Mental Health: Research and Practice

ISSN: 2980-8502 2022, Vol. 1, No. 1, 23-30
DOI: 10.22034/MHRP.2022.154063

Psychometric Properties of COVID-19 Psychological Dimensions Questionnaire

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Health emergencies like the one people faced in the coronavirus pandemic may affect individuals' psychological health. For example, stigma, economic losses, closure of businesses and schools and low medical resources can cause a wide range of emotional reactions and/or psychological problems. Current study was conducted to develop and evaluate the psychometric properties of a researcher-made questionnaire called COVID-19 psychological dimensions (CPD) which was prepared according to the theoretical and research background of SARS-CoV-2. To develop CPD, some items were first suggested for each of the subscales including discrimination, social norms, culture, stigma and labeling, political conflicts, and social relations. Content validity of the CPD was confirmed by using the CVR method indicating an acceptable CVR for all the items in the survey (all CVR's > 0.62). The overall CVR was found to be 0.85. The internal consistency of the CPD was also investigated and the Cronbach's alpha for the total CPD scale found to be 0.74 and the Cronbach's alphas for each of the subscales ranged between 0.7 and 0.81. By using an online call, 542 participants took part in this study and filled the CPD questionnaire. Confirmatory factor analysis (CFA) on the participants' responses showed that several fit indices including df/χ^2, RMSEA, SRMR, NFI, CFI, and IFI confirm that the proposed six-factor model fits the data well.

Keywords: COVID-19 Pandemic, Psychological Dimensions, Psychometric Properties

Coronavirus infection (COVID-19) caused by SARS-COV-2 was identified for the first time in December 2019 in Wuhan, China because of creating respiratory problems (Sakib, Bhuiyan, Hossain, Al Mamun, , Hosen, et al, 2020). The disease is being spread rapidly to other countries and the number of victims is being increased as time goes. In March 11, 2020, the World Health Organization (WHO) declared the infection caused by COVID-19 virus a global epidemic. In the early stages of the pandemic, Iran, like some other countries, experienced a rapid and widespread outbreak of the disease.

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After some different lockdowns, according to the law, people were forced to stay at home, except for work and health reasons which put people in an unprecedented situation.

A wide range of information is available on COVID-19 in terms of biological knowledge, clinical and diagnostic properties; Although there is no certain treatment available for COVID-19 to the date (Reznik, Gritsenko, Konstantinov, Khamenka, & Isralowitz, 2020; Wang, Pan, Wan, Tan, Xu et al, 2020). The prevalence of health emergencies like coronavirus pandemic can affect the health, safety and welfare of people. For example, insecurity, confusion, isolation and stigma at the individual level, and economic losses, closing works and schools and low medical sources at the social level can result in a wide range of emotional responses and

psychological disorders (Pfefferbaum & North, 2020). As an instance, predicting economic uncertainty can have a negative impact on individuals' mental health (Marotta, Pesce, & Guazzini, 2020).

Since any crisis requires wide social and behavioral changes and as it imposes a significant psychic burden on the socio-economic classes, the behavioral and social science research have focused on developing some applied theories that help increase adaptive behaviors for all the socio-economic classes (Satici, Gocet-Tekin, Deniz, & Satici, 2020; Bavel, Baicker, Boggio, Capraro, Cichocka et al, 2020). One of the most important psychological reactions to the crisis caused by a pandemic is fear which is one of the most probable emotional responses expected under crisis conditions (LeDoux, 2012). Therefore, the fear and the individual's perception of the effectiveness of coping strategies caused by the fear, make them change their behaviors or take extremist defensive behaviors (Witte & Allen, 2000).

Based on the mutual effects of social and behavioral factors, Van Bavel et al (Bavel et al., 2020) classified behavioral and social factors relevant to the pandemic periods. Pfefferbaum and North (Pfefferbaum & North, 2020), believe that evaluation and supervision during a pandemic period should focus on analyzing factors related to stressful conditions (e.g., encountering disease, sick family members, and losing family members), secondary effects (economic losses), psychological effects (depression, anxiety and domestic violence) and vulnerability indices (suicide). However, it should be noted that it is hardly possible to analyze the psychological needs of people and supporting them because of quarantine conditions and the prohibition of attending meetings and face-to-face communication.

