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Factorial Structure of the Covid-19 Pandemic Anxiety Scale (PAS-38) Using Exploratory and Confirmatory Factor Analysis

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Abstract: COVID-19 has created an unprecedented challenge for the whole world. Apart from being a big threat to lives, it has also created a lot of anxiety among the people. This study aimed to identify the factorial structures of the psychological anxiety scale for the COVID-19 pandemic. The initial form of the scale consisted of (55) items. The validity and reliability of the scale were verified. Moreover, the exploratory factor analysis was extracted, which showed the presence of three factors on which the items gathered: the somatic, the psychological, and the cognitive. Twelve items were deleted because they were not saturated with any of the three dimensions, then the confirmatory factor analysis was applied using the Amos program which indicated the results of the exploratory factor analysis of the scale, where nearly all the items of the three factors had significant loadings on the factor it belongs. Finally, the study recommended using this scale in future researches.

Keywords: Psychological anxiety, COVID-19, Factorial Structure, University students, Confirmatory Factor Analysis.

1. Introduction

The COVID-19 pandemic has caused widespread worry and concern among individuals worldwide. The fear of contracting the virus and the potential consequences of infection, including severe illness and death, have led to significant psychological distress in many people. Research has shown that worry and anxiety are prevalent during times of health crises and that the uncertainty and unpredictability of the COVID-19 pandemic have further contributed to increased worry.

Additionally, the disruption to daily life, including social isolation, economic insecurity, and changes to work and education, has further compounded stress and anxiety. It is crucial to recognize the psychological impact of the pandemic and to provide support and resources to individuals experiencing worry and anxiety to promote resilience and mental well-being during these challenging times [4].

The increasing numbers of infected cases and deaths, there are social, psychological and economic effects of this epidemic; this is because billions of individuals are subject or have been subjected to home quarantine, and many institutions and facilities have also closed to achieve social distancing as a measure to contain the spread of the virus, and the Corona pandemic and social distancing have changed the way individuals interact with each other [4].

Corona pandemic (covid-19) has gone beyond individuals to all families and societies, and redirected the compass of the entire world to contain the repercussions of this mysterious virus, especially as the lines of defense retreated in the face of the enormity of the misleading rumors that the media and social media had the lead in, which had a negative impact that worked It spread fear, anxiety, tension and frustration among people, especially with the distance education system and absence from the school environment, and the danger increased when the results of social distancing and their effects on mental health and emotional state were manifested by more feelings of anxiety and psychological disturbance.

As the virus's cases soar, the death toll rises, and severe measures to stop the diseasespread across the globe become mo

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re widespread, daily life has undergone rapid and unprecedented change. The identification of patients with coronavirus infections has received a lot of attention, but the needs of those affected by the pandemic for mental health care have received less attention [15].

There are currently significant problems with both physical and mental health as a result of the COVID-19 epidemic. Anxiety and dread seem to be the main psychological symptoms of COVID-19. This anxiety may have a long-term impact on the person. Although worry is a natural component of life, for some people it surpasses the status of a condition and becomes an essential part of who they are. As a result, people start to experience irrational concerns and symptoms like insomnia, nervousness, stress, and eating problems. Only a few of the documented mental health conditions that have been associated with the COVID-19 pandemic include stress, worry, fear, anxiety, and sadness, when a circumstance undermines a person's psychological health and security system, fear intensify [21].

In order to effectively assist those who are psychologically impacted by the epidemic and inform governmental policy on the psychology of the viral spread, it is important to understand how people are behaving and feeling about it. Understanding how the epidemic is affecting people's mental health right now can also be useful for comparing outcomes when examining the pandemic's long-term effects and its social repercussions. The threat of social stigmatization to affected people and their families' mental health is also growing. But the implications of the numerous manifestations that pandemic-related mental health disorders can take are being felt by both infected and non-infected individuals. Additionally, medical testing is frequently used to look for infected people, but mental health screenings are just as frequent [9].

Researchers around the world are trying to develop screening tools for measuring the adverse effects of the recent pandemic on mental health for different worldly populations; some tools have been adapted and contextualized for respective nations. Jordan, like the rest of the world, is dominated by the "Coronavirus pandemic" and is still on the joints of major events in it, like the rest of the world, to shape the form of social, political and economic events, as the epidemic claimed and injured thousands of Jordanian lives, leaving an economy suffering from major repercussions.

1.1 Anxiety

Anxiety consists of an emotional component represented in feelings of fear, panic, apprehension, tension, self-panic and annoyance, and a cognitive component represented in the negative effects of these feelings on a person's ability to properly perceive the situation and think about the consequences of failure and fear of the future, and a physiological component represented in the consequences of the state of fear of excitation and activation the autonomic nervous system. This situation leads to many physiological changes, including increased heartbeat, rapid breathing, and pallor of the face and sweating, as well as a behavioral component that includes the content of cautious or avoidant behavior [17].

Anxiety is a complex emotional response of fear, tension, distress, and a threat of reality or fear of its occurrence, a wave towards the personality as a whole, anxiety also includes a feeling of uneasiness, turmoil, anxiety related to future events, and preoccupation with thought about an expected or imminent pain or problem [7].

Psychological worry is a complex phenomenon that has been studied from various theoretical perspectives. Some of the key theories that have been used to explain worry include cognitive, behavioral, and psychodynamic theories. Cognitive theories of worry emphasize the role of thought patterns and beliefs in the development and maintenance of worry. According to these theories, individuals who have negative thought patterns, such as catastrophizing or overgeneralizing, are more likely to experience worry. Behavioral theories of worry focus on the role of avoidance behaviors and reinforcement in maintaining worry. These theories suggest that worry may be reinforced by avoiding situations or activities that are perceived as threatening. Psychodynamic theories of worry emphasize the role of unconscious conflicts and unresolved emotional issues in the development of worry. These theories suggest that worry may be a defense mechanism that is used to avoid or distract from underlying emotional conflicts.

