Kurdish Studies
Feb 2024
Volume: 12, No: 2, pp.5943-5953
ISSN: 2051-4883 (Print) | ISSN 2051-4891 (Online)
www.KurdishStudies.net

Received: December 2023 Accepted: January 2024
DOI: https://doi.org/10.58262/ks.v12i2.442

Validation and Psychometric Properties of the Arabic Version of the Fear of COVID-19 Scale Using Item Response Theory

Izzeldeen Abdullah Alnaimi[1]

Abstract

The deadliest infectious pneumonial disease clouded the globe with fear and terror intensively. Even though most of the world's attention is focused on the consequences of the coronavirus on physical wellbeing, the virus's psychological ramifications must not be disregarded. However, few screening tools have been introduced and evaluated to assess COVID-19's psychological impact. The Fear of COVID-19 Scale (FCV-19S) determines the degree of COVID-19-related fear. The study aimed to assess the reliability and psychometric properties of the newly translated fear administrative tool FCV-19S in Arabic using Item Response Theory (IRT). Responses were collected from the general Saudi population. Inclusion criteria were being (i) resident in Saudi Arabia, (ii) aged 18 years or older, and (iii) being able to understand spoken Arabic. Participants were recruited from online advertisements and google forms. Initial descriptive were calculated including skewness and kurtosis on the recruited participants (n = 720). Exploratory and confirmatory analysis proved the scale's internal consistency to be adequate. The psychometrics of the scale were analyzed using item response theory, which suggested the proved the scale's item consistently discriminating. FCV-19S has high psychometric qualities for measuring COVID-19 fear in the general population of Saudi Arabia, according to the findings.

Keywords: *Psychometric properties, Reliability, Validity, Item Response Theory, COVID-19, Pandemic, Fear of COVID-19 Scale, Saudi Arabia*

Introduction

Corona Virus the Novel Disease is also known as SARS-CoV brought great fearfulness to every individual's life. Humanity witnessed the world's biggest pandemic and the normal cycle of life was turned upside down. As unexpected it was every other person had to shut themselves down to into the loneliness he was born with. The world's biggest threat was wiping cities and families. The continuous decreasing mortality rate in different countries was bringing panic in the earthlings.

This global crisis brought more than 5 million deaths to the earth and still counting. The deadly virus made mankind shift to the virtual world totally. Mortals were not only fighting the Covid but also factors like depression, anxiety, fearfulness, loneliness, etc. The social interdependent creatures befriended themselves with WiFi and balconies. The mandatory precautionary practices were improvising human's mental health and its symptoms.

[1] Imam Mohammad Ibn Saud Islamic University, Faculty of Social Sciences/Department of Psychology, Email: eaalnuaimi@imamu.edu.sa

Individuals were working remotely behind the locked door meanwhile the doctors and nurses were out there risking their day count endangered by covid were directly and indirectly influenced by several mental health crises (Ahorsu et al.,2020). The rational fear made the existing therapy-seeking people cancel their upcoming appointments. The clinical settings were at high risk mostly because the virus was very contagious and SARS wards were linked in many cases (Xiang et al.,2020). Healthcare professionals working in hospitals caring for infected patients should receive regular clinical screenings for depression, anxiety, and suicide by mental health professionals. Prompt psychiatric treatment should be provided to those with more severe mental health problems. It caused a great deal to those who seek treatment for other chronic diseases like dialysis patients because public places were at great risk and probably carrying the coronavirus. These medical conditions were burdening humans mentally and physically. In most cases, patients and health front liners cope their mental distress with interpersonal connection, bondage, and linkage however the ongoing situation made people connect virtually through different portals for example zoom. (Lin et al.2021) cited authors titled them study "zoom-in and zoom-out" discussing how lockdown resulted in humans' transition to therapy into teletherapy. Therapists are designed to work in a therapeutic, clinical, and controlled environment. The biggest challenge faced during the pandemic was humans meeting in person regardless of any purpose. The study also recorded poor results in therapeutic practices done in a virtual manner. The study also suggests that the results can be better if training is introduced among therapists.

To acquire the maximum knowledge of fear during the pandemic situation, virtual scaling methods were made to conduct studies and appropriate data. Fear produces a negative response to emotion which can lead to perceived stress and anxiety (Bavel et al.,2020). The COVID-Fear scale has been used all around and is translated into many languages to get accurate responses.

