



Validation of coronavirus-2019 phobia scale using preschool practitioners in urban and rural communities in Nigeria

Implication for educational sociologists

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Abstract

Coronavirus-2019 (COVID-19) emerged in December 2019, causing significant changes in people's social lives and other human activities. The outbreak halted educational activities throughout the world. The Nigerian experience was unique in that most people were skeptical about the pandemic's existence. This practice contributed to the Nigerian people's fear of the COVID-19 outbreak. However, in Nigeria, there has never been a validated or established Covid-19 phobia scale, necessitating this study.

This study was a pure validation study on COVID-19 phobia scale (C19PS). The study area was south-east states and a sample of 386 preschool practitioners in urban and rural communities of South East States, Nigeria participated in the study. The eligibility criteria include being a preschool teacher and demonstrating signs of COVID-19 phobia. The validation of the C19PS was done by subjecting the data gathered to principal axis factoring analysis with varimax rotation. The model fit for the data was tested using root mean square error of approximation and comparative fit index.

It was found that the Kaiser-Meyer-Olkin value of .845 for the measure of the adequacy of the sample size. There was also a significant Bartlett's test of sphericity ($P < .05$). This implies that the correlation matrix for the C19PS is not an identity matrix. It was revealed that C19PS had good overall reliability ($\alpha = .896$) and model fit (Root mean square error of approximation = .042, comparative fit index = .943) in a sample of Nigerian preschool practitioners.

As a result, C19PS was recommended as a trustworthy tool for identifying persons who suffer from COVID-19 phobia.

Abbreviations: C19PS = Covid-19 phobia scale, CFI = comparative fit index, COVID-19 = coronavirus-2019, RMSEA = root mean square error of approximation.

Keywords: coronavirus-2019 phobia scale, Nigeria, preschool practitioners, urban and rural communities

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The datasets generated during and/or analyzed during the current study are not publicly available, but are available from the corresponding author on reasonable request.

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1. Introduction

The Coronavirus 2019 pandemic began in Wuhan, China, and has now spread over the world to become a pandemic. This pandemic has profoundly altered people's social interactions, among other things. This virus first appeared in Nigeria on February 27, 2020, when an Italian citizen in Lagos tested positive for the virus, and a second case was reported on March 9, 2020, involving a Nigerian person who had contact with the Italian citizen.^[1] COVID-19, unlike other illnesses, has caused people to experience excessive worry, stress, and anxiety.^[2] The devastating impacts of the COVID-19 pandemic have hit Nigerians as hard as they have hit the rest of Africa, despite the Nigerian government's efforts to limit the virus.^[3]

Despite this, the majority of Nigerians remain complacent and go about their daily lives without adopting the required procedures to flatten the curve.^[3] About 51% of the Nigerian sample had moderate anxiety as a result of the pandemic, whereas 49% of the Nigerian sample had severe anxiety, showing that the COVID-19 pandemic caused psychological suffering in the majority of Nigerians.^[4] The pandemic caused the absolute suspension of the following academic activities in the education sector: teaching and learning activities, internal and external examinations, and new student admission at all levels of the educational system.^[5] The COVID-19 outbreak has resulted in a variety of psychological problems, including anxiety and phobia, which is growing by the day and could lead to serious cases of anxiety disorders if not addressed.^[6] The negative consequences of the COVID-19 pandemic are not restricted to psychopathological issues. Major physiological, social, and economic challenges have been reported in several countries.^[7]

Not minding the negative effects of COVID-19 on the lives of Nigerians, particularly students, there is no validated COVID-19 phobia scale in the country. The development of the COVID-19 pandemic, like significant man-made or natural calamities, generated phobias in people, causing them to have uneven cognitive, affective, or behavioral responses to the pandemic.^[8] This leads to a deteriorating situation that may result in an imbalance in physiological and psychological functions. As a result of the COVID-19 epidemic, people have experienced acute dread, worry, and reactions that can be classified as distinct phobia.^[8] Specific phobias, such as those associated with the advent of COVID-19, are thought to have arisen spontaneously after the outbreak of COVID-19.^[9] Unfortunately, there has been insufficient development of psychological measuring tools for COVID-19 phobia in Indonesia.^[9] This study was prompted by a lack of information in the literature on the issue.

This study was anchored on Seligman's preparedness theory of phobia propounded in 1971. According to this theory, humans are always naturally prepared to learn to dread objects and life-threatening situations. This biological preparedness is thought to be responsible for the rapid acquisition of phobia characteristics such as irrationality, belonging, and high extinction resistance. As a result, this hypothesis suggests that fear-related stimuli are responsible for safety-signal conditioning, which the current study has confirmed by factorial validation of the C19PS.