More recently, mindfulness-based approaches have been used to address worry. Mindfulness-based approaches emphasize the importance of being present in the moment and accepting one's thoughts and emotions without judgment. These approaches have been found to be effective in reducing worry and improving overall well-being.

Overall, there are various theoretical perspectives that have been used to explain psychological worry. These theories emphasize the role of cognitive, behavioral, and psychodynamic factors, as well as the benefits of mindfulness-based approaches. A multidimensional approach that incorporates these various theories can provide a comprehensive understanding of the complex phenomenon of worry and can inform the development of effective interventions to address it.

1.2 Theories that Explained Anxiety

1.2.1 Analytical theory

This theory explained anxiety as a state of psychological pain, acting as a signal to the ego that there is a danger about to fall. As for the behavioral school, anxiety for it was educated from the environment in which the individual lives under conditions of positive and negative reinforcement. The behaviorists considered anxiety as a fear response provoked by stimuli. It does not provoke this response, but it has acquired the ability to elicit this response as a result of a previous learning process. Fear and anxiety are one emotional response, anxiety is a conditioned fear response, and the individual is not aware of the natural stimulus of it [17].

1.2.2 Humanistic Theory

The humanistic theory considered anxiety as the fear of the future and the events that it that may threaten human existence. Moreover, anxiety increases in the individual when he loses some of his energy and abilities as a result of neglect in health or suffering from an incurable disease or if he advanced in age and this means a decline of available opportunities and low success rate in his future, the humanistic theory is a psychological perspective that emphasizes the importance of individual subjective experience and personal growth. It emerged as a reaction to the dominant behaviourist and psychoanalytic theories of the mid-20th century, which were criticized for their narrow focus on observable behavior or unconscious processes, respectively. Humanistic psychology was developed by Abraham Maslow and Carl Rogers in the 1950s and 1960s and was based on the fundamental belief that humans are inherently good and have the potential for self-actualization, or the realization of one's full potential [25].

The humanistic theory emphasizes the importance of understanding people's subjective experiences and how they interpret and give meaning to their lives. Humanistic psychology also emphasizes the importance of personal responsibility, free will, and self-determination. Humanistic psychologists argue that people have an innate drive to develop and grow, and that this drive can be nurtured through positive interpersonal relationships, self-awareness, and self-exploration. One of the key concepts in humanistic psychology is Maslow's hierarchy of needs, which is a framework for understanding the progression of human needs from basic physiological needs to self-actualization. According to Maslow, people must first satisfy their physiological needs (such as hunger and thirst) before they can move on to fulfilling their safety, love and belongingness, esteem, and self-actualization needs. The fulfilment of these needs is seen as essential for the development of healthy individuals and society. Another important concept in humanistic psychology is Rogers' idea of unconditional positive regard, which emphasizes the importance of acceptance, empathy, and understanding in promoting personal growth and well-being. Rogers believed that individuals need to feel accepted and understood in order to be able to develop their true selves. Overall, the humanistic theory is a perspective that emphasizes the importance of the individual's subjective experiences and the innate drive towards self-actualization. It has been influential in the development of many areas of psychology, including humanistic therapy, positive psychology, and existential psychology [3].

1.2.3 Cognitive Theory

The cognitive theory was based on the idea that the people's emotions are a result of their way of thinking, and therefore it focused on the irrational thinking and the distortion of reality as one of the main causes of mental illness. The cognitive approach is based on the idea that what the individual thinks about himself is important matters that are closely related to his correct behavior or his pathological behavior. Social cognitive learning theory has also indicated that anxiety and fear can be learned in four ways: direct experience of pain or discomfort such as a direct increase to the dentist, or through the alternative experience of observing another person experiencing pain or discomfort in a particular situation; anxiety can also be acquired through Symbolic education such as reading about specific dangers or diseases, in addition to the theoretical perspectives mentioned, there are also other approaches that have been used to understand and address worry. For example, emotion regulation theories suggest that worry may be a maladaptive coping mechanism used to regulate negative emotions. According to these theories, individuals who have difficulty regulating their emotions may turn to worry as a way to manage anxiety, fear, or sadness. Additionally, attachment theories suggest that worry may be related to insecure attachment styles, where individuals who have insecure attachments may worry more as a way to feel a sense of control in their relationships.

Cultural factors are also important to consider in the study of worry. For example, some cultures place a high value on emotional control and suppression, which may lead to increased worry and internalizing symptoms. In contrast, other cultures may have more open and expressive attitudes towards emotions, which may lead to less worry and greater externalizing symptoms [8].

It is also important to note that worry is not always a negative experience. Some worry can be adaptive and can help individuals prepare for and cope with potential stressors. However, excessive worry can be problematic and can lead to negative consequences such as anxiety, depression, and physical health problems.

Overall, the study of psychological worry is a complex and multifaceted area of research. Various theoretical perspectives and approaches have been used to understand and address worry, and cultural factors play an important

role in shaping individuals' experiences of worry. A comprehensive understanding of worry requires consideration of multiple factors, and effective interventions should be tailored to address individual needs and cultural contexts.

1.3 Factor analysis

Factor analysis is a statistical method used to explore and identify underlying dimensions, or factors, in a set of data. Exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) are two commonly used types of factor analysis. EFA is an exploratory technique that is used to identify the underlying factors in a set of data.

