

Mental health consequences of COVID-19 pandemic on adult population: a systematic review

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Abstract

Purpose – *The spread of novel coronavirus 2019 (COVID-19) has infected millions of people worldwide. Public health emergencies caused by COVID-19 affect not only people's physical health but also mental health. This paper aims to summarize recent research findings on the mental health impact of COVID-19 experienced by the general adult population.*

Design/methodology/approach – *This paper used a systematic approach and aimed to review the literature on mental health problems faced by general adults during the COVID-19 pandemic. The PubMed database has been selected randomly from the Google Scholar, Cochrane Library, Embase and PubMed databases. Ten journal articles published between January and July 2020 were selected from the PubMed database for the final review.*

Findings – *There is growing evidence that COVID-19 may be an objective risk factor for mental distress among the general adult population. More psychological and social support should be provided to protect adult people's mental health.*

Practical implications – *This review will help policymakers develop mental health interventions for the general adult population vulnerable to psychological distress because of COVID-19 pandemic.*

Originality/value – *This paper is original and contributes to the existing knowledge that the mental health challenges of COVID-19 are widespread. There is, therefore, a need for more psychological interventions for adults, older adults, in particular, to promote mental health and reduce the distress associated with public health emergencies caused by COVID-19.*

Keywords *Mental health, Anxiety, Stress, Depression, Adults, COVID-19*

Paper type *Research paper*

Introduction

The new coronavirus 2019 (COVID-19) has infected millions of people worldwide since its first occurrence in December 2019, in Wuhan, China (Torales *et al.*, 2020). The world has been trying to determine an effective measure to prevent this novel acute respiratory illness (Lu, 2020). Despite widespread concern and action, the continuous rate of infection and death because of COVID-19 has been increasing day by day (Alkhamees *et al.*, 2020). Public health emergencies caused by COVID-19 have seriously affected both the people's physical and psychological well-being (Huang and Zhao, 2020). The common psychological impacts of COVID-19 include but are not limited to stress, anxiety, depression, insomnia, denial, anger and fear (Khanna, 2020), whereas the most common physical symptoms are fever and cough (Lei *et al.*, 2020).

As outlined by various studies, COVID-19 may affect people of any age group, irrespective of their livelihoods and living conditions (Verity *et al.*, 2020; Dong and Bouey, 2020). Among them, the adult (18 years and more) population, especially the elderly (65+ years) people are more vulnerable to infection and death because of their pre-existing chronic health

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conditions and age-related immune systems (Nikolich-Zugich *et al.*, 2020). In addition to physical damage, this ever-evolving pandemic also produces psychosocial fears that have had an intense impact on people's social life who are more likely to experience psychological distress (Wang *et al.*, 2020). For example, recent studies show that general people, younger adults (18–30 years old) and the elderly (more than 60 years old) report a moderate to high prevalence of anxiety, depressive symptoms and stress during COVID-19 pandemic (Holmes *et al.*, 2020; Qiu *et al.*, 2020; Mazza *et al.*, 2020).

Studies conducted since the outbreak looked at the psychological impacts of COVID-19 on adults and revealed a wide range of mental health effects of this novel coronavirus. However, most of the studies are empirical, and there is a lack of analysis and criticism of the existing literature. A systematic review is needed to explore the recent trends, critically analyses the findings and observe current situation. Therefore, based on a systematic evaluation of the selected articles, this review paper aims to understand the recent progress on the mental health impacts of COVID-19 pandemic on the general adult population and to provide future research direction.

Materials and methods

Aim and objectives

This review aimed to outline research findings on the mental health impacts of COVID-19 among the general adult population, aged 18 years and above. Specific objectives were to determine the relationship between socio-demographic factors and general adult people's mental health because of the COVID-19 pandemic and future research direction.

Literature search

The PubMed database was selected randomly using a lottery method from various databases, e.g. Google Scholar, Cochrane Library, Embase and PubMed. The keyword used for literature search in the selected database include the following terms: mental health, COVID-19 and adult subjects. All types of journal articles published between January and July in 2020 were considered for this review study. The details step by step guidelines especially inclusion and exclusion criteria for selecting articles for the final review is showed in the [Figure 1](#) below.