The COVID-19 phobia scale has been validated in several different nations. The validation of the COVID-19 phobia scale (C19PS) in a Persia sample revealed that the scale retained the original C19PS's 4-factor structure, as well as strong internal consistency and test-retest reliability coefficients.^[6] The scale's

convergent and discriminant validity were both validated.^[6] A study employing Korean volunteers evaluated the C19PS and found that it had great reliability as well as structural validity.^[10] Similarly, the Korean version of C19PS was found to have strong internal consistency reliability and structural validity.^[11] C19PS items were found to have initial construct validity and a high internal consistency reliability score, indicating that they may be utilized effectively for assessing the levels of phobia reactions in a variety of age groups.^[7] C19PS was validated on an Arabic population, and it was discovered that the scale's items showed good convergent and discriminant validity, as well as great internal consistency reliability.^[12]

Despite the devastating impacts of the COVID-19 in most nations, the C19PS has been validated in only a few places around the world. Furthermore, none of the validation studies for the C19PS was undertaken in any of the African countries that Nigeria is a part. As a result, this research was necessary at this stage of the COVID-19 pandemic. As a result, this study construct validated the C19PS utilizing preschool practitioners in Nigeria's urban and rural populations.

2. Method

2.1. Study participants

A total of 386 preschool practitioners in urban and rural communities of South East States, Nigeria participated in this research. These participants were sampled from a population of all the preschool practitioners in South East States using a convenient sampling technique. The South East States are Enugu State, Ebonyi State, Imo State, Anambra State and Abia State. This nonprobability sampling technique was used to enable the researchers to arrive at an adequate sample size for the study due to the restriction in access to people on the face-to-face platform as a result of COVID-19. The inclusion criteria for this study are:

1. being a preschool teacher,
2. must be teaching in either urban or rural primary schools,
3. must be aware of COVID-19 pandemic and showing signs of COVID-19 phobia. In this case, the COVID-19 phobia scale was used for screening purposes.

Any participant who had a total score of 53 and above on C19PS was regarded as having COVID-19 phobia and was included in the study. The distribution of the participants based on the state is 105 (27.2%) participants sampled from preschools in Enugu State, 77 (19.9%) participants sampled from preschools in Ebonyi State, 65 (16.8%) participants sampled from preschools in Imo State, 59 (15.3) participants sampled from preschools in Anambra State, and 80 (20.7%) participants sampled from preschools in Abia State, the participants were of different age ranges. 189 (49%) of the participants are within the age range of 22 to 30 years, 86 (22.3%) are within the age range of 31 to 35 years, while 111 (28.8%) are within the age range of 36 years and above. Gender-wise, 369 (95.6%) are female practitioners, while 8 (4.4%) are male practitioners. In terms of educational qualifications, 185 (47.9%) had National Certificate on Education (NCE), 137 (35.5%) had a first-degree certificate (BEd), and 64 (16.6%) had a master's degree in education. In terms of urban-rural community distribution, 205 (53.1%) participants were sampled from the urban community preschools while 181 (46.9%) participants were sampled from the rural community preschools. Figure 1 shows the flow chart for the screening.

