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The Relationship between Empathy Levels of Obstetrics and Gynecology Specialists and Their Attitudes toward Posthumous Organ Donation

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Abstract

Background Empathy is recognized as a critical factor in shaping attitudes toward organ donation among healthcare professionals. Given the continuous patient interaction and decision-making roles of obstetrics and gynecology specialists, the limited number of studies examining the link between empathy levels and attitudes toward postmortem organ donation represents a significant gap in literature. This study aims to investigate the relationship between empathy levels and attitudes toward postmortem organ donation among obstetrics and gynecology specialists.

Methods This correlational cross-sectional study included 142 obstetrics and gynecology specialists. Data were collected via Google Forms using a personal information form, the Toronto Empathy Questionnaire, and the Attitude toward Posthumous Organ Donation for Transplantation Scale. Analyses were conducted using SPSS 26 and JASP 0.19, including the

Spearman's correlation, Mann-Whitney U, Kruskal-Wallis, and Machine Learning-Random Forest regression analysis methods.

Results Ninety-three percent of the participants stated that their empathy levels influenced organ donation decisions, and 74.6% reported considering organ donation. Their mean TEQ score was 56.25 ± 7.51 , while their mean APODS score was 4.37 ± 0.57 . A statistically significant moderate positive correlation was found between empathy and general attitudes toward postmortem organ donation ($r=0.428$, $p<0.05$). Statistically significant, weak-to-moderate positive correlations were also found between empathy levels and the APODS Positive Attitudes dimension ($r=0.373$, $p<0.01$), Religion dimension ($r=0.266$, $p<0.01$), and Family Approval dimension ($r=0.352$, $p<0.01$) scores of the participants. Significant differences were observed in empathy scores based on gender, empathy levels, and organ donation consideration status ($p<0.05$). Attitudes toward posthumous organ donation also varied significantly by empathy levels, donation consideration status, ethical/humanitarian perception of donation, and religious influence ($p<0.05$). In the exploratory Random Forest model, attitudes toward organ donation had the highest relative contribution to model performance.

Conclusions Obstetrics and gynecology specialists exhibit moderate empathy levels and highly positive attitudes toward posthumous organ donation. Higher empathy scores were associated with more favorable attitudes toward organ donation among obstetrics and gynecology physicians. Interventions addressing empathy and donation awareness may be valuable, but their effects on attitudes and donation-related behavior should be tested in longitudinal and interventional studies.

Keywords Empathy, death, organ donation, attitudes, physicians

Introduction

Empathic attitudes and behaviors among healthcare professionals play a critical role in patient engagement, quality of care, and overall satisfaction.

Especially for obstetrics and gynecology specialists, whose interactions with patients are frequent and close, empathy contributes to positive clinical outcomes [1-3]. Empathy is defined as the ability to place oneself in another's position, perceive their emotions and thoughts accurately, and convey this understanding effectively [4]. It may influence decisions regarding organ donation [5]. The driving forces behind organ donation approval often include altruism and empathy. Empathic disposition is considered one of the explanatory variables for positive attitudes toward organ donation [6].

Transformations in the organ donation process are fundamentally rooted in understanding the emotional states of individuals, sharing their concerns, and cultivating empathic attitudes [7]. Empathy plays a key role in clinical communication, ethical sensitivity, and patient-centered decision-making, particularly in specialties such as obstetrics and gynecology where emotionally intensive interactions are frequent. Previous studies suggest that empathic disposition may influence attitudes toward organ donation; however, evidence focusing specifically on obstetrics and gynecology specialists remains limited [8-10]. The World Health Organization (WHO) emphasizes the necessity of active involvement by healthcare workers to increase organ donation rates [11].

Knowledge, beliefs, and attitudes of medical professionals, particularly obstetrics and gynecology specialists, profoundly influence both clinical practices and broader societal perceptions of organ donation [12]. A combination of increased knowledge, appropriate training, and supportive attitudes is likely to enhance public awareness and acceptance of organ donation. Being a physician is often associated with a greater willingness to donate organs, primarily due to familiarity with the relevant processes [13]. In this context, the association between empathy levels and attitudes toward organ donation remains an important area of inquiry, particularly among obstetrics and gynecology physicians. Healthcare professionals with strong empathic tendencies are known to build deeper relationships with patients and approach sensitive health issues more positively [6].

