

Original Article

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The COVID-19 Vaccine Knowledge and Attitude Scale: Methodological Study

Elyeli and Bebiş. COVID-19 Vaccine Knowledge and Attitude Scale

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ABSTRACT

BACKGROUND/AIMS: Covid-19 virus has spread to many countries in a short time since its emergence in December 2019 and has been declared as a pandemic. It is important to wear a mask and comply with physical distance to protect against Covid-19. However, the Covid-19 vaccine is important for breaking the infection chain. This study is a methodological type of validity and reliability study conducted in the Northern Cyprus between October 2020 and January 2021.

MATERIALS AND METHODS: This scale was produced from two different studies (cross-sectional study and methodological study). First study was the cross-sectional (n=396) study. This study's results was used to the first draft candidate scale, 50 items, with the literature. In this study was achieved to evaluate validity and reliability of Covid-19 Vaccine Knowledge and Attitude Scale. The study population consisted of individuals who are over the age of 18 living in the Northern Cyprus, speaking Turkish, using social media platforms, having a smartphone or a computer. In this study, firstly researchers evaluated the first candidate scale (n=50 items) and then it was reduced n=25 items. According to literature, the study sample size ($n = 25 \times 10$) should be at least $n = 250$ participants. In this study, sampling selection was achieved with Convenience Sampling method and reached to participants (n=477) who met the study criteria and accepted attending study as a volunteer. Also in this study Confirmatory Factor Analysis was performed with a different sampling (n=120). The data was collected via Google Form (age, gender, 8 socio-demographic questions and the Covid-19 Vaccine Knowledge and Attitude Scale) on internet platforms. SPSS were used for the statistical evaluation of the study. CVI method was used for the content validity of the scale. Kaiser-Meyer-Olkin (KMO) and Bartlett's Tests were applied to evaluate sampling adequacy and suitability for factor analysis. Pearson Correlation analysis was used for item

analysis and Cronbach alpha reliability coefficient was used to test internal consistency. Subsequently, approximately 2 weeks later, the scale was applied to the participants ($n = 85$) again, to test-retest reliability using the paired dependent sample t test. and there was not found statistically significant difference ($p > 0.05$). Results was shown as mean \pm , standard deviation, number (n) and percentage (%). Confidence Interval (CI) 95% and $p < 0.05$ were accepted as the statistical significance. AMOS program was used for Confirmatory Factor Analysis.

RESULTS: Content and construct validity of the items were evaluated ($n=477$). The 16-item scale was reached, with a Kaiser Meyer Olkin test result of 0.808 and a Bartlett test result of 2308.179. In order to determine the invariance of the scale with respect to time ($n = 85$), there was no statistical difference ($p > 0.05$).

Cronbach's alpha coefficient calculated for the whole scale and its factors (total scale $\alpha = 0.68$, Factor 1 " the Perceived of Severity" $\alpha = 0.81$, Factor 2. " the Perceived of Barrier" $\alpha = 0.782$ and Factor 3 " the Perceived of Benefit" $\alpha = 0.70$). Confirmatory factor analysis was also evaluated with a different sample ($n = 120$). According to these results; Degrees of Freedom (DF) value was found to be 101 ($p < 0.001$). Root Mean Square Error Approximate value (RMSEA) 0.08, Goodness of Fit Index (GFI) value 0.89; The Normalized Fit Index (NFI) value was 0.62 and the comparative fit index (CFI) value was 0.67.

CONCLUSION: The scale was considered a valid and reliable instrument. However, it is recommended to test it in other groups to increase reliability criteria.

Keywords: Covid-19 Vaccine, Validity-Reliability, Scale Development.

