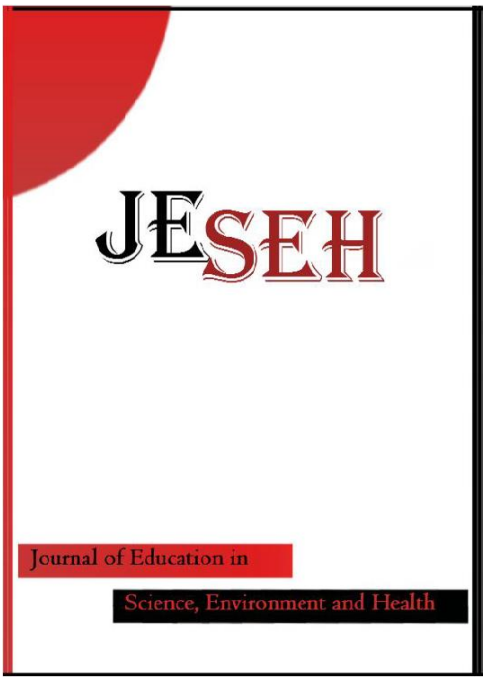

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The Investigation of Preservice Teachers' Epistemological Beliefs, Knowledge Levels and Attitudes regarding Organ Transplantation and Donation

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The Investigation of Preservice Teachers' Epistemological Beliefs, Knowledge Levels and Attitudes regarding Organ Transplantation and Donation

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Abstract

In this study, preservice teachers' epistemological beliefs and attitude/knowledge level regarding organ transplantation and donation (OTD) are investigated according to such demographical variables as gender, department and grade level. Teachers play a fundamental role in providing information to children/adolescents and could influence their attitudes. Organ transplantation is a life-saving hope for many people around the world. But, shortage of organs for transplantation is essentially a universal problem. Having positive attitude and true knowledge to the OTD are essential for teachers that affected students the future attitude toward this topic. The research method was descriptive and cross-sectional. The sample of research was 589 preservice teachers (preschool, classroom and science teachers) in a public university in Turkey's East. Data collection instruments were developed by researchers as valid and reliable questionnaire in order to determine the attitudes and knowledge levels of preservice teachers regarding OTD. In addition, epistemological beliefs scale which adapted to Turkish by Deryakulu and Buyukozturk (2002) was used. The results indicated the high level of knowledge and positive attitudes regarding the OTD and developed epistemological beliefs. In addition, the results of correlation matrix for relationship between attitude/knowledge and epistemological beliefs presents that developed epistemological belief has a positive effect on attitude and knowledge levels. Also, the results showed that there is a low positive relationship between attitude and knowledge level.

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 (Council of Europe, 2014). There is a wide gap between demand and supply of donated organs and the shortage of organs is a worldwide problem (Ganta, Pamarthi, & Prasad, 2018). The major concerns causing organ shortage are lack of awareness and correct information among public, myths and misconception clouding organ donation due to religious and cultural barriers, etc. (Adithyan, Mariappan & Nayana, 2017). Undoubtedly, having true information and positive attitude about organ donation process is one of the most important factors decision-making period of organ donation (Saylan, 2014). It is important to determine 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). 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.

Educational institutions play the biggest role in generating a solution to controversial issues with both social and scientific dimension such as organ transplantation and donation. Schools, where teacher-student and student-student communication is most common, are places these kinds of controversial and science based issues are addressed with an interdisciplinary approach and by taking beneficence-maleficence situations into consideration. Looking at the factors that affect the decision of organ donation, it is seen that characteristics like race, age, income, education level and gender are also determinative. The common characteristics of organ donors are being young, well-educated and having a high socio-economic status (Ozdag, 2001). Studies in literatures indicated that cadaveric organ donation rates are quite high in countries, which place importance to education about organ donation and are able to create a level of awareness about this issue in society (Ganta et al., 2018; Srivasta & Mani, 2018). In addition to that, comparisons between east-west or developed-developing countries determined that in all societies younger people compared to older people, women compared to men,

well educated people compared to less educated people have a more positive view regarding organ donation. It was also found out that people with bachelor's degree or higher education levels accept donating organs more often (Alat et al., 2007). In order to increase organ donation rates, studies suggest that in every level of education from primary to higher education the subject should be addressed, the number of organ donation campaigns should increase and society's positive attitude towards organ donation should be developed by raising awareness (Kocak, Aktas, Senol, Kaya, & Bilgin, 2010).