The present study is conceptually informed by the Theory of Planned Behavior (TPB), which posits that behavioral intentions are determined by attitudes, subjective norms, and perceived behavioral control [14]. In the present study, the Theory of Planned Behavior was used as a conceptual framework to contextualize physicians' attitudes toward organ donation. However, TPB constructs such as subjective norms or perceived behavioral control were not directly operationalized as measurable variables within the statistical models. Perceived behavioral control is approximated by participants' self-reported consideration of organ donation and the extent to which external factors, such as religious beliefs, influence their decisions. TPB is therefore employed as a conceptual framework to support interpretation of the findings rather than as a fully operationalized analytical model.

Given the intensive and value-laden communication inherent in obstetrics and gynecology practice, the limited examination of the empathy-organ donation relationship within this subgroup, and documented differences in empathy across medical specialties, obstetrics and gynecology specialists were selected as the focus of this study. The primary aim of this study was to examine the association between empathy levels and attitudes toward organ donation among obstetrics and gynecology physicians. Additionally, variables associated with empathy levels were ranked according to their relative contribution within an exploratory Random Forest model. The findings are expected to inform empathy-centered medical education and contribute to strategies aimed at enhancing societal awareness and acceptance of organ donation. In this study, obstetrics and gynecology specialists included residents and attending physicians who were actively involved in clinical practice.

Research Questions

- 1- Is there an association between empathy levels and attitudes toward organ donation among obstetricians and gynecologists?
- 2- Are empathy levels associated with organ donation-related attitudes and perceptions?

- 3- Do empathy levels differ according to sociodemographic characteristics?

Methods

Design

Accordingly, the findings were interpreted as reflecting associations between variables rather than directional or causal effects. In this study, obstetrics and gynecology specialists were defined as physicians who had completed medical training in obstetrics and gynecology and were actively practicing as residents or attending physicians at the time of data collection.

Population and Sample

Due to the unknown size of the target population, a post hoc power analysis was conducted using the G*Power program. With a sample size of 142 and a correlation coefficient of $r=0.428$, the statistical power of the study was calculated at 99.9% ($1-\beta=0.999$) at a significance level of $\alpha=0.05$. This indicated a very high likelihood of detecting a statistically significant relationship based on this sample size and this level of correlation. According to Cohen (1988) thresholds, $r = 0.423$ is a “medium to large (upper-medium)” effect (small $\approx .10$, medium $\approx .30$, large $\approx .50$); [15].

Inclusion Criteria

- Actively practicing as an obstetrics and gynecology specialist
- Being 18 years old or older
- Ability to read and comprehend Turkish

Exclusion Criteria

- Not practicing in obstetrics and gynecology
- Being under the age of 18
- Refusal to participate in the study.
- Presence of severe communication or cognitive impairment (Montreal Cognitive Assessment score < 26)

Location and Time

The study was conducted online between June and July 2025. Participants were recruited via a Google Forms link distributed through social media

and mobile communication platforms (e.g., WhatsApp). Necessary permission was obtained from Munzur University Non-Interventional Ethics Committee and information was provided in the application form.

Data Collection Instruments

A Personal Information Form, the Toronto Empathy Questionnaire, and the Attitude toward Posthumous Organ Donation for Transplantation Scale were used to collect data.

Personal Information Form

This form consisted of questions covering variables such as gender, age, professional experience, knowledge of organ donation, self-assessed empathy levels, consideration of organ donation, perceived influence of empathy on decision-making, ethical and humanitarian perceptions of organ donation, prior education on organ donation, and the impact of religious beliefs on attitudes toward organ donation [5, 9,16, 17].

Attitude toward Posthumous Organ Donation for Transplantation Scale (APODS)

To determine attitudes toward posthumous organ donation in this study, the scale developed by Holman (2012) was utilized. Following the application of the scale, explanatory and confirmatory factor analyses, convergent and divergent validity analyses, and reliability analyses were conducted [18]. The sample of the original study consisted of 450 students enrolled in health sciences programs. The Kaiser-Meyer-Olkin coefficient of the scale was calculated as 0.898. According to the results of the explanatory factor analysis, a four-dimensional construct consistent with the original scale was identified, and the explanation rate of the total variance was determined to be 70.83%. The goodness-of-fit index values of the scale were found to be good and acceptable. Consequently, the four-factor Turkish version of APODS was deemed suitable for use. The scale developed by Holman (2012) consists of four dimensions: Positive Attitudes, Negative Attitudes, Religion, and Family Approval. The scale is

scored with a five-point Likert-type scoring system ranging from “1 - Strongly Disagree” to “5 - Strongly Agree.” The Negative Attitudes and Religion subscales are inversely scored. Higher scores on the scale indicate more positive attitudes toward posthumous organ donation [16,18].