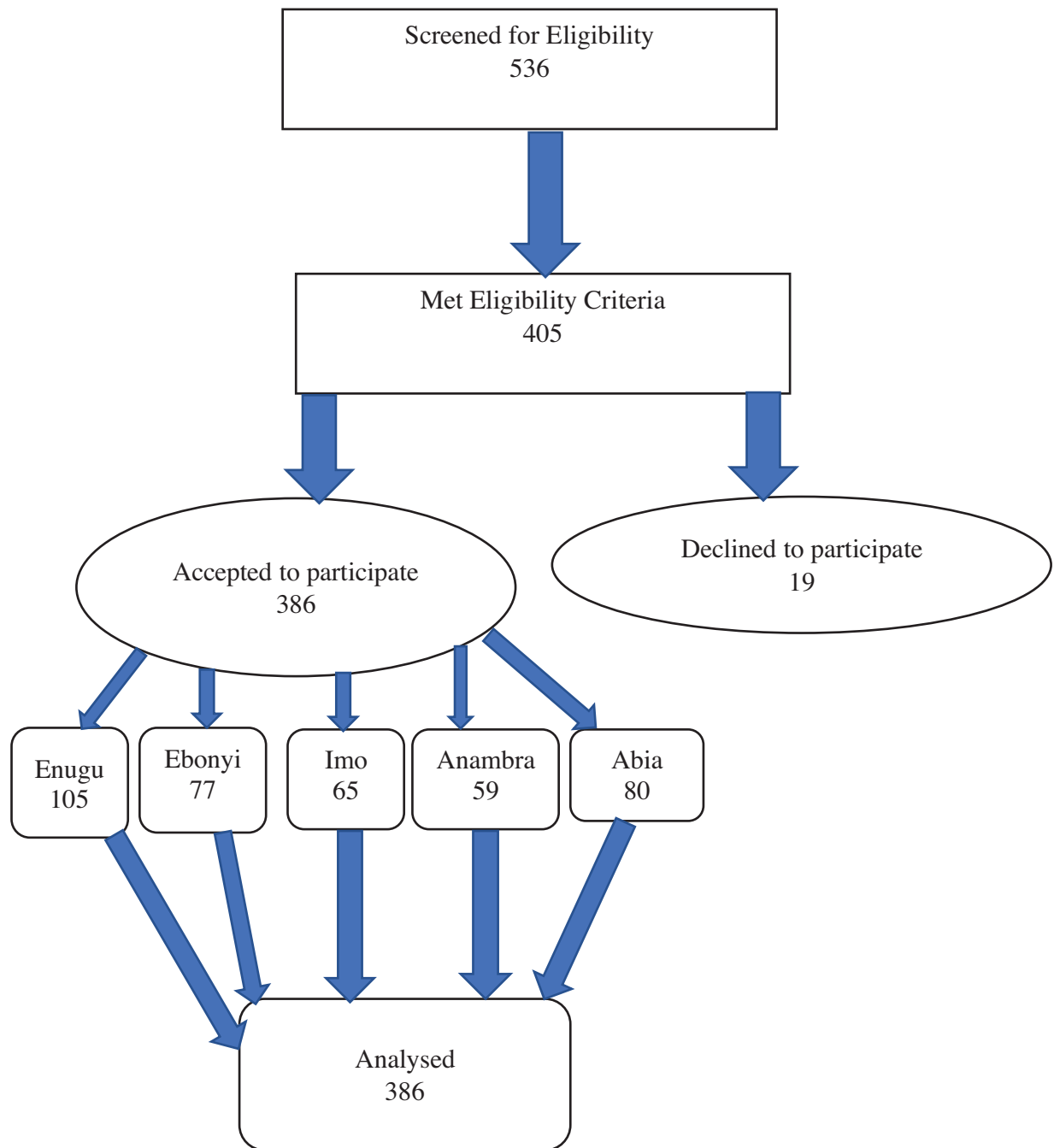


Figure 1. Flow Diagram for the screening.

2.2. Measure

For the sake of this research, the researchers adapted Arpaci et al COVID-19 phobia scale (C19PS) and carried out the construct validation in the Nigerian context. C19PS is a 20-item questionnaire structured on a 5-point Likert scale of strongly agree (SA = 5), agree (A=4), neutral (N=3), disagree (D=2), strongly disagree (SD = 1). Some examples of the items of C19PS are *I feel very anxious getting covid-19; The fear that my family members may contact covid-19 triggers me a lot; The fear of covid-19 causes me stomachache; I feel chest pain as a result of covid-19 phobia, Covid-19 fears cause me tremor.* Moreover, C19PS is a four-factor scale containing psychological factors (6

items), Psycho-somatic factors (5), Economic factors (40 and Social factors [5]).

2.3. Ethical consideration

Prior to the conduct of this research, the researchers first of all, wrote an application letter to the committee on research ethics for the approval of the conduct of the research. Thereafter, the Chairman of the committee on research ethics of the Department of Science Education, University of Nigeria, Nsukka approved the conduct of the research with reference number REC/SE/2021/000025. Moreover, the participants were served informed

Table 1
Kaiser-Meyer-Olkin (KMO) and Bartlett's test for the exploratory factor analysis (EFA) of C19PS.

Kaiser-Meyer-Olkin measure of sampling adequacy	.757
Bartlett's test of sphericity	
Approx. Chi-Squared	4897.471
df	190

consent forms to read and fill out, and properly signed before the commencement of data collection.

2.4. Data collection procedure

On the approval of the conduct of the research by the research ethics committee, the researchers went further to obtain written permission from the headteachers of the preschools used for the study. This research was conducted between December 5, 2020, to July 15, 2021. Thus, the participants were visited at their respective schools for the purpose of data collection. An on-the-spot method of data collection was adopted for the study. Therefore, the participants were allowed 30 minutes to respond to the items of the C19PS after which the filled copies were collected from them immediately. This method enabled the researchers to ensure 100% retrieval rate. At the end of the questionnaire administration and collection, the data gathered were arranged and subjected to factor analysis for the sake of construct validation.

2.5. Data analysis

Before the actual data analysis, the data were properly coded and cleaned through a screening process to ensure that missing data were identified. Multivariate outliers were identified using Mahalanobis'

and Cook's distance and leverage values outliers' detection techniques. Thereafter, SPSS and IBM SPSS AMOS were used to conduct the exploratory and confirmatory factor analysis of the items of C19PS. Specifically, the exploratory factor analysis was conducted using principal axis factoring (PAF) with varimax rotation while the confirmatory factor analysis was conducted using IBM SPSS AMOS. PAF employs an iterative procedure and as a result, we started by substituting the 1 second with the variable's squared multiple correlation (SMC) (that is, how much of the variance in that variable that can be explained by the rest of the variables in the correlation matrix). The EFA was then performed: eigenvalues and loadings were calculated, and communalities were estimated. After that, we replaced the SMC with the new communalities and repeated the EFA to obtain new eigenvalues, loadings, and communalities. We continued in that manner until the communalities did not alter significantly; at that point, the loadings were complete. Model fit for the data was tested using root mean square error of approximation (RMSEA) among others. These analysis approaches have been used in recent similar studies^[13–18]

3. Results

3.1. Identification of multivariate outliers

During the cleaning of the data, Mahalanobis' and Cook's distance and leverage values were used to identify possible multivariate outliers. At the end of the multivariate outliers' detection, only 1 outlier was identified as shown in Figures 2–4, *Mahalanobis distance P* value <.001, *Cook's distance value* >1. Thus, the identified outlier was removed accordingly.