It is often used when the structure of the underlying factors is unknown. EFA allows the researcher to identify patterns in the data and determine how many underlying factors are needed to explain the data. CFA, on the other hand, is a confirmatory technique that is used to test a pre-specified hypothesis about the structure of the underlying factors. It is often used when the researcher has a theoretical model of the underlying factors. CFA allows the researcher to test whether the data fit the pre-specified model and determine how well the data fit the model. Both EFA and CFA are important tools in psychometric research, and they can be used to explore and confirm the underlying structure of a 1.4 variety of constructs, such as intelligence, personality, and mental health [10].

1.4 Exploratory Factor Analysis

Exploratory factor analysis is used in the case of unknown or uncertain relationships between variables and factors. Factor analysis goes the way of exploration in determining the underlying factors and their relationship to the variables used. The result of the analysis and the way of exploration is going with the aim of identifying the underlying factors and their relationship to the variables [5].

Exploratory factor analysis (EFA) is a useful method for discovering the underlying structure of a set of variables, and it is often used when researchers do not have a pre-specified hypothesis about the number and nature of factors. EFA begins with the assumption that each variable is related to one or more underlying factors. The technique identifies the correlations among the variables and then groups them into factors that account for the correlations. EFA results in a set of factor loadings, which indicate the strength of the relationship between each variable and each factor. Researchers can then interpret the factors and label them based on the variables that have high loadings. EFA can be an iterative process, and researchers often run multiple analyses with different extraction methods and rotation techniques to identify the most meaningful and interpretable factors.

1.5 Confirmatory factor analysis

Confirmatory factor analysis (CFA) is a method for testing a pre-specified model of the underlying factor structure. In CFA, the researcher specifies a theoretical model of the relationship between the variables and the factors. The model is then tested against the data to determine how well it fits the observed data. CFA provides information about the fit of the model to the data, which can help researchers determine whether their theoretical model is a good representation of the underlying structure. CFA also, allows researchers to compare the fit of alternative models to determine which model best fits the data. This analysis aims to verify the structural validity of the standards that are built based on theoretical frameworks. It is one of the most widespread methods of factor analysis to verify the validity of the standards in order to work on the formulation of a hypothesis that says that there is a relationship between those structures under study [12].

The confirmatory factor analysis helps to identify and test the validity of certain models of measurement that are built according to a prior theory or research literature. They are statistical indicators that help the researcher determine the quality of the proposed model [14].

Overall, both EFA and CFA are powerful statistical methods for understanding the underlying structure of a set of variables. EFA is useful for exploratory research when the structure of the underlying factors is unknown, while CFA is useful for confirming a pre-specified theoretical model of the factor structure. Both techniques can be used to identify and validate the latent factors that are driving the relationships among a set of observed variables, and they are commonly used in fields such as psychology, education, and sociology.

2. Statement of the study problem

The problem of this study is the spread of the Corona virus in all countries of the globe, so that its repercussions have touched all humanity and generated fear and anxiety due to the psychological, social and economic damage that it contributed to. Studies revealed that the number of people who reported suffering from depressive and anxiety disorders increased by more than a quarter in 2020 and the beginning of 2021, and this led to an additional 76 million cases of anxiety-related disorders and 53 million cases of major depressive disorders. A number of COVID-19 cases have seen the largest increase in depression and anxiety, as young people have struggled to be separated from their friends as a result of school closures, and many women have found themselves taking on the brunt of household chores and facing

greater risks of domestic violence.

There is no doubt that the progress of any science is measured by the degree of accuracy it reaches in defining its concepts and in the accuracy of the tools used to measure it. The measurement process in educational and psychological research is a difficult and complex process compared to other natural sciences because the subject of measurement in education depends on human behavior in the fields of his performance is multiple mental, emotional, and self-kinetic, and building measurement tools is one of the main directions and concerns of researchers, especially the factorial construction within the framework of structural equations modelling. Therefore, this study came with the aim of verifying the factorial validity of the psychological anxiety scale associated with the Corona pandemic (Covid-19) among university students in Jordan.

2.1 Questions of the Study

This study sought to answer the following questions:

1-What are the indicators of the validity and reliability of the Covid-19 pandemic anxiety scale?

2- What is the factorial structure of the COVID-19 pandemic anxiety scale using exploratory factor analysis?

3-What is the factorial structure of the COVID-19 pandemic anxiety scale using confirmatory factor analysis?

3. Significance of the Study

This study derives its importance from the novelty of its subject and the impact of all countries of the world on the repercussions of this pandemic and its negative effects on all aspects of life, especially mental health. Degrees of accuracy and objectivity for how to verify the validity and reliability of psychological tests and measures. This study also contributes to providing a measure of anxiety associated with the COVID-19 pandemic that researchers and interested parties can use.

4. Terminology of Study

The terms are defined conceptually and procedurally as follows:

Anxiety

It is a psychological and physiological condition consisting of the combination of cognitive, physical and behavioral elements to create an unpleasant feeling usually associated with unease, fear and hesitation, and defined as a compound emotion of fear and anticipation of evil, danger or punishment. Psychological anxiety is defined procedurally as the degree to which the respondent obtains on the items of the scale developed for this study.

4.1 Factorial Validity

A form of construct validity that is reached through factor analysis, which is a statistical method that represents a large number of mathematical operations and treatments in analyzing the correlation between variables, interpreting these correlations and reducing them to a smaller number of variables called factor [24].

4.2 COVID-19

It is a family of viruses that may cause disease in animals and humans, and it is known that a large number of corona viruses cause respiratory infections in humans, ranging in severity from common colds to more severe diseases. The newly discovered coronavirus causes COVID-19, the novel coronavirus.