Selection of articles: inclusion and exclusion criteria

Specific inclusion and exclusion criteria were developed to include relevant articles. The studies were included primarily based on the following criteria:

- only original journal articles assessing the mental health effects of COVID-19; and
- the general population aged 18 years and more.

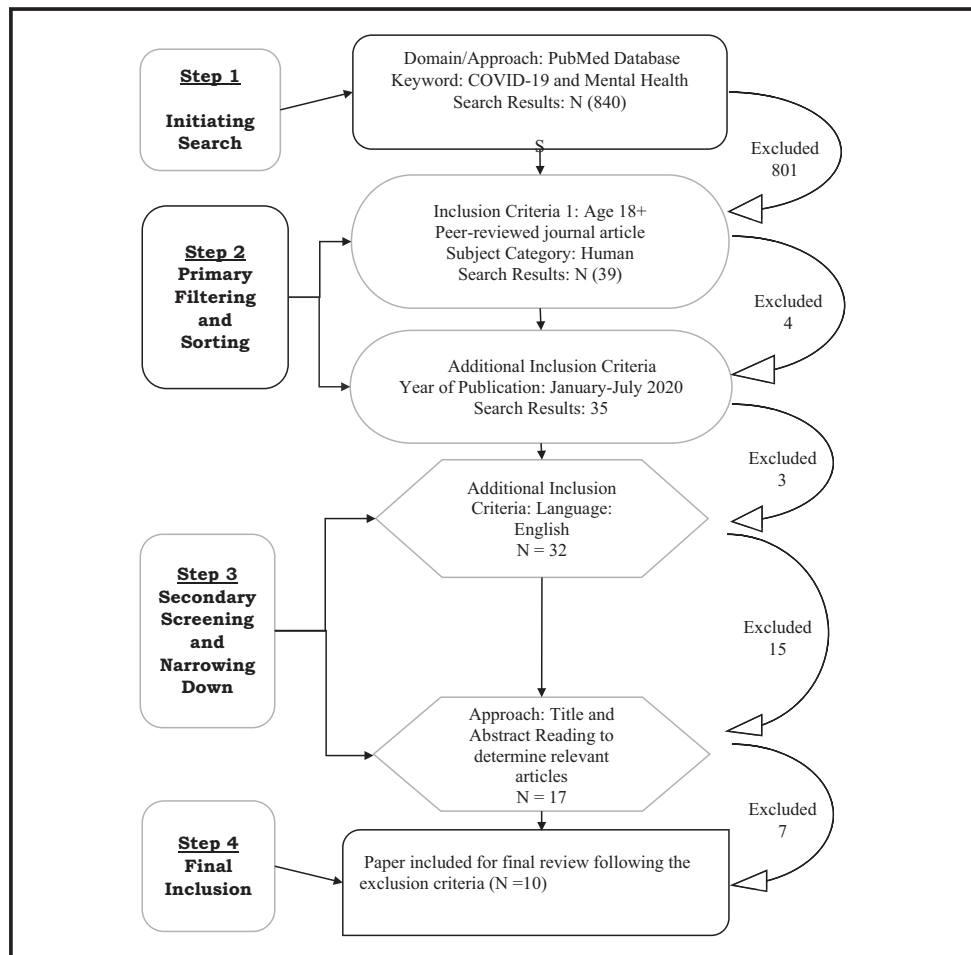
The studies were excluded if conducted on the frontline fighters such as health professionals, law enforcing and auxiliary service agencies. In the initial screening stage, 840 results were found using two keywords COVID-19 and mental health. In the primary filtering and sorting stage, 35 articles were extracted based on the inclusion criteria: 18 years old and more, Journal article and time of publication. Subsequently, in the third stage of secondary screening and narrowing, 17 research papers were included based on English language criteria, title reading and abstract reading approaches. In the final stage, ten articles were included in the review following the exclusion criteria.