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 showed by teachers about organ transplantation and donation (OTD) 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).Their role in teaching students and creating positive or negative viewpoints about various subjects is obvious. Their knowledge about issues is a key factor to transfer knowledge to next generation (Khoddami-Vishteh, Ghorbani, Ghasemi, Shafaghi, & Najafizadeh, 2011). Hence, it is essential to identify knowledge levels and attitudes of the teachers, who have a great influence on the next generation of public. The attitude and knowledge that teachers pass on to the students is the basis for their future attitudes towards this subject matter.

Mohammadpour et al. (2018) studied to determine the awareness, attitude, and performance of teachers regarding to organ donation. Their studies showed that despite the average awareness and favorable attitude towards organ donation, unfortunately, there was no proper performance toward donation. This study reported that teachers play an important role in changing the existing opinion to organ donation in students, families and society. In Spain, the results of the study 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, training is necessary to increase their awareness level in this regard. Furthermore, Khoddami-Vishteh 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.

Due to the close relationship between epistemological beliefs and learning-teaching processes and especially its effects on teachers teaching approaches and way of conceptualizing the teaching, determining preservice teacher's epistemological beliefs is considered important. Epistemological beliefs, which determine teachers point of view regarding scientific knowledge- including the existence and definition of knowledge and the way learning is being realized within this context- might directly affect individuals comprehension and evaluation of the information that exists in individual and social decision making processes in daily life (Demir, 2009; Evcim, Turgut, & Sahin, 2011). The effect it has on individual's beliefs, thoughts and behaviors, required educators to take beliefs in many different categories into consideration in terms of learning and teaching processes.

It was found out that epistemological beliefs are related to various learning orientations such as problem solving, interpretation and conceptual change on controversial issues (Kardash & Scholes, 1996; Qian & Alvermann, 2000). Especially students, who believe knowledge is simple, certain and unchangeable, have the tendency to avoid argumentation and higher anxiety levels in the face of arguments. Similarly Linn and Bell (2000) determined that students, who view science as dynamic and constantly changing structure, i.e. who have more "constructivist epistemic beliefs" regarding scientific knowledge, have the tendency to create more complex and integrated arguments. Schommer-Aikins and Hutter (2002) argued that the more individuals believe in the complex and tentative nature of knowledge, which indicates sophisticated epistemological beliefs, the more they succeed in using informal thinking in an effective way by willingly changing their thinking, holding multiple perspectives, and understanding the complex, debatable and open-ended nature of controversial issues (Ozturk & Yilmaz-Tuzun, 2017).

Epistemic beliefs are acknowledged as the premise of success. In addition to that epistemic beliefs and goals of success are considered as two important structure sets for explaining student's cognitive participation, especially their learning strategies (Buehl & Alexander, 2005). Studies showed that preservice teachers with more field knowledge have developed knowledge transformation skills, express their arguments; preservice teachers with lower field knowledge, on the other hand, have trouble expressing their views (Cross, Taasoobshirazi, Hendricks, & Hickey, 2008; Khishfe, 2012; Sadler & Donnelly, 2006). Demiral and Cepni (2018) concluded that preservice teachers with more field knowledge have more developed skills to convince the other party.

Epistemological beliefs which determine perspectives on scientific information, can directly affect the attitudes, behaviors and perspectives of individuals (Oztuna Kaplan & Cavus, 2016). It is of great importance to analyze the way preservice/inservice teachers define an information about organ transplantation and donation, how they combine it with previous knowledge, how they assess it and what kind of a conclusion they reach.

The Aim of the Study

A great responsibility falls on education given in schools and on teachers, who are inseparable pieces of schools. For those reasons, their attitude and knowledge level toward organ donation become important. They can act as an influential body of the society in institutionalizing the culture of organ donation. In this study, preservice teachers' epistemological beliefs and attitude/knowledge level regarding organ transplantation and donation (OTD) are investigated according to such demographical variables as gender, department and grade level. It is important to determine whether the preservice teachers are different in terms of their thoughts, feelings and behaviors related to the concept of OTD due to the education they receive in different branches. If there is a significant difference in attitudes towards OTD due to the training they receive, this will be discussed in the conclusion. It is important to do research with preservice teachers to get their ideas about socioscientific issues such as OTD because it can provide an insight into both teacher education and practice. The results of these studies can encourage policy-makers to revise teacher education, which currently lacks content through which teachers can develop the necessary skills to teach socioscientific issues in classrooms. The objective of the study is to assess preservice teachers' epistemological beliefs and attitude/knowledge level regarding OTD.