INTRODUCTION

The covid-19 virus spread very rapidly and turned into a long-term pandemic. The rate of morbidity and mortality (3.4%) of the virus causes fear, panic in society, causes economic losses, psychological and social problems (1,2). The virus causes serious health problems and deaths in all age groups, but especially for those who are elderly, have chronic diseases, have immune system problems. The virus also creates a heavy burden on the health system (3,4) There is no specific treatment for the virus yet, so prevention has become even more essential (2). It is aimed to gain both individual and social immunity with the vaccines developed (5). In the world, seven different vaccines have been developed so far (6). Their level of protection ranges from 40% to 90% and it is predicted that they will protect for at least six months (7). However, there are various problems and concerns about the obtaining, application, side effects, and preventiveness of vaccines (8). In some sections of society, these concerns remain even for vaccines developed many years ago (measles, polio, rubella, etc.), and this leads to "anti-vaccination" or "vaccine hesitation" (9,10)

Health belief is defined by individuals' beliefs and attitudes about health behaviors (11). If a person thinks that a disease has fatal or dangerous health consequences (Perceived of severity) and believes that the current method of protection/treatment will protect/cure him/her (Perceived of benefits), they will seek health. However, the same person may also experience some difficulties (Perceived of barriers) in adapting to the new treatment (12).

Valid, reliable measuring tools are needed to determine the community's knowledge of the vaccine, the perceived of barriers, severity and benefits.

This study was conducted as a methodological study to determine the validity of the newly developed "Covid-19 Vaccine Knowledge and Attitude Scale".

MATERIALS AND METHODS

This study is a methodological type of validity and reliability study conducted in the Northern Cyprus between October 2020 and January 2021.

Population

The study population consisted of individuals over the age of 18 living in the Northern Cyprus, speaking Turkish, using social media platforms, having a smartphone or a computer.

Sampling

In this study, the first candidate scale (50 items) was produced from the first study which was the cross-sectional (n=396) study (13) and then it was reduced 25 items. According to the literature (14-18), the sample size should be at least 5-10 times of the number of scale items. In this study, for the second candidate scale was 25 items, the study sample size calculate at least (n=250) participants.

In this study, sample selection was achieved with Convenience Sampling Method and reached to participants (n=477) who met the study criteria and accepted attending as a volunteer. Subsequently, approximately 2 weeks later, the scale was applied to the participants (n=85) again to test-retest reliability. The Confirmatory Factor Analysis was performed with a different sampling (n=120).

Figure 1

Data Collection:

The data was collected via Google Form (age, gender, 8 socio-demographic questions and the Covid-19 Vaccine Knowledge and Attitude Scale) on internet platforms.

Ethical Aspects of the Study

The ethical approval for this study was obtained from x Health Sciences Ethics Commission (2020/85-1183), and the written informed consent was obtained from all participants before the study.

Inclusion/exclusion criteria:

Those who read and understand Turkish and volunteered to participate in the study were included in the study, and those who could not access the internet with their computers or Smartphone were excluded from the study.

Limitations of the Study

The research data was collected with the participants' self-declaration and applies only to this sample group. It cannot be generalized to other groups.

Data Collection Tools

Socio-demographic Questionnaire

It consists of 8 questions that question the age, gender, educational status of the individuals, and the Covid-19 transmission status and chronic disease history of themselves and their family.

Covid-19 Vaccine Knowledge and Attitude Scale

Covid-19 Vaccine Knowledge and Attitude Scale developed by researchers which consists of last version (n = 16 items) and 3 sub-scales. All scale items was calculated positively and sub-scales can used individually. There is no cut-off point of the scale; An obtained high score indicates that the participant has a high level of "severty" (5 items = 1;2;3;4;5), "Barriers" (7 items = 6;7;8;9;10;11;12), and "Benefit" (4 items = 13;14;15;16) perception about the Covid-19 Vaccine Knowlede and Attitude. The scale was likert type scale. Items evaluate as 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, and 5 = Strongly Agree. It takes about 10 minutes to complete the scale.