One of the unhealthy behaviors and damaging norms during a pandemic is stigma. This could prevent people from returning to a normal life (Lee, 2020; Siu, 2008). The COVID-19 outbreak can cause problems related to stigma such as fear of isolation, racism, discrimination and marginalization with social and economic consequences (Siu, 2008). In a society with stigmatized people, they are referred to hospitals for medical services too late or hide a major part of their medical records. This can increase the risk of transmission in the society (World Health Organization, 2020).

For conspiracy theories, individuals attempt to attribute the pandemic to the hidden conspiracies of powerful actors in the world (Wang et al., 2020). Techniques motivating the analytical thinking can decrease belief in conspiracy. The conspiracy theories should be treated for medical reasons; Because these beliefs can lead to refusing to be vaccinated or taking required medication (Sun, Sun, Wu, Zhu, Zhang et al., 2020). The conspiracy theories may mostly appear in those individuals with emotional vulnerability factors, anxiety traits and lack of resilience. These traits are irrelevant to conspiracy theories; However, they can predict who will experience psychological distress when faced with epidemics such as COVID-19 (Shahed Hagh Ghadam, Fathi Ashtiani, Rahnejat, Ahmadi Tahour Soltani, Taghva et al., 2020).

Another aspect of a pandemic can be behavioral extremes of optimism bias, in which people think that bad events happen just for others and not for them. Such a bias is useful to reduce negative emotions (Strunk, Lopez, & DeRubeis, 2006). However, in the negative side, people may ignore the health advices and expose themselves to the infection (Soraci et al., 2020). Social relations are also important, while social relations help people cope with stressful situations by balancing their emotions (Jetten, Haslam, Cruwys, Greenaway, Haslam, et al., 2017), social isolation disrupts their mental health and leaves negative effects on their immune and cardiovascular system (Jetten et al., 2017). Therefore, besides identifying the psychological dimensions of COVID-19 pandemic, assessing factors like labeling or stigma, social interactions, cultural backgrounds and discrimination is useful in preventing adverse psychological effects of the pandemic.

A recent literature review suggests that no questionnaire with desirable psychometric properties has been developed to analyze psycho-social factors (Pakpour, Griffiths, & Lin, 2020), and no study has independently emphasized the psycho-social dimensions of coronavirus. Therefore, besides physical problems caused by

COVID-19 infection, it is important to pay attention to the relevant psycho-social dimensions. However, despite the importance of the psychological and sociological dimensions of the pandemic, no instrument has been designed to measure these variables to date.

Methods

The statistical population consisted of people who get infected by the coronavirus or were involved in the pandemic issues in 2021.

The initial questionnaire contained 56 items and six subscales including discrimination and prejudice, social norms, culture, stigma and labeling, political conflicts and social relations. The items were scored based on a 4-point Likert scale from totally disagree (0) to agree (4).

The content validity of the questionnaire was assessed by using both qualitative and quantitative methods. First, 20 experts in different fields including psychometrics, psychology, medication, nursing, social work and social psychology evaluated the initial items. The experts were instructed to read the items carefully and to write their corrective opinions to improve the items in the field of Persian grammar and comprehensibility. Next, the items were revised based on the collected opinions. After the corrections, 33 items were retained including discrimination and prejudge (9 items), social norms (9 items), culture (8 items), stigma and labeling (2 items), political conflicts (3 items) and social relations (2 items).

To assess the face validity of the scale, the opinions of experts were collected on face validity, adequacy of items, the attractiveness of items, the rationality of item arrangement, briefness and comprehensiveness of the items. Also, for the qualitative analysis, the items were presented to 20 sample individuals to leave a comment on the eloquence and comprehensibility of the items. The responses were collected and the face validity was confirmed by making corrections based on the opinions of the experts and sample individuals.

Also, for quantitative analysis of the content validity, the content validity ratio (CVR) was used. Each expert (n=20) left a comment on each of the items in the field of necessity. The participants were asked to assess if the items are necessary, useful but unnecessary, neither necessary nor useful. Then, the CVR for each item was estimated as follows:

$$\mathrm{CVR} = \frac{\text{numbr of necessary responses} - \text{number of participants}/2}{\text{number of participants}/2}$$

The content validity coefficient using the Lawshe method varies from -1 to 1. larger coefficients indicate higher validity of the item. After preparing the instrument and confirming its content validity, Cronbach's alpha was also used to estimate its reliability.