The COVID-19 Phobia Scale (FCV-19S) was developed to test this fear in a typical Iranian society and has proven to have adequate psychometric properties (Ahorsu et al.,2020). This scale has been validated in Italian (Soraci et al.,2022), Arabic (Alyami et al.,2020), Bangla (Sakib et al.,2022), Turkish (Satici et al.,2021), Norway (Iversen et al.,2021) and Spanish(Victoria et al.,2020), Argentina(Caycho-Rodríguez et al.,2020), which limits the breadth of cross-cultural research. Furthermore, recent findings have shown that two-dimensional frameworks can better understand the FCV-19S's framework (Reznik et al.,2021); thus, assessments of the FCV 19S's interior structure are required to determine whether a one-dimensional or two-dimensional method is best.

Therefore, the current study is distinguished from other studies, as it seeks to verify the psychometric properties of the Arabic Version of the Fear of COVID-19 Scale according to the Item Response Theory , in an attempt to provide an objective measurement tool on the subject of detecting symptoms of fear from the Corona virus in the Arab environment using (IRT), because the latent trait models did not receive much attention in building and validating educational and psychological scales on the Arab environment and the lack of Arab studies - according to the researcher's knowledge - that dealt with the use of modern test theory to verify the psychometric properties of this scale, it was necessary Conducting this study.

Methodology

Participants and Procedure

An anonymous online poll and a snowball sampling approach were used to recruit participants. A screening tool containing demographic information and a Saudi translated version of the Fear of COVID-19 Scale was provided to the recruited participants through a link channeling to google forms on social media messengers and emails. Google Forms was used to conduct the online survey, ensuring that it reached a large number of people and was simple to use. The survey participants were invited to share it with their personal and professional networks.

Comprehensively, 720 participants were recruited using convenience sampling from Saudi Arabia, out of which 391 (54.3%) were male and 329 (45.7%) were female of different educational, socio status, and working backgrounds. Aged between 18 and 60 years (M= 24.82, S.D= 8.05), as shown in Table 1. Recruited participants were told to evaluate every sentence and choose the descriptive rating that best characterized their opinions. There was no need to reverse score any of the items, and higher scores indicated a greater fear of Covid.

Table 1. Demographic Information.

Background	Category	N	%
Gender	Male	391	54.3%
	Female	329	45.7%
Education Level	Primary Stage	9	1.3%
	Intermediate Stage	23	3.2%
	High School	149	20.7%
	Bachelor's	474	65.8%
	Masters	49	6.8%
	Doctoral	16	2.2%
Social Status	Single	551	76.5%
	Married	157	2.8%
	Divorced	9	1.3%
	Widower	3	0.4%
Job	Government	81	11.3%
	Private	54	7.5%
	Student	519	72.1%
	Unemployed	57	7.9%
	Retired	9	1.3%
Age Group	30 Years and Below	612	85%
	More than 30 years	108	15%

Measurements

The Arabic Fear of COVID-19 Scale (6) was developed from the English version of the scale published in the original study by Ahorsu et al. (2020) to measure fear of COVID-19. The screening tool consists of seven items (e.g., "I cannot sleep because I am worried about getting coronavirus-19") with a five-item Likert point response from 1 (strongly disagree) to 5 (strongly agree) and its score range is 7 to 35. The higher the score indicates the greater the fear of COVID-19 (Ahorsu et al.,2020). The earlier version Persian scale has high internal reliability (Cronbach alpha =.82) and test-retest reliability (ICC =.72), as well as positive assessments of other qualities based on classical test theory and Rasch model analysis. In the "Results" section, the psychometric qualities

Data Analysis

The characteristics of study participants were described using descriptive statistics. Means and standard deviations were reported as continuous data, similarly, frequencies and percentages were reported as categorical data. Skewness and Kurtosis were also conducted to analyze each items. According to West, Finch & Curran (1995), the cut-off for a significant deviation from univariate normalcy is an absolute skewness value > 2 and an absolute kurtosis value > 7. Internal consistency was calculated using Cronbach's alpha as recommended by Hair et al. (1995), the cut-off criteria for internal consistency is > 60. As previously mentioned in the literature, the factor structure of the Fear of COVID-19 was validated using confirmatory factor analysis (CFA). GFI, NFI, and CFI ≥ .90 and SRMR ≤ .08 were regarded acceptable fit indicators. The discrimination, difficulty, and informativeness of the Fear of COVID-19 Scale were investigated using Item Response Theory once the factorial structure was established (Chalmers,2012). Since classical test theory does not allow us to obtain more detailed and reliable information at the individual and item level. The item characteristic curve (ICC), which is a curve curved like a "S" was utilized in ICC analysis, and the Graded Response Model (GRM), which is ideal for 5-point Likert-type scales, was used to characterize these essential elements of the IRT parameters (Baker,2001). A value of $\alpha > 1.0$ is regarded highly discriminating. The current study's analyses were carried out with IBM SPSS Statistics 28.0, Amos Graphics 26, and Stata 15.

