

Original Article

Development and Psychometric Properties of Covid-19 Attitude Scale: For Health Workers

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Abstract

Background: Coronavirus disease-2019 (COVID-19) emerged and became a worldwide concerning public health issue in a short time. One of the groups most affected by this situation has been health workers.

Aim: This study was conducted to develop COVID-19 Attitude Scale (CAS) for health workers.

Methodology: This study is a methodological design and is conducted with 310 health workers. Firstly 8-item draft scale was created and item-total correlation and Cronbach Alpha values were calculated to test content validity, factor analysis, and internal consistency.

Results: Item-total correlation values of the scale were = 0.23–0.60 and Cronbach Alpha value was 0.65. factor loading values of score items were between 0.329 – 0.750. The score took its final shape with 8 items and 3 sub-factors.

Conclusion: COVID-19 Attitude Scale is a valid and reliable tool that can be used in assessment of COVID-19 attitudes of health workers.

Keywords: COVID-19, attitude, health workers, scale development

Introduction

The concept of attitude is a complicated concept frequently used to identify people and society and to explain their practices. Generally, attitude is accepted as a factor that gives direction to practices of individuals (Thurstone 1928; Alport 1967).

Social psychology postulates that there is a basic and direct relationship between attitudes and practice. Thus it is argued that in case we know a person's attitude on a subject, we can estimate practice on that subject (Ajzen 2001).

Due to the inexistence of drug therapy in COVID-19 Pandemic process protective practice of society (mask, distance, hygiene, etc.) gained considerable importance (World Health Organization-a 2021).

It is beyond doubt that health workers are the most important group in the fight against COVID-19. Their attitudes must be determined and factors impacting their attitudes must be analyzed. According to our knowledge, studies to measure the COVID-19 attitudes of health works are very limited. Therefore, this study was conducted to develop CAS and examine its psychometric properties. It is considered that the COVID-19 Attitude Scale that was developed would be a useful tool to assess COVID-19 attitudes of health workers.

Background and Conceptual Framework: COVID-19 is a pandemic that emerged in Wuhan state of China and engulfed the entire world. Hence, the World Health Organization (WHO) declared a global pandemic and emergency in the whole world in March.⁵ From identification of

the first case onwards, this became an important global public health problem with its spread together with its psychological, social, and economic impacts (World Health Organization-b 2021; Cotrin et al. 2020).

The epidemic had caused millions of deaths across the world, and was still rapidly growing (World Health Organization-c 2021). Turkey was identification of the first case in March 10th and effected from this pandemic alongside the entire world (Turkish Ministry of Health 2021).

Despite the beginning of vaccination to prevent the COVID-19 pandemic, application could not be completed to entire population. Also, inexistence of a drug for this disease increased its spread and made an already bad situation worse (Yousaf et al. 2020; Qarawi, Jia, Gad 2020). This negative outlook proves the importance of being careful in fighting the pandemic and following precautions (distance, hygiene, mask, and other social restrictions) for its control (World Health Organization-a 2021).

Knowledge, attitude, and practices (KAP) of the society is a significant cognitive factor in protecting and improving health while fighting pandemic and for its prevention (Zhong et al. 2020; Zhou et al. 2020).

A study conducted during the SARS pandemic demonstrates that knowledge and attitude on pandemics is related with serious panic and other emotional reactions in the population and are important in preventing spread of the condition (Person et al. 2004). Beliefs about COVID-19 emerge based on effect of diverse sources such as stereotypes on similar pandemics, information given by official institutions, social media and the internet, previous personal experiences and medical sources. Accuracy of these believes might lead to emergence of different practices regarding prevention of the pandemic and it might take a different course in different societies (Ferdous et al. 2020).