Statistical Analysis

Statistical analyzes were performed using the Statistical Package for Social Sciences software version 21.0 (IBM SPSS Corp.; Armonk, NY, USA). While testing the reliability of the scale, the Content Validity Index was used to evaluate the Content Validity, and the exploratory factor analysis was used to evaluate the Construct Validity. Kaiser-Meyer-Olkin (KMO) and Bartlett's Tests were applied to evaluate sampling adequacy and suitability for factor analysis. Pearson Correlation analysis was used for item analysis and Cronbach alpha reliability coefficient was used to test internal consistency. To test-retest reliability was evaluated the paired dependent t-test. . Results was shown as mean \pm standard deviation, number (n) and percentage (%). Confidence interval (CI) 95% and $p < 0.05$ were accepted as the statistical significance. AMOS program was used for Confirmatory Factor Analysis.

RESULTS

1. Study Participants Sociodemographic Characteristics

The average age of the participants was 23 ± 39.3 , 67.1% (n=320) were women, and 81.8% (n=390) were university graduates. It was determined that 27.9% of the participants (n=133) had a family member infected with the Covid-19 virus, and 5% (n=24) lost one of their family members due to Covid-19. In addition, it was determined that 9% (n=43) of the participants were infected with Covid-19.

2. Covid-19 Vaccine Knowledge and Attitude Scale Validity Assesment

1. Content Validity Index Analysis

The first draft of this scale (50-item scale) was prepared on the basis of health belief model, according to the results of the literature review and before Cross-Sectional type study (n=396) results. Then, the first draft scale items (50-item scale) were evaluated independently by the researchers, and they reached a consensus the second draft scale (25-item draft scale).

The first draft of this scale (50-item scale) was prepared on the basis of health belief model, according to the literature and Cross-Sectional type study's results(n=396) (13). Then, the first draft scale items (50-item scale) were evaluated independently by the researchers, and they reached a consensus the second draft scale (25-item draft scale).

The second candidate scale (n=25) and it's items was evaluated by the expert researchers (n = 5) according to the "Content Validity Index (CVI). CVI evaluation for each item is as follows: 1 = the item is not relevant, 2 = the item is not relevant and major change is required to become relevant, 3 = the item is relevant but minor change is required, 4 = the item is very relevant. If the items assessed as 3 and 4 were considered sufficient in terms of Item Contend Validity and remained in the draft scale. At this stage, five items were removed from the scale; so that the The third draft scale (20-item scale) was created. The evaluation of experts for this scale was found to be CVI= 80-90%.

2. Construct Validity Analysis

According to the results of the first analysis (n=477), four items with Eigenvalue <1 were removed from the draft scale. Statistical evaluation was continued with the remaining the fourth draft scale (16-item scale).

Table 1.

In the Table1, KMO and Bartlett tests were used for exploratory factor analysis to the data obtained from the fourth draft scale (16-item scale). And then, KMO was found to be 0.808, and the Bartlett test result was found to be 2308.1 ($p < 0.001$) (Table 1).

The Varimax orthogonal rotation method was used to rotate the factor loadings matrix and explain the factor variances with fewer variables in a maximum way. Eigenvalue=1 was accepted to determine the number of factor items. A Scree Plot diagram was used to determine the number of factors. According to the Scree Plot diagram, the last point before falling below Eigenvalue 1; determines the number of factors (19).

It was determined that among the scale items included in the analysis, those with an Eigenvalue >1 explained 51.55% of the total variance. The variance ratio explained by the first factor with an eigenvalue of 4.00 was 25.00%; the variance ratio explained by the second factor with an eigenvalue of 2.64 was 16.55%; the variance ratio explained by the third factor with an Eigenvalue of 1.80 was 11.28%. The total variance ratio explained in the scale was found as 51.55%.

When the Scree Plot graph was examined, it was determined that the sharp decline continued until the fourth point, and after the fourth point, the slope of the line became horizontal (Figure 2). When the dot intervals up to the fourth point are counted, it was determined that it was three, and this suggests that a useful model for these data may have three factors.