Results

Statistical analysis was done on the collected data to study the psychometric properties of the scale. Item distribution and their reliability used in COVID-19 measure were studied and good description was acquired using the measures of internal tendency, central tendency, skewness, and kurtosis by the responses of each item. According to Byrne and Campbell (1999), a normal distribution may be proven when the skewness and kurtosis values are close to zero i.e. somewhere between -1.5 & +1.5. The calculations in Table 1 shows that the items are reliable but are unlikely to be normally distributed. The kurtosis values are relatively high than the skewness if the item as presented in Figure 1.

Internal Consistency

The internal consistency of the Arabic FCV-19S was good ($\alpha = 0.865$). The inter-item correlations ranges between 0.375 and 0.688, similarly item correlation after correction ranged between

Table 2. Overall Descriptive for FCV-19S (Overall Cronbach's Alpha Score = 0.865).

Item	Mean (S.D)	Skewness (St. Error)	Kurtosis (St. error)	Cronbach's alpha
Item 1	2.39(1.17)	0.489(0.91)	-0.623(0.182)	0.846
Item 2	2.54(1.26)	0.238(0.91)	-1.223(0.182)	0.847
Item 3	1.51(0.848)	1.945(0.91)	3.951(0.182)	0.852
Item 4	2.23(1.27)	0.702(0.91)	-0.684(0.182)	0.848
Item 5	2.56(1.23)	0.209(0.91)	-1.129(0.812)	0.843
Item 6	1.52(0.86)	1.883(0.91)	3.372(0.182)	0.847
Item 7	1.76(1.092)	1.44(0.91)	1.213(0.182)	0.842

0.612 and 0.673 in each item. Which indicates that the scale's internal consistency is adequate.