Beyond any doubt the most important duty in prevention of a pandemic is assumed by health workers. During a pandemic health workers are expected to both protect themselves and their families and contribute to public health (Qarawi, Jia, Gad 2020; Center of Disease Control 2021). Health workers get infected while providing services to fight against the COVID-19 and

especially countries with weak health systems are negatively affected from this situation (Olum et al. 2020; Kassie et al. 2020). Therefore, it is a priority that health workers develop positive attitude and practices regarding the COVID-19 and it is a useful approach for public health. Evidence based study results concerning COVID-19 attitudes of health workers could ensure preventive measures are used in this and other similar pandemics in the future and control procedures are developed.

Literature review presents some studies on COVID-19 attitude (Zhong et al., 2020; Alobuia et al. 2020; Dimitrios et al. 2020; Ghimire, Dhungel, Pokhrel 2020; Duruk, Gümüşboğa, Çolak 2020; Ayinde et al. 2020; Saqlain et al. 2020; Peng et al. 2020). However, studies to measure the COVID-19 attitudes of health workers are very limited. Development of CAS to determine attitudes of health workers that are in the risk group during the pandemic shall make a significant contribution to the literature and public health. This study was conducted to develop CAS and evaluate its psychometric properties.

Methods

This is a methodological study. The methodological study was conducted for development of a tool that would measure COVID-19 attitudes of health workers employed at a city hospital in eastern Turkey in February 2021 and assess its validity/reliability.

Population and Sample of the Study: Population of the study was 1794 health staff (doctors, nurses, technicians, etc.) employed at a city hospital in eastern Turkey. Sample was created from 310 persons determined with power analysis (95% confidence interval, 5% level of significance, and 95% representativeness). Accidental sampling method was used to select sample out of population.

Data Collection: Study data was digitally collected by the authors. Data were collected using personal information form, CAS. Pilot study for this study was conducted in a different health institution with 20 health workers. Afterwards survey forms were prepared digitally and sent to health staff in the institution though a phone application (WhatsApp) and also collected digitally. The study was completed with 310

persons that agreed to participate in the study and filled out and sent the survey.

Data Collection Tools: This study was conducted using Personal Information Form and CAS.: *Personal Information Form:* Developed by the authors to collect descriptive information of participants that agreed to participate in the study. This form has a total of 8 questions on sociodemographic information and particulars and work information (age, sex, income status, work unit, work hours, etc.).

COVID-19 Attitude Scale (CAS): A thorough literature study was conducted while preparing the CAS. As a result of the literature study it was determined that there were no scales to measure COVID-19 attitudes of health workers. This study aims to fulfil this gap in the literature by developing a scale compatible with the Turkish society and that measures COVID-19 attitudes of health workers.

Items in the survey were prepared as an 8-question draft assessing COVID-19 attitudes of health workers. Five specialists in the area provided assessment for content validity of the developed scale form. The group of specialists examined the items and did not make any suggestions.

Before validity assessment of the scale, authors made a pilot study with 20 participants. With this pilot study items that was not easily understood by participants were clarified and application started on the sample identified for the research. In order to calculate reliability coefficient of the study, construct validity, item and internal consistency assessments and final editing was made.

After all such assessments the 5-point Likert-type attitude scale with 8 items was formulated. Scoring of scale items were made as Absolutely agree (1), Somewhat agree (2), Undecided (3), Somewhat disagree (4), Absolutely disagree (5). Negative expressions in the scale were scored reverse between “absolutely agree: 1” and “absolutely disagree: 5”. 8 items in the scale were scored reverse. Scoring was based on self-assessments of participants regarding their own information. Scores were added to assess scale score. The highest score that could be received on the scale was 20 and the lowest score was 8. As score increased, attitude towards COVID-19 became more positive.

Ethical Considerations with the Study: Ethics permission was received from a University

Faculty of Medicine Non-Invasive Ethic Committee numbered (13679). Study participants were informed on the study, confidential handling of the study data and the voluntary nature of participation in or withdrawal from the study.