3.2. Exploratory factor analysis

Table 1 showed that the sample size for the EFA of the C19PS was very adequate. This was shown in the Kaiser-Meyer-Olkin

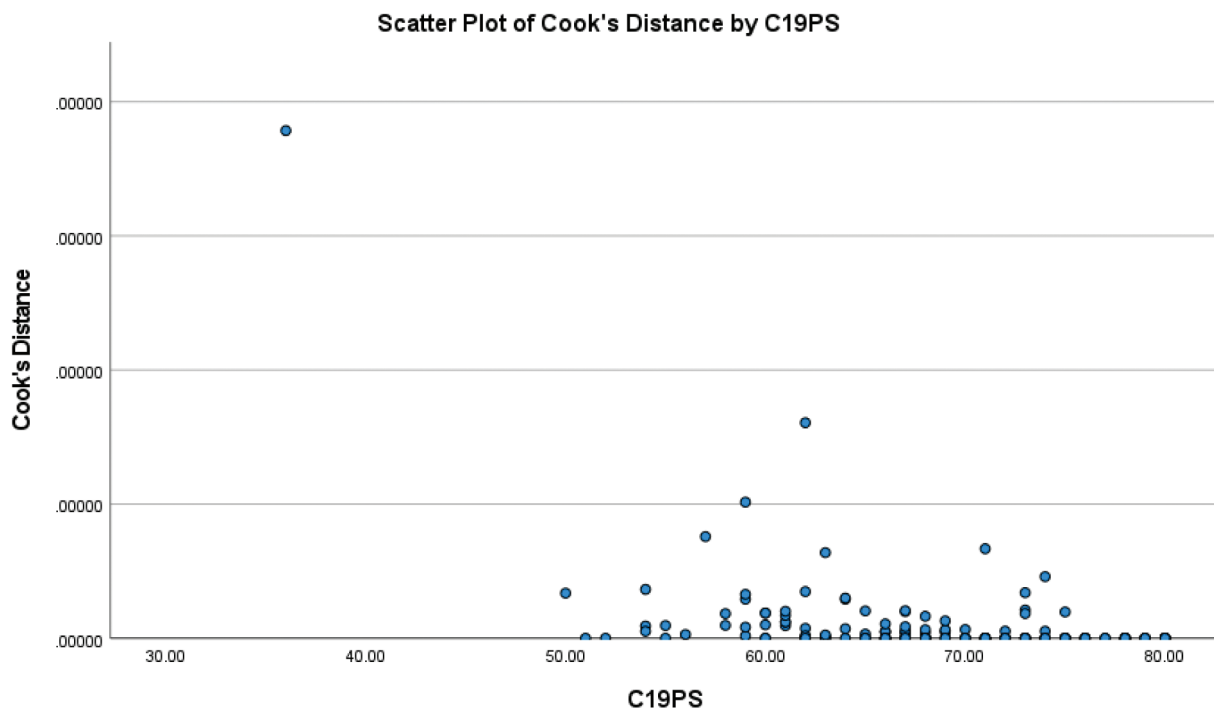


Figure 2. Scatter plot of Cook's Distance for the identification of multivariate outliers.