Method

Research Design and Participants

The survey research method, one of the quantitative research methods, was used in this study. Surveys are studies in which the views of the participants on a topic or their characteristics such as interest, skill, attitude or ability are identified (Buyukozturk, Akgun, Karadeniz, Demirel, & Kilic, 2014). Convenience sampling method is used in this research. In the cases where it is difficult or impossible to reach the whole of the sample, researchers can work with appropriate sample groups to represent the study. The sample of the study is composed of 589 preservice teachers who are studying in undergraduate programs of science education, classroom education and pre-school education of a state university in Eastern Anatolia Region in Turkey in the academic year of 2017-2018. Distribution of preservice teachers according to their demographic features is given in table 1.

Table 1. Demographic features of preservice teachers

Demographic Features		**f**	**%**
Gender	Female	493	83.7
	Male	96	16.3
Department	Science Education	174	29.5
	Classroom Education	252	42.8
	Pre-school Education	163	27.7
Grade	1st Grade	151	25.6
	2nd Grade	137	23.3
	3rd Grade	141	23.9
	4th Grade	160	27.2
Total		**589**	**100**

Research Instruments

In this research three different data collection tools were used. These tools are organ transplantation and donation attitude scale (OTDAS), epistemological beliefs scale (EBS), and organ transplantation and donation knowledge test (OTDKT).

Organ transplantation and donation attitude scale (OTDAS)

In the research, in order to determine the attitudes of preservice teachers regarding organ transplantation and donation, the scale developed by Gurkan and Kahraman (2018) was used. The 5-point likert scale, within which validity and reliability studies were done, consists of 20 items. In the attitude scale 11 items refer to negative attitudes and 9 items refer to positive attitudes towards OTD. In the scale statements are graded as follows; "1- Strongly disagree", "2- Disagree", "3- Slightly agree", "4- Agree", "5- Strongly agree". As result of the exploratory factor analysis and conducted parallel analysis, in order to verify the two-factor structure and provide structural validity of the scale, confirmatory factor analysis was carried out.

In order to calculate the reliability of 20 items in the organ transplantation and donation scale internal consistency coefficient "Cronbach Alpha" was calculated. General consistency of the scale was found α =0.900. Examining goodness of fit criteria after confirmatory factor analysis χ^2/Sd = 1.98 was found and in case of a χ^2/Sd value of 5 or smaller it is accepted that model data fit is perfect. GFI was found 0.94. Having the value of GFI >.90 points to an acceptable fit (Simsek, 2007). AGFI was found 0.92 and this value shows an acceptable fit. RMR was found 0.041 and having a RMR value <0.050 shows good fit. RMSEA value was found 0.045, having a RMSEA value <0.050 shows good fit (Munro, 2005). Analysis results point out that scale has a good fit in terms of determined factor structure, since fitness statistic model calculated by confirmatory factor analysis is concordant on an acceptable level with real data gathered from the participants.

Epistemological belief scale (EBS)

The Epistemological Belief Scale, which was developed by Schommer (1990) was translated into Turkish by Deryakulu and Buyukozturk (2002). It is a 5-point Likert-type scale (1- strongly disagree, 2- disagree, 3- not sure, 4- agree and 5- strongly agree) and it has a three-factor structure. The first factor of the scale called "The belief that learning depends on effort (BLDE)" consists of 18 items. The second factor of the scale called "The belief that learning depends on ability (BLDA)" consists of 8 items. "The belief that there is only one truth (BTOT)", the third factor, consists of 9 items.

Organ transplantation and donation knowledge test (OTDKT)

In order to develop the institutional framework of OTDKT, which was developed by researchers, literature was widely reviewed and item pool consists of 30 multiple choice questions regarding organ transplantation and donation was generated by examining the data collection tools used in related research. In the direction of expert views, 10 items were removed from the test and the draft test consists of 20 items was made ready for pretest. For the draft scale performed with 106 Science Education undergraduate students enrolled in their 3 and 4. years TAP statistics program was used for item analysis. As the result of item analysis items with low distinctiveness and difficulty indices were removed and item number was reduced to 12.

For OTDKT mean distinctiveness level was found 0.47, mean difficulty value was found 0.60 (3 items hard, 3 items medium and 6 items easy) and KR-20 reliability coefficient was found 0.706. Provided as evidence for reliability and validity of multiple choice tests developed to measure mental processes, these values should be evaluated together (Downing & Haladyna, 2006; Kubiszyn & Borich, 2013). According to this, examining these values together it can be concluded that scores obtained from the developed test is able to differentiate preservice teachers enrolled in their 1, 2, 3 and 4. years with various cognitive understanding levels regarding organ transplantation and donation; the test is easy difficulty and shows internal consistency (Tekin, 2000).