5. Literature Review

In order to examine the validity and reliability of the English version of the Stress and Anxiety to Viral Epidemics-6 (SAVE-6), which gauges the general population's anxiety response to the viral epidemic, Lee, Lee, Yoo, Suh, Chung & Lee [23] conducted a study. 314 Americans in total were signed up using an internet portal in exchange for money. An anonymous questionnaire was given to the participants in order to gather data on their demographics, psychiatric histories, SAVE-6, Patient Health Questionnaire-4 (PHQ-4), and Coronavirus Anxiety Scale. Confirmatory factor analysis's findings revealed the existence of a single-component model and produced high levels of internal consistency reliability (Cronbach's $\alpha = 0.88$). There were no gender disparities, according to the results of the multi-group CFAs: Additionally, the findings of this study confirmed the validity and reliability.

A study was undertaken by [26] to create a brief scale to measure COVID-19 pandemic anxiety. The sample consisted of 318 adult Indian individuals in total. In the first phase, the resulting Coronavirus Anxiety Scale (COVID-19 PAS) was also associated with a previously used scale based on the DSM-5. The study's findings showed that physical anxiety and terror accounted for 57.36 percent of the variance.

An 11-item Coronavirus Pandemic Anxiety Scale (CPAS-11) was created by Bernardo, Mendoza, Simon, Cunanan, Dizon, Tarroja, Balajadia-Alcala, and Saplala [1] to measure anxiety symptoms connected to the COVID-19 pandemic and to identify people who may require mental health treatment. The scale was tested on a sample of 925 Filipinos. Two variables were identified by exploratory factor analysis as representing somatic and non-somatic symptoms, and confirmatory factor analysis confirmed the two-factor model's good fit. Good internal consistency, convergent and divergent validity, and screening accuracy were all demonstrated by CPAS-11. The findings confirmed the usefulness of CPAS-11 as a tool for spotting those who are anxious about COVID-19.

Midorikawa, Aiba, Lebowitz, Taguchi, Shiratori, Ogawa, TakahashiI, Takahashi, Nemoto, Arai, & Tachikawa [13] conducted a study to assess fear and anxiety regarding COVID-19 viral infection, which is essential for investigating mental health during this epidemic. Based on responses to an online version of the questionnaire from a sizable, countrywide residential sample ($n = 6,750$) recruited through news and social media, the researchers had created and validated a Japanese-language version of the Fear of COVID-19 Scale (FCV-19S). According to the results of confirmatory factor analysis, the two-factor model of emotional fear reactions and symptomatic displays of fear provided a better match for our data than a single-factor model. Higher scores are correlated with socio-demographic characteristics that have been recognized as catastrophe vulnerabilities, such as female sex, sexual minority, aging, unemployment, and current psychiatric history.

The Coronavirus Anxiety Scale (CAS), a quick mental health screener to detect likely cases of dysfunctional anxiety related to the COVID-19 crisis, was developed and its qualities were evaluated by Lee [22]. This 5-item measure, which was based on answers from 775 persons who were concerned about the coronavirus, had good reliability and validity. Elevated CAS scores have been associated with coronavirus diagnosis, impairment, alcohol or drug use, inadequate religious coping, severe dejection, and suicidal thoughts. The CAS successfully distinguishes between those who have dysfunctional anxiety and those who do not using an ideal cut score of 9 (90% sensitivity and 85% specificity). These results attest to the CAS's efficacy and dependability as a tool for clinical research and practice.

Faisal, Jobe, Ahmed, and Sharker [22] replicated the analysis of the COVID-19 Worry Scale. A total of 729 Bangladeshis were selected to assess the psychological impact of the pandemic. The results supported the validation and reliability of the COVID-19 Worry Scale in Bangladeshi population. The validation of another COVID-19 mental health measure can help determine who is mentally affected by the pandemic and the extent of COVID-19's psychological impact.

6. Method and Procedure

The descriptive correlative approach was used for its suitability for the purposes of the current study. The population of the study consisted of Jordanian university students, whose number was (224000) in the academic year (2021/2022). A total of 699 responses were gathered through an online survey conducted between November 1 and November 26, 2021, from Jordanian universities.

6.1 Instrument of the Study

A pool of 55 potential items was developed each statement was written to capture a different expression of this specific type of anxiety.

7. Findings of the Study

7.1 In terms of the first question, which states: *What are the indications of the validity and reliability of the covid-19 pandemic anxiety scale?*

A-Content Validity

The scale validity content was achieved by presenting the scale to specialized arbitrators in the field of educational psychology at Jordanian universities to express their opinions and benefit from their observations regarding the clarity of the wording of the paragraphs and their belonging to the trait to be measured. The modifications were made in light of the observations they made, 5 items were deleted, the scale consisted in its final copy of (50) items.

B- Indicators of construct validity

The correlation coefficients of the items with the total score were extracted as these values ranged between (0.32 -0.67) and all of these values were positive which indicates that the study instrument has an appropriate construct validity.

C-Reliability Indicators:

The reliability of the study instrument was verified by extracting the internal consistency in terms of Cronbach alpha formula, where the scale was applied to an exploratory sample from outside the main study sample whose number was

(35) and its value reached (0.87). In addition, the split-half reliability was found; its value reached (0.90). All of these values are appropriate for the purposes of the current study.

7.2 With respect to the findings of the second question which states: What is the factorial structure of the covid-19 pandemic Anxiety Scale using exploratory factory analysis?

To answer this question, the Factorial analysis procedures were conducted, the normal distribution was verified by extracting the Kolmogrove-Smirnov test, where its value reached (0.012) with a significance level (0.876), which indicates a normal distribution of the data. In addition, the (KMO) test was extracted, which showed the adequacy of the study sample for conducting factor analysis, as its value reached (0.78), which is more than the benchmark (0.50), which indicates the adequately of the sample.