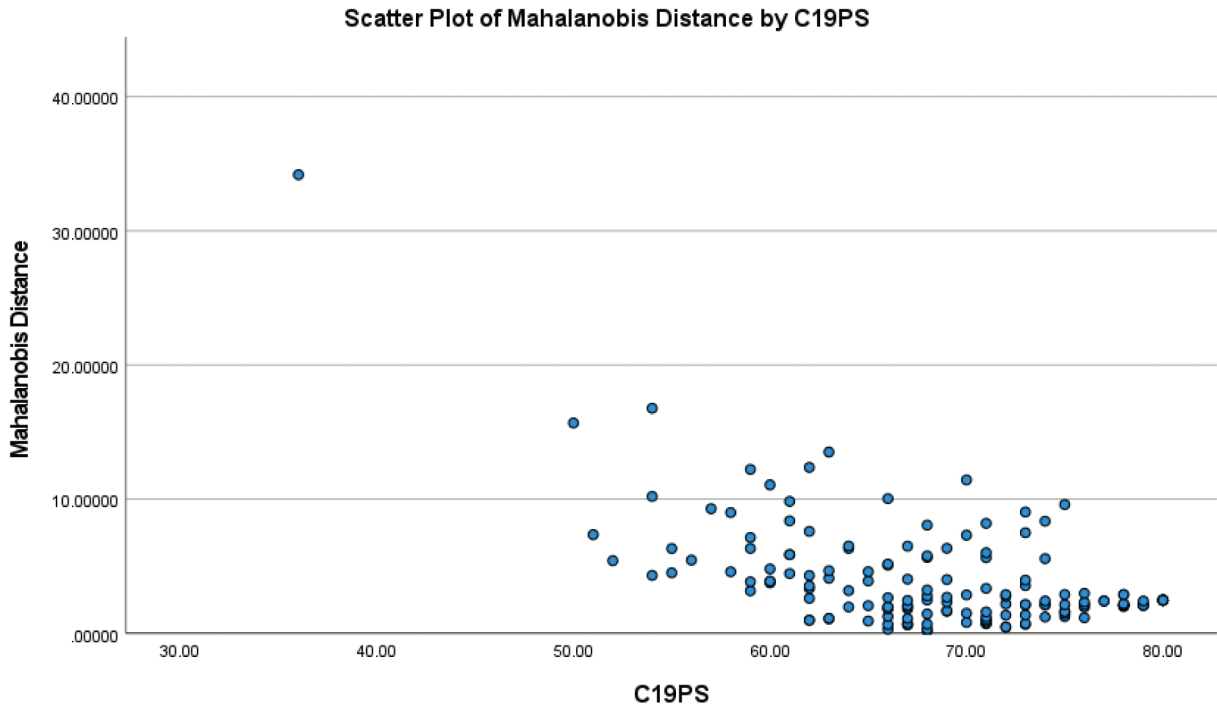


Figure 3. Scatter plot of Mahalanobis Distance for the identification of multivariate outliers.

value of .757 for the measure of the adequacy of the sample size. There was also a significant Bartlett test of sphericity ($P < .05$). This implies that the correlation matrix for the C19PS is not an identity matrix.

Table 2 indicates that the rotated sums of square loadings for the four-factor subscales of C19PS ranged from 4.181 to 1.633.

The greater percentage explained by the eigenvalue was 20.903% while the least was 8.166%. This is an indication that the items of the C19PS correlated very well and loaded strongly on the 4-factor at the level of extraction.

Table 3 shows the extracted communalities values for the items range from .425 to .755. The factor loadings of the 20-item

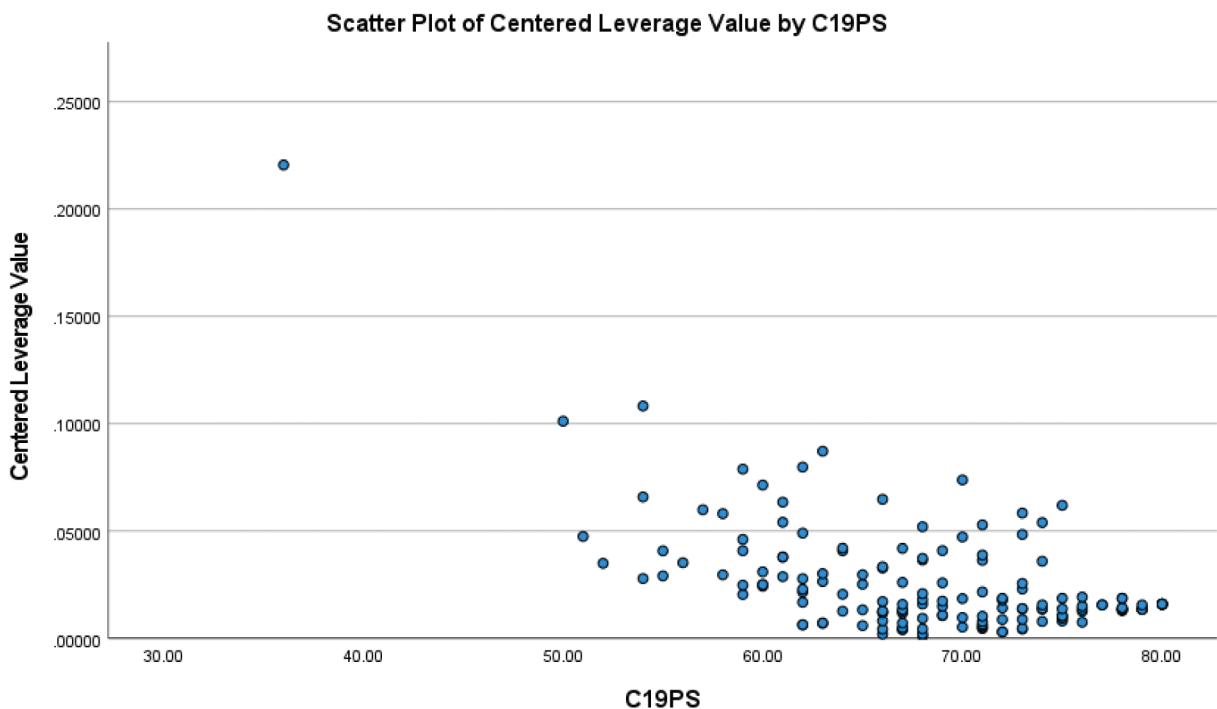


Figure 4. Scatter plot of centered leverage value for the identification of multivariate outliers.