Data Analysis

In the analysis of the data, besides frequency, percentage and arithmetic mean, "t-test of independent groups" was used in the comparison of two groups whereas "one-way variance analysis (ANOVA)" was used in the comparison of more than two groups. The Tukey HSD test (Post Hoc) was used to determine the groups in which the statistical difference emerged in binary comparisons following the analysis of variance. The significance level in the statistical analysis of the scale was accepted as 0.05.

Results

The purpose of this study is to reveal the attitudes/knowledge levels about OTD and epistemological beliefs of preservice teachers and to examine them in terms of different variables. Relevant results are presented below. Table 2 presents descriptive analysis reliability coefficient OTDAL, EBS (BLDE, BLDA, BTOT) and OTDKL values of mean scores of preservice teachers regarding OTD.

Table 2. Descriptive statistics values about attitudes, knowledge levels regarding OTD and epistemological belief levels

Variables (N=589)	Reliability (Cronbach Alpha Coefficient)	Mean	Standard deviation	Min.	Max.	Skewness	Kurtosis
OTDAL (20≤x≤100)	0.75	77.86	11.81	43.00	100.00	-.062	-.642
OTDKL (0≤x≤12)	0.63	7.77	1.69	3.00	12.00	.003	-.189
BLDE (18≤x≤90)	0.71	33.49	6.17	18.00	54.00	-.161	-.146
BLDA (8≤x≤40)	0.73	18.01	4.54	8.00	33.00	.455	.319
BTOT (9≤x≤45)	0.71	26.35	4.92	10.00	41.00	-.014	-.048

(**OTDAL:** Organ Transplantation and Donation Attitude Level, **OTDKL**: Organ Transplantation and Donation Knowledge Level, **BLDE:** The Belief that Learning Depends on Effort, **BLDA:** The Belief that Learning Depends on Ability, **BTOT:** The Belief that There is only One Truth)

The descriptive statistics analysis shows that the average in the total scores of the attitudes toward OTD is above the medium level. Alpha coefficient of organ transplantation and donation knowledge test was found 0.63 and mean was calculated 7.77. According to this it was found out that preservice teachers' OTD knowledge levels are above average. Considering the average scores of epistemological belief factors (BLDE, BLDA, BTOT) indicate mature epistemological beliefs (Deryakulu & Buyukozturk, 2000). Table 3 presents the results of correlation matrix, which indicates relationship between the preservice teachers' epistemological beliefs and attitudes/knowledge levels about organ transplantation and donation. Pearson Correlation Test was used because the data showed normal distribution.

Table 3. Correlation matrix for relationship between variables

Variables	BLDE Correlation (p)	BLDA Correlation (p)	BTOT Correlation (p)	OTDAL Correlation (p)
The belief that learning depends on effort (BLDE)	-			
The belief that learning depends on ability (BLDA)	0.301 (0.000)	-		
The belief that there is only one truth (BTOT)	0.032 (0.373)	0.381 (0.000)	-	
Organ transplantation and donation attitude level (OTDAL)	-0.165 (0.000)	-0.214 (0.000)	-0.134 (0.000)	-
Organ transplantation and donation knowledge level (OTDKL)	-0.061 (0.085)	-0.165 (0.000)	-0.067 (0.059)	0.128 (0.000)

($p < .05$)

When table 3 is examined, it is seen that more than half of the correlation between the variables is significant at 0.05 level and there are positive and negative correlations between some variables. Table 3 shows that there is a negative relationship between the dimensions of the epistemological beliefs and the attitude level; relationship between of the belief that the learning depends on the effort and attitudes ($r = -0.165$, $p = 0.000$), relationship between of the belief that the learning depends on the ability and attitudes ($r = -0.214$, $p = 0.000$) and relationship between of the belief that there is only one truth and attitudes ($r = -0.134$, $p = 0.000$).

The reason for this negative relationship is that the high score obtained from each factor of the epistemological belief scale shows that the individual has immature or undeveloped beliefs related to that factor, while the low

score indicates that the individual has matured or developed beliefs related to that factor. Therefore, it can be said that advanced/developed epistemological belief has a positive effect on attitude.