The Principal Component Analysis method of Hoteling, which is one of the most accurate factor analysis methods where each factor extracts the most possible variance. The axes were rotated perpendicularly by Varimax with Kaiser Normalization method as displayed in Table (1).

Table 1: Eigenvalues, explained variance, and the cumulative variance of the factors composing the covid-19 anxiety scale

Component	Initial Eigenvalues		
	Total	% of Variance	Cumulative %
1	9.519	19.038	19.038
2	2.572	5.144	24.182
3	1.976	3.953	28.134
4	1.821	3.642	31.776
5	1.616	3.231	35.008
6	1.425	2.850	37.857
7	1.408	2.816	40.673
8	1.365	2.730	43.403
9	1.345	2.690	46.093
10	1.234	2.468	48.562
11	1.164	2.328	50.889
12	1.126	2.252	53.141
13	1.089	2.179	55.320
14	1.044	2.087	57.408
15	1.005	2.011	59.419

The results of table (1) demonstrated that there were three factors whose value was higher than one, and that the first factor had a value of (9.519), which explained (19.038%) of the total variance, while the value of the second factor was (2.572), with explained variance percentage (5.572%). Moreover, the result of the division of the first factor over the second factor is more than (2), which indicates the availability of a one-dimensional trait in the performance on this scale. Figure (1) describes a graphical representation (Scree Plot) of the Eigenvalues of the factors composing the digital culture test.

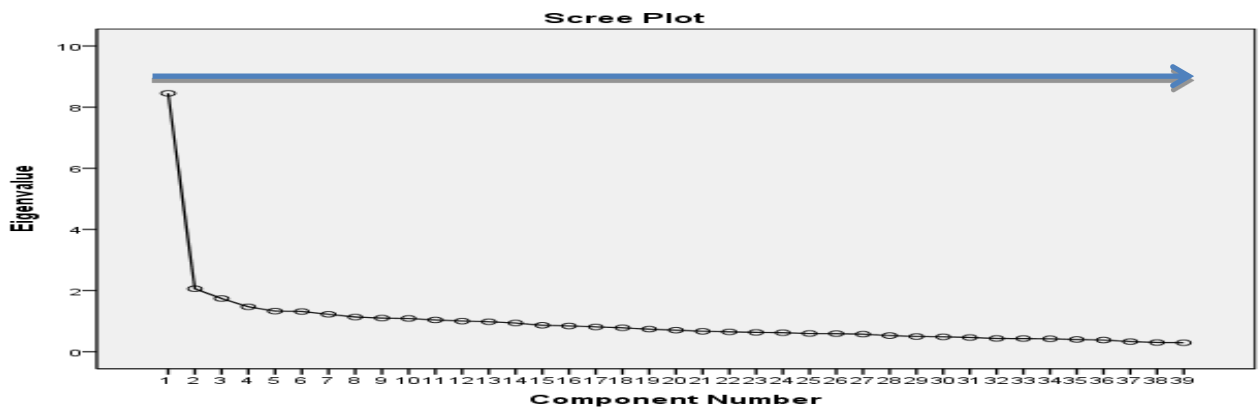


Fig. 1. The graphical presentation of the factors with Eigenvalue that explain the variance of the covid-19 anxiety scale
 It is noticed that the Eigenvalue of the first factor is immense compared to the second factor. There is a tendency for the third factor to shift while remaining close to the rest of the factors. It also suggests the presence of a dominant trait

in the scale.

Table 2: The loadings of the scale items on the resulted factors

Factor 1: psychological	Factor 2: Cognitive	Factor 3: Somatic	item
0.064		0.611	My sleep is disturbed and interrupted due to Corona.
		0.402	I have dreadful dreams.
		0.536	I have troubles in my stomach from Corona fear and anxiety.
		0.414	I often notice that my hands are trembling.
		0.452	I suffer from bouts of diarrhea.
		0.495	I get bouts of nausea.
		0.418	I often feel a sense of breathlessness.
		0.554	I feel hungry most of the time.
		0.492	I quickly feel tired.
		0.421	I feel so excited that I can't sleep.
		0.533	I have periods of so much instability that I cannot even sit in my seat.
		0.579	I sweat easily even on cold days.
		0.426	I often suffer from headaches.
		0.409	My heart is pounding hard and agitated.
		0.459	My arms and legs often feel heavy.
		0.652	I sometimes suffer from constipation.
		0.222	I cry easily.
-0.017	0.398		I trust myself.
0.194	0.517		It is hard to focus my mind on something.
0.205	0.543		I have a strong vulnerability to events.
0.147	0.548		I think I'm more sensitive than others.
0.230	0.573		Obstacles are piling on me that I don't think I can overcome them.
0.589			I tend to sit alone most of the time.
0.395			I am getting more nervous than before.
0.443			When seeing or hearing about a pandemic, I get nervous
0.518			I don't feel happy most of the time.
0.542			I am worried about something or someone almost all the time.
0.420			I become more sensitive towards minor physical symptoms than usual.
0.459			I feel frightened when there are lockdowns
0.498			I feel I have become easily annoyed.
0.511			I am so afraid I might catch coronavirus.
0.527			I think I am sometimes worried about things of no value.
0.409			I'm afraid that the covid-19 will cause me to die painfully.
0.499			My dread of dealing with strangers has increased.
0.549			I feel trouble to get relaxed.
0.434			I am concerned about my family being affected by covid-19.
0.539			I fear of being hospitalized due to covid-19.
0.504			I feel like I don't want to communicate with my friends.

By reviewing the items grouped on the factors in the table above, it was noted that each grouping of items shares one trait, and therefore the first factor was named (psychological), the second factor was (cognitive), and the third was (somatic). The deleted items were the following: (3, 13, 17, 22, 23, 29, 32, 39, 46, 38, 48, 50).

