: A Cross-sectional Study on University Students

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Abstract:

Studies have shown that the outbreak of COVID-19 would result in mental health problems. Though many studies have shown that adhering to the precaution practices (i.e., washing hands with soap and water, wearing masks, using disinfectants…etc.) are effective in slowing down infection, these practices had significant negative psychological effects as it increased the risk of developing depression and emotional distress. We aim to explore the correlation between adhering to the precaution practices and the depression in the community of Egyptian university students. To this end, a cross-sectional online survey of 417 undergraduate students in the British University in Egypt (BUE) who enrolled in different faculties was conducted between 18th of October and 11th of November 2021. An online survey included items about the adherent to follow the precautionary practices and depression. Depression was assessed with the Beck Depression Inventory-II (BDI-II). The results showed that there was a significant difference between males and females, students enrolled in medical and non-medical faculties in adhering to the precautions practices. The regression analysis revealed that the adherent to follow the precaution practices increased student depression symptoms assessed by BDI-II.

Keywords : coronavirus, COVID-19, depression, mental health, precaution practices, precautionary measures.

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الاكتئاب وعلاقته بالممارسات الوقائية لجائحة كورونا: دراسة مستعرضة على طلاب الجامعة

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ملخص البحث باللغة العربية :

أظهرت الدراسات أن انتشار وتفشي فيروس كورونا المستجد له ينتج عنه مشكلات تتعلق بالصحة النفسية. وعلى الرغم من الدراسات العديدة التي أوضحت ان الالتزام بالإجراءات الوقائية (مثل غسل اليدين بالماء والصابون، وارتداء الماسك، واستخدام المطهرات...الخ) يعد من الممارسات الفعالة في تجنب العدوى والحد من انتشارها، إلا أن لها بعض التأثيرات السلبية الدالة حيث إنها قد تزيد من فرصة ظهور الاعراض الاكتئابية والضغط الانفعالي. تهدف الدارسة الحالية إلى الكشف عن العلاقة بين الالتزام بالممارسات الوقائية والاكتئاب لدى عينة من طلاب الجامعة. تم تصميم تلك الدراسة المستعرضة بتطبيق استبيان الكتروني على ٤١٧ طالب بالجامعة البريطانية في مصر بمختلف الكليات في الفترة ما بين ١٨ أكتوبر إلى ١١ نوفمبر، ٢٠٢١. تضمن الاستبيان عبارات تعكس مدى التزام طلاب الجامعة بالإجراءات الوقائية والاكتئاب. تم قياس الاكتئاب عن طريق مقياس بيك الثاني للاكتئاب BDI–II. أظهرت النتائج فروق دالة إحصائياً بين الذكور والاناث، وبين الطلاب الذين يدرسون بكليات القطاع الطبي والطلاب الذين يدرسون بالكليات الأخرى في مدى التزامهم بالإجراءات الوقائية. كما أظهر نتائج تحليل الانحدار أن الالتزام بالإجراءات الوقائية قد يزيد من الاعراض الاكتئابية التي يقيسها مقياس بيك الثاني لدى طلاب الجامعة.

1 .Introduction:

The coronavirus (COVID-19) was first detected in Wuhan, China in December 2019. From that time forward, confirmed cases and death rates have been grown up speedily and the COVID-19 evolved to become a large-scale pandemic as it has been detected in almost all the countries all over the world. The COVID-19 pandemic is still devastating countries across the world as of January 2021, with over 100 million confirmed cases and 2.2 million deaths to date globally (Dong, Du, & Gardner, 2020). COVID-19 arrived early to the Middle East and North Africa (MENA) region, with Iran recording the first cases in February 2020. These quickly spread to neighbouring countries of the Gulf through travel, business contacts, and religious tourism. By early August 2021 the World Health Organization's Regional Office for the Eastern Mediterranean (EMRO), incorporating most MENA countries, had reported 12.6 million cases and 236 k deaths (Fawcett, L., 2021). In February 2020, Egypt reported the first case of COVID-19 in Cairo. On March 8, the number of Egyptian infected cases grew exponentially. Hence, the Egyptian government announced its initial COVID-19 prevention plan to slow the transmission of the virus. This was done by suspending the educational facilities, reducing the capacity of public sector workplace, cancelling all the cultural events, suspending all the international flights, and introducing the nighttime curfew. Regarding the Egyptian people, this was the first major experience of an emergency since the 25th of January Revolution in 2011, which led to great uncertainty and significant adverse consequences for the collective and individual wellbeing.