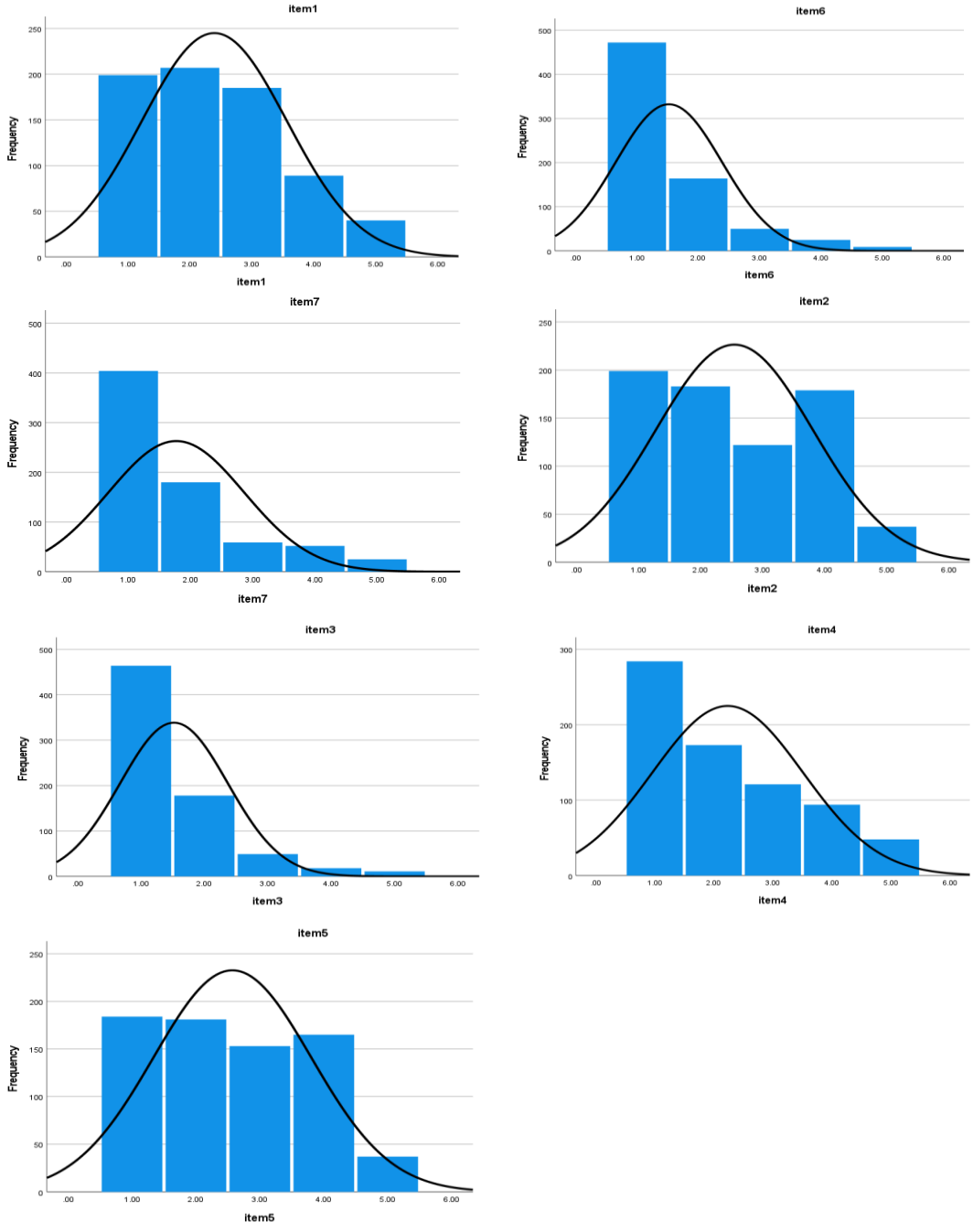

Figure 1: Skewness and Kurtosis of the Items.

Factor Analysis of the Arabic Version of FCV-19S

Exploratory and Confirmatory factor analysis were done using SPSS Amos 26 Graphics on each items. The communalities extractions ranged between 0.53 to 0.63. Because dimension reduction strategies look for things with a common variance, any item with a communality score of less than 0.2 should be removed (Child,2006). As seen in **figure 3.** That factors

loading between fear and each item did not fall the cut-off (0.2), which indicates that none of the items were extracted and the solution cannot be rotated. The scale's outstanding psychometric performance is confirmed by factor loadings.

Table 3: Inter-Item Pearson's Correlation Matrix and Corrected Item-Total Correlations.

	item1	item2	item3	item4	item5	item6	item7	Corrected item-total Correlation
item1	1.000							0.643
item2	0.584	1.000						0.642
item3	0.406	0.375	1.000					0.612
item4	0.522	0.491	0.407	1.000				0.632
item5	0.507	0.589	0.415	0.516	1.000			0.663
item6	0.425	0.401	0.679	0.439	0.446	1.000		0.659
item7	0.437	0.429	0.605	0.485	0.497	0.688	1.000	0.673

Statistically Significant at $\varrho < .01$ (Two Tailed).

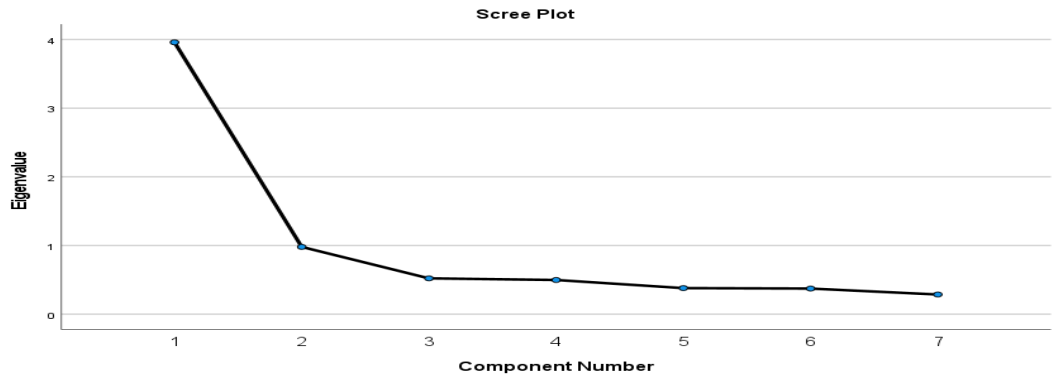

Figure 2: Exploratory Factor Analysis, Scree Plot.