Table 2
Extraction and rotation sum of squares loadings associated with the factors.

Component	Total	Initial eigenvalues		Extraction sums of squared loadings			Rotation sums of squared loadings		
		% of variance	Cumulative %	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %
Psychological factors	6.826	34.128	34.128	6.367	31.834	31.834	4.181	20.903	20.903
Psycho-somatic factors	3.521	17.605	51.733	3.179	15.896	47.729	3.287	16.433	37.336
Economic factors	1.288	6.441	58.174	.812	4.062	51.791	2.040	10.201	47.537
Social factors	1.184	5.922	64.097	.782	3.912	55.703	1.633	8.166	55.703

C19PS are shown in Table 3. It was found that items 1 to 6 loaded strongly on factor 1, items 7–11 loaded strongly on factor 2, items 12–15 loaded strongly on factor 3, while items 16–20 loaded strongly on factor 4. This implies that none of the original items of C19PS was factorially complex or impure to warrant the dropping of such item. Thus, the items of the C19PS are very fit in measuring the desired construct (COVID-19 phobia) using the Nigerian sample.

3.3. Internal consistency

The kurtosis and skewness coefficients ranged within the threshold values of ± 3 , indicating that the data were regularly distributed, according to normality tests in Table 4. The 20-item Cronbach alpha coefficient was .896, with subscale reliabilities ranging from .781 to .856 (see Table 4 below). Furthermore, while the correlations between the components were significant

Table 3
Rotated component matrix for the items of C19PS.

Item statement	Communalities	Component			
		1	2	3	4
Psychological factors					
I feel very anxious getting covid-19	.425	.583			
The fear that my family members may contact covid-19 triggers me a lot	.435	.582			
Deaths news as a result of covid-19 makes me anxious	.649	.765			
I develop a lot of anxiety as a result of covid-19 uncertainties	.467	.585			
The rate at which covid-19 spreads causes me to panic	.675	.753			
I argue with people who behave irresponsibly in the face of covid-19	.490	.590			
Psycho-somatic factors					
The fear of covid-19 causes me a stomachache	.564		.691		
I feel chest pain as a result of covid-19 phobia	.465		.522		
Covid-19 fears cause me tremor	.538		.661		
I have sleep problems as a result of covid-19 fear	.611		.742		
I feel a lot of tension as a result of fear of covid-19	.480		.855		
Economic factors					
Shortage of food supply caused by covid-19 causes me anxiety	.616			.420	
The tendency that covid-19 may lead to a shortage in cleaning supplies makes me be anxious	.450			.637	
I resorted to stocking of food for fear of covid-19	.750			.618	
Covid-19 pandemic makes me feel uneasy	.755			.680	
Social factors					
After the emergence of covid-19, I started having extreme anxiety when I see people coughing	.653				.694
After the emergence of covid-19, I formed the habit of dodging people who sneeze	.380				.566
As a result of covid-19, I formed the habit of washing my hands frequently	.441				.532
The fear of contacting covid-19 affected my social relationships	.580				.639
I am unable to avoid the fear of contacting covid-19	.717				.748

Table 4
Descriptive and reliability analysis.

Factors	Mean	Std. deviation*	Cronbach alpha	Skewness	Std. error	Kurtosis	Std. error
Psychological	21.46	2.35	.782	-1.766	.194	.513	.386
Psychosomatic	17.08	2.25	.804	-.651	.194	.107	.386
Economic	13.59	2.12	.856	-.759	.194	.280	.386
Social	16.12	2.88	.823	-.635	.194	-.480	.386
Covid-19 phobia scale			.896				

* For each variable, missing values are replaced with the variable mean.

Table 5
Convergent and discriminant validity of C19PS.

	CR	AVE	Psychological	Psychosomatic	Economic	Social
Psychological	.745	.452				
Psychosomatic	.799	.554	.486*			
Economic	.823	.407	.527*	.583*		
Social	.856	.490	.367*	.550*	.432*	
Covid-19 phobia	.877	.486	.367*	.660*	.536*	.901*

Table 6
Model fit indices for the C19PS data.

Model	CFI	RMSEA	PCFI	χ^2	P
Default model	.943	.042	.938	204.93	.000

χ^2 = Chi-Square, CFI = comparative fit index, p = probability value, PCFI = parsimony confirmatory factor Index, RMSEA = root mean square error of approximation.

($P < .05$), they were not so high as to raise concerns about multicollinearity (i.e., $> .90$).

3.4. Convergent and discriminant validity

Average variance extracted (AVE) and composite reliability (CR) values were used to examine convergent and discriminant validity. The CR values were found to be higher than the .70 cut-off value as recommended by.^[18] Furthermore, some AVE values were lower than the .50 criterion. According to Fornell and Larcker,^[18] convergent validity can be acceptable for variables with an AVE value less than .50 if the CR is more than .60. There were also significant connections among the C19PS variables ($P < .05$), according to the findings. The overall internal consistency reliability index of the items of C19PS is .896. Inter-factor correlations, as well as discriminant and convergent validity coefficients, are shown in Table 5.

