PSYCHOMETRICS EVALUATION OF COVID-19 DEATH ANXIETY AMONG HEALTH WORKERS

AWOSOLA Rasaq Kayode
DEPARTMENT OF PSYCHOLOGY
AMBROSE ALLI UNIVERSITY
rasaq.awosola@aauekpoma.edu.ng

&

AIKPOGHOMHE Kingsley Monday
DEPARTMENT OF PSYCHOLOGY
AMBROSE ALLI UNIVERSITY

ABSTRACT
Due to anxiety and high fatality associated with Coronavirus (COVID-19) pandemic, the study conceived the idea of developing the COVID-19 death anxiety scale using a three-stage approach (Pre-pilot stage, Pilot stage and main study stage). A total of 315 health workers participated in the research (115 at the pilot stage and 210 at the main study). A snowball or chain sampling technique was used for data collection and to validate the proposed COVID-19 death anxiety scale. The exploratory factor analysis showed a two-factor solution for the items in the scale. While correlation analysis indicated that the scale had a satisfactory internal consistency (α = 0.82). The scale also had a high convergent validity with coefficient of .76. Therefore, the scale would serve to measure the impact of COVID-19 pandemic among the populace especially health workers.

Keywords: *Coronavirus, Reliability, Validity, Health Workers, Snowball technique, Isolation*

INTRODUCTION
Anxiety as widely seen is a human emotion that is characterized by feeling of worry, insecurity, anticipation and tension regarding the future with a view of unseen misfortune or danger. Although situations warrant anxiety which could be participating in social gatherings, preparing for an examination/interview or other encounters such as concerns about death. Death cannot be avoided as long as living continues to exist, it is therefore one event that no one can avoid; it can be considered as dominant stimulus of human behaviour (Freud, 1914). The certainty and impulsiveness of death cause people to feel dreadfulness, and this is a fundamental source of anxiety (Yalom, 1980).The uncertainty associated with death provokes four characteristics which are (i) Death itself (i.e. suffering, illness, loneliness etc.) (ii) Loss (i.e. the loss of everything that belongs to the material world; mostly his own body, (iii) Unpredictability (i.e. the when and how the death will happen) and (iv) Obscurity (i.e. the anonymity of death and after-death).

Death anxiety is fondly associated with uncertainty, negative attitude and cognitions relating to death and dying. Death Anxiety could be best described as apprehension that occurs as a result the awareness of death (Abdel-Khalek, 2005). The awareness of death was high during the lockdown especially among health workers and other frontline staff who work in various isolation centres (Mhango, Dzobo, Chitungo & Dzinamarira, in press). The difficulty that is posed when an individual is confronted with death and anxiety generate by the knowledge of its inevitable and having the same universal psychological outcomes. Though there are scales that give much attention to fear of death (Templer 1970 death anxiety scale, Thorson and Powell 1994 the revised death anxiety scale, Abdel-Khalek (2011) death distress scale) however there is a great need to develop death anxiety scale with specific reference to coronavirus infection especially among health workers. As at June, 2020, 812 health workers were infected with this virus in Nigeria. While another 19 medical doctors have been quarantined in the South Western part of the country due to their exposure to coronavirus (Adeniran, 2020). The existing scales

on death anxiety measure concerns, fear, apprehension and thoughts people have about death. While the present attempt measures peoples' disposition towards COVID-19 infection and what happens when one has tested positive. Furthermore, existing death anxiety scales measure antecedent components that influence death anxiety which include externally generated death anxiety and general health statements (Thomas-Sadabo and Gomez-Benito, 2005). Also, other death anxiety scales report factors that show an individual's attitude toward death, such factors are important to the understanding of death anxiety. Researchers are of the view that the exiting scales are not quite related to the nature and characteristics of death anxiety associated with COVID-19 (Olatunji & Olagundoye, 2016; Tang, Wu & Yan, 2002). This is because of high fatality associated with the virus, its mode of transmission, the fact that one can be asymptomatic but can still infect others, and subsequent isolation give different feelings entirely.
Consistent with previous literature, the current study proposed a new scale of death anxiety related to COVID-19 Pandemic. The COVID-19 Death Anxiety Scale will not only measure psychological components, but also somatic symptoms. The COVID-19, a novel virus which is associated with severe acute respiratory syndrome was in March 2020 declared by the World Health Organization as global pandemic, though the virus expanded globally from Wuhan (Hubei) in China at the end of 2019 (Lu, Stratton and Tang, 2020) . Among the symptoms of COVID-19, Pneumonia appears to be the most frequent serious manifestation of infection, characterize primarily by fever, cough, dyspnoea, and bilateral infiltrates on chest imaging. (Yang, Peng, Wang, Guan, Jiang, Xu, Sun, Chang, 2020). However, less common symptoms have included headaches, sore throat, and diarrhoea. In addition to respiratory symptoms, gastrointestinal symptoms (e.g., nausea and diarrhoea) have also been reported, and in some patients, they may be the presenting complaint. Respiratory droplet transmission is the main route and it can also be transmitted through person-to-person contacts by asymptomatic carriers (Yang, Peng, Wang, Guan, Jiang, Xu, Sun, Chang, 2020).
Besides the above mentioned symptoms of COVID-19, there are other symptoms associated with the mental health of individual who are living with this virus. It is now that people have accepted the fact that we are in a new world and such COVID-19 like other diseases such as Ebola, HIV/AIDS has come to stay (Mhango, *et. al*. in press). Based on the above, there is need to develop a psychological instrument that measures COVID-19 Death Anxiety related indices, which will be of great important to the evaluation and management of the pandemic.