There is a negative correlation between the sub-dimensions of epistemological beliefs and the level of knowledge; relationship between of the belief that the learning depends on the effort and knowledge level (r = -0061, p = 0.085), relationship between of the belief that the learning depends on the ability and knowledge level (r = -0165, p = 0.000) and relationship between of the belief that there is only one truth and knowledge level (r = -0.067, p = 0.059). A similar effect is observed due to the situation mentioned above. So, it can be said that advanced/developed epistemological belief has a positive effect on knowledge levels. In addition, there is a significant positive relationship between attitude and knowledge level (r = 0.128, p = 0.000).

Table 4. The findings of preservice teachers' epistemological beliefs and attitudes /knowledge levels about OTD according to the gender

	Groups	N	Mean	Standard deviation	df	t	p
OTDAL (20≤x≤100)	Female	493	78.27	11.48	587	1.93	**.028**
	Male	96	75.73	13.25			
OTDKL (0≤x≤12)	Female	493	7.77	1.69	587	.015	.463
	Male	96	7.77	1.67			
BLDE (18≤x≤90)	Female	493	33.39	5.97	587	-.86	**.037**
	Male	96	33.98	7.09			
BLDA (8≤x≤40)	Female	493	17.81	4.46	587	-2.47	.568
	Male	96	19.06	4.81			
BTOT (9≤x≤45)	Female	493	26.22	4.85	587	-1.42	.237
	Male	96	27.01	5.26			

(**OTDAL:** Organ Transplantation and Donation Attitude Level, **OTDKL**: Organ Transplantation and Donation Knowledge Level, **BLDE:** The Belief that Learning Depends on Effort, **BLDA:** The Belief that Learning Depends on Ability, **BTOT:** The Belief that There is only One Truth)

Table 4 presents the results of the t-test, which indicates whether the preservice teachers' epistemological beliefs and attitudes and knowledge levels about organ transplantation and donation differ according to the gender variable. Kolmogorov Smirnov Test was used to determine whether the data showed normal distribution.

Table 5. The findings of the preservice teachers' epistemological beliefs and attitudes/ knowledge levels about OTD according to the grade level.

	Variants	Sum of Squares	df	Mean Square	F	p
OTDAL (20≤x≤100)	Between Groups	1342.490	3	447.497	3.240	.022
	Within Groups	80792.644	585	138.107		
	Total	82135.134	588			
OTDKL (0≤x≤12)	Between Groups	60.150	3	20.050	7.210	.000
	Within Groups	1626.876	585	2.781		
	Total	1687.027	588			
BLDE (18≤x≤90)	Between Groups	36.938	3	12.313	.322	.809
	Within Groups	22358.291	585	38.219		
	Total	22395.229	588			
BLDA (8≤x≤40)	Between Groups	10.937	3	3.646	.176	.913
	Within Groups	12129.926	585	20.735		
	Total	12140.862	588			
BTOT (9≤x≤45)	Between Groups	355.122	3	118.374	4.976	.002
	Within Groups	13917.717	585	23.791		
	Total	14272.839	588			

(**OTDAL:** Organ Transplantation and Donation Attitude Level, **OTDKL**: Organ Transplantation and Donation Knowledge Level, **BLDE:** The Belief that Learning Depends on Effort, **BLDA:** The Belief that Learning Depends on Ability, **BTOT:** The Belief that There is only One Truth)

According to the results of the t-test in table 4, preservice teachers' attitudes about organ transplantation and donation shows a significant difference according to their gender (t (587) = 1.93, p = 0.028 <0.05). In other

words, the mean scores of female preservice teachers' attitudes towards on organ transplantation and donation were higher than those of male preservice teachers. In addition, according to the findings in table 4, the hypothesis is accepted that preservice teachers' beliefs about learning depends on the effort shows a significant difference according to the gender of preservice teachers ($t(587) = -0.86$, $p = 0.037 < 0.05$).

The high score obtained from each factor of the epistemological belief scale shows that the individual has immature or undeveloped beliefs related to that factor, while the low score indicates that the individual has matured or developed beliefs related to that factor. In other words, female preservice teachers' beliefs that learning is depends on effort is more developed than male preservice teachers' belief that learning is depends on effort. According to table 4, the level of knowledge of preservice teachers about organ transplantation and donation and the belief that learning depends on ability and that there is only one truth does not differ according to their gender. Table 5 shows the results of the one-way variance analysis, indicating whether the attitudes, knowledge levels and epistemological beliefs of the preservice teachers about OTD differ according to the grade level variable.