Results

The demographic characteristics of the participants is summarized in Table 1.

Table1

Demographic Characteristics

Gender	Male	27.3%
	Female	72.7%
Age	Minimum	10
	Maximum	67
	Mean	31.74
Education	Ph.D	5.7%
	Ma	35.5%
	Ba	38.4%
	Diploma	20.4%
Infected/Uninfected	Infected	8.2%
	Uninfected	91.8%
Total		524

Table 2 shows mean and SD for each of the subscales as well as the total score.

Table2

Mean and SD of the subscales of CPD

Subscale	M	SD
Discrimination or Prejudge	17.52	5.49
Social Norms	22.48	4.03
Culture	18.66	4.80
Stigma	2.01	1.70
Political Conflicts	3.63	2.27
Social Relations	4.78	1.82
Total	12.26	3.52

Results showed that the content validity of the majority of the items was more than 0.62. The CVR for the total scale was estimated to be 0.85. Six items with content validity below 0.42 were excluded. Cronbach's alphas for all the subscale and the total scale is shown in table 3.

Table 3

Cronbach's alpha for the subscales of CPD

Factors	Cronbach's alpha
Discrimination	0.74
Social norms	0.72
Culture	0.70
Stigma and label	0.81
Political conflict	0.73
Social relations	0.76
Total	0.74

To test construct validity, confirmatory factor analysis (CFA) was conducted and the diagram of the 6-factor model is presented in Figure 1.

Figure 1 shows factor loadings for the proposed 6-factor model of CPD resulted from CFA. All t-values were greater than 1.96 indicating the statistical significance of all the factor loadings in Figure 1 at least at 0.95 levels.

Overall, the goodness-of-fit indices showed that the 6-factor model presented in Figure 1 fits the data well. The value of df/χ^2 was found to be 2.64 which is less than 3. The values of RMSEA and SRMR were 0.071 and 0.068, respectively, which both are pretty below the desired value of 0.08. Finally, other fit indices including NFI, CFI, IFI and RFI were found to be 0.93, 0.91, 0.94, 0.91, respectively, and all were greater than the desired value of 0.9. Table 4 shows all the items for all factors in CPD scale.

Discussion

As relevant studies recently emphasized the psychological effects of the coronavirus infection, it seems necessary to provide an appropriate instrument to measure its psychological consequences. Of the initial item-pool of 65 items, only 33 items retained after revision by the experts. A 6-factor model is suggested and tested by using CFA. The results of CFA showed that the 6-factor model is a good fit.

Factor 1, called "discrimination or prejudge", consisted of 9 items and the factor loadings varied from 0.57 to 0.80 (see Figure 1 and Table 4 for more details). The "discrimination or prejudge" subscale contains items concerning the social discrimination toward individuals infected with COVID-19. Factor 2, called "social norms", contained 9 items and the factor loadings varied from 0.24 to 0.99. This factor includes those social norms that are effective in preventing the further prevalence of COVID-19. Factor 3, called "culture", contains 8 items and the factor loadings varied from 0.57 to 0.77. This factor also refers to social and cultural effects on the coronavirus pandemic with the difference that the cultural dimension is significantly rooted in the history and background of the society. Factor 4, called "political conflicts", contained 3 items and the factor loadings varied from 0.76 to 0.84. This factor shows individuals' political attitudes throughout the coronavirus pandemic. Factor 5, called "labeling and stigma", contained 2 items and the factor loadings were 0.76 and 0.77. This factor shows the labels and stigmas created during a pandemic. People may attribute these stigmas to themselves or others while infected. Factor 6, called "social relations" contained 2 items with factor loadings ranged from 0.69 to 0.72. This factor considers types of social relations and the variances during a pandemic.

The total reliability of CPD scale was 0.74 by using the Cronbach's alpha method. Some of these factors such as stigma and labelling have been written based on recent studies (Sadeqi, Sharifirahnmo, Fathi, & Mohamadi, 2020).