University community is a mixture and special social group contains students with active life habits based on relationships and contacts, faculty staff, and administrative technical staff. During the COVID-19 crisis. The pandemic emergency changed the university's life drastically: considering university restrictions, indeed suspension of teaching in presence (Villani, et al., 2021).

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Only the half capacity of faculty and administrative technical staff were allowed to access the campuses.

Although the overall impact of COVID-19 on the mental health is still unknown, the current crisis is expected to produce a notable psychological impact on population. In 2020, Odriozola-Gonzáleza et al. analyzed the psychological impact of COVID-19 on the Spanish university community during the first weeks of confinement. The results of the Spanish study showed that moderate to extremely severe anxiety, depression, and stress were reported by the 2530 respondents. Furthermore, the results showed that students from the school of Arts and Humanities, Social Sciences, and Law had higher scores related to anxiety, depression, and stress. Similarly, Sundarasen et al. (2020) examined the impact of the COVID-19 on the anxiety levels of 983 university student in Malaysia during the peak of the crisis. This study indicated that age, gender, academic specialization, and living conditions were significantly associated with anxiety levels.

In non-pandemic settings, factors associated with increases in depressive and anxiety symptoms include female gender (McLean et al., 2011), younger age (Molarius et al., 2009), being single (Scott et al., 2010), and lower education (Bjelland et al., 2008). Furthermore, several other factors have been considered to investigate regarding depressive and anxiety symptoms during the COVID-19 pandemic. These include frustration of autonomy, which is commonly observed because of imposed behavioral restrictions during pandemics, (e.g., Tindall & Curtis, 2019). One of these behavioral restrictions that emerged during the pandemic crisis is adhering to the precaution practices that stressed on the importance of cleaning and/or washing hands several times a day, wearing masks and gloves, keeping social distance of at least 1 m, avoiding crowded places.

Though many studies have shown that practicing the precaution guidelines are effective in reducing the spread of infection (Jang, et al., 2019), these practices had significant negative psychological

effects as it increased the risk of developing depression and emotional distress (Balkhi, et al., 2020).

In 2021, Sonbol et al. evaluated the impact of the COVID-19 pandemic on people's depression in Saudi Arabia. They found that the commitment of a person to follow the restrictions increased his/her depression symptoms. Similarly, Balkhi et al. (2020) described the psycho-behavioral response to the COVID-19 crisis among the population of Karatchi, Pakistan. The results indicated that more than 75% out of 400 participants were adherent to the precaution practices to reduce the spread of coronavirus and they experienced high level of anxiety. In 2020, Cao et al. focusing on the mental health of population in the university community during the COVID-19 period. They found that higher levels of anxiety were associated with some factors related to COVID-19 such as the commitment of students to follow the Chinese government restrictions.

To our knowledge, there is minimal knowledge about the impact of large-scale pandemics (COVID-19 in our study) and its precaution practices on community mental health, particularly during the acute phase. In Egypt, it is not known how and to what extent the pandemic is affecting different sociodemographic groups of university community. Hence, the current study aims to extend the existing literature by empirically assessing the level of depression during the COVID-19 pandemic in the university community and how adhering to the precaution practices affected depressive state. This will help in developing and probably implementing psychological interventions properly adjusted to current situation or any expected one that might be occurred in the future. As well known, the sudden change in people's routine may impact on mental health of the public. We are expecting that the adhering to the precaution practices can predispose one to depression.

(ISSN : 2536 - 9555)

2. Research Methodology

2.1 Study Design

Every Egyptian student the British University in Egypt (BUE) between 18th of October and 11th of November 2021 was eligible for participation. The anonymous web-based survey was announced after receiving an approval from the department of psychology, faculty of arts and humanities. The survey started with the nature and the aim of the study explaining that participation implied analyzing participants' responses with full of confidentiality of their responses. Participants (n = 417) completed the announced web-based survey through Google Forms in the Arabic language and the communication between the researcher and the participants was possible. The online survey was designed to allow participants to stop whenever they wanted.