3.5. Construct validity

The confirmatory factor analysis (CFA) of the C19PS data showed that the scale demonstrated a good model fit. Thus, Table 6 revealed that the comparative fit index (CFI) for the data is .943 while the RMSEA and PCFI are .042 and .938 respectively. The Chi-Squared goodness of fit index was also significant, $\chi^2 (289) = 204.93, P < .050$. This implies that C19PS demonstrated a good model fit since the RMSEA value was less than .05 and the CFI value was higher than .90. Moreover, Figure 6 which is a trimmed path diagram of Figure 5, showed that the 4 subscales of the C19PS had significant standardized regression coefficients which are within .37 to .58.

4. Discussion of the findings

The goal of this study was to determine the psychometric properties of the C19PS developed by Arpacı et al. This scale has been validated in other continents than Africa, which is why it was necessary to validate it on the Nigerian sample. The results of this investigation revealed that the C19PS items had a high level of internal consistency dependability. Furthermore, the C19PS data exhibited a good model fit with a high CFI, and the 4-factor model’s subscales correlated very strongly, among others. In other words, the subscales on the main scale had extremely significant standardized regression coefficients. This suggests that the C19PS is a trustworthy tool for determining whether or not someone has COVID-19 phobia. These findings are

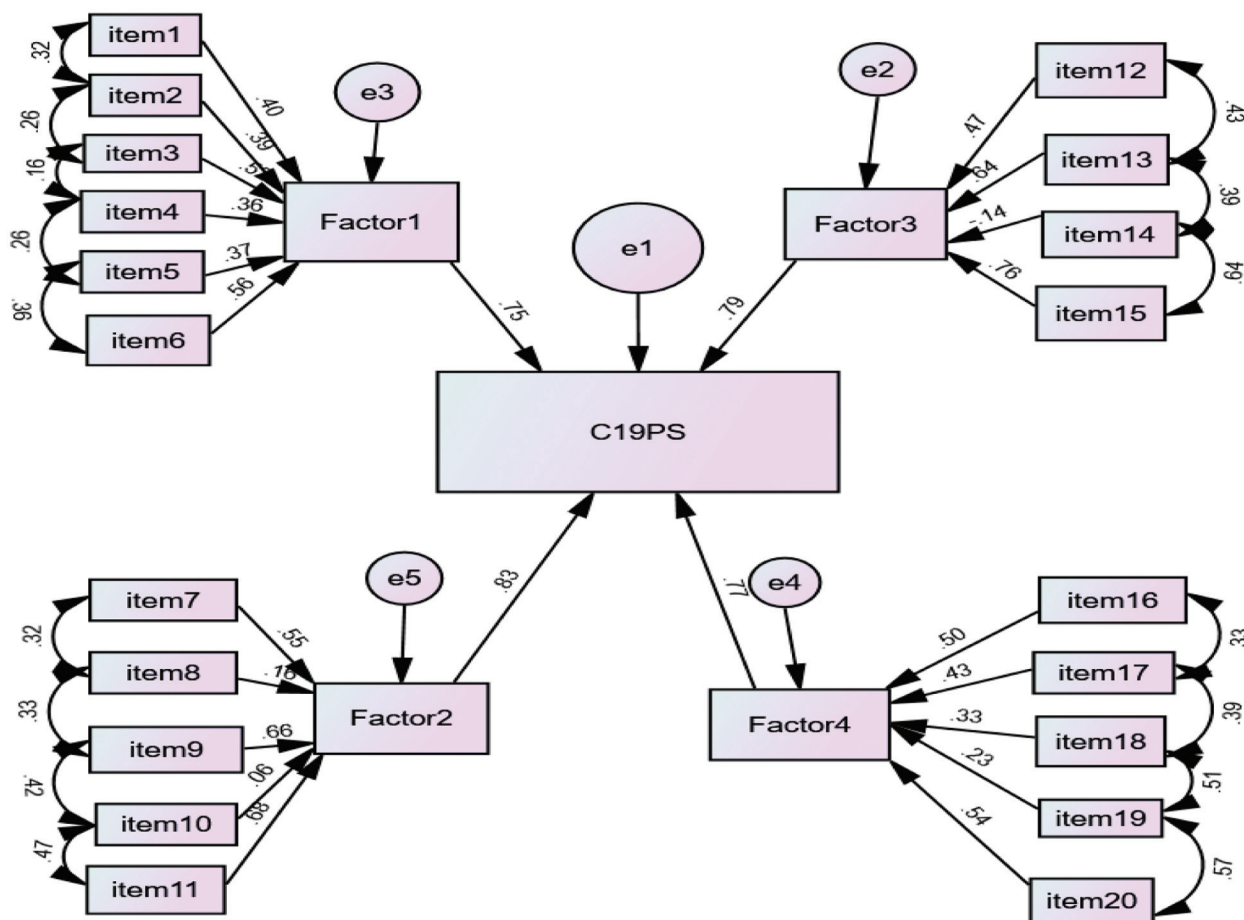


Figure 5. Untrimmed Path diagram for the regression coefficients of the subscales of C19PS.

