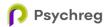# Big five factors of personality in predicting the psychological symptoms as a response to the first wave of the COVID-19 pandemic

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The present study examined the relationship between big five factors of personality and some psychological symptoms (PS) and demographic variables, and how these variables contribute on PS variance as response to the first wave of the COVID-19 pandemic. Symptom Checklist 40 (SCL-40) and The Arabic Big Five Personality Inventory were responded online by 530 participants, 375 females and 155 males, 454 Egyptians, and 69 are of other Arab nationalities. Results indicated that Neuroticism correlated positively with all PS, Extraversion and consciousness correlated negatively with all PS, Agreeableness correlated positively only with psychosomatic disorders and openness correlated negatively with obsessive- compulsive disorders and paranoia. After quarantine, the time an individual spent on the Internet and the PS correlated positively with anxiety, psychotic, hostility, depression, and phobia. Females had higher mean scores than males on all PS indexes except paranoia, and Egyptian had higher mean scores than the other Arabic cultures on anxiety, hostility, depression, and severity index. There were significant differences between the educational levels` groups in all PS indexes except psychosomatic disorders. Finally, big five factors of personality factors had contribution in predicting PS indexes and the time an individual spent on the internet was the only demographic variable that predicted some PS indexes. The results were discussed in the light of literatures.

Keywords: **anxiety;** COVID-19; personality; psychological symptoms; psychosomatic disorders

The new decade brought with it the pandemic of the age which scientists identified it a novel coronavirus (COVID-19), which associated with an outbreak of pneumonia. Its profound effect on all aspects of society, including mental health and physical health, COVID-19 reminds us of the 2003 SARS outbreak (Sood, 2020). The number of cases and the number of deaths for COVID-19 is increasing very rapidly, resulting in catastrophe for humans to the point that the World Health Organization (WHO, 2020) issued a statement that the COVID-2019 outbreak a 'public health emergency of international concern.' In less than two months, over 200 papers have been published on COVID-19 in fields of virology, epidemiology, aetiology, diagnosis, and treatment since the first report on 07 January 2020. Countries are beginning to take the necessary health precautions to cope with the virus (Garfin et al. 2020). This is due to coronavirus disease 2019 (COVID-19) pandemic is having a profound effect on all aspects of society, including mental health and physical health (Holmes et al. 2020). Also, there is a general agreement in all the relevant literature that health care professionals are at an increased risk of high levels of stress, anxiety, depression, burnout, addiction, and post-traumatic stress disorder, which could have long-term psychological implications (El-Hage et al., 2020). Since COVID-19 virus emergence in December 2019 (First wave), which has spread to every continent on earth. Countries are racing to slow down the spread of the disease. The pandemic ongoing and global efforts are marathoning to comprehend the virus biology, epidemiology, natural history and eventually applying the sound control measures promptly. Also, understanding effects it on social and psychological lives.

Lack of an endpoint of the COVID-19 pandemic led to distress uncertainty and unpredictability because treatment is still not in sight, have led to the emergence of mental health issues, such as panic, anxiety, and depression (Tsamakis, 2020, as cited Tsamakis, et al 2021). Moreover, repeated media images of severely ill people, dead bodies, and coffins, and knowledge that people may not be able to say goodbye to their dying loved ones have magnified social distress. Also, the unfamiliarity with strict quarantine measures that infringe on personal freedoms combined with the widening economic crisis and unemployment mainly affecting those with informal, daily wage jobs, which include a substantial proportion of the workforce in lower-income countries (such as Egypt), have resulted in various deleterious ways of coping with daily stressors, such as online gaming and gambling, and rise in rates of domestic violence and sexual abuse (Tsamakis, et al 2021).

In Egypt, the first confirmed of COVID-19 case on the 14th of February 2020 (first wave), and then increased rapidly, like all countries in the world. Egypt and South Africa (within the African countries; 46 out of 47 WHO member states from the 56 African countries) to the number of injuries and deaths from the COVID-19 epidemic reported till the 11th of June 2020. In the second wave of COVID-19, a stronger outbreak of the pandemic hit Egypt at the beginning of 11th November 2020. This is for cause many reasons are the rapid lifting of the lockdown, also the irresponsible ease of the restrictions on the part of the individual, his relaxing behaviour and negligence in taking the necessary precautions; thinking that the severity of the disease is over (Deif & El-Naggar, 2021). Galal (2021) published Coronavirus (COVID-19) cases in Egypt from February 2020 to June 2021. He reported that as of June 20, 2021, 532 new cases of coronavirus were registered in Egypt, leading the cumulative number of COVID-19 infections in the country to reach its highest at 277,288 cases. As of the same date, there were 15,859 deaths and 205,613 recoveries recorded in Egypt. On June 19, 2020, the highest daily increase in cases was recorded at 1,774. From 3 January 2020 to June 2021, there have been 277,797 confirmed cases of COVID-19 with 15,898 deaths, reported to WHO. As of 20 June 2021, a total of 4,010,467 vaccine doses have been administered (WHO, 2021). The third wave of COVID-19 begun April 2021. On 02 June 2021, an official at the scientific committee combating the pandemic said that Egypt is past the peak of the third wave, which had forced the country to ban. In May 2021, Head of Genome Research Unit at Children Cancer Hospital pointed out that the viruses of the first and second waves were of European origin. He added that until present Egypt is clear of the Indian, South African, Brazilian, and British variations.

Using different mathematical regression models as a prediction tool to model both pervious and next upcoming Coronavirus waves, Ahmed et al. (2021) study results reached that Egypt and Saudi Arabia will only exposed to a second wave until 04 October 2021.