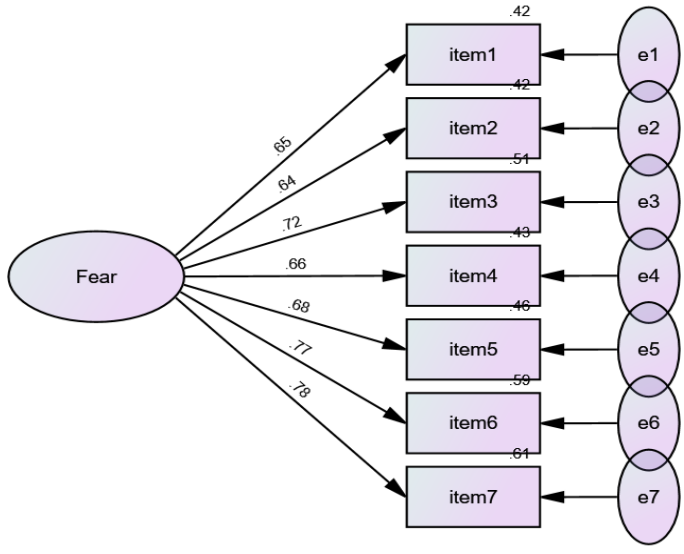

Figure 3: Baseline Model with No Covariance's Correlates.

Graded Response Model (IRT Results)

In IRT models, intercept parameters, also known as slope and discrimination parameters, describe how successfully an item discriminates between levels of the latent characteristic and θ. Higher intercepts indicate that the item is better at discriminating θ. The point along θ and the axis where endorsing two neighboring categories (e.g., "a lot less" vs "slightly less") has a probability of 0.5 is referred to as the threshold parameter. Because θ has a conventional normal distribution, threshold parameters may be read as z-scores of θ. For example, a threshold 1 of 1.50 indicates that individuals who react with "a lot less" are below 1.50 on the latent trait than those who respond with "slightly less." It is optimal for k1 threshold settings to span a wide range of a typical normal distribution, where k is the number of answer categories so that varying amounts of θ are collected based on participant replies.

Table 4. IRT Results for the FCV-19S Scale.

Item	α	b_1	b_2	b_3	b_4
Item 1	1.83	-.7554	.2471	1.205	2.178
Item 2	1.89	-.7469	.1687	.7180	2.194
Item 3	2.73	.4406	1.371	2.003	2.616
Item 4	1.96	-.3008	.5883	1.118	1.967
Item 5	2.03	-.8033	.0820	.7507	2.129
Item 6	3.53	.4561	1.245	1.784	2.571
Item 7	3.34	.2129	.9677	1.355	2.017

As seen in Table 4, all α values were more than 1.0. As a result of the experience, the Fear of COVID-19 Scale had acceptable item difficulty and the capacity to differentiate each item, according to IRT data. Whereas Item 6 had the maximum discrimination, as per the item parameters (α = ±3.53), followed by Item 7 (α = ±3.34), however, Item 1 (α = ±1.83), and Item 2 (α = ±1.89) were reported to be the least discriminating. We used ICCs to measure item discrimination as a function of COVID-19 perceived risk. Across the theta spectrum, all of the objects gave the most information.

In accordance with the psychological dimension of fear, item information functions were studied as shown in the item information curves in the **figure. 4**. Item 6 and 7 are the most accurate for evaluating the latent characteristic, according to the Item Information Curve. Furthermore, the Test Information Curve suggests that the factor is more dependable (accurate) in the 0 to 4 scale range.

