# DEVELOPMENT OF AN ATTITUDE SCALE TO MEASURE ATTITUDES TOWARDS ORGAN TRANSPLANTATION AND DONATION OF PRESERVICE TEACHERS

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## Introduction

Organ transplantation is a life-saving hope for many people around the world. However, the number of recipient patients on waiting lists for different organs continues to increase. Undoubtedly, having true information and positive attitude about organ donation process is one of the most important factors in the decision-making period of organ donation (Saylan, 2014). Organ donation is a process which is not only the health system involved in, but many other organizations, such as the Broadcasting, Health Charities, Ministry of Education, and many other institutions, also have an impact on the expansion of the culture of organ donation. Therefore, it is important to measure the attitude of social groups that might have a strong influence on the public opinion, such as medicine staff, teachers, journalists and religious authorities (Febrero et al. 2014).The results of the study conducted by Sadic, Sadic, Krupic, Fatahi and Krupic (2016) indicated that there is a need for greater collaboration between the health-care personnel, religious authorities, and school teachers to reduce the large difference between the supply and demand of organs for transplantation. Therefore, it is necessary to provide a suitable platform for encouraging people to organ donation through the involvement of other groups of society (especially teachers) in the culture building practices in this regard.

Teachers in every community are considered as the influential groups and their awareness, attitudes, and performances in various fields would directly and indirectly influence the society (Mohammadpour, Mohammadpour, Ajam-Zibad, & Najafi, 2018). The attitude about organ transplantation and donation (OTD) showed by teachers can considerably affect the attitude of pupils. Teachers, together with the family, the media, and social networks, are the biggest sources of information currently available to adolescents (Febrero et al. 2014). Teachers' role in teaching students and creating positive or negative viewpoints about various subjects is obvious. Their attitude and knowledge about these issues is a key factor to transfer positive attitude to the next generation (Khoddami-Vishteh, Ghorbani, Ghasemi, Shafaghi, & Najafizadeh, 2011). Hence, it is essential to identify the attitudes of the teachers, who have a great influence on the next generation of public. The attitude and

**Abstract.** *Today, there is a great discrepancy between the number of recipient patients on waiting lists for an organ transplant and the number of donated organs. Negative attitudes toward organ donation are important factors in the lack of donors. Education is an important tool to change attitudes, so it is important to determine the attitudes of teachers and pre-service teachers. The aim of this research was to develop a reliable and valid scale to evaluate pre-service teachers' attitudes towards organ transplantation and donation (OTD). The attitude scale development process was conducted on three different pre-service teachers' groups for the purposes of performing the exploratory factor analysis (n=208), confirmatory factor analysis (CFA) (n=480) and test-retest correlation (n=62) of the scale.*

*It was established that the scale had two factor structure consisting of a total of 20 items. It was determined that the two factors determined explain 61.749% of the total variance. The CFA values confirmed the two-factor model with acceptable goodness of fit indices. The Cronbach Alpha coefficient for the total scale was calculated as .900. Test-retest reliability was calculated as .951.*

*Finally, the results demostrated that this scale is able to measure pre-service teachers' attitudes related to OTD use reliably.*

**Keywords:** *attitude scale development, organ transplantation, organ donation, pre-service teachers.*

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knowledge that teachers pass on to the students is the basis for their future attitudes towards this subject matter.

According to literature, Mohammadpour et al. (2018) studied to determine the awareness, attitude, and performance of teachers toward organ donation. This study finding is suggesting a focus on educational program for teachers that play an important role in changing the existing opinion to organ donation in students, families and society. In Spain, the results of the study conducted by Febrero et al. (2014) showed that 75% of teachers support the organ donation, and their attitude was influenced by the psychosocial factors. In addition, the results of the study done by Rios et al. (2012) showed that teachers are the educators in the community, therefore, training is necessary to increase their awareness level in this regard. Furthermore, Khodammi-Visthteh et al. (2011) showed that the main reasons for not attending the teachers in the process of organ donation included the lack of their awareness of patients with chronic diseases and lack of trust in the organ transplant system. According to the study of Kocaay et al. (2015) a better understanding and growing awareness of the organ donation by the individuals affecting the behavioral beliefs of the community can contribute to the people's positive attitudes towards the organ donation and transplantation.