The impact of COVID-19 has been devastating all around the world, particularly for the poorest families in low- and middle-income countries. The increasing talk about Coronavirus developments in the media is increasing physical and mental health implications. This is what Garfin, Thompson, and Holman, 2018 (Garfinet al. 2020) study showed, that threatened events are usually followed by negative physical and mental health outcomes. It also leads to an increase in help-seeking behaviour that may be inappropriate in response to the actual threat, such as an increase in the behaviour of buying panic for consumer items, and this is what happened in all countries of the world in the crisis of the Coronavirus as a threatening event. The studies showed that heightened media exposure to popular health crisis such as Ebola-related stories, in 2014 (also, COVID-2019 at this time) was associated with increased distress, worry, and impaired functioning. In the early phase of the SARS in 2003 and H7N9 in 2013 outbreak (COVID-19 is developing

from it), the studies reported a range of psychiatric morbidities including persistent depression, anxiety, panic attacks, psychomotor excitement, psychotic symptoms, delirium, and even suicide were reported (Black Dog Institute, 2020; Lee, et al., 2007; Qiu, et al, 2018; Sood, 2020; Yi et al., 2020). Thus, mental health care should be provided to COVID-19 patients, suspected individuals, and people in contact with them as well as the public who are in need supporting (Black Dog Institute, 2020; Sood, 2020; Yi, et al, 2020). Especially whose have experiences quarantine, which due to negative psychological impacts, including depression, post-traumatic stress symptoms, confusion, anger, boredom, loneliness, and stigma feelings. Also, those front-line health care workers experience higher anxiety than the general community about contracting viruses during pandemics (e.g., COVID-19) (Black Dog Institute, 2020). Vahratian et al (2021) reported that the percentage of adults with recent symptoms of an anxiety or a depressive disorder increased from 36.4% to 41.5%, and the percentage of those reporting an unmet mental health care need increased from 9.2% to 11.7% in the US, during August 2020–February 2021 (second waves). This increasing was largest among adults aged 18–29 years and those with less than a high school education.

Anglim and Horwood (2021) study assessed the effect of the COVID-19 pandemic on subjective well-being (SWB) and psychological well-being (PWB) and whether the pandemic moderated the effect of personality on well-being. Using a sample of young adults in Melbourne, Australia (n = 1132; 13 July to 11 August 2020) during a second wave of viral transmission and lockdown, and an identically recruited pre-Covid sample (n = 547). Well-being was lower in the Covid sample and differences were largest for positive affect (d = –0.48) and negative affect (d = 0.70). While the effect of personality on well-being was relatively robust, the effect of personality on well-being was slightly reduced and the effect of extraversion on positive affect was particularly attenuated during the pandemic.

Psychic symptoms may be returned partially to ambiguous information of the disease, and lockdowns and quarantines (Sood, 2020); the ambiguity can lead to heightened appraisals of threat. This occurred in the H1N1 crisis when the uncertainty increased, the inability to control anxiety feelings increased. When this ambiguity is related with an invisible threat, such as a virus (e.g., Covid-2019), public fears may ascend, fire rumours, excite stress responses. It becomes a vicious circle between compressing negative feelings and misinformation (Garfin et al., 2020).

Using 1,160 respondents of the public of Saudi Arabia in time the early stage of the COVID-19 outbreak. Findings from the study of Alkhamees et al. (2020) showed that nearly one-fourth of the sampled general population experienced moderate to severe psychological impact in depressive, anxiety, and stress symptoms. These results were asserted by Parlapani, et al (2020) Using 3,029 adult Greek.

In the study of Bani-Mustafa and Al-Mazari (2020), 355 adults completed an online survey to evaluate the physiological and psychological symptoms during the COVID-19 pandemic between the 20th and 30th of March 2020 in Irbid governorate, Jordan. The findings explain that the overall physiological factor is significantly and positively correlated with all psychological factors (emotional, behavioural, cognitive, and belief). The highest correlation was with the emotional factor (r = 0.68; p <0.001) and the least correlated was with the cognitive factor (r = 0.39). Those findings interpret that assessment, prevention, and treatment efforts of psychopathology including screening for mental health and psychological problems should focus on those groups with more emotional reactions and provide them with exceptional support to avoid acquiring further adverse physiological risks.

The exposure to the pandemic is one of the severe stressors that people are exposed to. So, the coronavirus, which is exposed to people all over the world, is one of the most severe current stressors. Several personality traits have been linked to the endurance of experience negative emotions in response to stressors. Theoretically, people who have high scores on one or more scales that measuring personality traits, versus to people with low scores, are usually to suffer distress responses to a wide range of threatening events, including influenza pandemic threat (or coronavirus). For example, Lu et al. 2006 showed that the person who have high score on neuroticism predicts the level of distress experienced by who were responsible for caring for patients with suspected SARS. Also, Smith et al (2009) found that neuroticism predicted the level of distress in response to the threat of Avian flu infection in university students, (Taylor, 2019).

Kilgo et al. (2018) reported that pandemics are associated with all kinds of uncertainties, such as getting infected, the seriousness of infection, whether the people around you are infected, whether objects or surfaces are infected, the optimal type of treatment or protective measures, and whether a pandemic is truly over. Because the pandemics come in waves, so the end of a wave of infection does not necessarily signal the end of the pandemic. There could be another wave more serious than the one before. Unfortunately, the news media can fuel uncertainties with contrast articles and talk show programs about what 'might' happen during an outbreak of infectious disease. This confirmed by Taha et al. (2014) reported during the Swine flu

pandemic 2009, people with a high degree of uncertainty, compared to people with lower levels, were most likely to become anxious about contracting the virus.