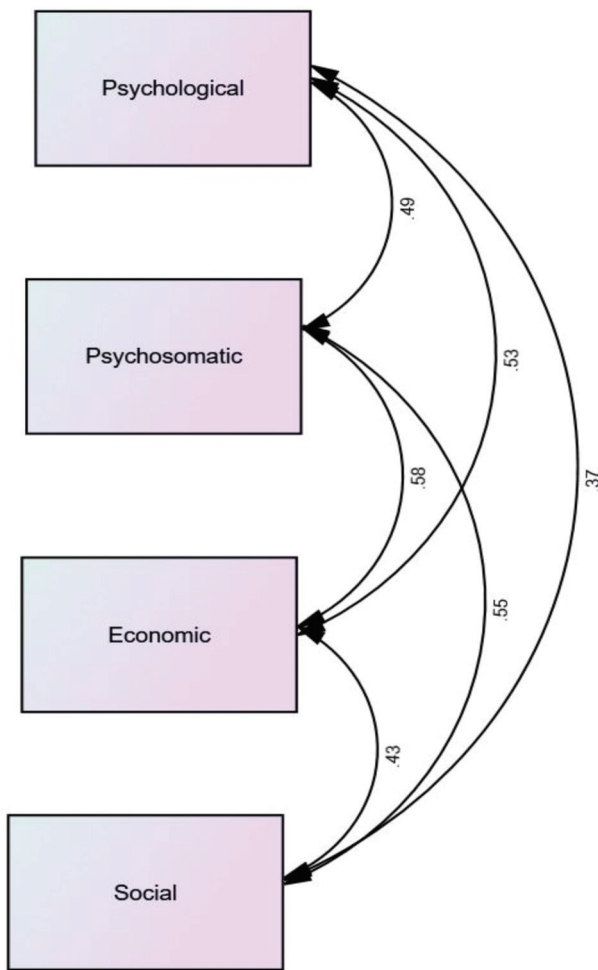


Figure 6. Trimmed Path diagram for the regression coefficients of the subscales of C19PS.

important because COVID-19 is currently raising a lot of concerns in several nations around the world. A study backs up these findings, revealing that C19PS items can be used effectively to assess the levels of phobia reactions in a variety of age groups.^[7] As a result of this scale, it will be quite straightforward to identify persons who have COVID-19 phobia and treat them as soon as possible. These results are consistent with those of similar empirical investigations conducted in other nations.

In a Persia sample, researchers discovered that the 4-factor structure of the original C19PS had strong internal consistency and test-retest reliability coefficients.^[6] Similarly, the Korean version of C19PS was found to have strong internal consistency reliability and structural validity.^[11] C19PS was discovered to have a high internal consistency reliability index.^[7] In a Korean sample, it was discovered that C19PS showed great reliability and structural validity.^[10] In an Arabic population, the scale's items had good convergent and discriminant validity, as well as excellent internal consistency reliability.^[12]

4.1. Strength of the research and its implication to educational sociologists

In this period of the COVID-19 pandemic, no African-based research has been able to design or validate an existing scale for

measuring covid-19 fear, as this study has. As a result, this is the first study on the African continent to validate the Arpacı et al COVID-19 phobia scale on a factorial basis. In other words, this study makes a significant contribution to measuring and evaluation research for the well-being of preschool teachers in both urban and rural settings. As a result, the COVID-19 phobia scale functions as a valid and reliable measure for identifying people with COVID-19 fear in both urban and rural areas in Nigeria. In other words, the findings of this study have implicated educational sociologists in the fact that when C19PS is used to properly identify persons who have COVID-19 phobia, people will be able to socialize freely.

4.2. Limitations of the study

The findings of this research may have been affected by some limiting factors. For example, it was difficult for the researchers to factor in the mental conditions (disability, depression, stress among others) of the participants at the time of the conduct of this research. That was a result of lack of adequate instrument to ascertain such mental health conditions of the participants. This may have limited the generalizability of the findings of this research. Thus, research suggest that intending researchers can replicate this study with adequate consideration of such mental health conditions of the participants.

5. Conclusion and recommendation

Based on the findings of this research, the researchers concluded that C19PS is a highly reliable instrument for measuring COVID-19 phobia among the Nigerian preschool practitioners in both urban and rural communities. This has equally been confirmed in a population of Persia, Korea among others. Thus, the COVID-19 phobia status of the preschool practitioners can be assessed from time to time using the C19PS. The researchers, therefore, recommended that C19PS should be used as a standardized instrument for measuring the development of phobia relating to the current COVID-19 pandemic.

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