### Attitudes toward Organ Transplantation and Donation

Ajzen (1985) and Fishbein and Ajzen (1975) defined attitude as the individual's evaluation of performing a behavior and term it the attitude toward a behavior. Other scholars consider attitude to be a multidimensional construct and decompose it into three concepts: cognitively based attitudes, affectively based attitudes, and behaviorally based attitudes (Rosenberg & Hovland, 1960). Still others suggest the simultaneous existence of positive and negative dimensions in an individual's attitude (Jonas, Broemer, & Diehl, 2000). All of these conceptualizations of attitudes are reflected in the previous organ donation research. Van den Berg, Manstead, Van der Pligt, and Wigboldus (2005) argued about the importance of assessing affective attitudes toward organ donation and the independence of those attitudes from cognitive attitudes. Accordingly, they created a Likert scale of attitudes toward organ donation with six independent sub-scales: positive/negative overall attitudes, positive/negative affective attitudes, and positive/negative cognitive attitudes.

While the concept of attitude has been treated as a fundamental psychological landmark in the theoretical modeling of organ donation decisions, its measurement in the various investigations conducted on this topic has been quite heterogeneous. Generally, attitudes towards organ donation have been assessed in different manners. The instruments employed in some studies addressed these attitudes through items that actually target people's intentions to donate organs (usually coined as "willingness to donate"), or to agree to organ donation for their next of the kin. Another type of attitudinal assessment is a global one, employing only one item, such as "Do you think organ donation after death can always be justified, never be justified or somewhere in-between?" (Holman, 2012).

Several existing scales measure medical/nursing students and general population and/or relatives of patients' attitudes and views toward organ donation subject (Baykan et al. 2009; Holman, 2012; Kaca et al. 2009; Kavurmaci, Karabulut, & Koç, 2014; Shi, 2018; Yazici-Sayin, 2015). Holman (2012) has developed a scale that was aimed at determining the post-humous organ donation for transplantation attitudes of Romania general population. This newly developed scale includes four factors: altruism, lack of information, transgression of the sacrality of the donor's body and the relieving of the donor's family suffering. Yazici-Sayin (2015) conducted adaptation process from English to Turkish of the validity and reliability of The Organ Donation Attitude Scale. This scale consists of three relatively independent components: humanity and moral conviction, fears of medical neglect and fears of bodily mutilation. Internal consistency of these three components resulted in acceptable Cronbach's α levels (.857). This researcher found that positive correlation occurred between the volunteerism score and positive attitude about organ donation. Also, Shi (2018) developed a multi-dimensional attitude scale for organ donation in the Chinese populations. The results of this study showed that the attitudes toward organ donation consisted of two statistically independent dimensions, namely, positive and negative attitudes. A questionnaire was developed by Singh, Agarwal, Al-Thani, Al Maslamani and El-Menyar (2018) to measure the factors affecting organ donation and transplantation, which was based on the behavior theory planned by Ajzen (1991). The results of this study suggest that organ donation and transplant questionnaire is a valid and reliable tool to use in Arabic and other wider range of population; however, it is recommended that confirmatory factor analysis on larger sample may be useful for the generalizability.

Literature review demonstrated that some of the important obstacles coming up in organ donations in

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Turkey are religious beliefs, ignorance, lack of confidence in the health services, shortcoming in the legal system, sociocultural structure and family relationships (Guzel et al. 2013; Kilic et al. 2010; Turkyilmaz et al. 2013; Uskun & Ozturk, 2013; Yazici-Sayin, 2015). However, most of them use their own scales that are not validated, and therefore are not comparable. Also, according to international literature there are few attitudes conducted with teachers, it was found that the validity and reliability tests were not used in these studies (Febrero et al. 2014; Khodammi-Vishteh et. al. 2011). Only a valid and reliable scale where awareness, attitudes and performance were mesured together has been found in the literature with teachers, which is a study that has been studied by Mohammadpour et.al. (2018). This research tool was a researcher-made questionnaire consisting of 4 sections including the questions on the demographic information, 19 questions on the assessment of awareness, 25 questions about the attitude, and 8 questions on the evaluation of the performance. The Cronbach's alpha coefficient of 0.79 was determined for this questionnaire as a whole, and the alpha coefficients of 0.53, 0.74, and the Kuder-Richardson coefficient of 0.68 were separately calculated for the awareness, attitude, and performance sections, respectively.