Jeronimus (2020) indicated that the firstly negative affect of societal response to COVID-19 infections was fear. The people confronted the disaster with a loss of power and control which makes people angry and frustrated. And there are frequency and intensity of unpleasant emotions including fear, anxiety, stress, tension, hysteria, sadness, agitation, anger, frustration, and annoyance. In contrast, some positive affect such as feeling cheerful and happy decreased in their prevalence and intensity. Qiuet al. (2020) emphasised increased anxiety, phobias, obsessive-compulsive disorder, physical complaints, and frustration in the spring of 2020. He justified by the hyperawareness of pollution (p.19). Recent meta-analytic data exhibited that mental health problems are common in different populations, which were with following percentages: 31.4, 31.9, 41.1 and 37.9% for depression, anxiety, distress, and insomnia, respectively. In regards patients with non-infectious chronic disease (such as cancer or diabetes) had the highest prevalence of depression, and high rates of anxiety and distress. In addition, people who were quarantined, patients suspected of COVID-19 infection, and physicians and nurses had high prevalence of depression, anxiety, distress, and insomnia (Wu et al, 2020, as cited Tsamakis, et al 2021).

A total of 1,933 Spanish people who participated in Ozamiz-Etxebarriaet al. (2020) study. The results reveal that more than a quarter of the participants have reported symptoms of depression (27.5%), anxiety (26.9%) and stress (26.5%) and as the time spent in lockdown has progressed, psychological symptoms have risen. In relation to gender, data indicate that men have higher levels of depression than women, and similar levels of anxiety and stress. Greater symptomatology has also been found among the younger population and in people with chronic diseases.

Using 6,700 Italian individuals which representative of the Italian population, Delmastro and Zamariola (2020) study revealed higher scores of depressive symptoms in females, younger adults, people reporting professional uncertainty and lower socioeconomic status. A positive correlation was also found for individuals living alone, those who could not leave home for going to work, and people with a case of COVID-19 in the family.

Al Dhaheri et al. (2021) study purposed to assess the effect of the COVID-19 pandemic on mental health and quality of life among the general population in the Middle East and North Africa (MENA) region. A total of 6142 adults from 18 countries (Algeria, Bahrain, Egypt, Iraq, Jordan, Kuwait, Lebanon, Libya, Morocco, Oman, Palestine, Qatar, Republic of Yemen, Saudi Arabia, Sudan, Syria, Tunisia, and United Arab Emirates) completed an online questionnaire between May and June 2020 (the end of first wave). The results showed that 30.9% reporting severe psychological impact. Most participants (45%–62%) felt horrified, apprehensive, or helpless due to COVID-19. Furthermore, over 40% reported increased stress from work and financial matters. Higher Impact events scale scores (IES-R) were found among females, participants aged 26–35 years, those with lower educational level, and participants residing in the North Africa region ($p < 0.005$). About 42% reported receiving increased support from family members, 40.5% were paying more attention to their mental health, and over 40% reported spending more time resting since the pandemic started.

Taylor (2019) mentioned a many of studies that indicate many people, although the prevalence of epidemic, have an unrealistic optimism. This is the strong believe that positive events are more likely to happen to themselves than to others, and that negative events are more likely to happen to other people than themselves. This may explain some people's behaviours whose does not follow the precautions and rules health for dealing with the coronavirus epidemic; unfortunately, they are more likely to spread the infection. In contrast, the people whose have more bodily vigilance, elevated anxiety sensitivity is related to a range of different disorders, particularly, panic disorder and other anxiety disorders, and is correlated with fear or anxiety about becoming infected during epidemic (Taylor, 2019). This may explain some people's behaviours whose does follow strictly the precautions and rules health for dealing with the coronavirus epidemic.

During an epidemic, people who have high scores on anxiety and the overestimation of threat (neuroticism) are likely to become highly worried and anxious because their estimates of being harmed tend to be inflated compared to the estimates of people scoring lower on these traits. Also, the high degree of intolerance of uncertainty (sub-trait of anxiety) is associated with a range of disorders, including mood and anxiety disorders, obsessive compulsive disorder, health anxiety and other clinical conditions. The intolerance of uncertainty is likely to be a particularly important contributor to pandemic-related anxiety and distress (Taylor, 2019, p. 42). These symptoms were reported by Li et al. (2020) for confirmed or suspected cases of COVID-19. Also, these researchers reported that limited knowledge of the COVID-19 and a lot of news may lead to anxiety and fear in the public. Also, may public at large experience boredom, disappointment, and irritability under the isolation measures. Tain et al. (2020) investigated the psychological symptoms (using SCL-90) of ordinary Chinese citizens during the Level I Emergency Response throughout China, during

COVID-19 spreading (from 31st January to 2nd February 2020). They found that COVID-19 has a significant adverse socio-psychological influence. The results showed more than 70% of Chinese have moderate and higher level of obsessive compulsion, interpersonal sensitivity, phobic anxiety, and psychoticism. There were no significant differences between males and females. Those over 50 years old and those had an undergraduate education and below had more symptoms.

Taylor (2019) has presented a set of studies demonstrating personality traits associated with psychological responses to future epidemics. For examples, harm avoidance and anxiety traits (facets under neuroticism) are both related to anxiety disorders, mood disorders, obsessive compulsive disorder, somatoform disorders, and with health anxiety. Also, anxiety as a trait predicted the level of SARS-related anxiety during the SARS outbreak (p. 41). Studies have shown that the overestimation of threat (as one character of anxiety trait) is related to a range of disorders, particularly anxiety and obsessive-compulsive disorders, and the overestimation of threat predicts anxiety in response to outbreaks of SARS, Swine flu, Avian flu, and Ebola virus disease (p. 41).

Jeronimus (2020) indicated that personality effects on affective responses to COVID-19 are the increase in negative affect was probably stronger in people characterised by High neuroticism and low consciousness, and the drop in positive affect was probably stronger in people with high extraversion and weaker in neuroticism and consciousness (p. 19).

Carvalho et al. (2020) investigated to what extent two personality traits, extroversion and conscientiousness (from the Big Five Inventory 2 Short, BFI-2-S), are associated with two containment measures (social distancing and hand washing). The sample ($n = 715$ Brazilian adults aged 18–78 years) answered factors the Dimensional Clinical Personality Inventory 2 (IDCP-2). The findings indicate the importance of extroversion and conscientiousness traits as relevant to people's engagement with the measures recommended for COVID-19 containment.