Assessment of Data: Data was assessed with licensed Statistical Package for the Social Sciences (SPSS) 23.0 packaged software. Distribution of questions in personal information form were interpreted in frequency and percentages. Regarding sample adequacy Kaiser-Meyer-Olkin Measure of Sampling Adequacy and for sample size, Bartlett’s Test of Sphericity was conducted. for reliability and validity of the sample Cronbach’s Alpha, Spearman-Brown correlation and factor analysis tests were used.

Results

Findings on Personal Properties of Participants: Table 1 shows identifier variables of health workers. Average age of health workers that participated in the study was 34.50 ± 8.36 and average years of employment were 11.94 ± 8.89 . 48% of participants were women and 64% were married. 71.9% of health workers that participated in the study were working as nurses, 23.9% were working at out-patient diagnosis and treatment unit and 63.5 were working 40 hours or less per week.

Content Validity: The draft scale with 8 items was examined by a group of 5 specialists in terms of suitability and expressiveness. No suggestions were made as a result of examination of 5 specialists. The scale was applied to 20 health workers to assess readability and comprehensibility of items. 8 items on the scale were found to be sufficient to determine COVID-19 attitude levels of health workers.

Construct Validity: In the study as a result of Kaiser-Meyer-Olkin Measure of Sampling Adequacy (sample adequacy), analysis KMO coefficient of Covid-19 Attitude Scale was found to be 0.630 and as a result of Bartlett’s Test of Sphericity (sample sphericity) analysis X^2 value was found to be 415.65. Both test results were found to be significant on $p=0.000$ level (Table 2). Result demonstrated that sample size was sufficient and appropriate for factor analysis of CAS. Result of factor analysis conducted to establish factor structure of CAS, explanation rate of total variance by items and factors, their factor loadings are given in Table 3. As a result

of exploratory factor analysis to assess validity of the scale, it was determined that factor loading values of items changed between 0.329 and 0.750, Protective Attitude sub-dimension (items 1, 2, and 3) explained 27.20% of total variance, Infection Related Attitude sub-dimension (items 5, 6, and 7) explained 20.54% and Information Attitude sub-dimension (items 4 and 8) explained 12.70%, while total scale explained 60.46% of variance (Table 3)

Reliability: As a result of Cronbach's alpha reliability analysis conducted to measure internal consistency of CAS; internal consistency coefficient for Protective Attitude sub-dimension was calculated to be 0.76, Infection Related Attitude internal consistency coefficient was calculated to be 0.52, Information Attitude internal consistency coefficient was calculated to be 0.59 and total internal consistency coefficient

was calculated to be 0.65 (Table 3). Consistency of CAS was found to be reliable. Item-total correlation coefficients of CAS were examined. It was concluded that item-total correlation coefficients were between $r=0.23-0.60$ and were at acceptable levels for CAS (Table 3).

Human Rights: All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed consent : Informed consent was obtained from all individual participants included in the study.

Place of Study: Elazig Fethi Sekin City Hospital

Table 1. Characteristics of the Health Worker

| Descriptive Variables | | n | % |
|--------------------------|-----------------------------|-----|------|
| Gender | Female | 220 | 71.0 |
| | Male | 90 | 29.0 |
| Marital Status | Married | 198 | 63.9 |
| | Single | 112 | 36.1 |
| Education Level | Normal High School | 13 | 4.2 |
| | Vocational high School | 14 | 4.5 |
| | Undergraduate(2 years) | 63 | 20.3 |
| | License(4 years) | 184 | 59.4 |
| | Post Graduate and Doctorate | 36 | 11.6 |
| Position in Organisation | Nurse | 233 | 71.9 |
| | Doctor | 17 | 5.5 |
| | Technician | 51 | 16.5 |
| | Other | 19 | 6.1 |

| | | | |
|----------------|------------------------------------|-----|------|
| Working Clinic | Outpatient Diagnosis and Treatment | 74 | 23.9 |
| | Emergency Group | 67 | 21.6 |
| | Intensive care | 43 | 13.9 |
| | Internal Services | 57 | 18.4 |
| | Surgical Services | 42 | 13.5 |
| | Other | 27 | 8.7 |
| Work hour | 40 hours and less | 197 | 63.5 |
| | Over 40 hours | 113 | 36.5 |