Accordingly, the first factor is the Perceived of Severity, the second factor is the Perceived of Barrier, and the third factor is the Perceived of Benefit (Table 1.).

Figure 2.

3. Covid-19 Vaccine Knowledge and Attitude Scale Reliability Analysis

Reliability is the degree to which the items of the measurement tool are consistent with each other, the degree to which their results are free of random errors (11). Internal Consistency Cronbach Alpha, Spearman and Guttman Coefficients, Item analysis, Test-retest confidence analyses were used in the reliability of the scale developed.

1. Internal Consistency Reliability (Cronbach Alfa) Analysis

Table 2.

Cronbach's alpha coefficient, one of the methods of testing the internal consistency reliability in Likert-type scales, was calculated for the whole scale and its sub-scales (Table 2). Scale Total Cronbach alpha value was $\alpha = 0.68$, Factor 1 " the Perceived of Severity" Cronbach Alpha value $\alpha = 0.81$, Factor 2. " the Perceived of Barrier" Cronbach Alpha value $\alpha = 0.78$ and Factor 3 " the Perceived of Benefit" Cronbach Alpha value was determined as $\alpha = 0.70$. Cronbach alpha item deleted test was performed, but it was determined that Cronbach alpha value did not increase if any substance was removed.

2. Determination of Spearman-Brown and Guttman Values Analysis

Table 3.

As can be seen in Table 3, the split-half reliability coefficients obtained by dividing the scale items into two equivalent halves were calculated. Accordingly, the spearman value (Equal-

length Spearman-Brown) was found to be $S = 0.349$, and Guttman value (Guttman split-half) was $G = 0.347$.

4. Item Correlation Analysis

1. Correlation Analysis

Table 4.

In Table 4, "Pearson-moment correlation analysis" was performed to determine the relationship between scale score and factor scores. A correlation was found between Factor 1 " the Perceived of Severity" and Factor 2 " the Perceived of Barrier" ($r = 0.310$), Factor 3 " the Perceived of Benefit" ($r = 1.000$), and scale total score ($r = 0.816$) ($p < 0.001$). A correlation was found between Factor 2 " the Perceived of Barrier" and the scale total score ($r = 0.782$), Factor 1 " the Perceived of Severity" ($r = -0.105$), Factor 3 " the Perceived of Benefit" ($r = 1.000$) ($p < 0.001$). A correlation was found between Factor 3 " the Perceived of Benefit" and the overall score of the scale ($r = 0.697$), Factor 1 " the Perceived of Severity" ($r = 1.00$), Factor 2 " the Perceived of Barrier" ($r = -0.108$) ($p < 0.001$).

2. Item Loads of Factors Analysis

In cases where Eigenvalue is below 0.40, the relevant item is removed from the scale. Accordingly, factor loads are shown in Table 5.

Table 5.

The factor loads of the items in the first factor vary between 0.522 and 0.807, the factor loads of the substances in the second factor vary between 0.459 and 0.713, and the factor loads of the substances in the third factor vary between 0.472 and 0.721.

5. Test-retest analysis

Table 6.

In the Table 6, to determined the relationship between the overall and sub-scale of the scale was applied a group of the study participants ($n = 85$) again. And then data was analysed with the paired dependent sample t test. There was no statistically significant difference both the total mean point of the scale (pre-test = 52.28 ± 4.30 , post-test = 45.95 ± 5.08) and the mean point of Factor 1,2,3 between the pre-test and post-test ($p > 0.05$).

6. Confirmatory Factor Analysis

The Confirmatory Factor Analysis performed in the AMOS statistical program examined the relationship between the different participants ($n = 120$) and the factors and the covariance values (Figure2).