Through what has been mentioned above, it is noted the importance of personality examination as a determinant of psychological disorders associated with the spread of the epidemic (e.g., COVID-19). Most adult personality differences can be summarized in terms five broad factors (the Big Five Factor Model): Neuroticism (N), Extraversion (E), Conscientiousness (C), Agreeableness (A), and Openness to new experiences (O).

Because the big five factors of personality model is the most common in the research field now, it will be focused on in this research, in addition that worker team of the third section of the Diagnostic and Statistical Manual of Mental Disorders, fifth edition (DSM-5; American Psychiatric Association, 2013) has developed The Personality Inventory for DSM-5 (PID-5; (PID-5) that including five factors corresponds to the big five factors of personality model . This confirms that the personality has a role in shaping psychological disorders. Below are the details of the PID-5 and the Five Factors Model (FFM; Stover et al. 2019).

Section III in DSM-5 (APA, 2013, as cited in Stoveret al., 2019) explained the five dimensions of personality deviations (PID-5) which as big five factors of personality (FFM) as the following: 1) Negative Affectivity (vs. Emotional Stability); The experiences with negative emotions which frequented and intensive (e.g., anxiety, depression, guilt/ shame, worry, anger as a lower order of facets) and their behavioural (e.g., self-harm) and interpersonal (e.g., dependency) aspects. 2) Detachment (vs. Extraversion): The individual is avoidant of socio-emotional experiences, and withdrawal from interpersonal interactions (starting from, daily interactions to close friendships to intimate relationships). He is characterized restricting affective experience and expression, particularly limited hedonic capacity. 3) Antagonism (vs. Agreeableness): It is concerned with the behaviours that put the individual at dispute with other people, including an extreme sense of self-importance and an associated expectation of special dealings, as well as a solid antipathy toward others. Also, including both an unawareness of needs and feelings for others and willingness to use others in the benefit of self-growing. 4) Disinhibition (vs. Conscientiousness): It is concerned with orientation toward rapid satisfaction which lead to impulsive behaviour paid by current thoughts, feelings, and external stimuli, without concerning for past learning or sight of future consequences. 5) Psychoticism (vs. Lucidity/ Openness): The individual shows a wide range of culturally inconsistence odd, eccentric, or unusual behaviours and cognitions, including both process (e.g., perception, dissociation) and content (e.g., beliefs).

DSM-5 working group relied on the hypothesis which the continuity between the normal dimensions of personality (e.g., The FFM) and the abnormal dimensions of personality represented by the PID-5, a number of studies were conducted to investigate the relationships between the PID-5 dimensions and big five factors of personality by a number of lists that measure them (e.g. NEO PI-R). Stover et al (2019) reviewed a set of studies, most studies results were similar: There is a positive relationship between Negative Affectivity and Neuroticism was whereas pairs such as Detachment and Extraversion, Antagonism and Agreeableness,

Disinhibition and Consciousness obtained negative relationships. Psychoticism and Openness, on the other hand, exhibited nil indices, and the results of their study asserted these findings also.

By using exploratory factor analysis for PID-5's 25 facets and the FFM 's five factors with each other. De Fruyt et al. (2013) found a good fit for a five-factor structure model. The abnormal facets have grouped with its corresponding factors of normal personality. For example, Neuroticism loaded positively with Negative Affectivity facets, whereas negative loadings were obtained for pairs such as Extraversion and Detachment, Agreeableness and Antagonism, Consciousness and Disinhibition. The openness loaded on the one hand, with a positive with the Psychoticism facets – Unusual Beliefs and Experiences, Perceptual Dysregulation, Eccentricity – and other hand with Perseveration. Using Item Response Theory, Suzukiet al. (2015) reached similar conclusions. But the results of study by Thomas et al., 2013 (as cited in Stover et al., 2019) asserted only three factors. The results of Gore (2013) study provided support for the hypothesis that all five domains of the DSM-5-dimensional trait model are maladaptive variants of big five factors of personality structure (FFM), including the domain of psychoticism. Stover. et al., (2019) asserted only the first four dimensions by exploratory factor analysis.

Although the Stover et al. (2019) study used Symptom Check List 90-R (SCL-90) with another World Health Organization Disability Assessment Schedule 2.0 (WHODAS 2.0) to classify the community sample used as the High-Adaptation/Low-Symptomatology group and the Low-Adaptation/High-Symptomatology group, with the aim of examining the PID-5 ability to distinguish between these two groups. The general results of the study which confirmed this distinguish and confirmed the relationships between big five factors of personality. These findings implicitly confirm the relationship between big five factors of personality and the symptoms of SCL-90.

There are many studies that have attempted to examine correlation coefficients between the big five factors of personality (using vary scales) and pathological symptoms through different forms of Symptom Check List (SCL), using clinical samples. Roma et al. (2019) studied psychopathological symptoms, personality traits and predictive variables associated with problematic internet use (PIU). This study conducted on total 343 Italian university students administrating Pathological Internet Use Scale, Big Five Questionnaire (BFQ, energy friendliness, conscientiousness, emotional stability, and openness), and SCL- 90 R. The results concluded that PIU individuals have higher psychopathology then non pathological internet users. Among the other characteristics, depression, anxiety, and sensitivity are preeminent in PIU subjects. The personality of PIU is constituted of low: energy, friendliness, and emotional stability. The last two are significant predictors of PIU.

The Big Five Personality Traits, the emotion regulation questionnaire (ERQ), and Prodromal Questionnaire for measuring psychotic experience were administrated on 3147 Chinese university by Shi et al. (2018). They found that Neuroticism significantly positively correlated with psychotic experiences, while Extraversion, Openness, Agreeableness, and Conscientiousness were found significantly negatively correlated with it. Both the suppression and reappraisal strategies mediated the relationship between personality traits and psychotic experiences.