7.3 The results of the third question which state: What is the factorial structure of the Covid-19 pandemic anxiety scale using confirmatory factor analysis?

A CFA was run to test whether or not the three dimensions identified in the previous PCA cohered together into a single coronavirus anxiety construct. AMOS (V24) program was used, and by using the Maximum Likelihood method and extracting some indicators to investigate this match, namely: chi-square (χ^2), standard chi-square (CMIN/DF), and good fit index (GFI), Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), Standardized Match Index (NFI), and Root Mean Rounding Error (RMSEA). Some indicators have given indications of the degree of conformity of the extracted model with the theoretical scale, and the following figure shows the structural model extracted using the AMOS program.

The following model matching indicators were extracted as table (3) shows, besides the Confirmatory factor analysis diagram as can be seen in diagram(2).

Table 3: Fit indices of higher order confirmatory factor analysis models

Fit indicator	Fit criteria	Calculated value		result
χ^2	$> p \ 0.05$	0.000	p	Not fitting
		2172.0	χ^2	
		699	DF	
CMIN/DF	CMIN/DF < 5	3.107		fitting
GFI	GFI ≥ 0.90	0.890		fitting
CFI	CFI ≥ 0.90	0.910		fitting
TLI	TLI ≥ 0.90	0.891		fitting
NFI	NFI ≥ 0.90	0.870		fitting
RMSEA	$0.08 \geq RMSEA \geq 0.00$	0.062		fitting

It is obvious from table (3) above that all indicators used to verify the conformity of the model with the data were all identical, except for the Chi-Square index; its value reached (2172.00) with a statistical significance level of (0.000) (p = which is less than (0.05)). The following is a presentation of these indicators, their values, and their conformity:

- 1) Standard Chi-square (CMIN/DF): This indicator has a value of (3.107), and this value is good as it is less than 5 as an admission test. This supports the congruence between the proposed theoretical model and the data of the exploratory sample.
- 2) Comparative Conformity Index (CFI): This index has a value of (0.911), and this value is good, as it is equal to the value of the minimum cut-off score as an admission test, which is (0.90). This is an indication of the quality of matching the independent model with the proposed theoretical model, and thus this is reflected in the matching between the data of the exploratory sample and the assumed model.
- 3) The square root mean rounding error (RMSEA): This indicator has a value of (0.062), and this value is good as it is within the acceptance test range between (0.00 and 0.08). This reinforces to a high degree the hypothesis of matching the proposed theoretical model in the study community, and thus is reflected in the matching between the data of the exploratory sample and the assumed model.
- 4) Good Fit Index (GFI): Its value is (0.890), and this value is very close to the value of the minimum cut-off score as a test for acceptance, which is (0.90), which is less than it by (0.02). This reinforces the hypothesis that the assumed model matches the data of the exploratory sample.
- 5) Tucker-Lewis Index (TLI): Its value is (0.891), and this value is very close to the value of the minimum cut-off score as an admission test, which is (0.90), which is less than it by (0.06). This reinforces the hypothesis that the assumed model matches the data of the exploratory sample.
- 6) 6 - Standard Conformity Index (NFI): This indicator has a value of (0.870).