Table 2. Results of the Kaiser–Meyer–Olkin measure of sampling adequacy and Bartlett’s test of sphericity.

| Test | | Result |
|--|--------------------|---------|
| Kaiser-Meyer-Olkin Measure of Sampling Adequacy. | | .630 |
| Bartlett's Test of Sphericity | Approx. Chi-Square | 415.650 |
| | df | 28 |
| | Sig. | .000 |

Table 3. Factor loadings and item-total correlations or Cronbach's Alpha if Item Deleted of the Covid-19 Attitude Scale

| The items of the scale | Factor Loading | Item-total correlation | Cronbach's Alpha if Item Deleted | Variance (%) | Eigenvalue |
|-----------------------------------|----------------|------------------------|----------------------------------|--------------|------------|
| Protective Attitude | | | .76 | 27.20 | 2.1 |
| Q1 | .678 | .588 | .709 | | |
| Q2 | .687 | .590 | .703 | | |
| Q3 | .750 | .694 | .654 | | |
| Infection Related Attitude | | | .52 | 20.54 | 1.6 |
| Q5 | .329 | .230 | .629 | | |
| Q6 | .673 | .348 | .412 | | |
| Q7 | .690 | .461 | .207 | | |
| Information Attitude | | | .59 | 12.70 | 1.0 |
| Q4 | .586 | .241 | .716 | | |
| Q8 | .443 | .606 | .244 | | |
| Total | | | .65 | 60.46 | |

Discussion

In the scope of this study, a thorough literature review was made on existing studies. As a result of studies, no scales measuring COVID-19 attitudes of health workers in COVID-19 pandemic process which is a significant public health problem were found.

Therefore, a tool measuring COVID-19 attitudes was developed through a sample of 310 health workers and its psychometric properties were analyzed.

As a result of this study, CAS was determined to have appropriate psychometric properties for measurement and assessment.

Validity and reliability are two important criteria expected from all scales used in studies. Validity is described as suitability of measurement tool to the situation or properties that are measured (Salkind 2020). Reliability is the fact that measurement tool has the same stable degree of measurement of what is wanted to be measured or that responders to the scale gives coherent answers. In more simple terms, it is how much a tool used for measurement is coherent (Hodgetts et al. 2018).

Content Validity

CAS was developed by authors by following a meticulous methodology. In order to evaluate reliability and validity of CAS on health workers, psychometric verification process was used. In order to accept a measurement tool as valid, a group of specialists must determine if every item of scale reflects the concept that is wanted to be measured (Esin 2018; Erefe 2004; Yaghmaei 2003). In this study draft scale items were assessed by 5 specialist academics. Academics did not make any suggestions. In order to ensure items of the scale are better understood, a pilot study was conducted with 20 persons by the authors and 8-item draft scale was developed. 8 items on the scale were sufficient to determine COVID-19 attitudes of health workers. CAS was

prepared in Turkish and opinion of language specialists was also received. It could be used in languages other than Turkish.

Construct Validity

Construct validity analysis is conducted to determine which concepts and properties scale measures (Altunisik 2010). In other words, the extent to which measurement tool aims to measure reached its aim, the degree to which it correctly measures the concept it is wanted to measure is assessed with construct validity. Factor analysis is a method used to assess construct validity (Esin 2018).

It is noted that in order to make factor analysis, there must be a level of correlation among variables (Esin 2018; Öztürk and Babacan 2012). The level of relationship between these variables is ascertained with Bartlett test. The value of $p < 0,05$ in this test demonstrates that there is a sufficient level of relationship among variables (Karadagli and Ecevit, 2017).

Also at factor analysis Kaiser Mayer Olkin (KMO) value determined if sample is sufficient for scale and if items on scale are appropriate to factor analysis and this value is expected to be higher than 0.5 (Esin 2018; Cinar 2018).