Habibi et al. (2013) investigated a sample (100 Iranian) of people with addiction, in relation to SCL-90 and NEO-FFI. Finding revealed a correlation between personality factors and mental health indicators as following: neuroticism factors high correlated with physical complaints, obsessive-compulsive, interpersonal sensitivity, depression, anxiety, aggression, phobia, Paranoia and psychosis. Extraversion factor have negatively correlated with obsessive-compulsive, interpersonal sensitivity, depression, phobia, and psychosis. Openness to experience factor was negatively correlated with Obsession, interpersonal sensitivity, paranoid ideation, and psychosis. Agreeableness factor was negatively correlated with aggression, phobia and conscientiousness negatively correlated with physical complaints, interpersonal sensitivity, Depression, anxiety, aggression, phobia, paranoid ideation and positive correlated with psychosis.

Hengartner et al. (2016) used SCL-27 and The Big Five Inventory short form (BFI-S) in their study. They found that high neuroticism and low conscientiousness, related significantly to low social support, health-impairing behaviours such as cannabis use, and psychopathology, including negative affect and various mental disorders. And the personality factors predicted psychopathological distress over a 6-month observation period. Grevenstein and Bluemke (2015) found negative relationships between mental health (as measured by SCL-9K) and extraversion, conscientiousness, and agreeableness, and positively relationship with neuroticism (as measured by BFI-25).

Hubicka et al. (2010) intended to investigate the personality traits as assessed by The NEO personality inventory (NEO-PI-R) and aspects of mental health as assessed by the symptom checklist (SCL-90) on severity drivers under influence (DUI) offenders in a Sweden as compared to the general population. It was found that the openness to experience and conscientiousness scales of NEO-PI-R differentiated Swedish DUI

offenders from Swedish norm population. The differences between the DUI group and the general population on the on SCL- 90 scales were all significant except on the Hostility scale.

There are many studies that investigated the relating between big five factors of personality and some psychological disorders. Such as Using patients with a primary diagnosis of OCD ($n = 98$) or major depression ($n = 98$), Rector et al. (2002) reported that participants with OCD were differ across the big five factors (and its facets): neuroticism, extraversion, and conscientiousness and the facets of openness and agreeableness. Further, when compared to depressed participants, those with OCD were found to be more extraverted, agreeable, conscientious, and less neurotic. Except for the conscientiousness factor (and its facets), these significant differences were maintained even after controlling for depression severity. Fardin et al. (2017), using a sample of Iranian university students, found a high positive correlation between neuroticism and obsessive-compulsive disorder (OCD), and openness to experience, acceptance, and conscientiousness was negatively associated with OCD. In addition, a low correlation was found between neuroticism and sleep quality, high positive correlation between each of consciousness, openness to experience, agreeableness, extraversion, and sleep quality.

In the first wave of Covid 19 in January/February 2020 when the public was not aware of the spread of coronavirus in the USA. Participants were reassessed in late March 2020 with four sets of questions about the pandemic: concerns, precautions, preparatory behaviours, and duration estimates. The sample consisted of 2066 participants (mean age = 51.42; range = 18–98; 48.5% women). The results showed that higher neuroticism was related to more concerns and longer duration estimates related to COVID-19, higher extraversion was related to shorter duration estimates, and higher conscientiousness was associated with more precautions. Also, higher neuroticism was associated with fewer precautions. Concerning the age, the older adults high in conscientiousness prepared more (Aschwandenet al., 2020).

From previous information, it is paramount to understand and investigating the psychological impact and key determinants to behaviours as responses to spread of pandemics such as COVID-19 to which the world is now exposed it. So, this research study aims to examine the following hypotheses: (1) The big five factors of personality (BFF) correlate with psychological symptoms (PS), as measured by SCL-40); (2) There is a relationship between the rate of change in interaction time with the Internet and the PS, excluding the effect of BBF; (3) There are differences between gender in the BFF and PS; (4) There are differences between participants' educational levels in the BFF and PS; (5) There are differences between the Egyptian culture and the rest of the other Arab cultures on the BFF, PS, and the rate of change in dealing with the internet; and (6)The big five factors (BFF) of personality and demographic variables (gender and educational level) contribute to the psychological symptoms (PS) concerned by the current research (as which measured by SCL-40).

METHODS

This study was conducted after the outbreak of the COVID-19 pandemic in Egypt and the partial banning of people in their homes began. The research sample answered the standards used online in April 2020 (first wave time of COVID-19).

Participants
The study sample consisted of 530 individuals with age of 19- 73 old years (M = 30.66; SD= 12.54); 375 females and 155 males, 454 Egyptians, 69 of other Arab nationalities.

Measures

Symptoms Checklist- 40 (SCL-40): It was used to evaluate the psychological health status of the individual. It derived from SCL-90-R which modified SCL-90 in two items of the anxiety scale and some minor modifications. Most of SCL versions are measuring Somatization, Obsessive-compulsive, Interpersonal sensitivity (social phobia), Depression, Anxiety, Hostility, Phobic anxiety, Paranoid ideation, Psychoticism, and additional 7 items (in SCL-90) are not scored collectively as a dimension. They primarily touch upon disturbances in appetite and sleep patterns. SCL-90 developed by Derogatis et al. 1977. which have good reliability (Cronbach's α and stability coefficients) and validity (Holi, 2003). Also, SCL-90-R versions revealed satisfactory validity and reliability (Sereda & Dembitskyi, 2016). There are many short versions derived from it: Brief Symptom Inventory (BSI; Derogatis, 1993), SCL40, SCL-27, SCL-10, SCL-K9, and SCL-11 (Müller et al., 2010). The SCL- 40 derived from BSI (psychoticism, obsessive-compulsive disorder, hostility, and some item of anxiety), SCL- 27 (Depression, paranoia, and somatization). Using 103 university students, the validity of this scale was calculated in a study of Khalil and El-Shenawy (Submitted), which correlated to the dimensions of SCL-90, all of which indicated an acceptable validity of the SCL-40.