### The Aim of this Research

As summarized above, there are many attitude scales in the literature that have been conducted with medical/nursing students, general population and/or relatives of patients. However, there are fewer suitable scales for teachers and preservice teachers (Febrero et al. 2014; Khodammi-Vishteh et al. 2011). It is noteworthy that validity and reliability analyses of existing scales are not at appropriate levels. Validated measurement instruments are needed to compare the results. It is important to validate questionnaires to determine their psychometric characteristics, especially those that have been used in different studies (Rios et al. 2018).

The role of teachers and their influencing role in the education and raising the level of students' awareness and consequently, raising their accountability in the education of society is important, therefore, they can act as an influential body of the society in institutionalizing the culture of organ donation. Therefore, the present research was conducted to develop a scale to measure pre-service teachers' attitude towards organ transplantation and donation and to assess its validity and reliability.

## Methodology of Research

### Research Design

This research was about developing a scale which is an instrument to get quantitative measures in social research. For this aim, correlational research design was used employing factor analysis technique. The Organ Transplantation and Donation Attitude Scale (OTDAS) development process was conducted on three different pre-service teachers' groups for the purposes of performing the exploratory factor analysis (EFA), confirmatory factor analysis (CFA) and test-retest correlation of the scale.

### Research Group

Three different samples of pre-service teachers were used for the current research:

**Sample Group I (Exploratory Factor Analysis):** A sample of 208 students (pre-service science teachers) from Inonu University, Faculty of Education, participated in the study during the 2017-2018 first semester. 85.6% ($n$=178) of the study group consists of female students, while 14.6% ($n$=30) of it consists of male students. 31.2% ($n$=65) of the students are first graders, 24.6% ($n$=51) are second graders, 20.2% ($n$=42) are third grades and 24% ($n$=50) are fourth graders.

**Sample Group II (Comfirmatory Factor Analysis):** A sample of 480 students (pre-service science and classroom teachers) from Inonu University, Faculty of Education, participated in the study during the 2017-2018 second semester. 80.4% ($n$=386) of the study group consists of female students, while 19.6% ($n$=94) of it consists of male students. 27.5% ($n$=132) of the students are first graders, 25.5% ($n$=122) are second graders, 22% ($n$=106) are third grades and 25% ($n$=120) are fourth graders. In addition, 40% ($n$=190) of the study group consists of pre-service science teachers while 60% ($n$=290) of it consists of pre-service classroom teachers.

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**Sample Group III (Test - re-test Reliability):** A sample of 62 students (pre-service science teachers) from Inonu University, Faculty of Education, participated in the study during the 2017-2018 second semester. 77.4% (*n*=48) of the study group consists of female students, while 22.6% (*n*=14) of it consists of male students. 54.8% (*n*=34) of students are third graders and 45.2% (*n*=28) of students are fourth graders.

*Development Procedure of OTDAS*

**Step 1. Literature Review:** Existing attitude scales were investigated through a literature review of the items related to organ transplantation and donation. We have taken the aspect suitable for the construct regarding attitude (statements in attitude sentences, their contents etc.) and conceptual equivalence (cognitive, affective and behavioral) into consideration. Some of the items were developed by the authors and some of them were obtained from literature (Buthelezi & Ross, 2011; Çetin & Harman, 2012; Sharpe, Moloney, Sutherland, & Judd, 2017; Shi, 2018; Singh, 2018; Sungur & Mayda, 2014; Tuney, 2011; Uzuntarla, 2016; Yazar & Acikgoz, 2016; Yazici, Kavak, Kaya, Tekin, & Kalayci, 2015; Yazici-Sayin, 2016).

**Step 2. Pilot Scale Development:** The pilot attitude scale of 98 items was developed for 5-point Likert scale. Points are labeled as "strongly disagree (1 points), disagree (2 points), medium agree (3 points), agree (4 points) and strongly agree (5 points)".

**Step 3. Review of Field Experts:** Pilot attitude scale's content validity, clarity, ambiguity, generality of attitude items were consulted by seven experts [2 measurement and evaluation specialist, 2 science education specialist, 2 biology specialist and 1 Language specialist]. The experts were asked to provide their opinions about expediency, clearance and coherence of the items to take place in the scale. At the end of the review of the field experts 48 items were eliminated and 4 items were modified. Finally, 46 items were left after the expert reviews.