The structure examined contains five items for severity sub-scale, seven items for barrier sub-scale, and four items for benefit sub-scale. The results of the confirmatory factor analysis are shown in Figure 3. According to these results, the Degrees of Freedom (DF) value was found to be 101 ($p < 0.001$). The Root Mean Square Error Of Approximation (RMSEA) value was found to be 0.08, Goodness of Fit Indices value (GFI) 0.89, Normed Fit Index (NFI) value 0.62, and Comparative Fit Index value (CFI) 0.67.

Figure 3

DISCUSSION

Covid-19 virus affected large masses shortly after its emergence and caused deaths worldwide. While there are more than 3 million deaths from Covid-19 worldwide, the number of deaths due to the virus in Northern Cyprus has exceeded 30 (20,21). In this study, 5% of the participants lost a family member due to Covid-19, and approximately 10% were infected with Covid-19 (Table1). The data in this study are similar to the literature.

In the literature, it is stated that draft scale questions in scale development studies were created by scanning the literature or by qualitative interviews (22-24). In this study, the literature was reviewed and the first draft scale (50-item draft scale) was created using cross-sectional study data conducted with a different sample group in the first step of the research as part of the scale development study (23). In this study, firstly researchers evaluated the first candidate scale (50 items) and then the second draft candidate scale was reduced to 25-item.

Validity is the conformity of the measurement tool to the feature required to measure and the degree of measurement of the feature it intends to measure (25). A developed measurement tool is expected to meet validity. Validity is evaluated as content validity and construct validity (26). Testing the content validity of a scale is carried out to determine whether the newly developed scale measures the concept that it's intended to measure and whether it contains unrelated concepts (27). The scale was presented to the opinion of experts in the field for the eliminating of items that are not related to the condition to be measured. The scale was edited in line with the comments and assessments of experts. In the literature, it is stated that the number of experts to be consulted to test the content validity can vary between 5 and 40 (25,28-30). The purpose of the validity test is to reveal the draft scale items by determining whether the candidate draft items represent the behavior to be measured by an expert group. This second draft scale (25-item scale) was presented to experts (n=5) to test the content validity. As a result of the evaluations of the experts, five items scored below three were removed from the scale, and it was determined that the CVI value of the scale was above 80%. The research was carried out with the third draft candidate scale (20-item).

The construct validity determines to what extent the items in the scale accurately measure what it's intended to measure (31). The test of construct validity is done by using the factor analysis method and scoring the answers given to the items in the measurement tool. As a result of the analysis, items with low factor load are excluded from the scale. Factor analysis is maintained until an appropriate result is reached, which includes a sufficient number of items to measure the desired area (32,33). With the Kaiser-Meyer-Olkin test and Bartlett tests, data on the scale are tested to be suitable for factor analysis. The lower limit of KMO testing is 0.50, and factor analysis should not be continued in case of the result is lower than this value. The KMO result is expected to be above 0.70 and close to 1 to perform a good factor analysis (20,25,34). In this study, the Kalmogrow Simirnow test was used to determine the distribution normality of data. Accordingly, whether the sample size was sufficient to develop a scale was tested with the Kaiser Meyer Olkin (KMO) test and Bartlett test among the exploratory tests. As a result of these tests, it was determined that the items were sufficient to develop scale. KMO coefficient of the study (0.808) and Bartlett test (2308.179) was found to be sufficient for analysis (Table 1.).

Among principal component analysis, Varimax Rotation method is one of the most used methods to determine the factor structure of a scale (32). In this study, Varimax Rotation was used and the factor structure of the scale was determined. In the literature, the value of factor load is used to explain the relationship between items and the factor and when deciding on the substances to be included in the scale. The lower limit specified for the factor load value is 0.30, and the load values between 0.30 and 0.59 are considered to be medium and the values 0.60 and above are considered high. It was recommended that values above 0.40 should be taken as the factor load value (26,32). In this study, four items with a factor load

below 0.40 were excluded from the scale. Thus, the number of items on the scale decreased to $n=16$ items (the fourth draft candidate scale).