METHOD

Research Design: This Study utilized a cross-sectional research design. This is because the study was carried out with different groups of participants. The cross-sectional research design was also adequate because the different sample of participants varied in the variable of interest but then share other characteristics.

Setting: Due to nature of this study and the participants recruited for the study, the setting for the study was based online as participants were contacted via the various social media platforms such as Facebook, Whatsapp, Instagram, Twitter and Electronic mail.

Population: The target population for this study was health workers directly or indirectly working in health facilities were COVID-19 patients are managed. The target groups were Medical Doctors, Nurses, Medical Laboratory Scientists, Dentists, Care Assistants, Biochemists, Physiotherapists and other support staff such Cleaners and Drivers.

Sample Description: The total number of target population that participated in this research was 330. The breakdown shows that 120 participated in the second stage (pilot phase) and 210 took part in the main study.

Pilot study: A total number of 120 participants were involved at the second stage, which is the pilot study. The demographic descriptions were 69 (57.5%) females and 51 (42.5%) males. The average age of participants was 36 years; their academic qualification also indicated that 76% of them were degree holders while the remaining 24% had post graduate degree. About 65 of the health workers had direct contact with COVID 19 patients while the 35 percent had no direct contact with COVID-19 patients.

Main study**:** A total of 210 health workers participated in the main study, which 65(54.2%) were males and 55 (45.8%) were females with an average age of 39 years; their marital status indicated that 55 (45.8%) were single, 55(45.8%) were married, 5(4.2%) were divorced and 5 (4.2%) were separated from their spouse. Educational qualification indicates that 25(20.8%) had Diploma, 50(41.7%) had degree while 45 (37.5%) had Post Graduate degree, also their religion affiliations reveals that 105 (87.5%) were Christians, 15(12.5) were Muslim. Their profession also indicated that 20(16.7%) were researchers, 20(16.7%) were Medical Laboratory scientist, 30(25%) were Nurses, 10(8.3%) were support staff, 10(8.3%) were Physiotherapist, 15(12.5%) were Medical Doctors, 5(4.2%) were Health Care Assistant, 5(4.2%) were Public Servant and 5(4.2%) were Social Workers.

Measures

The COVID-19 death anxiety scale is a 16 items scale design to measure death anxiety among health workers. The items measure personal thoughts and actions related COVID-19 infection. The scale is a self-report measure with a 5-point Likert response format scale, which ranges from strongly agree (5) to strongly disagree (1). The items are worded in the same direction and score of each item are added to arrive at composite score for each of the respondents. The higher the score the higher, the higher death anxiety experienced by the respondent.

Hospital Anxiety Depression Scale (HADS): The scale was developed by Zigmond and Smith (1997); it consists of 14 questions, 7 of which measure anxiety (odd numbers) and 7 of which measures depression. The scale was chosen because it can be used for both healthy individuals and patients and its administration is easy. It had an initial coefficient of internal consistency of .89 and the coefficient internal of this study was .79

Sampling Technique

The study instrument was designed using the Google Doc. Google doc is an online platform that enables researcher to design, administer, collate and analyse data. The study was conducted using the snowballing sampling techniques also known as the chain sampling. This sampling technique was adopted due to the fact that participants were recruited/contacted using social media such as Electronic mail, Twitter, WhatsApp and Facebook. The snowball or chain sampling technique involves a situation where from one respondent, then one is connected to another respondents. This means that each of the respondents is free to share the questionnaire with any health worker in their list. The COVID-19 Death Anxiety Scale was shared as a web link with health workers working directly or indirectly in various facilities where COVID-19 patients were managed and they were asked to share the web link with their colleagues.

Procedure

In developing this scale, the guidelines outlined by Clark and Watson (1995) was adopted, these are scale conceptualization, item generation, item writing and scaling, item selection, scale refinement and structural analysis. These steps were grouped into three phases in accordance with Gerbing and Hamilton (1996), Gerbing and Anderson (1998) recommendations. The three phases are pre-pilot phase, pilot phase and the main study phase. The pre-pilot phase consisted of scale conceptualization, item generation, item writing and

scaling. Phase two comprised item selection and scale refinement, and phase three was structural analysis.