Mental health measurement scales

The selected studies used different scales to measure the mental health of general adult people. Choi *et al.* (2020) assessed the mental health effect by measuring the prevalence of

generalized anxiety disorder and depression using the Generalized Anxiety Disorder (GAD-7) scale and the Patient Health Questionnaire (PHQ-9). Wang *et al.* (2020) and Zhang *et al.* (2020) assessed the respondent's psychological distress using a six-item scale called the Kessler Psychological Distress Scale. Huang and Zhao (2020) used different Chinese version scales to measure anxiety (GAD-7), depression (Center for Epidemiology Scale for Depression [CES-D]) and sleep quality (Pittsburgh Sleep Quality Index [PSQI]) over the past two weeks. Lei *et al.* (2020) used self-rating anxiety scale (SAS) and the self-rating depression scale (SDS). Alkhamees *et al.* (2020) assessed psychological impact and mental health status using Impact of Event Scale-Revised (IES-R) and the Depression, Anxiety and Stress Scale (DASS-21). Zhang and Ma used (2020) Impact of Event Scale-15 items; six modified and validated questions regarding negative mental health impacts before and resulting from the pandemic; Mental Health Lifestyle Scale (MHLSS) to measure the mental health of the respondents. Mazza *et al.* (2020) measured mental health using the Depression, Anxiety and Stress Scale-21 items (Likert type), and the Personality Inventory for DSM-5-Brief Form-Adult (PID-5-BF: 25 items) was used to measure the personality functioning. Ran *et al.* used the Connor-Davidson Resilience Scale (CD-RISC), the Patient Health Questionnaire-9 (PHQ-9), the GAD-7 scale and the Patient Health Questionnaire-15 (PHQ-15) scale to measure the depression, anxiety and somatization symptoms.

Figure 1 Flow chart for selection of studies



Results

The key findings from selected studies are summarized in [Table A1](#) based on the characteristics such as: design types, the sample size, the mean age, the main objectives and findings. Most of the studies were conducted in China ($n = 7$), followed by Italy ($n = 1$), Turkey (1) and Saudi Arabia (1). This review considered studies conducted on the general adult population (aged 18 years and above) whose mental health was affected because of the COVID-19 pandemic. Therefore, there were no studies on the frontline fighters in the review, like health professionals or others.

Socio-demographic characteristics and mental health

Overall findings showed that the population's average age was between 26 and 48 years old. In [Choi et al.'s \(2020\)](#) study, respondent's average age (47.26 years old; $STD = 15.82$) was the highest among all the selected studies (see [Table A1](#) in Appendix). [Wang et al. \(2020\)](#) found that age was linked to higher depressive symptoms and psychological distress ([Huang and Zhao, 2020](#)). The study of [Mazza et al. \(2020\)](#) found that younger adults working outside during the pandemic had a higher level of anxiety and stress. [Huang and Zhao \(2020\)](#) emphasized that people younger than 35 had more anxiety symptoms than people older than 35. [Lei et al. \(2020\)](#) also concluded that younger groups under 30 years were more anxious in the COVID-19 pandemic than people aged over 30 years old.

Gender is another key determining factor in psychological distress at the time of COVID-19. Results indicated that being female were associated with increased anxiety, depression and stress ([Mazza et al., 2020](#); [Lei et al., 2020](#); [Özdin and Özdin, 2020](#)). But, [Wang et al. \(2020\)](#) found no differences in anxiety, depression and stress based on gender dimension. On a similar stand, [Huang and Zhao \(2020\)](#) similarly identified that anxiety and disorder are same between men and women. Although contrasting findings exist, gender is a crucial predictor of mental health, where men and women differently report levels of depression and anxiety ([Aneshensel, 1992](#); [Mirowsky and Ross, 1995](#)). According to the findings of the selected articles, other major factors were existing chronic health problems and a history of stressful situations, which have resulted in increased anxiety, depression and stress among respondents to the COVID-19 epidemic ([Mazza et al., 2020](#); [Zhang et al. 2020](#)). Zhang and his associates (2020) also found that people who stopped working because of Covid-19 reported worse mental health and psychological distress.

Mental health variables

Different scales were used to identify the prevalence of anxiety, depression and stress among the general adult population because of the COVID-19 pandemic. [Lei et al. \(2020\)](#) and [Mazza et al. \(2020\)](#) studied anxiety and depression using a self-rated anxiety-depression scale ranging from low to severe anxiety and depression. [Lei et al. \(2020\)](#) conducted a comparative study, which suggested that infected people were significantly more depressed and anxious than uninfected people. [Huang and Zhao \(2020\)](#) found that older people are at a high risk of low sleep quality and are highly vulnerable to mental illness. Studies also assessed respondents' mental health based on depression, anxiety and stress levels and found a moderate to severe psychological effects of COVID-19 ([Alkhamees et al., 2020](#); [Wang et al., 2020](#)). Similarly, [Zhang and Ma \(2020\)](#) revealed that more than half (52%) of the respondents were horrified because of the pandemic, which was mildly stressful.