As a result of factor analysis, the higher variance rates mean a stronger factor structure. However, it is not possible to reach a high variance rate in many areas; variance rates varying between 40% and 60% are considered ideal (31). In this study, the total variance explained after factor analysis was determined as 51.55%. This scale is within acceptable limits in terms of the exploratory factor load value.

Scree Plot graph is used to determine the number of factors (35). In this graph, the vertical axis expresses eigenvalues and the horizontal axis expresses factors. Points giving a steep slope in the graph are included in the study. Points giving a superficial, flat slope are not included in the study. A horizontal line is drawn from the point where the graph shows a horizontal slope, and the distance between the points above this line is accepted as a scale (36). In the literature, it is recommended to take the opinions and comments of experts in the naming of sub-scales (34). In this study, according to the factor analysis, the three factors were named as the perceived of "severity" sub-scale, the perceived of "barrier" sub-scale and the perceived of "benefit" sub-scale.

.s The consistency of all items in the measurement tool and the degree to which the measurement results are free from random errors is called reliability. A test accepted as valid should also be reliable (25,26). Internal consistency, split-half, test-retest, and factor analysis methods are used in the reliability analysis of a developed scale.

Internal consistency is determined by calculating the Cronbach alpha coefficient (37).

Internal consistency is the reliability method that indicates the items included in the developed measurement tool can measure the variable that is desired to be measured. A high Cronbach alpha coefficient means that the items in that scale are consistent with each other (38). In the literature, it was reported that the scale is reliable if the Cronbach alpha coefficient is in the range of 0.60-0.70, while the values between 0.70-1.00 are considered as high reliability (26). In this study, total scale the Cronbach's alpha value of the scale was found to be $\alpha = 0.68$. This value was considered as the reliability of the developed scale was within acceptable limits. Removing any item from the scale while evaluating Cronbach alpha may affect the increase of the Cronbach alpha value (39). However, in this study, it was determined that the Cronbach alpha value did not increase with the deletion of any item. The Cronbach alpha value of the sub-scales, the perceived severity sub-scale $\alpha = 0.81$, the perceived barrier sub-scale $\alpha = 0.78$, and the perceived benefit sub-scale $\alpha = 0.70$, was determined, and it was considered a reliable measurement tool.

In determining the internal consistency of the scale, in addition to the Cronbach alpha coefficient, the split-half method is used and the Guttman and Spearman-Brown reliability coefficients are calculated (40). When calculating the internal reliability coefficient using the division in half method, the coefficient value should be at least 0.70 (29). In this study, the Spearman-Brown value of the scale was calculated as $S = 0.349$ and the Guttman value as $G = 0.347$. Spearman-Brown and Guttman values were found to be low in this study.

Testing the consistency against time is another scale of scale reliability. The scale is applied to part of the the same sampling group - after 2 to 4 weeks, and the mean scores between the two measurements are compared (25,26). In this study, the relationship between the overall and sub-scale of the scale was evaluated in the test-retest method with a group of the study participants ($n=85$), and there was no statistically significant difference between them ($p>0.05$). This result was evaluated as a consistent measurement of the scale against time.

Item analysis is carried out to test whether the items in the whole or sub-scales of the measurement tool are significantly included in the whole or sub-scales of the scale. In item analysis, the variance of each scale item and the variance of the total scale score are compared with Pearson-moment correlation analysis, and the relationship between them is

examined (40). If the items of the scale are of equal weight and in the form of independent units, it is expected that the correlation coefficient between each item and the total value will be high, and the item-total correlation results will also show statistical significance (25,34,20). In this study, there was a statistically significant relationship between all items in the scale and the total score according to the results of Pearson -moments correlation analysis calculated to determine item-total correlations ($p < 0.05$). As a result of the Pearson-moment correlation analysis performed for the item-total correlations of the sub-scales of the scale, a significant correlation was found between the severity, barrier, benefit Perceived items, and their sub-scales total score ($p < 0.05$). These results indicate that the items in the scale are distinctive in terms of the properties they measure.