**Step 4. Pilot Application:** The pilot attitude scale was administered to 208 pre-service science teachers.

**Step 5. Analysis of the Items:** Likert type scales have two main psychometric properties. The first one is the reliability and the other is the validity. Studies about the reliability of the scale were done at distinct phases successively (Sad, 2012). First, following EFA that based on principal component analysis with varimax rotation, preliminary reliability analyses estimating Cronbach Alpha internal consistency and Parallel analysis and corrected item-total correlations were done. Next, following the CFA, composite reliability was tested. Finally, the confirmed final version of OTDAS was subjected to test-retest temporal reliability analysis.

Examinations on the items were first carried out during the EFA process. Factor loading values of the items as a result of factor analysis are of great importance. Buyukozturk (2017) express that if the factor loading values of the items is .45 or higher, that is an indicator of a good result and this value can be lowered to .30 for a small number of items. Of these items, those with factor load values of below .45 and those included in more than one factor with a difference of less than 0.10 were removed from the scale.

For determining the number of principal components to retain for further analysis and interpretation when decomposing a correlation matrix, Parallel Analysis is an efficient and robust means. In parallel analysis, the mean value of the eigenvalues calculated from random matrices is compared with the eigenvalues calculated from the actual data. The criterion used in determining the number of factor (component) is; it is the point where the eigenvalues calculated from the real data are greater than the eigenvalues calculated from the coincidental data (Ladesma & Valero-Mora, 2007; O'Connor, 2000; Piconne, 2009; Watkins, 2006; Zwick & Velicer, 1986). In the original parallel analysis proposed by Horn (1965), the average of the eigenvalues obtained from random data is taken as a reference. Recently, however, a number of researchers (Cota, Longman, Holden, & Fekken, 1993; Glorfeld, 1995; O'Connor, 2000; Turner, 1998); it is recommended to use a certain percentage of the distribution of random data eigenvalues (such as 95%). The reason for this proposal; in determining the number of factors, the first type of error is to be controlled (Piconne, 2009).

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**Results of Research**

*Exploratory Factor Analysis (EFA)*

Exploratory factor analysis (EFA) was calculated using a Principal Component Analysis with Varimax rotation to evaluate the scale's construct validity. Firstly, in the research oblique rotation (Oblimin) was done, and the component correlation matrix was examined. And because of low correlations between the components, the analysis is repeated with Varimax rotation. Varimax rotation has maximized the factor loadings, assuming no correlations between components. Before conducting an EFA, the results of the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and the Bartlett's test of sphericity were examined to control appropriateness of factor analysis. Bartlett's test was found $\chi^2$=5108.291; $SD$=1035; $p$<.05 and also the KMO measure of sampling adequacy of 0.882 was significant. Both results suggested that it is satisfactory to run a factor analysis (Tabachnick & Fidell, 2007).

As result after the EFA process, 26 items from 46 items were removed from the scale and EFA was repeated. Eigenvalue and scree plot were examined at the end of the repeated EFA. It was determined as a result of these examinations that the scale has two factors as the positive and negative attitude towards organ transplantation and donation. In the Table 1, the eigenvalues, factor loading, and percentages of variance associated with each factor according to the EFA results are presented. Two factors whose eigenvalue equals to more than 1 have been found in EFA result of the scale. The variance explained of these two factors equals to 61.749%. The scree plot of EFA is shown in the Figure 1.