The Arabic Big Five Personality Inventory (ABFPI; Abdel-Khalek, 2018) was inspired by the Costa and McCrae model of the five factors in the personality, and it composed of 30 items, for each factor of six items, the alpha Cronbach coefficients are calculated for the five factors, which ranged between 0.63- 0.90 (Abdel-Khalek, 2018). Hussein and Abd al-Khalek (submitted) then conducted several analyses in light of the Item Response Theory, which resulted in the deletion of an item from each factor, hence the scale made up of 25 items, which were associated with high correlation coefficients with the previous inventory (30 items), and items parameters for the modified version (25 items) are better than the previous version, and the Test Information Function for the inventory is no less substantial than the previous version, and the modified version (25 items) have good psychometric properties. The version' which has 25 items is used in this study.

RESULTS

Firstly, bivariate correlations were used to analyse the relationship between personality (BFF) and psychological symptoms. Secondly, a partial correlation was used to estimate the relationship between person' s time spent on the Internet and the PS, excluding the effect of BFF. Thirdly, t -test for independent groups was used to examine the differences between males and females, and between Egyptian culture and other Arab cultures in PS. Fourthly, ANOVA was used to examine differences between participants' educational levels on PS. Finally, multivariate regression analysis was used to examine the contribution of demographic variables and BFF in PS variance.

Personality and PS

All correlations between Extraversion and PS were negative (ranged from 0.15 to 0.36). As expected, correlations between Neuroticism and PS were positive (ranged from 0.55 to 0.67). Agreeableness correlated positively only with psychosomatic symptoms (r=0.13) and openness correlated negatively with obsessive-compulsive and paranoia symptoms, r = 0.12 and 0.11 respectively. For consciousness, all correlations with PS were negative (ranged from 0.13 to 0.30).

Table 1
Correlation between personality factors and psychological symptoms

	Anxiety	Psychotic	Paranoia	Obsessive	Hostility	Depression	Phobia	Psychosomatic. D	Severity index
E	−0.24**	−0.33**	−0.28**	−0.29**	−0.19**	−0.29**	−0.36**	−0.15**	−0.29**
N	0.67**	0.65**	0.56**	0.55**	0.61**	0.67**	0.58**	0.55**	0.65**
A	0.001	0.04	−0.06	−0.01	−0.03	0.01	−0.05	0.13**	−0.02
O	−0.03	−0.06	0.00	−0.12**	−0.01	−0.03	−0.11*	−0.04	−0.07
C	−0.16**	−0.22**	−0.14**	−0.30**	−0.19**	−0.22**	−0.26**	−0.13**	−0.19**

*p < .05, **p < .01, N=523

Table 2 shows the results of partial correlation between time an individual spends with the internet and the PS with excluding the effect of the BFF. As shown in the table, time spent on the internet correlated positively with anxiety, psychotic, hostility, depression, and phobia.

Table 2
Relationship between time an individual spends with the internet PS

Anxiety	Psychotic	Paranoia	Obsessive	Hostility	Depression	Phobia	Psychosomatic	Severity index
0.08*	0.12**	0.07	0.08	0.10**	0.08*	0.08*	0.05	0.06

*p < .05; **p < .01; N = 523

Table 3 shows that females had higher mean scores than males on anxiety, psychotic, obsessive- compulsive symptoms, hostility, depression, phobia, and severity index.

Table 3
Group means differences between genders on PS

PS Index	Males (n=155)	Females (n=375)	T
Anxiety	5.76	7.38	4.52**
Psychotic	5.59	6.96	3.52**
Paranoia	6.08	6.66	1.63
Obsessive	8.36	9.69	3.38**
Hostility	5.25	6.65	4.19**
Depression	5.51	6.81	3.53**
Phobia	3.90	4.87	3.09**
Psychosomatic D.	3.43	4.71	4.95**
Severity index	2	2.61	3.56**

**$p < .001$

Cultural difference in PS

Participants from Egyptian culture had higher mean scores than other Arabic culture on anxiety, hostility, depression, and severity index.

Educational level and PS

As ANOVA results indicated in table 5, there are significant differences among the educational levels groups in all PS indexes except psychosomatic symptoms. Scheffé test results indicated that participants with undergraduate education levels had higher scores on anxiety, psychotic, hostility, and phobia than participants with M.A education and Ph.D. Whereas, participants with undergraduate education levels had higher scores than M.A education level participants on obsessive-compulsive symptoms and depression and they had higher scores than participants with PhD education on severity index.

Table 4
Group means differences between Egypt culture and other cultures on PS

PS Index	Egypt culture (n = 454)	Other cultures (n = 69)	T
Anxiety	7.16	5.43	3.53**
Psychotic	6.73	5.71	1.94
Paranoia	6.52	6.30	.45
Obsessive	9.42	8.71	1.33
Hostility	6.53	4.53	4.43**
Depression	6.61	5.43	2.35*
Phobia	4.68	4.04	1.50
Psychosomatic D.	4.44	3.82	1.71
Severity index	2.52	1.95	2.40*

**$p < .001$, * $p < 0.05$

Table 5
Mean scores (S.D) on PS indices for different educational levels' groups and ANOVA (F) results with post hoc Scheffé test