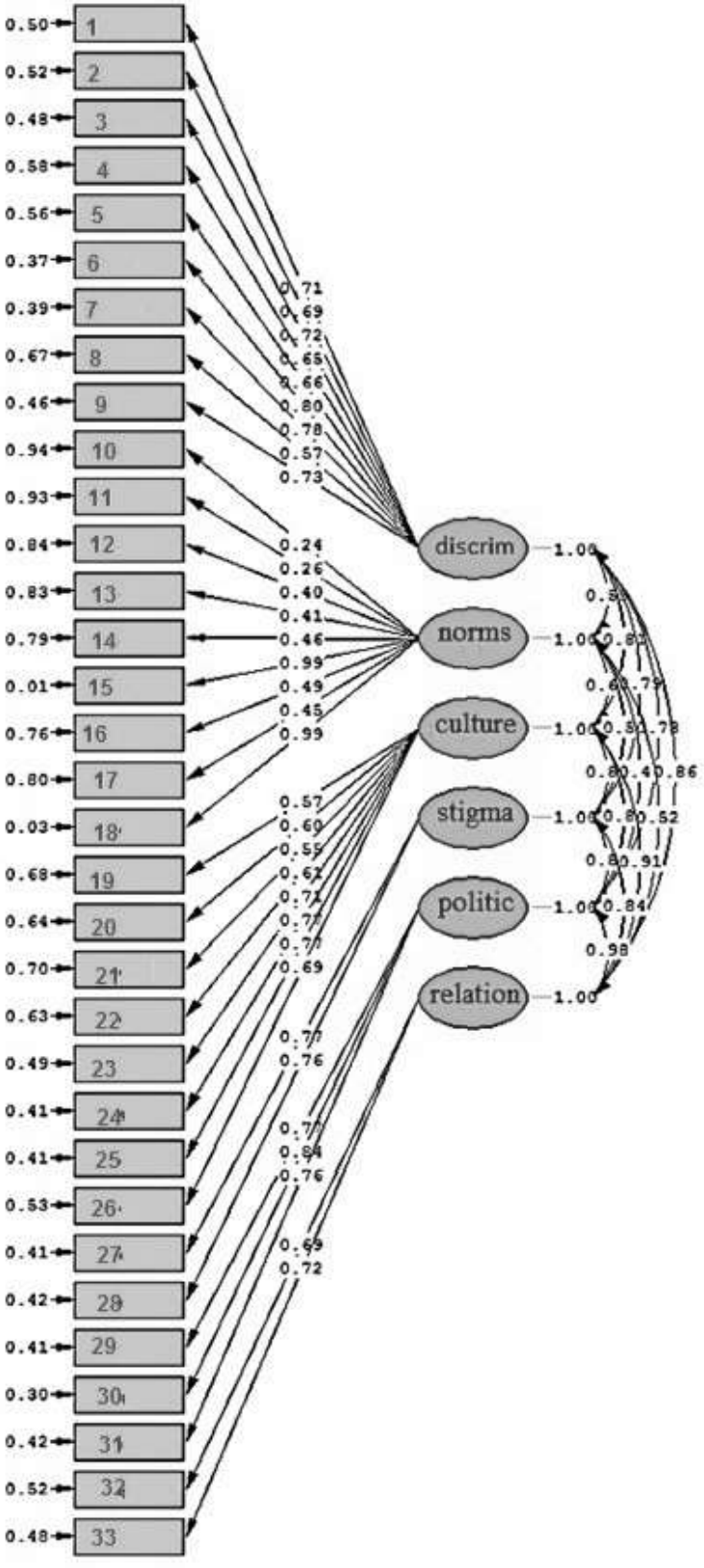

Figure 1. Factor Loadings for 6-Factor Model of CPD

Table 4

Items of the Coronavirus Psychological Dimensions Scale

	Factor 1: Discrimination or Prejudge
1	It is not necessary to be worry about COVID-19 outbreak in other distant countries.
2	Because it was the foreigners who spread the coronavirus, we have the right to mistreat them.
3	The Chinese people and we sympathize with each other and we must help each other
4	We have to act in the same way as other countries to control the coronavirus
5	No matter what country we come from, the coronavirus threatens us all
6	I have to think only of myself not to get infected with coronavirus
7	It does not matter if I'm infected with the virus myself, I must help others not to become infected
8	We need to care about others more than ourselves
9	In my opinion, in cases of limited access to health items and services, saving the lives of young people is a priority over saving the elderly.
	Factor 2: Social Norms
10	I need others to appreciate me when I wash my hands or observe the hygiene.
11	I think that washing hands never can affect preventing the infection.
12	All the social classes have paid specific attention to health advices.
13	I prefer the health tips told me by family and friends to the health advices on the radio or television.
14	I prefer the health tips told me by family and friends to the health advices published in cyberspace (Instagram, Telegram, WhatsApp, etc.)
15	I do not believe in washing hands or using disinfectant sprays.
16	I stay at home because the health authorities have asked me to do so.
17	Following the health instructions is a social responsibility or duty of all of us
18	The words of the health officials made me stay at home to fight the coronavirus.
	Factor 3: Culture
19	I trust policies to prevent and control the coronavirus pandemic.
20	Our society is involved in various natural disasters and we have learned how to deal with such crises
21	In our culture, violation of the health advices results in social punishment.
22	Violation of health advices in my society is followed by legal punishment.
23	I like to go for a walk, but I stay home to take care of others.
24	I have not shaken hands with anyone since the coronavirus spread in the country
25	I get embarrassed when I see my friends and I don't touch them.
26	I observe the health advice because of social pressure.
	Factor 4: Labeling and Stigma
27	COVID-19 infection is a stigma in my neighborhood.
28	I prefer to hide my coronavirus infection from others
	Factor 5: Political Conflicts
29	As a Turk, Kurd, or Baluch, I violate the health advices of the Health Ministry of Iran, Because that recommendations are different from those of my culture
30	I think all social classes will be infected by COVID-19 and there is no difference between us and the government officials.
31	I trust in policies in the field of preventing and controlling coronavirus outbreak.
	Factor 6: Social Relations
32	Quarantine has made me have a more intimate relationship with my family.