Stress during the COVID-19 pandemic

During the COVID-19 pandemic, the general adult population's mental stress was intensified because of various factors. The study conducted by [Wang et al. \(2020\)](#) showed

that contact with an infected person or visiting an infected area, media reporting, pandemic-related dreams and a lack of emotional control were crucial factors that were found to be harmful for adult's mental well-being. Other factors, for example, over-thinking about the outbreak of COVID-19, detachment, concern about the possibility of infection of family members, acquainted person or family member infected with coronavirus, working outside during the outbreak were also determinants of the psychological distress among the general adult population (Huang and Zhao 2020; Choi *et al.* 2020; Mazza *et al.* 2020).

Protective factors during COVID-19

Zhang *et al.* (2020) found that doing physical exercise as a protective factor increased respondent's life satisfaction in COVID-19 pandemic. Psychological support and psychological resilience during the COVID-19 outbreaks were associated with positive mental health (Choi *et al.*, 2020; Ran *et al.*, 2020). Lei *et al.* (2020) found that having no psychological support was associated with increased depression and anxiety. The study of Huang and Zhao (2020) showed that financial assistance and practical assistance from others helped respondents maintain mental well-being during the pandemic. Similarly, Zhang and Ma (2020) showed that family and friends support and sharing feelings with family members or other protected adult people from being mentally depressed at the time of COVID-19.

Discussion

Based on the findings of the selected articles, this review suggests that because of the pandemic caused by COVID-19, the general adult population has been experiencing moderate to severe stress, anxiety and depression. Results show that infected people are more vulnerable to psychological distress than uninfected persons. Factors related to the mental health impacts of the COVID-19 include detachment from a fellow human being, perceived consequences of the outbreak, contact infection, current medical condition, non-working status or working outside, the rapid spread of the illness, media reporting and lack of available protective equipment and vaccines. Findings of this systematic review are consistent with research results following the outbreak of past epidemics, which reveals that infectious diseases and epidemics caused more psychological problems among the general population (Ko *et al.*, 2006). A study in Taiwan found that affected population reported higher depression, poor relations with neighbors and higher economic impacts than unaffected people when severe acute respiratory syndrome (SARS) spread in 2003. Studies also suggest that people had the highest level of anxiety symptoms during SARS (Cheng *et al.*, 2004; Chua *et al.*, 2004; Wu *et al.*, 2005). A sudden outbreak of epidemics such as SARS or COVID-19 commonly causes a wide range of psychological disorders among general people, exposed or not. Psychological distress includes fear and anxiety disorder, helplessness, self-denial, blame others for infection, depression, guilt, psychosis, panic attacks, post-traumatic stress disorder and even suicide attempts. (Hall *et al.*, 2008; Müller, 2014; Sim *et al.*, 2010; Xu *et al.*, 2020).

Despite the challenges resulting from an ongoing pandemic of COVID-19, there is also a growing concern to protect the general population's mental health. Zhang and Ma (2020) showed that family and friends' emotional support protects respondent's mental health from the adverse effects of Covid-19. Studies emphasized that the government should implement psychological interventions to improve vulnerable groups' mental health during the COVID-19 pandemic (Choi *et al.*, 2020; Wang *et al.*, 2020). The results also suggested providing economic, medical support and continuous surveillance of the psychological consequences are essential to protect and improve the mental state of the general population (Lei *et al.*, 2020; Huang *et al.*, 2020). A similar finding was also reported by Naushad *et al.* (2019), which showed that a lack of social support and communication commonly associates with psychiatric morbidity at the time of any disaster.

Limitations

Several factors have limited the findings of this review. All articles used a cross-sectional design of research, which is inadequate in explaining the effect of COVID-19 over time (Levin, 2006). The results cannot be generalized because most of the studies (7 out of 10 reviews) were conducted in China, limiting the applicability of findings to other countries. The mean age of the people between the ages of 26 and 48 indicates that the respondents were young and middle-aged adults. The respondents' average age suggests that results cannot be generalizable for elder older adults who are more vulnerable to mental health problems because of their age-related medical conditions. In this study, groups such as frontline fighters: health workers, law enforcement officers and auxiliary support officers were excluded, restricting the opportunity to extrapolate these groups' results.