In the present study, the APODS was administered in its full original form using Google Forms, and no items were removed, modified, or adapted for online administration. Internal consistency analysis conducted in the current sample demonstrated high reliability for the total scale (Cronbach's $\alpha = 0.89$). Subdimension reliability coefficients were calculated as follows: Positive Attitudes ($\alpha=0.91$), Negative Attitudes ($\alpha=0.747$), Religion ($\alpha=0.76$), and Family Approval ($\alpha=0.819$), indicating acceptable to good internal consistency across all subscales.

Toronto Empathy Questionnaire (TEQ)

TEQ is a 13-item, single-factor, five-point Likert-type scale developed by Spreng, Kinnon, Mar, and Levine (2009) [19]. The scale was adapted into Turkish by Totan, Doğan, and Sapmaz (2012). A confirmatory factor analysis was conducted to assess construct validity, and the fit index values of the scale were examined [20]. The results of the confirmatory factor analysis indicated that the fit index values were within acceptable ranges, and the factor structure of the original form was confirmed in the Turkish sample (CFA - Final model fit indices: $\chi^2/sd = 3.67$; NFI = .91; GFI = .94; RFI = .90; IFI = .94; CFI = .94; RMSEA = .067; RMR = .05). The reliability of the scale was examined using the test-retest and internal consistency methods. Accordingly, the internal consistency coefficient of TEQ was found to be 0.79. The test-retest reliability coefficient of TEQ, calculated based on two implementations made two weeks apart, was found to be 0.73. In this study, the internal consistency coefficient of the scale was calculated as 0.83. The scale consists of a single dimension, and higher scores indicate higher levels of empathy [20]. The TEQ was administered in its full original 13-item form via Google Forms, and no items were excluded or modified for the online format.

Data Collection

The data collection forms created via the Google Forms platform were distributed between June and July 2025 using the snowball sampling method. Because participation relied on voluntary online responses within professional networks, physicians with greater interest in empathy or organ donation topics may have been more likely to participate. The link was shared online, allowing individuals to access and complete the forms. Upon receiving the Google Forms link, participants were first presented with an introductory explanation about the study. If they provided informed consent, they were then directed to complete the forms. The “Limit to one response” feature in Google Forms was selected to ensure that each participant could submit the forms only once. The average completion time for the forms was approximately three to five minutes.

Data Analysis

Data analyses were conducted using SPSS (version 26) and JASP (version 0.19). Descriptive statistics were calculated to summarize participant characteristics and scale scores. No missing data was present, as all fields in the Google Forms survey were mandatory. The distribution of continuous variables was assessed using skewness and kurtosis values. Given the non-normal distribution of several scale-based variables and the ordinal nature of Likert-type data, nonparametric statistical tests were preferred. Accordingly, Spearman’s correlation analysis, the Mann-Whitney U test, and the Kruskal-Wallis test were performed in SPSS (version 26). Statistical significance was set at $p < 0.05$, and all results were interpreted using a 95% confidence level.

In addition to conventional statistical analyses, Random Forest regression was conducted in JASP (version 0.19) to explore potential nonlinear relationships and complex multivariate interactions among psychosocial variables related to empathy. As a machine-learning approach, Random Forest was selected for its robustness to multicollinearity and its ability to model higher-order interactions without

strict distributional assumptions. The model comprised 67 decision trees, with three randomly selected variables considered at each split. The dataset was partitioned into training ($n = 91$), validation ($n = 23$), and test ($n = 28$) subsets. Model performance was evaluated using mean squared error (MSE), root mean squared error (RMSE), mean absolute error (MAE), mean absolute percentage error (MAPE), and the coefficient of determination (R^2).