**Table 1.    Exploratory factor analysis (EFA) results.**

| | Items | Factor Loading | | Communalities | Item-total correlations |
|---|---|---|---|---|---|
| | | Factor 1 | Factor 2 | | |
| 1. | I encourage my family and friends to donate organs if required. | .831 | | .699 | .658 |
| 2. | I want to donate an organ. | .828 | | .691 | .742 |
| 3. | Now, if a document is given to me regarding the donation of my organs, I fill it out and sign it. | .819 | | .673 | .705 |
| 4. | I am determined to donate an organ of my own notwithstanding what other people will think. | .778 | | .609 | .581 |
| 5. | I can easily donate an organ to a non-family member if required. | .763 | | .615 | .660 |
| 6. | It makes me happy my organs to live in the presence of a body after I die. | .730 | | .571 | .648 |
| 7. | I participate voluntarily in the campaign about organ donation and transplantation. | .687 | | .473 | .627 |
| 8. | My religious beliefs encourage me to organ donation. | .644 | | .398 | .488 |
| 9. | I take the decision to donate their organs if brain death has occurred in one of the family members | .630 | | .415 | .477 |
| 10. | I think that the spirit of a dead person will not be restful unless all the organs are complete. | | .895 | .819 | .838 |
| 11. | I think organ donation is against God and the destiny. | | .860 | .740 | .739 |
| 12. | I'm against organ donation. | | .856 | .738 | .800 |
| 13. | I think that I will die as a cripple if I donate my organs. | | .852 | .739 | .788 |
| 14. | I think that organ donation is against the laws of nature. | | .846 | .720 | .735 |
| 15. | I do not approve of organ donation and transplantation because of my religious beliefs. | | .821 | .696 | .777 |
| 16. | I feel uncomfortable to think or talk about organ donation. | | .801 | .648 | .720 |
| 17. | I think that the donation of the organ will destroy the body integrity of the funeral. | | .761 | .617 | .702 |
| 18. | I am worrying about donating an organ to the opposite sex. | | .754 | .569 | .716 |

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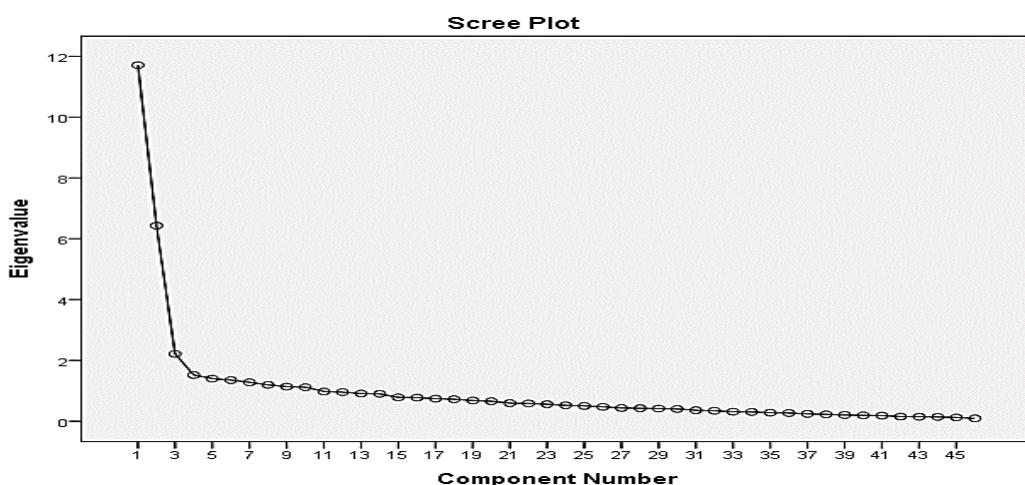| Items | | Factor Loading | | Communalities | Item-total correlations |
|---|---|---|---|---|---|
| | | Factor 1 | Factor 2 | | |
| 19. | I want to preserve the integrity of my body because I believe in resurrection or post-mortal life. | | .723 | .550 | .642 |
| 20. | I often think that organ donation will be useless because of the risk of tissue incompatibility between the donor and recipient. | | .608 | .369 | .454 |
| | Eigenvalue | 4.537 | 7.813 | | |
| | Total variance (61.749) | 22.685 | 39.064 | | |
| | Cronbach Alpha (Total α= .900) | .905 | .890 | | |



**Figure 1.** Scree plot for factor solution of items in the OTDAS.

Although the scree plot appears to be three-dimensional, the scale considered as two-dimensional because only two items in the 3rd dimension were included, and these substances actually explained the first two dimensions. It was determined as a result of EFA that the first factor of OTDAS is comprised of eleven items as 1, 2, 3, 4, 5, 6, 7, 8 and 9, and that the item factor loads vary between .630 and .831. It was also determined as a result of examining Factor 1 that the items related with the factor are positive attitudes towards organ transplantation and donation. In this regard, Factor 1 was named as, "Positive Attitude towards Organ Transplantation and Donation". Results related with Factor 2 indicated that the items of 10, 11, 12, 13, 14, 15, 16, 17, 18, 19 and 20 had an item factor load of between .608 and .895. When Factor 2 is examined, it can be observed that the items related to the factor are those that can reveal the negative attitudes towards organ transplantation and donation. Accordingly, Factor 2 was defined as: "Negative Attitude towards Organ Transplantation and Donation".