Confirmatory Factor Analysis (CFA) is the frequently used analysis method in developing a new measurement tool, evaluation of the psychometric properties of the measuring instrument, examining the effectiveness of the method, determining whether the validity of the measurement tool created varies according to time, population and groups, and determining the correlation between measurement errors (41). Confirmatory Factor Analysis of the scale developed in this study was carried out with a different sample ($n=120$) (Figure 3).

In the confirmatory factor analysis, if the root mean square error of approximation (RMSEA) value is less than 0.08 and the goodness of fit indices value (GFI) is above 0.90, it indicates that the scale has a "good" fit (42). If the normed fit index (NFI) value is above 0.90 and the comparative fit index value (CFI) is equal to 0.95 means that the scale has a "perfect" fit (33). According to this study results, the Degrees of Freedom (DF) value was found to be 101.

The root mean square error of approximation (RMSEA) value was found to be 0.08, goodness of fit indices value (GFI) 0.89, Normed Fit Index (NFI) value 0.62, and Comparative Fit Index value (CFI) 0.67. In line with these data, it was found that the confirmatory factor analysis of the scale was in the reference values given.

CONCLUSION

It was concluded that the Covid-19 Vaccine Knowledge and Attitude Scale, which was analyzed for validity and confidence in this study, was a valid and reliable tool. However, it is recommended to test it in other groups to increase reliability criteria.

MAIN POINTS

- This is the first scale which is about to Covid-19 Vaccine Knowledge and Attitude in the literature.
- This scale help to plan health education in the future in the society for communities fear, barriers and benefits about the Covid-19 vaccine.
- Owing to this scale which is validate and reliable might compare to different study results in a standardized way.

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ETHICS

Ethics Committee Approval: The ethical approval for this study was obtained from x Health Sciences Ethics Commission (2020/85-1183).

Informed Consent: Written informed consent was obtained from all participants before the study.

Peer-review: Externally peer-reviewed.

Authorship Contributions

Concept: K.E., H.B., Design: K.E., H.B., Data Collection and/or Processing: K.E., H.B., Analysis and/or Interpretation: K.E., H.B., Literature Search: K.E., H.B., Writing: K.E., H.B., Critical Review: K.E., H.B.

DISCLOSURE

Conflict of Interest: No conflict of interest was declared by the authors.

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Tables

Table 1. Distribution of Factor Analysis of the Scale

Kaiser – Mayer - Olkin (KMO) Sample Measurement Value Adequacy		0.808
Bartlett Test	Chi-Square	2308.179
	sd	120
	sig.	0.001

Table 2. Internal Consistency Distribution of the Scale

Cronbach α Coefficients	n	Cronbach α Coefficients
Total	477	0.68
Factor 1: Severity	477	0.81
Factor 2: Barrier	477	0.78
Factor 3: Benefit	477	0.70

Table 3. Internal Consistency of the Scale Spearman and Guttman Coefficients

Coefficients	n	Point
Spearman-Brown	477	0.349
Guttman	477	0.347

Table 4. Correlation of Scale Total Score and Factor Scores

Variables	Total Point		Severity		Barrier		Benefit	
	r	p	r	p	r	p	r	p
Total Point	**	**	0.816	0.001	0.782	0.001	0.697	0.001
Severity	0.816	0.001	**	**	0.310	0.001	1.000	0.001
Barrier	0.782	0.001	-0.105	0.001	**	**	1.000	0.001

Benefit	0.697	0.001	1.00	0.001	-0.108	0.001	**	**
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r= Pearson's Correlation test

Table 5. Item Load Distribution of Factors

Factor Groups	Factor Weight
Factor 1	0.807 - 0.639
Factor 2	0.713 - 0.459
Factor 3	0.721 - 0.472