The participant's response about adhering to the precautionary measures during the pandemic of COVID-19 was assessed using a cross-sectional survey design. The questionnaire was adopted from studies where it was pre-tested and (Huang, 2020; Guan et al., 2020; Wang et al., 2020). Regarding the assessment of depression, we used the standardized Arabic version of Beck's Depression Inventory-II (BDI-II) that was developed to correspond to the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) criteria for measuring the major depression symptoms. The lifetime of BDI-II extends for two weeks, and it includes 21 items. BDI-II is a 4-point scale indicates degree of severity; items are rated from 0 (not at all) to 3 (extreme form of each symptom). BDI-II's cut-off scores are classified into minimal, mild, moderate, and severe depression. We used the cut-off scores for males (minimal =0-19; mild = 20-27; moderate = 28-34; severe = 35- 63) and females (minimal = 0-20; mild = 21-29; moderate = 30-38; severe = 39-63) university students aged from 18-22 to evaluate the severity of depression. The BDI–II was administered to a sample of 145 Egyptian college students (44 female, 101 male) and a sample of 36 psychiatric patients (18 females, 18 males). The measure demonstrated high internal reliability, construct and factorial

validity in Egyptian society. Therefore, the BDI –II can be used in Arab countries especially in Egypt, Whether as a research tool or as a clinical instrument (Ghareeb, 2000).

The questionnaire in its final version consisted of items covering the following sections: (1) Sociodemographic data, (2) commitment to follow precautionary measures, and (3) the BDI-II items. In section 3, The instructions indicated to students that they should take their time and read each item carefully and then pick out the one statement in each group that best describes the way he/she has been feeling during the past two weeks, including today.

The items of the adhering to the precautionary measures scale were translated into Arabic (see Appendix). The translated items were revised by 3 English language experts at the department of English language and literature (DELL) to ensure the correctness of translation. We used the content validity to correct possible defects or to foresee any inconsistent and/or inappropriate item(s), the items were evaluated by 5 academic staff in psychology department, 3 academic staff in the faculty of pharmacy who were familiar with the precaution practices of COVID-19. The evaluation task instructed experts to fill out the questionnaire and report any feedback using a 4-point Likert scale ranging from 1 (the lowest) to 4 (the highest). The content validity ratio (CVR) proposed by Lawshe (1979), and the content validity index (CVI) were used to evaluate the proportional level of agreement among experts using the following two equation:

CVI = Number of experts giving a rating of 3 or 4/ Total number of experts

CVR = [n-(N/2)]/(N/2); where n is the number of experts giving a rating of 3 or 4; and N is the total number of experts. The results indicated that CVI was ranged between [87.5% - 100%] and CVR was ranged between [0.75 - 1.00]. In the current study, CVI > 0.8 and CVR > 0.45 were acceptable (Torabizadeh et al., 2016).

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The reliability of the scale was assessed using a pilot test with 88 student participants, aged 18-22 years. Scale reliability, using internal consistency, was tested using a Cronbach's Alpha (□). The reliability of the scale was confirmed with Cronbach's □□= 0.86 which represented adequate reliability (Nunnally & Nunnaly, 1978).

2.2 Statistical Analysis

The complete sample characteristics were examined using means, standard deviation, percentages. We used the *t*-test and one-way ANOVA to examine the group differences between the sociodemographic groups. The Pearson correlation was calculated, and a regression analysis was conducted between the variables of precautionary measures and depression. SPSS Statistics 23.0 (IBM SPSS Statistics) was used. The *p*-values below 0.05 were statistically significant.

3. Results

3.1. Sociodemographic Characteristics

A total of 417 participants completed the survey. Most respondents were female (72.4%, *n* = 302) and their age (between 18 and 19 years) was under 20 years (67.9%, *n* = 238). Participants were mostly non-medical students (72.9%, *n* = 304) where the demographic profile is as follows: Faculty of Arts and Humanities: 27.6% (*n* = 115); Faculty of Business Administration, Economics, and Political Science (BEAPS): 31.4% (*n* = 131), Faculty of Engineering: 13.9% (*n* = 58), Faculty of Dentistry: 14.9% (*n* = 62), and Faculty of Pharmacy 12.3% (*n* = 51). About half were belonged to families with 5 members and more (51.5%, *n* = 215), where (42.4%, *n* = 177) belonged to families with 4 members, and only (6.0%, *n* = 25) belonged to families with 3 members.