In the Table 2, the real eigenvalues and random data eigenvalues according to the parellel analysis results are presented. When Table 2 is examined, it is seen that the first three eigenvalues of the original matrix are greater than the random mean and the percentage of the eigenvalue but smaller than the fourth eigenvalue. Thus, the number of dimensions were found to be three as the first three of the original matrix values were greater than the eigenvalues obtained from the random matrix. The results of parallel analysis showed similar results with scree plot graph. However, it was concluded that there are 2 items in the third dimension and these items can be included in the first two dimensions. Therefore, it was decided that the scale was two-dimensional. Confirmatory factor analysis and parallel analysis results supported the theoretical structure.

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**Table 2.    Eigenvalues obtained from parallel analysis\***

| Number | Real Eigenvalues | Random data eigenvalues | |
| --- | --- | --- | --- |
| | | Mean | 95% percentile |
| 1 | 11.708 | 2.036 | 2.160 |
| 2 | 6.432 | 1.917 | 1.989 |
| 3 | 2.216 | 1.837 | 1.920 |
| 4 | 1.522 | 1.759 | 1.813 |
| 5 | 1.401 | 1.696 | 1.743 |
| 6 | 1.353 | 1.639 | 1.69 |
| 7 | 1.280 | 1.585 | 1.636 |
| 8 | 1.195 | 1.532 | 1.578 |
| 9 | 1.139 | 1.481 | 1.531 |
| 10 | 1.119 | 1.433 | 1.478 |

*\* Only the eigenvalues greater than 1 are shown in the table.*

### Reliability Findings

Cronbach Alpha coefficients, test-re-test reliability, item total correlations and item distinctiveness values were examined within the scope of the reliability studies for OTDAS. The Cronbach Alpha coefficient for the total scale was calculated as .900. Having a Cronbach Alfa coefficient at .80's refers to high reliability, at .60's refers to enough reliability (Alpar, 2016; Ozdamar, 2015). For test-retest reliability, OTDAS was reapplied on 62 pre-service teachers after a period of four weeks (Buyukozturk, 2017). Test-retest reliability was calculated as .951. This result can be interpreted like that the scale is consistent against elapsed time.

### Confirmatory Factor Analysis (CFA)

CFA was applied during the study for controlling the validity of the scale structure comprised of two factors and 20 items obtained by way of EFA. GFI (Good fit index), AGFI (Adjusted fit index), RMSEA (Root Mean Square Error of Approximation), SRMR (Standardized Root Mean Square Residual), CFI (Comparative Fit Index), NFI (Normalized Fit Index), the value of $\chi^2$ normalized according to sample size ($\chi^2$ /SD) and IFI (Incremental Fit Index) values have been used for CFA. In addition, the standardized factor loads obtained as a result of CFA were examined. Perfect and acceptable fit value intervals regarding the fit indices examined for determining whether or not the structure determined for OTDAS is verified, along with the values obtained from CFA, are shown in Table 3. Also, goodness of fit indexes without any modification and after modification are given in Table 3.