Both test results were found to be significant at $p=0.000$ level (Table 2). The result demonstrated that sample size for CAS was appropriate and sufficient in terms of factor analysis.

Factor analysis was conducted to determine construct validity of CAS and whether dimensions explaining concepts in scale could be collected under different dimensions (Esin, 2018). As a result of analysis the 8-item scale with 3 sub-dimensions and total variance value 60.46% was established.

High total variance demonstrates that factor structure of scale is strong (Öztürk and Babacan 2012; Cinar et al. 2018; Dost and

Bahçecik 2015). It is noted that for a scale to be acceptable, the total variance it explains must be a minimum of 30% (Buyukozturk 2012). In this study, the total variance explained by scale is sufficient. Also scale items have sufficient factor loadings (Table 3). The minimum acceptable score for factor loading is 0.40 (Aslan 2020; Polit and Beck 2004).

Reliability

While testing reliability of draft scale, internal consistency analysis was made. Internal consistency demonstrates homogeneity of items on scale (Heppner, Wampold, Kivlighan 2008). In order to determine if scale items represent only one dimension, structure, and interest coherence among items are checked (Salkind 2020). In this study, while internal consistency was assessed, total score correlation of item and Cronbach's Alpha values were analyzed.

The relationship between total score of draft scale and scores of items on scale is determined with item-total correlation. If score of one item of score and total score are in positive values and have high correlation score, its internal consistency is high and is taken to scale (Esin, 2018; Ozturk and Babacan 2012; Heppner, Wampold, Kivlighan 2008). Although there is not a definite standard on then reliability would be insufficient when item-total test correlation coefficient falls under a certain criterion, items with value on or above 0.30 in interpretation of item-total correlation are accepted to be sufficient (Esin 2018). However, the literature shows that the acceptable minimum point for correlation between individual items is 0.15 (Aslan et al. 2020; Polit and Beck 2004)

When item-total correlation coefficients of CAS are examined, it was seen that item-total correlation coefficients changed between $r=0.23-0.60$ and was at acceptable

level for COVID-19 Attitude Scale (Table 3).

Another reliability measure, Cronbach's alpha reliability coefficient assesses whether items measure the same property and whether they are related to the measured subject (Esin 2018; Heppner, Wampold, Kivlighan 2008). Cronbach's alpha coefficient is frequently used when determining internal consistency of Likert type scales (Esin 2018). If Cronbach's alpha coefficient is high, that denoted the scale reliability is high. Tools that have a minimum of 0.60 on this coefficient value are accepted to have no measurement risks (Erefe 2004). COVID-19 Assessment Scale was measured to have a general reliability value of 0.65 and that CAS had reliable consistency.

Conclusion: This study determined that CAS was a valid and reliable measurement tool for his group of health workers.

This scale is important regarding evaluation of attitudes of health workers concerning COVID-19 and shall raise awareness. In addition, this scale that was developed due to the inexistence of a similar scale in literature shall be a reference for studies in this framework. Application of a methodology accepted in the science literature enables comparison of data in different languages.

In order to strengthen reliability of this scale, it could be tested for invariability. It is suggested to conduct studies in different institutions, different cultures, and different sample groups to test findings.

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COVID-19 Attitude Scale Items

| |
|---|
| 1. Protective clothing, gloves, mask, glasses must be used when dealing with COVID-19 patient. |
| 2. Health worker must accept and use all current and correct information on COVID-19. |
| 3. COVID-19 patient must be isolated. |
| 4. Every information on COVID-19 must be spread among other health workers. |
| 5. Spread of COVID-19 could be reduced with active participation of health workers. |
| 6. COVID-19 can be prevented with universal preventions given by CDC (Center for Disease Control and Prevention) and WHO (World Health Organization). |
| 7. COVID-19 pandemic can be controlled with effort of Public Health Institutions. |
| 8. Health education has no effect on prevention of COVID-19 infection. |

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