3.2 Sociodemographic Groups and Precautionary Practices

Most of participants always washing hands with soap and water (73.4%), avoiding sharing of utensils (71.6%), and avoided leaving their homes (82.7%) as shown in Table 1. Participants committed

to covering their mouth when coughing and sneezing most of the time (68.4%). About half of participants (55.6%) adhered occasionally to wash their hands immediately after coughing, rubbing nose, or sneezing. Regarding wearing masks, only (38.6%) of participants always adhered to wearing masks regardless of the presence or absence of symptoms. Regarding the anxious about COVID-19, (33.4%) of the participants felt that the COVID-19 has caused too much unnecessary anxiety

Table 1. Percentage of respondents (n = 417) adhering to different precautionary practices. Response alternatives: 1 = *never*; 2 = *occasionally*; 3 = *sometimes*; 4 = *most of the time*; 5 = *always*.

Precautionary Practices	**Response %**				
	1	**2**	**3**	**4**	**5**
1- Covering mouth when coughing and sneezing	7.4	11.2	4.5	**68.4**	8.5
2- Avoiding sharing of utensils	14.6	2.5	3.8	7.5	**71.6**
3- Washing hands with soap and water	6.5	3.3	5.6	11.2	**73.4**
4- Washing hands immediately after coughing, rubbing nose, or sneezing	14.8	24.6	**55.6**	3.0	2.0
5- Wearing mask regardless of the presence or absence of symptoms	10.3	18.4	16.9	15.8	**38.6**
6- I feel anxious about the spread of COVID-19	7.7	13.2	**33.4**	25.6	20.1
7- Hours stayed at home	**<9 h**	**10-19 h**	**>19 h**		
	3.0	14.3	**82.7**		

(ISSN : 2536 - 9555)

A significant difference (*t*-test, $p < 0.05$) in the scores of males ($M = 17.4$, $SD = 4.1$) and females ($M = 23.2$, $SD = 3.8$) was found (see Table 2). The students who belonged to the medical sector faculties (Dentistry and Pharmacy) showed more commitment to the precaution practices than students who belonged to non-medical sector faculties (Arts and Humanities, BEAPS, and Engineering), $F(4, 412) = 199.1$, $p = 0.0$. Tukey Honesty Significant Difference (HSD) procedure indicated a significant difference ($p = 0.0$) between the faculty of dentistry ($M = 21.5$) and all non-medical faculties (Arts and Humanities ($M = 14.3$), BEAPS ($M = 15.1$), and Engineering ($M = 14.2$). Similarly, a significant difference ($p = 0.0$) between the faculty of pharmacy ($M = 21.8$) and all non-medical faculties. All other combinations of faculties indicated no significant difference in adhering to the precaution practices.

The age and the family members had no effect, as no significant difference among the participants' age groups as well as family members groups was found.

Table 2. Participants ($n = 417$) adherent (mean, SD) to the precautionary practices in different sociodemographic groups and the *p* value.

Variable	Group	N	Mean	SD	*p* Value
Gender	Male	115	23.2	3.8	0.01
	Female	302	17.4	4.1	
Age	18-19	283	21.2	4.2	0.14
	20-21	110	20.9	3.8	
	>=22	24	20.3	3.4	
Faculty	Arts and Humanities	115	14.3	2.3	0.00
	BEAPS	131	15.1	2.5	

	Engineering	58	14.2	2.3	
	Dentistry	62	21.5	1.9	
	Pharmacy	51	21.8	1.6	
Family members	3	25	20.8	2.9	0.61
	4	177	21.1	3.1	
	>=5	215	20.3	3.4	

3.3 Sociodemographic Groups and Depression

The results obtained from BDI-II scores indicated that there was a significant difference between female participants and male participants $t(415) = 14.2$, $p = 0.00$, with those females having higher scores ($M = 20.2$, $SD = 1.3$) than those males ($M = 18.3$, $SD = 1.5$) (see Table 3). The BDI-II score was not significantly affected by the age, $F(2, 415) = 0.8$, $p = 0.45$. The students' field of study had no significant effect, $F(4, 412) = 1.3$, $p = 0.28$. Families with three members were significantly more depressed ($M = 19.4$, $SD = 1.5$) than families with four members ($M = 18.1$, $SD = 1.4$) as well as more depressed than families with five members or more ($M = 17.6$, $SD = 1.1$), $F(2, 414) = 26.4$, $p = 0.00$.