Conclusion and future research direction

In the general population, young or middle-aged adults, the COVID-19 pandemic causes a higher degree of symptoms of depression, anxiety and distress. One of the reasons may be that health authorities emphasize physical health rather than psychological health in health emergencies. Therefore, along with material support, different government and non-governmental organizations should provide psychological support to the vulnerable population to increase their psychological resilience and mitigate depression and anxiety during the pandemic. Also, help from family and friends could protect people's psychological well-being throughout the COVID-19.

An overlooked aspect of human health is the psychological impacts of any disaster; thus, research data on the direct mental health effect of COVID-19 on general individuals, in particular, on older adults, are still scarce. This review suggests that existing medical conditions of adults are linked to psychological distress. The rate of infection and older people's death is much higher than any other age group because of the COVID-19 pandemic. For example, in Canada, 40% of fatalities occurred in long-term care homes (Hsu and Lane, 2020; Statistics Canada, 2017). The World Health Organization reported that more than 95% of COVID-19-related deaths occurred between people aged over 60, and half of all deaths were above 80 years old (Kluge, 2020). The Center for Disease Control and Prevention (CDC) reported that older adults are at the highest risk for COVID-19, and 80% of deaths have been reported in adults over 64 years old (CDC, 2020). In Sweden, 90% of COVID-19-related deaths were in people aged over 70 (Sandoiu, 2020). Owing to these significant effects of the COVID-19 on older adults, they are more likely to suffer from increased depressive and anxiety symptoms following the COVID-19 infection worldwide. Therefore, further research is needed to assess the impact of this pandemic on mental health among older adults in developed, particularly in less developed countries where the subsequent effect of COVID-19 will likely be more severe (Duan and Zhu, 2020). Researchers should also try to assess the impact of COVID-19 on other vulnerable populations, such as women, children and adolescents living in areas without adequate mental health services. These studies will help policymakers develop mental health interventions for vulnerable people to increase their psychological resilience following the COVID-19 pandemic.

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Appendix

Table A1 Summary of included studies					
<i>Author(s)</i>	<i>Sample(s) & place</i>	<i>Mean age</i>	<i>Study design</i>	<i>Mental health measurement scale (s)</i>	<i>Aim (s) and main finding(s)</i>
Alkhamees et al. (2020)	1160 general public, Saudi Arabia	The mean age was 35.21 (<i>SD</i> = 12.99) years.	Cross-sectional online survey using snowball sampling strategy	IES-R DASS-21	This investigation was aimed to assess the degree of psychological impact during the pandemic. Results showed that nearly one-fourth of the general population experienced moderate to the severe psychological impact. The specific precautionary measures were acted as a protective factor in the individual's mental health
Choi et al. (2020)	500 General population in Hong Kong, China	The mean age was 47.26 (<i>SD</i> = 15.82) years old.	Cross-sectional study	GAD-7 PHQ-9	The aim was to evaluate the depression and anxiety of people in Hong Kong. More than one fourth (25.4%) of respondents reported that their mental health deteriorated because of the pandemic, and they were suffering from depression and anxiety
Huang and Zhao (2020)	7236 self-reported volunteers, China	The mean age was 35.3 (<i>SD</i> = 5.6) years.	Cross-sectional web-based survey	GAD-7 CES-D PSQI	This study aimed to assess the mental health burden and explore the

(continued)

Table A1

<i>Author(s)</i>	<i>Sample(s) & place</i>	<i>Mean age</i>	<i>Study design</i>	<i>Mental health measurement scale (s)</i>	<i>Aim (s) and main finding(s)</i>
					potential factors during the outbreak. Analyses showed that younger people had a significantly higher level of GAD and depressive symptoms than older people. Besides, comparatively, people having a specific profession had lower sleep quality
Lei et al. (2020)	1593 general population, Chinawas	The mean age was 32.3 (<i>SD</i> = 9.8) years old.	Cross-sectional comparative study among affected and unaffected group	SAS SDS	The aim was to compare the prevalence and associated factors of anxiety and depression between affected and unaffected people during the COVID-19 outbreak. Results revealed that the prevalence of anxiety and depression in the affected group (12.9%, 22.4%) was significantly higher than in the unaffected group (6.7%, 11.9%)
Mazza et al. (2020)	2766 general population, Italy	The mean age was 32.94 (age range is 18–90 years) years old.	Cross-sectional online survey	DASS-21 (Likert type) PID-5-BF	The aims were to identify the prevalence of psychiatric symptoms and risk and protective factors of psychological distress. Results suggested that female gender, detachment, having an acquaintance