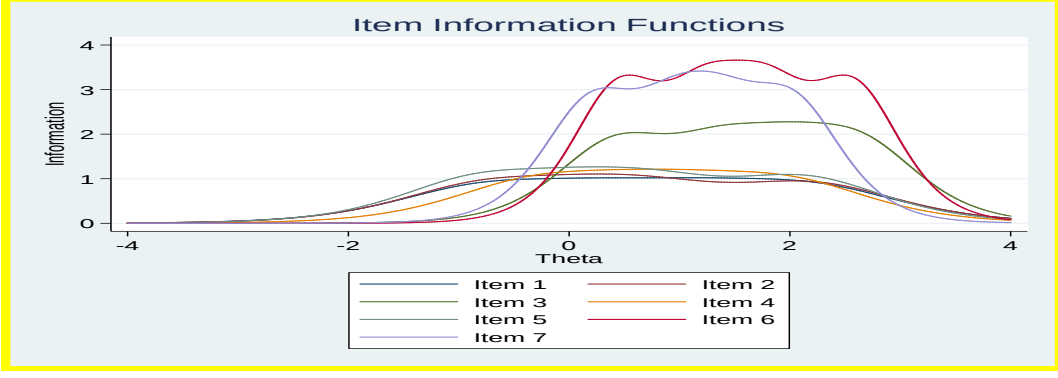

Figure 4: Item Information Curves.

Discussion

The impacts of COVID-19 on people's mental health require evaluation techniques Individuals have experienced panic, anxiety, and despair as a result of constant exposure to news about global deaths or pandemic infection rates. The public's dread of becoming infected grows as a result of these concerns (Lin,2020). The purpose of this research was to study the psychometric properties of Arabic translated version of The Fear of COVID19 Scale. The statistical and psychometric qualities of the seven-item FCV-19S appear to be satisfactory, making it suitable for large-scale epidemiological studies, randomized experimental design studies for therapeutic intervention, as well as, another very relevantly, for deployable purposes in the public and private sectors to detect the presence of such fear cognitions in the Saudi population, according to the findings of the study.

On a Saudi sample, the CFA verified the 7-item scale's unidimensionality with a .865 Cronbach's alpha as a concomitant metric Because all of the values passed the required cut-off, all of the psychometric measures' findings, as shown in Table 4, verified the validity and reliability of Arabic FCV-19S. The Fear of COVID-19 Scale factor loadings were all confirmed to be statistically significant. As a result, we may infer that the Arabic version of the COVID-19 Fear Scale maintained the framework of Ahorsu et al. (2020) original's scale. The item's validity on the Fear of COVID-19 Scale was assessed using Item Response Theory (IRT) in this study. Two alternative measuring frameworks are IRT and classical test theory (CTT). There is a serious flaw with CTT. Because it is anticipated that scores obtained should be treated as a range scale, statistical conclusions generated from sequence scoring are likely to be erroneous (Jafari et al.,2012).

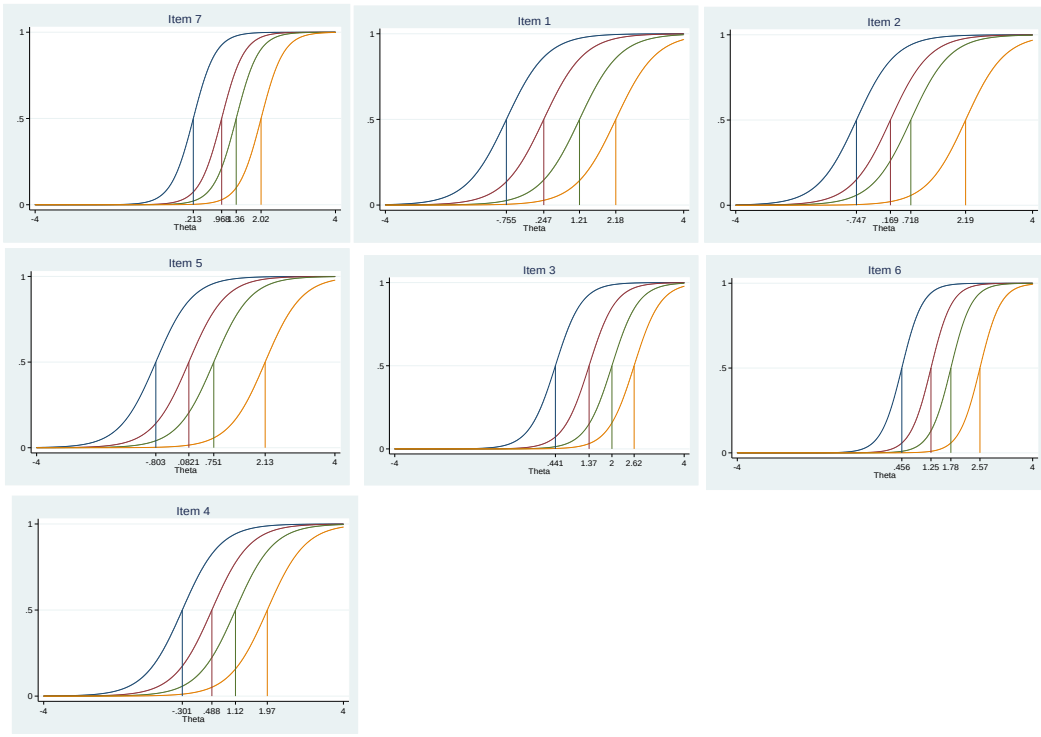

Figure 5. ICC curves Item Response Theory Model.