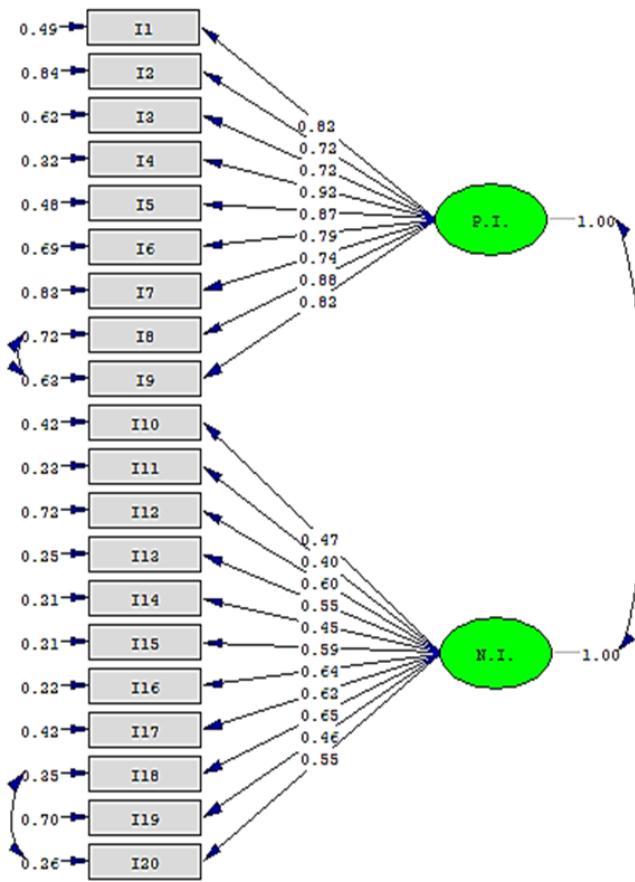**Table 3.    Findings of CFA for pre-modification and post-modification (final) models of OTDAS.**

| Examined fit indices | Perfect fit criterion | Acceptable fit criterion | Pre-modification Scale values | Post-modification Scale values | Results |
| --- | --- | --- | --- | --- | --- |
| *p\** | > .01 or .05 | < .01 or .05 | .0001 | .0001 | Accetable |
| $\chi^2$ ISD | ≤ 2 | 2-5 | 387.77/169= 2.29 | 330.67/167= 1.98 | Perfect |
| RMESA | ≤ .05 | ≤ .08 | .052 | .045 | Perfect |
| RMR | ≤ .05 | ≤ .08 | .043 | .041 | Perfect |
| SRMR | ≤ .05 | ≤ .08 | .047 | .045 | Perfect |

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| Examined fit indices | Perfect fit criterion | Acceptable fit criterion | Pre-modification Scale values | Post-modification Scale values | Results |
|---|---|---|---|---|---|
| GFI | ≥ .95 | ≥ .90 | .93 | .94 | Accetable |
| AGFI | ≥ .95 | ≥ .90 | .91 | .92 | Accetable |
| CFI | ≥ .95 | ≥ .90 | .95 | .96 | Perfect |
| NFI | ≥ .95 | ≥ .90 | .92 | .93 | Accetable |
| NNFI | ≥ .95 | ≥ .90 | .95 | .96 | Perfect |

*A nonsignificant p value for $\chi^2$ test suggests lack of difference between observed and expected covariance matrices, which means a reasonable fit to the data (Brown, 2006). If there is a significant difference (p < .01 or .05), other parameters are considered (Cokluk, Sekercioglu, & Buyukozturk, 2010).

When the modification suggestions coming from the analysis results are examined, it is seen that the modification to be carried out between item 8- 9 and item 18- 20 will have enormous contributions to $\chi^2$. The results of the investigations have shown that 8-9 and 18-20 assess similar situations, therefore an invisible relationship between these two items is acceptable and modification suggestion was taken into account. Figure 2 gives a model of a construct of two factors.



(I: Item; P.I.: Positive Items; N.I.: Negative Items)

**Figure 2.    Path diagram of two-dimensional model post-modification.**

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## Discussion

This research focused on developing a valid and reliable attitude scale that could be conducted to determine pre-service teachers' attitudes towards the organ transplantation and donation.

This research has provided a valid and reliable instrument to measure pre-service teachers' attitudes towards organ transplantation and donation with a satisfactory degree of validity and reliability indicators. Based on educational measurements for content validation, a comprehensive review of literature, discussion with science educators and educational specialists, a pilot study with a sample of 208 pre-service teachers to test the factorial structure of the scale, and a cross-validation study with a sample of 480 pre-service teachers to confirm the two-dimensional model and to provide reliability and further validity evidence, the OTDAS with two dimensions was developed and validated.