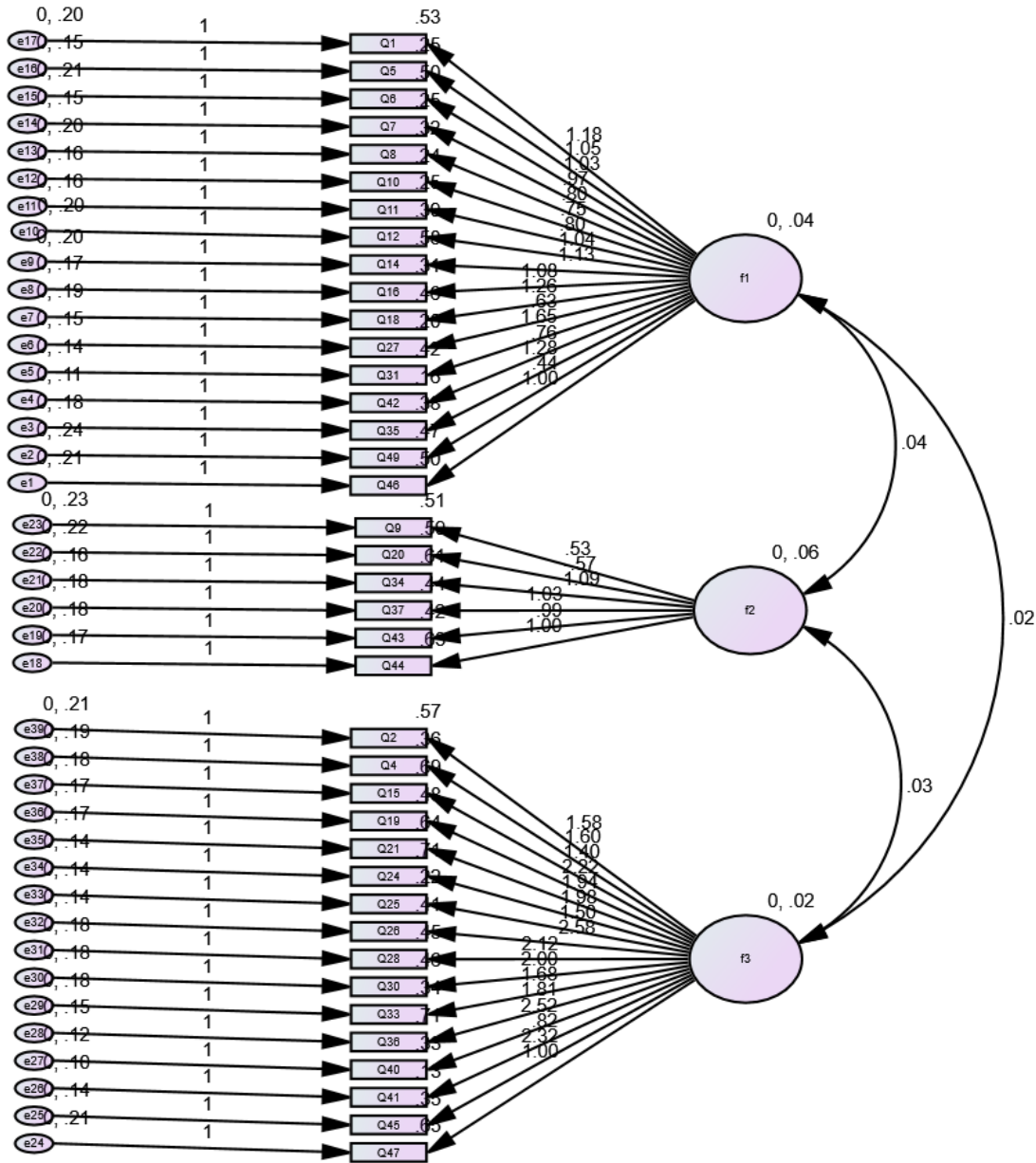


Fig. 2. Confirmatory factor analysis diagram

8. Conclusion

The purpose of the current study was to develop a short scale for assessing COVID-19 pandemic anxiety. The psychological challenges that human beings face during and after the pandemic are quite demanding. Mental health care during this period should be given considerable importance. The newly developed COVID-19 PAS could be a useful instrument for studying anxiety resulted from the COVID-19 or any similar pandemic in the future . The current study revealed three psychological factors, namely somatic dimension, Psychological and cognitive. However, this study only gives a preliminary insight into the internal consistency and validity of the scale. As the pandemic situation unfolds, more studies using the scale will provide further insight.

8.1 Recommendations for Further Research

- Such adaptations of this scale should be tested on representative, diversified, and general clinical samples.
- Using the scale in future research.
- In order to better understand how COVID-19 is affecting people mentally around the world, future researches

should involve translating and verifying the COVID-19 anxiety Scale across other populations.

8.2 Limitations of the Study

There are certain restrictions on the study, despite the scale's notable reliability and validity. Social desirability can cause bias, which could have an impact on the scale's results. Participants in the current study were similarly between the ages of 18 and 21. This restriction made it impossible to assess the scale's generalizability for the elder groups. The resulted scale is not advised for use in specific diagnostic procedures.

Data Availability

The underlying data supporting the findings of this study can be obtained by contacting the corresponding author directly.

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Ethics Approval

Ethics approval was not required for this study.

Conflict of interest

The authors declare that there is no conflict regarding the publication of this paper.

References

- [1] A. Bernardo, N. Mendoza, P. Simon, A. Cunanan, J. Dizon, M. Tarroja, A. Ma Balajadia-Alcala & J. Saplala.(2020). Coronavirus Pandemic Anxiety Scale (CPAS-11): development and initial validation. *Current psychology*, New Brunswick, N.J.: 1–9, [DOI: 10.1007/s12144-020-01193-2](https://doi.org/10.1007/s12144-020-01193-2), (2020).
- [2] American Psychiatric Association (APA),(2013). *Diagnostic and statistical manual of mental Disorders 5th ed.*, (2013).
- [3] A. Ohman.(2018). Fear and anxiety: Evolutionary, cognitive, and clinical perspectives. In M. Lewis & J. M. Haviland-Jones (Eds.), *Handbook of emotions*, 2nd ed., Guilford: 573–593, (2018).
- [4] D. Banerjee & M. Rai. (2020).Social Isolation in COVID-19: The Impact of loneliness. *The International Journal of Social Psychiatry*, **66** (6):525-527, DOI: 10.1177/0020764020922269.
- [5] D. D. Gunzler & N. Morris.(2016). A Tutorial on Structural Equation Modeling for Analysis of Overlapping Symptoms in Co-occurring Conditions Using MPlus, *Statistics in Medicine*, **34** (24), DOI: 10.1002/sim.6541, (2016).
- [6] D. H. Barlow. Disorders of emotion.(1991). *Psychological Inquiry*, **2** (1), 58–71. [DOI: 10.1207/s15327965pli0201_15](https://doi.org/10.1207/s15327965pli0201_15), (1991).
- [7] D. H. Barlow.(2004). *Anxiety and Its Disorders: The Nature and Treatment of Anxiety and Panic*. New York, NY, Guilford Press, (2004).
- [8] D. H. Schunk & M. K. DiBenedetto.(2020). Motivation and social cognitive theory. *Contemporary Educational Psychology*, **60**,101832, [DOI: 10.1016/j.cedpsych.2019.101832](https://doi.org/10.1016/j.cedpsych.2019.101832), (2020).
- [9] G. Mertens, L. Gerritsen, S. Duijndam, E. Salemink, & I. Engelhard(2020). Fear of the coronavirus (COVID-19): Predictors in an online study conducted in March 2020. *Journal of Anxiety Disorders*, **74**, 1-8. [DOI: 10.1016/j.janxdis.2020.102258](https://doi.org/10.1016/j.janxdis.2020.102258), (2020).
- [10] G. Nagy, M. Brunner, O. Lüdtke, S. Greiff(2017). Extension Procedures for Confirmatory Factor Analysis. *The Journal of Experimental Education*, **85** (4), 574–596. [DOI:10.1080/00220973.2016.1260524](https://doi.org/10.1080/00220973.2016.1260524), (2017).
- [11] G. Orrù, D. Bertelloni, F. Diolaiuti, C. Conversano, R. Ciacchini, A. Gemignani.(2019). A psychometric Examination of the Coronavirus Anxiety Scale and the Fear of Coronavirus Disease 2019 Scale in the Italian Population, *Frontiers in Psychology*, **12**, DOI:10.3389/fpsyg.2021.669384, (2021).
- [12] H. Kim, B. Ku, J. Kim, Y.G. Park, Y.B. Park(2016). Confirmatory and Exploratory Factor Analysis for Validating the Phlegm Pattern Questionnaire for Healthy Subjects, *Evidence-Based Complementary and Alternative Medicine*: 1-8, DOI:10.1155/2016/2696019, (2016).