The Random Forest analysis was implemented as a complementary exploratory method rather than a causal modeling technique. Variable importance metrics, including mean decrease in accuracy, total increase in node purity, and mean dropout loss, indicate the relative contribution of predictors to model performance within the given dataset. These metrics should therefore be interpreted as reflecting associative and predictive relevance rather than causal directionality or conceptual primacy. Potential sources of uncertainty related to the cross-sectional design and self-reported measures were considered during interpretation and are further addressed in the limitations. The Random Forest model was applied as an exploratory machine-learning approach to complement traditional inferential analyses. Unlike classical statistical tests that estimate the strength and significance of associations between variables, the Random Forest algorithm identifies patterns in the data and evaluates the relative contribution of variables to model performance.

Results

Demographic Characteristics of the Participants

Among the participants, 57.7% were female, and 51.4% were between the ages of 22 and 34 years. More than half of the participants (54.2%) had 0–9 years of professional experience. Regarding organ donation-related characteristics, 66.2% reported having knowledge about organ donation, while 60.6% evaluated themselves as having high levels of empathy. A total of 74.6% stated that they were considering organ donation, and 93.0% expressed that empathy could influence patients' decisions. Although

88.7% of participants considered organ donation to be ethical and humanitarian, only 25.4% reported having received formal education on the topic. Additionally, 72.5% stated that their religious beliefs did not influence their attitudes toward organ donation (Supplementary Table 1). Prominent descriptive profiles of participants' attitudes toward organ donation are summarized in Figure 1.

Empathy Levels of Participants

The mean total Toronto Empathy Questionnaire (TEQ) score of the participants was 56.25 ± 7.51 , indicating generally moderate levels of empathy. Internal consistency analysis demonstrated good reliability for the TEQ, with a Cronbach's alpha coefficient of $\alpha = 0.841$. Statistically significant differences in TEQ scores were observed according to gender, self-assessed empathy levels, and consideration of organ donation ($p < 0.05$). Female participants (57.41 ± 6.92), those who evaluated themselves as having high empathy (58.57 ± 6.45), and those considering organ donation (57.60 ± 6.49) exhibited significantly higher empathy scores compared with their respective counterparts (Table 1). No significant differences in TEQ scores were found across age groups or years of professional experience.

Attitudes Toward Organ Donation

The mean total Attitudes toward Organ Donation Scale (APODS) score was 4.37 ± 0.57 , reflecting highly positive attitudes toward organ donation. The internal consistency of the APODS was high, with a Cronbach's alpha coefficient of $\alpha = 0.89$. Statistically significant differences in APODS scores were found based on empathy levels, consideration of organ donation, perceiving organ donation as ethical and humanitarian, and the influence of religious beliefs on donation attitudes ($p < 0.05$). Participants with high empathy levels (4.49 ± 0.52), those considering organ donation (4.53 ± 0.43), those who perceived organ donation as ethical and humanitarian (4.42 ± 0.56), and those whose religious beliefs did not influence their

attitudes (4.43 ± 0.53) demonstrated significantly higher APODS scores (Table 1). No significant differences were observed according to age, sex, professional experience, or prior education on organ donation.

Association Between Empathy and Organ Donation Attitudes

Spearman correlation analysis revealed statistically significant positive correlations between TEQ scores and total APODS scores, as well as all APODS subdimensions ($p < 0.01$). In particular, a moderate, positive correlation was observed between total TEQ and APODS scores ($r = 0.428$, $p < 0.01$), indicating that higher empathy levels were associated with more positive attitudes toward posthumous organ donation. Additionally, a statistically significant weak-to-moderate positive correlation was found between religion-related variables and the Family Approval dimension of APODS ($r = 0.352$, $p < 0.01$) (Supplementary Figure 1). The density and scatter plots illustrating these relationships are presented in Figure 2. These findings indicate statistical associations between empathy and donation-related attitudes; however, due to the cross-sectional design, they should not be interpreted as evidence of temporal or causal relationships.