Fear of COVID-19 can be used to gauge the mental health of the general public during a pandemic. Knowing this information can aid in the dissemination of information to targeted audiences so that they can engage in COVID-19 actions that will assist lower fear levels (Pakpour& Griffiths,2020). Fear in humans causes reactions (mainly psychological) that aid in preparing a person to respond to a potentially dangerous situation (Ferraro& Grange,1987). As the findings of this study demonstrate, participants' dread of COVID-19 was substantially linked to their depression levels and their concerns about lockdown.

As a result, it's critical to examine notions like COVID19 dread, which might anticipate negative psychological reactions or impacts i.e. emotional distress, mood disorders, and stress etc. It is commonly understood that psychological anguish may reduce people's happiness and contentment with life (Alyami et al.,2020). The measure might still be useful in establishing ways to reduce the psychological effect of distress, anxiety, and emotional turmoil in COVID-19 even infected persons, as well as working to reduce illness stereotypes as well as the fear of getting infection.

The higher the difficulty parameter, the more the latent trait (in this example, dread of the COVID-19) must be present to respond the higher response categories (Hambleton et al.,2010). The IICs revealed that the objects varied in their capacity to discriminate, implying that giving them same weights might be detrimental.

Generally, the results suggest that the FCV-19S provides scientifically valid scores for assessing COVID-19 fear in the wider population of Arabs of all ages. As a result, it is appropriate to be used in substantial epidemiological research, studies evaluating the efficiency of psychological therapies, and detecting the existence of COVID-19 fear in the Saudi Arabian population.

A convenience sample technique was used due to limited resources and the necessity to swiftly

gather information on the mental health consequences of the epidemic; as a result, the findings may not be typical of the broader population. The snowball sampling approach utilized during the lockdown and quarantine procedures may have resulted in selection bias, as only people who got the study link were eligible to take part. Other reinforcement that causes anxiety and fear were not controlled and associated with the study. Because this study did not contain official diagnoses of mood disorders, sensitivity and specificity should not be addressed in future research, but should be explored in future research. Second, the 720-person sample size may not be properly representative, due to the challenges in recruiting bigger samples during a nationwide lockdown, as previously indicated. Also the study's conclusions were based on self-report data, which is subject to source bias.

References

Ahorsu,D, Lin C, Imani,V, Saffari,M, Griffiths,M. & Pakpour,A.(2020). The Fear of COVID-19 Scale: Development and Initial Validation. *International Journal of Mental Health and Addiction*, https://doi.org/10.1007/s11469-020-00270-8.

Alyami, M., Henning, M., Krägeloh, C., Alyami, H.(2020). Psychometric evaluation of the Arabic version of the Fear of COVID-19 Scale. *International journal of mental health and addiction*, https://doi.org/10.1007/s11469-020-00316-x

Baker, F.(2001).*The basics of item response theory*. ERIC Clearinghouse on Assessment and Evaluation,USA.

Bavel,J. Baicker, K., Boggio P., Capraro, V., Cichocka, A., Cikara ,M., et al. (2020).Using social and behavioural science to support COVID-19 pandemic response. *Nature Human Behaviour,*https://doi.org/10.1038/s41562-020-0884-z.

Byrne, B., Campbell T.(1999) Cross-cultural comparisons and the presumption of equivalent measurement and theoretical structure: A look beneath the surface. *Journal of Cross-Cultural Psychology*,30(5):555-74.

Caycho-Rodríguez, T., Vilca, L., Cervigni, M., Gallegos ,M., Martino, P., Portillo, N., Barés,I Calandra,M.& Videla,C.(2020). Fear of COVID-19 scale: Validity, reliability and factorial invariance in Argentina's general population. *Death Studies*, DOI: 10.1080/07481187.2020.1836071

Chalmers, R. mirt: A multidimensional item response theory package for the R environment.(2012). *Journal of statistical Software,48*:1-29.