33	I think that online relationships can be a good alternative for face-to-face communication.

Stigma is an innate feeling about being in an unwanted situation, along with fear of discrimination because of low position or lack of acceptance by the society, which is dependent on the culture of that society (Brazeau, Nakhla, Wright, Henderson, Panagiotopoulos, et al., 2018). Stigma is not an individual problem or part of a disease but a social problem (Mohamadi, Mohtashami, & Arab Khangholi, 2020). Stigma in the period of COVID-19 pandemic is important because it may interfere with communities' efforts to control the pandemic. On the other hand, Li, Jiao, Liu & Zhu (2020) believe that improvement of the public beliefs and knowledge of some disease can be the basis for reducing stigma, and reducing stigma in turn will help reduce the disease in the society.

Another component identified in this questionnaire is the social relations. Alizadeh and Saffari Nia (2020) have shown that social cohesion can predict better mental health during COVID-19 pandemic in Iran, because it creates a variety of positive psychological effects among people in the community, during which people feel that their help is effective in the success of the society in overcoming the pandemic, and therefore the observance of health protocols among people-increases. The social cohesion stemming from the COVID-19 pandemic led to the emergence of unity and mutual support in Iran in which people gave each other a sense of social support. On the other hand, under pandemic conditions, family and financial stress are increased, because many people would be quarantined. Under such conditions, people may be irritable and isolated which can worsen their family and social relations. Besides, such stressful conditions may result in behaviors such as avoidance of getting information or choosing an inactive lifestyle (Lau, Yang, Tsui, & Kim, 2005). Hence, the authors think inclusion of social relations subscale can be useful.

Altogether, the COVID-19 psychological dimensions questionnaire (CPD) showed high content validity, internal consistency, and construct validity. The scale has high validity and reliability in both clinical and normal populations. However, it should be noted that CPD has been administered and analyzed more in a normal population (less than 10% of sample individuals were infected by COVID-19). Hence, the results should be carefully generalized to the population with the disease experience.

Author Note:

The authors would like to thank all the participants in this study. This study has not received any financial support or grants.

Statements:

There is no conflict of interest to report. Ethical aspects of this study was approved by the scientific and ethical committee for research of Shahid Beheshti University of Medical Sciences. All the participants studied and signed the informed consent forms.

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Received	March 7, 2022
Revision received	July 10, 2022
Accepted	September 12, 2022