(continued)

Table A1

Author(s)	Sample(s) & place	Mean age	Study design	Mental health measurement scale (s)	Aim (s) and main finding(s)
Özdin and Özdin (2020)	343 individuals, Turkey	The mean age was 37.16 (<i>SD</i> = 10.31) years.	Cross-sectional online survey	HADS HAI	infected, and medical problems were associated with a higher level of depression, anxiety and stress The purpose of this study was to evaluate depression, anxiety, and health anxiety levels and examine the factors affecting these in Turkish society. Findings suggested that women were mostly affected psychologically due to COVID-19 pandemic. Individuals with previous psychiatric illness and an accompanying chronic disease were also mostly affected by the COVID-19
Ran <i>et al.</i> (2020)	1770 Chinese citizens, China	The average age was 28.7 (<i>SD</i> = 10.64) years.	Cross-sectional research design	CD-RISC PHQ-9 GAD-7 PHQ-15	This study has investigated the relationship between psychological resilience and mental health. Results suggested that people had a high prevalence of psychological distress during the peak of the COVID-19 epidemic and was negatively correlated with psychological strength

(continued)

Table A1

<i>Author(s)</i>	<i>Sample(s) & place</i>	<i>Mean age</i>	<i>Study design</i>	<i>Mental health measurement scale (s)</i>	<i>Aim (s) and main finding(s)</i>
Wang et al. (2020)	1599 general population, Chinawas	The mean age was 33.9 (<i>SD</i> = 12.3) years and age range is 18–84 years.	Cross-sectional online survey using snowball sampling	KPDS-6	This study investigated the psychological distress and coping styles in the early stages of the COVID-19. Results showed that the general population's psychological distress differs based on age, marriage, epidemic contact characteristics, concern with media reports, and perceived impacts of the epidemic outbreak. A negative coping style was associated with a higher level of distress
Zhang and Ma (2020)	263 local Chinese in Liaoning Province, mainland China	The mean age was 37.7 (<i>SD</i> = 14) years old.	Cross-sectional online survey	IES-15 MHLSS	The study aimed to investigate the immediate impacts of the COVID-19 pandemic on the mental health and quality of life. Results showed that respondents were horrified and mildly stressed. Support from family and friends were critical protective factors at the time of the epidemic
Zhang et al. (2020)	369 adults in 64 cities, China	The mean age was 36.6 (<i>SD</i> = 10.5) years old.	Cross-sectional survey	KPDS-6	The aim was to assess normal adults' health and well-being living and work after one month of confinement. Results showed

(continued)

Table A1

<i>Author(s)</i>	<i>Sample(s) & place</i>	<i>Mean age</i>	<i>Study design</i>	<i>Mental health measurement scale (s)</i>	<i>Aim (s) and main finding(s)</i>
					that adults who were not working during the pandemic reported worse health as well as distress

Notes: GAD-7, the Generalized Anxiety Disorder-7 scale; PHQ-9/15, the patient Health Questionnaire-9/15; SAS, the Self-rating Anxiety Scale; SDS, the self-rating depression scale; IES-R/15, the Impact of Event Scale-Revised/15; DASS-21, the Depression, Anxiety, and Stress Scale; HADS, the Hospital Anxiety and Depression Scale; HAI, the Health Anxiety Inventory; CD-RISC, the Connor-Davidson Resilience Scale; KPDS-6, the Kessler Psychological Distress Scale; CES-D, the Center for Epidemiology Scale for Depression scale; PSQI, Pittsburgh Sleep Quality Index; MHLSS, the Mental Health Lifestyle Scale; DASS-21, the Depression, Anxiety and Stress Scale (Likert type); PID-5-BF, the Personality Inventory for DSM-5–Brief Form–Adult

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