Table 3. The BDI-II score (Mean, SD) for depression in different sociographic groups and the *p* value indicating the significant effect of the group.

Variable	Group	N	Mean	SD	*p* Value
Gender	Male	115	18.3	1.5	0.00
	Female	302	20.2	1.3	
Age	18-19	283	19.0	2.1	0.45
	20-21	110	19.2	1.6	

(ISSN : 2536 - 9555)

	>=22	24	18.8	2.3	
Faculty	Arts and Humanities	115	20.3	2.4	0.28
	BEAPS	131	20.2	1.6	
	Engineering	58	20.1	2.2	
	Dentistry	62	19.6	1.8	
	Pharmacy	51	20.4	1.7	
Family members	3	25	19.4	1.5	0.00
	4	177	18.1	1.4	
	>=5	215	17.6	1.1	

3.4 The Relation between the Precautionary Practices and Depression

BDI-II score correlated directly with anxiety item (r = 0.314) and the next with wearing a mask (r = 0.312) (see Table 4). The total scores of precautionary measures taken by the participants positively correlated with BDI-II score (r = 0.276).

Table 4. Pearson correlation coefficient (r) between the precautionary practices and the DBI-II score

Precautionary Practices	**Pearson Correlation Coefficient (r)**
1- Covering mouth when coughing and sneezing	0.006
2- Avoiding sharing of utensils	0.041
3- Washing hands with soap and water	0.013
4- Washing hands immediately after coughing, rubbing nose, or sneezing	0.008

5- Wearing mask regardless of the presence or absence of symptoms	0.312
6- I feel anxious about the spread of COVID-19	0.314
Total scores for precautionary practices	0.276

A significant regression equation was found $F(1, 415) = 31.1$, $p = 0.00$, between total precautionary practices and BDI-II score with R^2 of 0.07 (see Table 5). The regression line equation is BDI-II score = 0.14 X total precautionary score + 15.5 indicating that the participants' BDI-II score increased 0.14 for each increase in precautionary practices and it explained only 7% of depression variation score of university students.

Table. 5 Regression analysis between the total scores of precautionary practices and BDI-II score

	Sum of Squares	**DF**	**Mean Square**	**F**	***p***	**R^2**
Regression	450.8	1	450.8	31.4	0.00	0.07
Residual	5952.3	415	14.3			
	Unstandardized Coefficients	**Standardized Coefficients**		**T**		***p***
	B	**SE**	**Beta**			
Constant	15.5	0.523		29.6		0.00
Precaution Practices	0.142	0.025	0.265	5.6		0.00

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4. Discussion

The level of adhering to the precaution practices among university students was moderate. This result was expected as youth are less to adhere to the precaution practices or any giving preventive measures against diseases. These results aligned with the results reported by Saeed, et al., 2022 who conducted their research on Egyptian university students. They found that most of the university students were not knowledgeable about each item of protective measures against COVID-19. It is worth mentioning that there is no consensus on the level of commitment to the precaution practices among youths in different cultures. Karijo, et al., 2021 contradicted with the current results as they found the youths in Kenya were more committed to the prevention practices. Our different results might be interpreted in the context Egyptian culture as the Egyptian public awareness towards the negative effects of COVID-19's infection is still in its initial phase. The current results showed that females were more committed to the precaution practices more than males. These results agreed with the study conducted in Saudi Arabia (Sonbol et al., 2021). The current results might be explained in the light of the previous studies that showed significant differences between males and females in anxiety, stress, and adaptability during the COVID-19 outbreak. These studies showed that females are less adapted to unstable situations caused by COVID-19, more anxious, and more stressed compared to males. Hence, they might be more adherent to the prevention practices (Hou, et al., 2020). Most of participants in this study were adhered to wash their hands with soap and water, followed by avoiding sharing their utensils, and covering their mouth when coughing and sneezing. And so, only less than half of participants reported that they adhere to wear masks regardless of the presence or absence of symptoms these results are aligned with the ones reported by Sonbol et al., 2021 in Saudi Arabia and Karijo, et al., 2021 in Kenya. The reason of not making "wearing masks" took the priority in preventive practices may associated with stigmatization. This has been studied previously, as different studies suggested that wearing mask could elevate stigma for

populations especially in case of infectious diseases (Burns, et a., 2020).