Phase One: Pre-Pilot Phase:

Interviews and Literature Review: This phase involved the collection of information that could trigger the fear or the anticipation of death as it concerns COVID-19. Method such as interview where the researcher had to note information that was made available on all media platforms regarding fear or death related complication of the pandemic. The review of related literatures (this involves the review of past publications on psychological effect of COVID-19, especially in the area of fear as it becomes threat to the life of the individual). Information obtained was used to generate items for the study.

Phase Two: Pilot Study: Pilot study plays important role in research; hence studies in social sciences make use of pilot study. Pilot study was used to field test the research instrument and it was used to determine whether the research protocols were realistic. The pilot study was conducted using individuals working at the various medical centres where COVID-19 patients were being managed. After collecting social media handles of few health workers, the 30 statements that were developed during the pre-pilot phase were administered to 120 health workers. The submitted questionnaires were analysed using the Statistical Product for Social Sciences, Cronbach alpha was computed. An inclusion criterion was set for item convergent validity at ≥. 40 (Stewart, Hays & Ware, 1998), which mean that any item that has an item total correlation less .40 will be deleted from the proposed scale. As a result of this criterion, the items of scale were reduced from 30 items to 16 items.

Phase Three: Main Study

The remaining 13 items were administered to 210 health workers who participated in the main study. This was in accordance with the Guadagnoli and Velicer (1988) recommendations of 100 participants as minimum sample size for factor analysis, which means that the sample size is large enough to produce a stable factor structure.

Statistical Analyses: Data were analysed using the Statistical Package for the Social Science (SPSS 20). Correlational analysis was employed for Cronbach's alpha coefficient and item-total correlation coefficients. Also, correlation analysis was used to establish convergent validity for the proposed scale. Exploratory factor analysis was used to determine factor structure of the scale. Principal components analysis was performed on the data obtained to investigate the factor structure for the 16 items.

Ethical Consideration

Although, there was no physical contact with the respondents, they were guaranteed that no harm would befall them by virtue of their participation in the research because it was specifically for academic purposes. The confidentiality and anonymity of their responses were assured. There was anonymous distribution and submission of the questionnaire since the whole exercise was conducted online.

RESULT:

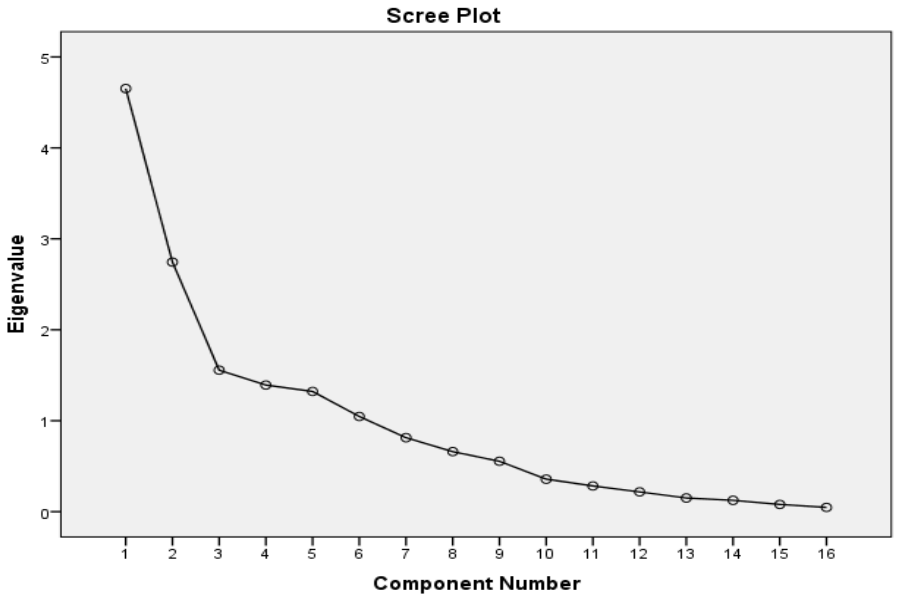
Reliabiliy of COVID-19 Death Anxiety Scale: Cronbach alpha coefficient for COVID-19 Death Anxiety Scale was .82 no item was deleted from the 16-item scale as each item alpha was within the range of .79 to 81.