Table 6. Test /Re-test Analysis Results of Covid-19 Vaccine Knowledge and Attitude Scale and Sub-Scales

Scale Total and Sub-Scale	Pre-Test			Post-Test			Statistic	
	Min	Max	Mean±Sd	Min	Max	Mean±Sd	t test	p
Factor 1	11.00	23.00	17.49±2.47	8.00	23.00	16.06±3.45	- 0.136	0.140
Factor 2	13.00	31.00	21.21±3.86	9.00	31.00	17.04±4.31	0.134	0.144
Factor 3	8.00	20.00	13.57±2.41	8.00	20.00	12.84±2.17	- 0.224	0.014
Total	41.00	64.00	52.28±4.30	38.00	64.00	45.95±5.08	- 0.144	0.116

t test:for paired two dependent sample

Additional: Covid-19 Vaccine Knowledge and Attitude Scale

		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	Covid-19 Vaccines protect against Covid-19 disease.					
2	Those with chronic diseases should get the Covid-19 vaccine.					
3	The elderly need to get the Covid-19 vaccine.					
4	Everyone should get the Covid-19 vaccine.					
5	Covid-19 vaccines provide mild Covid-19 disease.					
6	Covid-19 vaccines can have serious side effects.					
7	Covid-19 vaccines have just been developed, they are not safe yet.					
8	Covid-19 vaccines with low protection are used in developing countries.					
9	Even if serious side effects of Covid-19 vaccines are seen, they are hidden from society.					
10	The positive news in the press about Covid-19 vaccines is exaggerated and advertising.					
11	Highly protective Covid-19 vaccines are applied in developed countries.					
12	It is impossible for everyone to get the vaccine in sufficient dosage and frequency.					
13	Children should also get the Covid-19 vaccine.					
14	Young people should also get the Covid-19 vaccine.					
15	Even if the virulence of the Covid-19 virus decreases, it is necessary to be vaccinated.					
16	Someone recovering from Covid-19 disease should still get the Covid-19 vaccine.					

Covid-19 Aşısı Bilgi ve Tutum Ölçeği

		Kesinlikle Katılmıyorum	Katılmıyorum	Kararsızım	Katılıyorum	Kesinlikle Katılıyorum
1	Covid-19 aşıları, Covid-19 hastalığından korur.					
2	Kronik hastalığı olanlar Covid-19 aşısı yaptırmalıdır.					
3	Yaşlıların Covid-19 aşısını yaptırması gerekir.					
4	Covid-19 aşısını herkes yaptırmalıdır.					
5	Covid-19 aşıları hastalığı hafif geçirmeyi sağlar.					
6	Covid-19 aşılarının ciddi yan etkileri olabilir.					
7	Covid-19 aşıları yeni geliştirildi, henüz güvenli değil.					
8	Koruyuculuğu düşük Covid-19 aşıları, gelişmekte olan ülkelerde uygulanır.					
9	Covid-19 aşılarının ciddi yan etkileri görülse bile toplumdan gizlenir.					
10	Covid-19 aşıları ilgili basında çıkan olumlu haberler abartılı ve reklamdır.					
11	Koruyuculuğu yüksek Covid-19 aşıları, gelişmiş ülkelerde uygulanır.					
12	Herkesin yeterli doz ve sıklıkta aşı yaptırması imkansızdır.					
13	Covid-19 aşısını çocuklar da yaptırmalıdır.					
14	Covid-19 aşısını gençler de yaptırmalıdır.					

15	Covid-19 virüsünün hastalık yapma gücü azalsa bile, aşılanmak gerekir.					
16	Covid-19 hastalığından iyileşen biri, yinede Covid-19 aşısı yaptırmalıdır.					

Figures

Figure 1. Steps of This Research

Figure 2. Scree Plot of Eigenvalue

Figure 3. Confirmatory Factor Analysis