According to the results of the One-Way Analysis of Variance in table 5, the attitudes and knowledge levels of preservice teachers about organ transplantation and donation and their belief that there is only one truth show a significant difference according to the grade level. According to table 5, it was concluded that the preservice teachers' belief that learning depends on effort and ability did not show a significant difference according to the grade levels of preservice teachers. Levene test was used to determine whether the groups' variances were equal (Table 6).

Table 6. Test results for homogeneity of variables

Variables	Levene Statistic	df1	df2	p
BTOT	.504	3	585	.679
OTDAL	1.344	3	585	.259
OTDKL	4.246	3	585	.006

(**BTOT:** The Belief that There is only One Truth**, OTDAL:** Organ Transplantation and Donation Attitude Level, **OTDKL**: Organ Transplantation and Donation Knowledge Level)

According to the Levene test result in table 6, BTOT, OTDAL; since $p>.05$, variances were found to be equal and LSD test from Post Hoc Test was used in cases where the variances were distributed homogeneously. OTDKL; since $p <.05$, it was concluded that the variances were not equal and Dunnett's C Test was used from Post Hoc Tests in cases where the variances were not homogeneously distributed (Table 7).

Table 7. Post Hoc Test results for determining to the differences in terms of grade level

Post Hoc Tests	Variables	Grade Level (I)	Grade (J)	Mean Difference (I-J)	Std. Error
LSD	**OTDAL**	4th Grade	1st Grade	1.28820	1.25573
			2nd Grade	3.78745*	1.42829
			3rd Grade	3.15749	1.35794
LSD	**BTOT**	4th Grade	1st Grade	-1.94673*	.55340
			2nd Grade	-1.57258*	.56776
			3rd Grade	-1.60297*	.56340
Dunnett's C	**OTDKL**	4th Grade	1st Grade	.51310*	.19751
			2nd Grade	.77727*	.19700
			3rd Grade	.76106*	.20295

(**OTDAL:** Organ Transplantation and Donation Attitude Level, **BTOT:** The Belief that There is only One Truth**, OTDKL**: Organ Transplantation and Donation Knowledge Level)

According to table 7, the 4th grade students' attitudes towards OTD were found to be higher than the 2nd grade students. It was found that 4th grade students had more advanced epistemological beliefs (for BTOT) than the 1st, 2nd and 3rd grade students. The level of knowledge about OTD of 4th grade students was higher than the 1st, 2nd and 3rd grade students.

Table 8 shows the results of the one-way variance analysis, indicating whether the attitudes, knowledge levels and epistemological beliefs of the preservice teachers on organ transplantation and donation differ according to the department variable (preschool, classroom and science).

Table 8. The results of the one-way analysis of variance by indicating the attitudes, knowledge levels and epistemological beliefs of the preservice teachers in terms department variable

	Variants	Sum of Squares	df	Mean Square	F	p
OTDAL (20≤x≤100)	Between Groups	1084.086	2	542.043	3.919	.020
	Within Groups	81051.048	586	138.312		
	Total	82135.134	588			
OTDKL (0≤x≤12)	Between Groups	73.614	2	36.807	13.368	.000
	Within Groups	1613.413	586	2.753		
	Total	1687.027	588			
BLDE (18≤x≤90)	Between Groups	166.477	2	83.238	2.194	.112
	Within Groups	22228.752	586	37.933		
	Total	22395.229	588			
BLDA (8≤x≤40)	Between Groups	19.404	2	9.702	.469	.626
	Within Groups	12121.459	586	20.685		
	Total	12140.862	588			
BTOT (9≤x≤45)	Between Groups	698.504	2	349.252	15.077	.000
	Within Groups	13574.334	586	23.164		
	Total	14272.839	588			

According to table 8, it was concluded that the preservice teachers' belief that there is only one truth (BTOT), attitudes and knowledge levels were showed a significant difference according to department type of preservice teachers. Levene test was used to determine whether the groups' variances were equal in order to determine which groups differed according to the class level (Table 9).

Table 9. Test results for homogeneity of variables

Variables	Levene Statistic	df1	df2	p
OTDAL	1.020	2	586	.361
OTDKL	6.368	2	586	.002
BTOT	0.445	2	586	.641

(**OTDAL:** Organ Transplantation and Donation Attitude Level, **OTDKL**: Organ Transplantation and Donation Knowledge Level, **BTOT:** The Belief that There is only One Truth)

According to the Levene test results in table 9, since OTDAL and BTOT were $p > 0.05$, it was concluded that the variances were equal and LSD test from Post Hoc Test was used in cases where the variances were distributed homogeneously. According to table 9, since OTDKL were $p<0.05$, it was concluded that the variances were not homogeneously distributed. So it was used Dunnett's C Test.