- [13] H. Midorikawa, M. Aiba, A. Lebowitz, T. Taguchi, Y. Shiratori, T. Ogawa, A. Takahashi, S. Takahashi, K. Nemoto, T. Arai, & H. Tachikawa, Confirming validity of The Fear of COVID-19 Scale in Japanese with a nationwide large-scale sample. *PLOS ONE*, **16** (2), Article e0246840, DOI: [10.1371/journal.pone.0246840](https://doi.org/10.1371/journal.pone.0246840), (2021).
- [14] Miyejav.(2018). Confirmatory factor analysis of Mathematics Teachers' Professional Competences (MTPC) in a Mongolian context. *EURASIA Journal of Mathematics, Science and Technology Education*, **14** (3). 499-608, DOI: 10.12973/ejmste/80816, (2018).
- [15] Xiong, O. lipstiz, F. Nasri, L. Lui, H. Gill, L. Phan, D. ChenLi, M. locobucci, R. Ho & R. Mchntyre.(2020). Impact pf covid-19 pandemic on mental health in the general population: A systematic review, *Journal of Affective disorders*, 227, 55-64, (2020).
- [16] Cosmides & J. Tooby.(2000). Evolutionary psychology and the emotions. In M. Lewis & J. M. Haviland-Jones (Eds.), *Handbook of emotions*, 2nd ed., Guilford: 91–115, (2000).
- [17] Fajkowska, E. Domaradzka & A. Wytykowska.(2018). Types of Anxiety and Depression: Theoretical Assumptions and Development of the Anxiety and Depression Questionnaire. *Frontiers in Psychology*. **8**:2376, DOI: 10.3389/fpsyg.2017.02376, (2018).
- [18] O. Ahmed, M. Ahmed, S. Alim, A & M. Jobe.(2022). COVID-19 outbreak in Bangladesh and associated psychological problems: An online survey. *Death Studies*, **46** (5):1080-1089, DOI: 10.1080/07481187.2020.1818884, (2022).
- [19] P. Ekman.(2003). *Emotions revealed: Recognizing faces and feelings to improve communication and emotional life*, 2nd ed. Owl Books, (2003).
- [20] R. Faisal, M. Jobe, O. Ahmed, & T. Sharker.(2020). Replication analysis of the COVID-19 Worry Scale, *Death Studies*, **46** (3), 574-580, DOI:10.1080/07481187.2020.1815104, (2022).
- [21] S. Dubey, P. Biswas, R. Ghosh, S. Chatterjee, M. J. Dubey, S. Chatterjee, et al. (2020). Psychosocial Impact of COVID-19. *Diabetes Metab Syndr*. **14**, 779 – 788, DOI:[10.1016/j.dsx.2020.05.035](https://doi.org/10.1016/j.dsx.2020.05.035), (2020).
- [22] S. Lee(2020). Coronavirus Anxiety Scale: A brief mental health screener for COVID-19 related anxiety, *Death Studies*,**44** (7), 393–401, DOI: [10.1080/07481187.2020.1748481](https://doi.org/10.1080/07481187.2020.1748481), (2020).
- [23] S. Lee, J. Lee, S. Yoo, S. Suh, S. Chung & S. A. Lee.(2021). The Psychometric Properties of the Stress and Anxiety to Viral Epidemics-6 Items: A Test in the U.S. General Population. *Front. Psychiatry* **12**:746244, DOI: 10.3389/fpsyg.2021.746244, (2021).
- [24] F. Lewis.(2017). Evidence regarding the internal structure: Confirmatory factor analysis. *Measurement and Evaluation in Counseling and Development*, **50** (4), 239–247, DOI:[10.1080/07481756.2017.1336929](https://doi.org/10.1080/07481756.2017.1336929), (2017).
- [25] T. Lecerf, & G.L. Canivez.(2018).Complementary exploratory and confirmatory factor analyses of the French WISC-V: Analyses based on the standardization sample. *Psychological Assessment*, **30** (8), 793–808. DOI:[10.1037/pas0000638](https://doi.org/10.1037/pas0000638), (2018).
- [26] V. Kumar, G. Tankha, S. Shelly, T. Apeksha.(2020). Construction and Preliminary Validation of the COVID-19 Pandemic Anxiety Scale. *Systematic Reviews in Pharmacy*, **11**(9):1019-1024. DOI:10.31838/srp.2020.9.147, (2020).
- [27] World Health Organization (WHO). WHO Director-General's opening remarks at the media briefing on COVID-19. Retrieved March 11, 2020, from <https://www.who.int/dg/speeches/detail/who-director-general-s-opening-remarks-at-themedia-briefing-on-covid-19>, (2020a).
- [28] World Health Organization (WHO). Coronavirus disease (COVID-19) outbreak situation, Retrieved from <https://www.who.int/emergencies/diseases/novel-coronavirus> 2019, (2020b).