It was established that the scale had a two-factor structure consisting of a total of 20 items. It was determined that the two factors determined explain 61.749% of the total variance. The values obtained from CFA suggested that the model-data congruence was at an acceptable and goodness level for the scale. As a result of the analyses conducted as part of the scale reliability studies, the Cronbach Alpha internal consistency coefficient was calculated as ".905" for the "positive attitude" dimension, as ".890" for the "negative attitude" dimension. The test-retest reliability (Pearson correlation) coefficient of the scale was calculated as ".863" for the "positive attitude" dimension, as ".886" for the "negative attitude" dimension.

OTDAS is a five-point likert scale option ranging from strongly agree to strongly disagree (5-Strongly agree, 1-Strongly disagree). It consists of 20 items and two factors. The highest negative attitude score of the scale is 55 while the lowest is 11 (these items are scored by reversing). The highest positive attitude score of the scale is 45 while the lowest is 9. The score is directly proportional to the positiveness of attitudes of the pre-service teachers.

According to literature review, valid and reliable OTDAS at national and international levels for pre-service teachers were not found. There are few attitudes conducted with teachers, it was found that the validity and reliability tests were not used in these studies (Febrero et al. 2014; Khodammi-Vishteh et al. 2011). Only a valid and reliable scale where awareness, attitudes and performance were measured together has been found in the literature with teachers, which is a study that has been studied by Mohammadpour et al. (2018). But, in this study, awareness, attitudes and performance were measured together and only Cronbach's alpha method was applied to test the reliability of the questionnaire. So, this attitude scale developed by us is the first in the literature in terms of both being for pre-service teachers and focusing only on attitude. Furthermore, culture is regarded as a background factor that forms and shapes individuals' behavioral attitudes (Yzer, 2013). Taking this premise into account, the development of the attitude scale in this study begins with assessing Turkish pre-service teachers' attitudes regarding organ donation. More specifically, Turkish pre-service teachers' cultural beliefs are reflected in the current attitude scale. Such instruments would disclose the attitudes of the Turkish society/teachers so that solutions could be quickly found and disseminated.

When examining the attitude scales concerning organ transplantation and donation attitudes in literature, it is seen that these studies were performed mostly with the medical students, high school students, middle school students and relatives of the patient (Lisowska, Budzińska, Ścieranka, Mazur, Smoleń, 2017; Ozturk-Emiral, et al. 2017; Saleem et al. 2009; Yazici- Sayin, 2015; Shi, 2018; Weiss, Schober, Abati, Immer, & Shaw, 2017; Zampieron, Corso & Frigo, 2010). In these studies findings show that to be an organ donor is affected by multiple factors; the knowledge level, socio-economic and socio-cultural status, awareness, religious beliefs, legal and medical processes. And also, although participants state that they want to donate their organs, the number of individuals carrying the organ donor card is very small. In this context these studies suggested that issues related to organ transplantation and donation should be included early in the training programs to improve the attitudes of students to organ donation and a more intensive interdisciplinary approach could bring about an even more positive attitude towards organ donation.

## Conclusions and Suggestions

With the OTDAS developed by us, pre-service teachers/teachers in Turkey will be able to possess certain important data on attitudes of themselves concerning organ donation. They can, thus, mentor students and families about organ donation.

Generally, studies related to organ transplantation and donation in Turkey are performed among health

workers or medical school students. In this research, the OTDAS can help add to the international database about attitudes and also provide valuable information for understanding organ transplantation and donation attitudes of pre-service teachers. Further research must be conducted to confirm this generalizability. The attitude scale was developed in the context of Turkish culture and was administered only to pre-service teachers. However, it may be applicable in other countries and different research groups including both teachers and pre-service teachers to in-depth examination of the situation.

Findings obtained via the implementation of the OTDAS in future studies will establish the positive and negative attitudes of pre-service teachers towards organ transplantation and donation. In addition, findings acquired by applying the OTDAS using different variables could enable better perceptions and assessments of the attitudes of university students towards this issue and would also allow precautions to be taken concerning the issue.

The research findings are limited to the study sample. As these are preliminary findings for the Turkish pre-service teachers of the OTDAS, studying this research with similar (in-service teachers etc.) and larger populations to improve the attitude scale could help verify its results and eliminate random errors. Via the help of organ donation campaigns/projects, positive attitudes towards organ donations are being encouraged and thus negative attitudes can be decreased all over the world. This state may require a review of the dimensions of the scale; therefore, validity and reliability analysis should be repeated for the OTDAS in further research.

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