Table 10. Post Hoc tests results for determining which differences between department variables of preservice teachers

Post Hoc Tests	Variables	Department Type (I)	Department (J)	Mean Difference (I-J)	Std. Error
LSD	**OTDAL**	Preschool Education	Science Education	2.08536	1.28197
			Classroom Education	3.30840*	1.18212
LSD	**BTOT**	Preschool Education	Science Education	2.87092*	.52463
			Classroom Education	1.29908*	.48377
Dunnett's C	**OTDKL**	Science Education	Classroom Education	.83370*	.17389
			Pre-School Education	.36060	.18346
Dunnett's C	**OTDKL**	Preschool Education	Science Education	-.36060	.18346
			Classroom Education	.47310*	.15492

(**OTDAL:** Organ Transplantation and Donation Attitude Level, **BTOT:** The Belief that There is only One Truth**, OTDKL**: Organ Transplantation and Donation Knowledge Level)

According to table 10, preservice preschool teachers' attitudes about OTD were higher than those of preservice teachers attending classroom teaching departments. In the belief dimension that there is only one truth, the epistemological beliefs of preservice preschool teachers were found to be more advanced than the preservice teachers studying in science and classroom teaching departments. In addition, preservice science teachers' knowledge about OTD were higher than of preservice classroom teachers; the level of knowledge of preservice

preschool teachers on organ transplantation and donation was found to be higher than that of preservice classroom teachers.

Conclusion and Discussion

Our data analysis results obtained from preservice teachers indicated the high level of knowledge and positive attitudes regarding the OTD and matured/developed beliefs related to epistemological belief factors. In addition, the results of correlation matrix for relationship between attitude/knowledge and epistemological beliefs presents that advanced/developed epistemological belief has a positive effect on attitude and knowledge levels. Also, the results showed that there is a low positive relationship between attitude and knowledge level of preservice teachers.

The preschool, classroom and science teachers are an influential population group that plays an important role in introducing the children/adolescent groups to OTD by providing them with training and knowledge about the subject. However, not many studies have concentrated on all of this group of teachers. In the literature, few studies have been found assessing the attitude of secondary school teachers (Febrero et al., 2014; Lopez-Navidad, et al., 1999; Rios et al., 2010) and both primary and secondary teachers (Khoddami-Vishteh et al., 2011; Mohammadpour et al., 2018) toward organ donation. In addition, only one study has been investigated knowledge of the brain-death concept among secondary school teachers (Rios et al., 2012). In Spain, the results of the study by Febrero et al. (2014) showed that 75% of teachers support the organ donation, and their attitude was influenced by the psychosocial factors. In Lopez-Navidad et al. (1999)'s research have reported on this matter and only 20 teachers were interviewed, all of whom were sensitive to the issue of OTD, demonstrating a good knowledge of the general concepts related to OTD. Khoddami-Vishteh et al. (2011) carried out a study of 93 secondary school teachers in Iran finding 70% of teachers to be in favor of donating their organs. Khoddami-Vishteh et al. (2011) have reported the following as main factors affecting the attitude of teachers: knowing patients with serious diseases or transplant patients; the knowledge of the Brain Death concept; attitude toward blood donation; confidence in the healthcare system; and information about OTD in general. Rios et al. (2012) showed that a third of secondary school education teaching staff did not know or understand the brain death concept as the death of an individual. The knowledge of brain death positively affects attitude toward organ donation. Mohammadpour et al. (2018) studied to determine the awareness, attitude and performance of teachers toward organ donation. The results of this data analysis indicated the moderate level of awareness, positive attitudes and a relatively weak performance of teachers regarding the organ donation. Based on the results of the present study, the teachers had a favourable attitude towards the organ donation, but did not have a good performance in this regard.

Compared to studies above mentioned, the results of our study are similar in terms of positive attitude and high level of knowledge. A positive attitude and the highest knowledge about organ donation are expected from teachers because they are supposed to be role models. It is also very promising to obtain these results from preservice teachers. When examining the attitude and knowledge level concerning OTD 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, Budzinska, Scieranka, Mazur, Smolen, 2017; Ozturk-Emiral, et al., 2017; Saleem et al., 2009; Shi & Salmon, 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. In our study, knowledge and attitude had a significant positive correlation. In Chakradhar et al. (2016)'s research have reported on this matter and they illustrated knowledge, attitude and practice had a significant positive correlation with each other.