Concerning the current results that indicated significant differences between students of different field of study in committing with precaution, our study showed that students of medical related faculties (i.e., Pharmacy and Dentistry) were more committed with the precaution practices more than students of non-medical faculties (i.e., Arts and Humanities, BEAPS, and Engineering). This result was in line with the findings of the cross-sectional study conducted by Hasan et al., (2021) in the United Arab Emirates. They found that that the non-medical related students were less knowledgeable about the precaution practices compared with medical related students. Also, our findings are aligned with results reported by Hussein et al., 2021 who conducted their research in Egypt. They reported that the medical students were more knowledgeable and more committed with the precaution practices.

The results of this study indicated that females obtained higher BDI-II scores more than males. The results are consistent with results reported in Hou, et al., 2020, as they found that females were experiencing more stress and anxiety symptoms, while males showed better resilience to stress during the period of outbreak in China. According to the reported publish by the World Health Organization WHO, women are susceptible to common mental disorders such as depression and anxiety (see WHO, 2021). In current study, university students of large families (i.e., greater than 3 members) obtained lower BDI-II scores measuring depression. These results were supported by studies focused on the correlation between household members with scores on mental health. Studies showed that the large number of families considering being a factor for protection against depression (Grinde & Tambs, 2016).

The regression analysis of our data indicated that the participants' BDI-II score was increased by 0.14 units with each

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increase in the precautionary measures and they explained only 7% of the variation in BDI-II score. Thus, it seems that the depression is relatively high in students of small families less then 3 members and females. All these groups obtained a score higher than their correspondent student groups. This interpretation must be taken carefully because the explanatory power of the regression analysis was relatively low, and the precautionary measures explained only 7% of the variation in DBI-II score as just mentioned before. In addition, the depression is a mood disorder which could be caused by several factors that might impacts negatively on the individual's behavior.

The limitations of our research design may affect the reliability of our results. First, we need to evaluate the depression state of university students before and after the lockdown. Therefore, the current results must be interpreted with caution in the light of our sample characteristics and the time of conduction. Moreover, the sociodemographic profile of our sample did not follow the actual profile of university students such as more different faculties, students in public sector universities, and post-graduate students. Finally, our study is cross-sectional design which does not allow us to make generalization.

5. Conclusions:

In the current study, we found a positive relationship between adhering to the precaution practices and the depression state assessed by BDI-II. In addition, we found that females are more vulnerable than males in depression as well as students with less family members. It is recommended for government and health institutions as well as the mental health units in university to provide mental health supports and services for university student to reduce the negative effects of pandemic diseases if they occurred in the future. Furthermore, we recommend establishing and activate mental health units in the universities to provide online support services for students to reduce the risk of depression. The findings of our study can be used to plan psychological interventions to improve mental health and adaptability during the

COVID-19 pandemic and to elevate the level the precaution practices awareness in the university community.

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Appendix

The Arabic version of the precaution's practices scale					
الفقرة	ابداً	من حين لأخر	أحياناً	معظم الوقت	دائماً
١. تغطية الفم عند السعال (الكحة) والعطس.					
٢. تجنب مشاركة أدواتي الشخصية.					
٣. غسيل اليدين بالماء والصابون.					
٤. غسيل اليدين مباشرة بعد السعال (الكحة)، ملامسة الانف، العطس.					
٥. ارتداء ماسك الوجه بغض النظر عن وجود أعراض أم لا.					
٦. أشعر بالقلق بشأن انتشار جائحة كورونا.					
٧. عدد الساعات التي أقضيها بالمنزل.					
- أقل من ٩ ساعات					
- من ١٠ إلى ١٩ ساعة					
- أكثر من ١٩ ساعة					