PS Indexes'	Group 1	Group 2	Group 3	Group 4	F
Anxiety	6.66 (4.82)	7.49^^ (3.85)	5.92(3.56)	5.40 (3.21)	9.45**
Psychotic	7.77 (4.96)	7.14^^ (4.05)	5.72 (4.16)	4.79 (3.57)	9.52*
Paranoia	8.66 (3.84)	6.80 (3.77)	5.54 (3.71)	5.85 (3.41)	4.41*
Obsessive	10 (3.77)	9.71^ (4.15)	8.19 (4.01)	8.56 (4.11)	4.06*
Hostility	6.66 (4.84)	6.92^^ (3.55)	4.87(3.14)	4.63 (2.79)	15.49**
Depression	6.55 (3.46)	6.93^ (4)	5.96 (3.41)	4.78 (3.38)	7.88**
Phobia	5 (3.84)	4.97^^ (3.40)	3.83 (2.69)	3.64 (2.90)	5.61**
Psychosomatic D.	4.55 (2.83)	4.51 (2.75)	3.92 (2.58)	3.97 (2.99)	1.57
Severity index	2.77 (2.10)	2.66º (1.86)	2.06 (1.75)	1.78 (1.51)	6.97**

**p < .001, * p < 0.01, Note1 : cells with the ^^ symbol in the rows are significantly different (Scheffé test) vs the next cells in the same raw and cells with ^ symbol in the rows are significantly different vs. the next cell, where the cells with the symbol º in the rows are significantly different vs. the last cell
Note 2: group 1= participants with educational level less than university, group 2= participant with university education, group 3= participants with M.A, group 4= participants with PhD

BFF and demographic variables as a contribution to predicting PS

Multivariate regression analysis results showed that the big five factors of personality and only the time an individual spends with the internet (as a demographic variable) predicted of some PS indexes. Neuroticism and the time an individual spend on the internet were significant predictors of anxiety. In addition, Extraversion, neuroticism, and time an individual spends on the internet were significant predictors of psychotic. For paranoia and severity index, extraversion and neuroticism were significant predictors. But extraversion, neuroticism, and consciousness were significant predictors of obsessive-compulsive symptoms. Also, Neuroticism and the time an individual spends on the internet were significant predictors of hostility. For depression and phobia, extraversion, neuroticism, and consciousness were significant predictors for them. Neuroticism and agreeableness were significant predictors of psychosomatic symptoms.

DISCUSSION

The present study investigated the psychological impact and key determinants of behaviour as a response to the COVID-19 pandemic (during the first wave) by examining the relationship between each of BFF and some demographic variables, and psychological symptoms as measured by (SCL-40), and how these variables contribute on PS variance. The results indicated that neuroticism correlated positively with all PS as measured by SCL -40. In general, these results are consistent with previous studies, which indicated that neuroticism correlated positively with mental health as measured by SCL-9K (Grevenstein & Bluemke, 2015) and as measured by SCL-90 in Iranian addicted (Habibiet al., 2013). As Taylor (2019) indicated, during an epidemic, people who score high on anxiety and the overestimation of threat; neuroticism person' s estimate of being harmed tend to be inflated compared to the estimates of people scoring lower on these traits. In addition, neuroticism is associated with concepts such as pessimism and negative emotions, which leads to negative interpretations of the public health state in people (Habibi et al., 2013). Also, low emotional stability individuals (neuroticism), feel anxious, angry, sad, and cope poorly with stress (Roma et al., 2020). All these factors make neurotic people are prone to PS, especially with the spread of COVID-19 pandemic.

Also, the present results indicated that extraversion correlated negatively with PS. These results are in line with previous studies, which found negative relationships between mental health (as measured by SCL different versions) and extraversion (e.g., Grevenstein & Bluemke, 2015; Habibiet al., 2013). A possible explanation for these results is that extroversion is closely related to activity and hence can lead to acceptance and group-oriented behaviour. Also, extraversion is related to positive emotions, skill in creating successful situations, and expression and confidence in social situations. Each of these components can positively influence the individual's well-being (Ghazanfariet al., 2020) and make his view of the future under COVID19 pandemic optimistic. In contrast, As DSM 5 team indicated, Detachment individual (vs Extraverted) is avoidant of socioemotional experiences, and withdrawal from interpersonal interactions (starting from, daily interactions to close friendships to intimate relationships). He is characterised by restricting affective experience and expression, particularly limited hedonic capacity, so his response to stress (COVID-19 pandemic) will be maladaptive.

In the present study, agreeableness showed a significant positive relationship with psychosomatic symptoms. Agreeable people have the tendency to be forgiving, kind, generous, trusting, sympathetic, compliant, altruistic, and trusting (Penley & Tomaka, 2002), these kinds of persons may respond to difficult situations or stress internally, therefore they suffer from psychosomatic symptoms. Also, openness to experience had a significant negative relationship with obsessive– compulsive symptoms and phobia, an explanation for this might be that individuals who have high scores on openness trait are prone to intellectual curiosity, receptivity to the inner world of fantasy and imagination, appreciation of art and beauty, openness to inner emotions, values and active experiences (Hubicka et al., 2010), openness is directly related with the internal locus of control, which meaning that, such people feel more responsible for their health and more often manifest self-care behaviours (Ghazanfari et al., 2020). As a result, they are less likely to suffer from psychological symptoms under the stress of COVID 19 pandemic especially obsessive-compulsive symptoms and phobia.

Results showed that consciousness was related negatively with all PS indexes. These results are consistent with several study results which indicated that consciousness is a predictor of mental health (e.g, Penley & Tomaka, 2002), where consciousness is correlated positively with perceived coping ability perceived responsibility and control over the task, positive emotion, compassion, happiness, hope, and pride, also it is negatively correlated with perceived stress and fear. Therefore, consciousness can be associated with health-promoting behaviour (Ghazanfari et al., 2020).