Also, in this research cross-sectional survey study assessed knowledge, attitude regarding OTD and epistemological beliefs among preservice preschool, classroom and science teachers according to different variables (gender, department type and grade level). In this population sample of teacher education at various branches, we found that knowledge levels about OTD significantly differ with grade level and department type. This difference for grade level is in favor of 4th grade preservice teachers. It can be said that 4th grade preservice teachers have higher knowledge levels about the OTD concept than the 1st, 2nd and 3rd grade preservice teachers. This difference for department type is in favor of preservice science and preschool teachers.

It can be said that preservice science teachers have higher knowledge levels about the OTD concept than preservice classroom teachers. In addition, preservice preschool teachers have higher knowledge levels about the OTD concept than preservice classroom teachers. The most important reason of this difference in the OTDKL in favor of preservice science teacher can be considered as the effect of undergraduate course contents. Science undergraduate courses such as biology, anatomy, physiology and health knowledge have a positive effect knowledge level. However, while the attitude varies according to the department variable, it has been observed that the course contents have no effect on this difference. According to this result, it can be said that while the level of knowledge on such socio-scientific subjects is directly related to the contents of the courses, attitudes are not directly affected by the knowledge.

Similarly, we found that attitudes regarding OTD affected with grade level, department type and gender. According to our results, the mean scores of female preservice teachers' attitudes towards on organ transplantation and donation were higher than those of male preservice teachers. The 4th grade preservice teachers' attitudes towards OTD were found to be higher than the 2nd grade students. And also, pre-service preschool teachers' attitudes about OTD were higher than those of preservice teachers attending classroom teaching departments. In addition, the results indicated that the epistemological beliefs (for especially BTOT dimension) affected with grade level and department type. It was found that 4th grade students had more advanced epistemological beliefs (for BTOT) than the 1st, 2nd and 3rd grade students. In the belief dimension that there is only one truth, the epistemological beliefs of preservice preschool teachers were found to be more advanced than the preservice teachers studying in science and classroom teaching departments. In addition, we found that female preservice teachers' beliefs that learning is depends on effort is more developed than male preservice teachers' belief that learning is depends on effort.

According to literature, Mohammadpour et al. (2018) showed that there were significant relationships among awareness, attitude and teachers performance about organ donation with age, teaching experience, education levels, teaching levels, disciplines of teaching and experience of participation in the course ($p < 0.05$), but there was no significant relationship with gender. In this study, the highest mean awareness, attitude, and performance scores were associated with the teachers who had the master's degree or higher education level. Obviously, the level of awareness and knowledge increase with the increase in the level of education. This finding is consistent with the results of our research including various grade level preservice teachers. Research suggests that the education level of health professionals is positively related to their personal willingness to donate organs (Schaeffner, Windisch, Friedel, Breitenfeldt, & Wolfgang, 2004). The positive effect of education level has been studied in various populations and may have a direct influence on attitudes toward organ donation (Ozdag, 2001; Ganta et al., 2018; Srivasta & Mani, 2018). The results of both us and other studies are very encouraging in terms of emphasizing the importance of education. Because, this shows that it will be possible to increase organ donation rates with the right training.

The results of this study showed that there was a significant difference between the male and female teachers in terms of their mean scores of attitude associated with organ donation ($p < 0.05$). This finding is consistent with the results of the study conducted by Febrero et al. (2014), who examined the attitude of secondary school working in the Southeast of Spain towards the solid organ donation and transplantation. These researchers show that seventy-six percent of female teachers support organ donation while seventy-three percent of the male teachers support organ donation. However, our results were not consistent with the study of Mohammadpour et al. (2018), who assessed the awareness, attitude and performance of teachers with regard to organ donation. The results of this study showed that there was no significant difference between the male and female teachers in terms of their mean scores of awareness, attitude and performance associated with organ donation.

In conclusion, our results have shown that gender, department type and grade level have played important roles in the positive attitudes for organ donation. To increase organ donation rates, it is impossible to change the economic status, religion, sex, age, and graduated schools. However, it is possible to give correct information about myths regarding organ donation. Except teachers, the sources of information for students are media, health workers, and religious figures. These sources could be used for education of organ donation. It is accepted that effective integration of issues about organ donation into the curriculum can be achieved by teachers who have positive attitude and high knowledge level on issues such as OTD.

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