Convergent Validity: Convergent validity was established for the COVID-19 death anxiety scale with a scale that measures similar construct with the same population sample. In essence

the proposed COVID-19 death anxiety scale was correlated with Hospital Anxiety and Depression Scale (HADS). This is in line with the position of Diener, Ingehart and Tay (2012) that say a scale should correlate high with other scales measuring similar construct or trait (Convergent) and correlate low or negatively with scales measuring different concept (Discriminant) Therefore, the calculated coefficient of correlation between the COVID-19 anxiety scale and Hospital anxiety and depression scale (HADS) was .76 which indicated that the proposed scale has a high convergent validity.

Assessment of Factors Structures: The 16 items were subjected to principal component analysis (PCA) to determine the factor structure. This study adopted the Kaiser rule 1 and the scree plot as methods of extracting the factors structure to be retained. Using the Kaiser rule 1 extracting and retaining the number of factors from a data was considered based on the numbers of factors with an Eigenvalue greater than 1 (Kaiser, 1974). Furthermore, Nunnally (1978) contend that in identifying the items loading in each of the factors, such items must have a coefficient of .50 and such items must not cross loaded on other factors. Six factors were identified showing 79.46% of the common variance. The first factor accounted 29.08% of common variance (*fear* provoked by visual stimuli related to COVID 19 Death: items 2,4, 8, and 13), second factor accounted for 17.15% (fear of COVID 19 related death: items 1, 5, 6, and 7), third factor accounted for 9.7% (fear of death: item 15) fourth factor accounted for 8.7% (fear of Isolation: items 10, 16), fifth factor accounted for 8.3% (fear of dead body: item 9) and sixth factor accounted for 6.5% of common variance (fear of COVID 19 infection: item 14). The scree plot (figure 1) which involves examining the graph of the eigenvalues and looking for the natural bend or break point in the data where the curve flattens out and the number of data point above this break point determines the factors for the scale. The scree plot shows two factors from the break point, while Kaiser 1 rule identifies six factors**.** Four factors out of six factors have less three items each loaded on them which means that they are not fit (Costello & Osborne, 2005). Therefore, both scree plot and Kaiser 1 rule indicate two factors as the best fit for the data.

Figure 1: The Scree test for the COVID 19 Death Anxiety Scale



KEY: X axis: Eigenvalue value
Y axis: Items in the Scale
The Gradient of the Graph: Shows the data points

Table 1: Table for Rotated Component Matrix with Loadings

Items	Factors					
	1	**2**	**3**	**4**	**5**	**6**
I fear death whenever I watch TV program on COVID 19		.55				
I am scared of looking at the dead	.88					
The possibility of having to use/fix a ventilator for a patient terrifies me	.74					
Am afraid of getting effected with COVID 19		.83				
Am worried that death will deprive me of my loved ones		.81				
Am apprehensive of what will happen after my death		.63				
I do not like to look at COVID 19 patient	.83					
I do not like to see the corpse of someone who died COVID 19					.91	
I do not want to be isolated				.81		
The sight of COVID 19 patient frightens me	.55					
The thought of being effected sometimes overwhelmed me						.91
I often think of how short this life is			.93			
I shudder when I hear/read the number of COVID 19 fertilities				.84		
Variance %	**29.08**	**17.15**	**9.72**	**8.70**	**8.26**	**6.54**

DISCUSSION

In this study, the construction of COVID-19 Death Anxiety Scale was carried out; hence its validity and reliability were established. The psychometric properties of the scale were further enhanced with the correlation of the proposed scale and Hospital Anxiety and Depression Scale (HADS). The calculated Cronbach Alpha was .76 which indicated that COVID-19 Death Anxiety Scale has high Criterion Validity and the reliability coefficient of internal consistency was .82. The reason for the high reliability and validity coefficients could be attributed to the physical and psychological disposition of the participants to the nature of the pandemic which generally generated fear globally and the various procedures involved in the prevention and management of the pandemic.

The factor structure of the proposed scale was examined using the principal component analysis, which revealed two factors. The first factor which is the fear provoked by visual stimuli related to COVID-19 Death has four items and the second factor which is the fear of COVID-19 related death has four items. All other factors have less than three items loaded on them and the implication of this result is these items do not fit the data set. Though the study sample was adequate and having same characteristics to elicit the desire responses needed for the development of this scale, however specific limitation had been acknowledged. The participants were not assessed for other psychological disorders. Also, the physical disposition of the participants could have influenced their response to items in the scale, it therefore believed that such response would not be the same for individual who are not in such position regarding the subject under consideration.

Conclusion: The Psychometric properties of the COVID-19 Death Anxiety Scale indicated that the Scale was reliable and valid. Also, factors predicting COVID-19 related death can be considered as another interesting research topic to be studied in order to proffer workable solutions to the psychological issues that are associated with death of COVID-19 Patients. This scale will therefore be of a great importance to those who manage COVID-19 patients when considered from the psychological perspective and it will be of importance to researchers in the field of social sciences across the globe.

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