The present study also indicated that time an individual spends using the internet correlated positively with anxiety, psychotic, hostility, depression, and phobia. These results are consistent with previous results (e.g., Roma et al., 2020) which indicated that extreme group who using internet had higher scores on PS indexes as measured by SCL-90 comparing to other groups. A possible explanation for these findings is that time an individual spends using the internet, may increase the psychological symptoms to each other, with psychiatric symptoms lead to persistence of time spent to internet or internet addiction, and the long time spent on the internet precipitate psychic symptoms (Roma et al., 2020). But the Internet can provide social support, achievement, and pleasure of control, which provide escape from emotional difficulty. Thus, individuals with high-level PS may use the Internet to cope with emotional distress. The repeating use of the internet might result in internet addiction. In contrast, addiction to the Internet results in ineffective coping and difficulty in real life, which may increase PS (Yen et al., 2008).

With respect to gender differences, there are not consistent conclusions in the literature. For example, Zhang et al. (2018) indicated that females had higher scores than males on anxiety and depression. Using the Symptom Checklist-90, but, Liuet al., (2017) found that Chinese male university students reported more serious mental health problems. Other studies used Symptom Check-List-90 found no gender differences on psychological symptoms (e.g., Tian et al., 2020), while Zang and Zang (2013) found significant difference between males and females only on Somatization, where Females had lower score than males. The present results indicated that females had higher mean scores than males on all SCL-40 PS indexes. A possible explanation of these findings comes from Egyptian culture where woman is responsible for all family affairs, which makes her always under stress and more vulnerable to psychological symptoms. These affairs are increased with precautionary requirements that led to the family spend a long time in the house.

Regarding the culture differences on PS, the present results indicated that Egyptian culture had higher mean scores than other Arabic cultures on anxiety, hostility, depression, and severity index. No wonder, that preliminary evidence suggests that culture plays a central role in individuals' perceptions of and responses to various health conditions (as cited in Zisberg, 2017); where culture influences symptoms, the interpretation of them, the form of illness, modes of coping with distress, help-seeking, and the social response to distress and disability (Kirmayer, 2001). So, in many cultural, anxiety and depression are not viewed as mental health problems but as social or moral problems (Kirmayer, 2001). In Egypt, anxiety and depression is viewed because of social and economic conditions, which contribute to the tendency among Egyptians to express these symptoms freely without of stigma.

Also, the present results found significant differences between the educational levels` groups in all PS indexes except psychosomatic symptoms. Where, participants with undergraduate education level had higher scores on PS indexes than participants with M.A education or Ph.D. levels. The literature indicated that psychological symptoms had inverse association with educational attainment (e.g., Assari, 2018; Ericksonet al., 2016; Tainet al., 2020) which is consistent with the finding of the present study. Lower levels of education may make it more difficult to obtain employment and secure income, which may increase stress and vulnerability to psychological symptoms. Conversely, individuals with higher levels of education have been shown to have a greater degree of occupational advancement and income stability (Erickson et al. 2016). In Egypt, many individuals with undergraduate education level have no work, and no secure income,

so they are vulnerable to psychological symptoms in comparison with individuals with a master's degree or PhD qualifications who have a positive view of the future.

Multivariate regression analysis results of this study showed that neuroticism played an important role in predicting all PS indexes, where it had contributed with the most variance of psychological symptoms. These results are consistent with previous studies which indicated that a high score on neuroticism can negatively affect the physical and psychological health of the individual (Ghazanfariet al., 2020), and the self-focus and threat vigilance, which are characteristic of individuals whose has high score of neuroticism, and chronic stress and negative affect undermine physiological functioning (Ode & Robinson, 2007). Therefore, the neuroticism considers as a precursor to a variety of psychological symptoms, and it causes suffer from many emotional problems such as fear, hostility, pessimism, and depression. These problems can undermine positive beliefs about future and repress happiness. Thus, these people are most vulnerable to psychological symptoms under stress of COVID-19. The second personality factor that had contributed negatively in predicting all PS indexes except anxiety, hostility, and psychosomatic symptoms was extraversion. Extraverted people tend to be positive, assertive, energetic, social, talkative, and warm. Extraversion positively correlated with perceived coping ability and with both perceived responsibility for and control over the task. Also positively associated with happiness and pride, and negatively correlated with perceived stress, fear, and self-disgust (Penley & Tomaka, 2002). As Argyle and Lou (1990) indicated extraverted people had main goals which are to achieve well-being, happiness, pleasure, and enjoyment of opportunities. Therefore, these skills help these individuals to be satisfied with different situations and to promote their well-being and thus decreases the chances of psychological symptoms. Consciousness had contributed negatively to predicting obsessive – compulsive symptoms, depression, and phobia. Penley and Tomaka (2002) indicated that consciousness is significant predictor of mental health, as it correlated positively with perceived coping ability, perceived responsibility for task control, positive excitement, sympathy, happiness, hope and pride. Consciousness may also associate with health-promoting behaviour (Ghazanfari et al., 2020). Therefore, individuals with higher scores on consciousness may use positive coping styles as response to stress which undermine psychological symptoms. Agreeableness and neuroticism, in the present study had contribution in predicting psychosomatic symptoms, this is consistent with what Ode and Robinson (2007) indicated that all studies found that agreeableness and neuroticism interacted to predict somatic symptoms such that high levels of agreeableness decoupled the relationship between neuroticism and somatic distress. These findings indicate a broad role for agreeableness in the self-regulation of neuroticism-linked distress.

The present study was carried out in first wave period of COVID-19. The authors are predicted that PS may increase in second wave period which emerged at the beginning of autumn 2020.This study has several strengths. First, it provides an extension to previous studies that have examined the association between BFF and Psychological symptoms especially under the stress of COVID 19 pandemic. Second, a need exists for studies to examine culture differences in psychological symptoms under the stress of COVID-19. Despite these strengths, the findings of the present study have several limitations. First, the nature of the online questionnaires which posted through face book site, where respondents have self-selected themselves, thus the sample may not be representative of Egyptian society. Second, the extent of psychological symptoms may be underestimated by the reliance on self-reports. In contrast to official reports, self-reports can provide information about undetected psychological symptoms; however, there are difficulties related to memory, honesty, and willingness to report.

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