Child, D. (2006).*The Essentials of Factor Analysis (3rd edition)*. London: Bloomsbury Academic

Ferraro, K.& Grange, R.(1987).The measurement of fear of crime. *Sociological inquiry,57*(1):70-97.

Hair J., Anderson, R., Tatham, R.& Black, W. *Multivariate data analysis (4th ed.): with readings.*(1995). Prentice-Hall, Inc.,USA.

Hambleton, R. K., van der Linden, W. J., & Wells, C. S. (2010). *IRT models for the analysis of polytomously scored data: Brief and selected history of model building advances*. In M. Nering, & R. Ostini (Eds.), Handbook of polytomous item response theory models (pp. 21-42). Routledge. http://www.routledge-ny.com/books/Handbook-of-Polytomous-Item-Response-Theory-Models-isbn9780805859928

Iversen,M., Norekvål,T., Oterhals,K., Fadnes,L., Mæland,S., Pakpour,A.& Breivik.K.(2021). Psychometric Properties of the Norwegian Version of the Fear of COVID-19 Scale. *International Journal of Mental Health and Addiction,* https://doi.org/10.1007/s11469-020-00454-2

Jafari, P., Bagheri, Z., Ayatollahi, S.& Soltani, Z.(2012). Using Rasch rating scale model to reassess the psychometric properties of the Persian version of the PedsQL TM 4.0 Generic Core Scales in school children. *Health and Quality of Life Outcomes*, DOI: 10.1186/1477-7525-10-27

Lin, T., Stone S., Heckman T., Anderson, T. (2021).Zoom-in to zone-out: Therapists report less therapeutic skill in telepsychology versus face-to-face therapy during the COVID-19 pandemic. *Psychotherapy*, doi: 10.1037/pst0000398

Lin, C. (2020).Social reaction toward the 2019 novel coronavirus (COVID-19). *Social Health and Behavior*,3(1),1-2.

Pakpour, A.&Griffiths, M.(2020). The fear of COVID-19 and its role in preventive behaviors. *Journal of Concurrent Disorders*, 2(1):58-63.

Reznik, A., Gritsenko, V., Konstantinov, V., Khamenka, N., Isralowitz, R.(2021). COVID-19 fear in Eastern Europe: validation of the fear of COVID-19 scale. *International journal of mental health and addiction*, https://doi.org/10.1007/s11469-020-00283-3

Sakib, N., Bhuiyan, A., Hossain, S., Al Mamun, F., Hosen, I., Abdullah, A., et al.(2022) Psychometric validation of the Bangla Fear of COVID-19 Scale: Confirmatory factor analysis and Rasch analysis. *International journal of mental health and addiction*, https://doi.org/10.1007/s11469-020-00289-x

Satici, B., Gocet-Tekin, E., Deniz, M., Satici, S.(2021). Adaptation of the Fear of COVID-19 Scale: Its association with psychological distress and life satisfaction in Turkey. *International journal of mental health and addiction*, https://doi.org/10.1007/s11469-020-00294-0

Soraci, P., Ferrari ,A. Abbiati,F., Del Fante,E., De Pace,R., Urso,A.& Griffiths,M.(2022). Validation and Psychometric Evaluation of the Italian Version of the Fear of COVID-19 Scale. *International Journal of Mental Health and Addiction*, https://doi.org/10.1007/s11469-020-00277-1

Victoria,J., Zegarra,D., Podestà,A.& Luna-Cuadros,M.(2020). Psychometric Properties of a Spanish Version of the Fear of COVID-19 Scale in General Population of Lima, Peru. *International Journal of Mental Health and Addiction*, https://doi.org/10.1007/s11469-020-00354-5

West, S. G., Finch, J. F., & Curran, P. J. (1995). *Structural equation models with nonnormal variables: Problems and remedies*. In R. H. Hoyle (Ed.), Structural equation modeling: Concepts, issues, and applications (pp. 56–75). Sage Publications, Inc

Xiang Y., Yang, Y., Li ,W., Zhang, L., Zhang, Q., Cheung, T.(2020) Timely mental health care for the 2019 novel coronavirus outbreak is urgently needed. *The lancet psychiatry*, DOI: 10.1016/S2215-0366(20)30046-8