Predictors of Empathy: Random Forest Analysis

Given the complex, multifaceted, and potentially nonlinear nature of empathy, a Random Forest (RF) model was employed as an exploratory machine-learning approach to examine patterns associated with empathy levels (TEQ total score). Model performance evaluation on the test dataset demonstrated relatively low error rates, with a mean squared error (MSE) of 36.105, root mean squared error (RMSE) of 6.009, mean absolute error (MAE) of 5.002, and mean absolute percentage error (MAPE) of 9.71%, indicating good predictive performance. A strong correspondence between predicted and observed empathy values was observed. Variable importance analysis indicated that the total Attitudes toward Posthumous Organ Donation Scale (APODS) score showed the highest relative contribution to model performance (mean decrease in accuracy = 5.125),

followed by self-assessed empathy level (MDA = 3.849) and consideration of organ donation (MDA = 1.936) (Supplementary Figure 2). These findings reflect relative predictive contributions within the model and should be interpreted as associative patterns rather than evidence of causal influence or hierarchical importance. Accordingly, the model identifies variables that co-occur with empathy scores in this dataset, rather than variables that determine or produce empathy. These machine-learning results should therefore be interpreted as complementary to the traditional correlation analyses reported above, providing an additional perspective on how multiple variables jointly relate to empathy scores.

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Discussion

In this study, the relationship between empathy levels and attitudes toward posthumous organ donation among physicians specialized in obstetrics and gynecology was examined. A statistically significant moderate positive association was observed between empathy levels and attitudes toward posthumous organ donation. According to the exploratory Random Forest analysis, the variables with the highest relative contribution to empathy score prediction were the total APODS score, self-assessed empathy level, and consideration of organ donation. It is important to emphasize that these findings reflect relative importance within a predictive framework and do not imply causal directionality or conceptual primacy.

The prominence of the APODS total score may be interpreted in light of its domain-specific and multidimensional structure, which captures attitudes, perceived barriers, and social and contextual considerations related to organ donation. In contrast, empathy as measured by the TEQ represents a more general, trait-like construct, which may be linked to organ donation attitudes in a more indirect manner. Therefore, the Random Forest results should be viewed as highlighting associative patterns between empathy-related variables rather than establishing a hierarchical or causal relationship among them. These findings suggest that empathy scores were associated with multidimensional psychosocial and attitudinal factors within the study sample. While our findings suggest that higher levels of empathy are associated with more positive attitudes toward postmortem organ donation, this association should be interpreted with caution. Because empathy and donation-related attitudes were measured at the same time point, it cannot be determined whether empathy precedes more favorable donation attitudes, whether donation-related beliefs shape self-perceived empathy, or whether both constructs are linked to shared underlying factors.

In addition, it should be noted that empathy in this study was assessed using a self

reported instrument, reflecting perceived empathy rather than directly observed empathic behavior. This methodological characteristic may have introduced response-related biases that could influence both empathy scores and their observed associations with attitudinal variables. In medical populations, self-perceived empathy may not always correspond to interpersonal conduct, and response tendencies such as self-enhancement or socially desirable responding may influence reported scores.

In a study investigating the role of empathy and altruism in the organ donation decision-making process among nursing and paramedic students, it was determined that students with high empathic tendencies were more sensitive to ethical and humanitarian values, and this sensitivity positively influenced their decision-making regarding organ donation [7]. Given that obstetrics and gynecology specialists frequently encounter ethical decision-making processes related to death, birth, and reproduction, it is particularly meaningful that their empathy levels are not low. In a systematic review conducted in South America, Moya-Salazar et al. (2023) found that obstetrics and pediatrics physicians exhibited higher empathy levels compared to surgical physicians. These findings support the interpretation of empathy as a relevant professional characteristic in emotionally intensive medical specialties, rather than implying a direct need for intervention based on the present results [23].

In this study, the participants who were female, those who described themselves as having high empathy levels, and those who expressed consideration of organ donation were found to have higher empathy levels. These results suggested that gender and the ability to understand the emotions of others may influence empathy levels, and they aligned with the findings of systematic reviews indicating that female healthcare professionals tend to exhibit stronger empathic tendencies [24].

According to the Religion subdimension of the APODS scale, 72.5% of participants indicated that their religious beliefs did not influence their attitudes toward organ donation, suggesting that religious beliefs may be less restrictive than generally assumed. This finding is consistent with other studies in the literature showing that various religions generally view

organ donation positively [25,26]. Focusing on the Turkish healthcare context, targeted educational initiatives that integrate factual knowledge with ethical, cultural, and communication-oriented content may be particularly important for strengthening physicians' confidence and effectiveness in organ donation advocacy [27].

Although 88.7% of the participants in this study considered organ donation to be ethical and humanitarian, only 25.4% reported having received education on the subject, revealing a significant gap in practice. This finding highlights an important educational deficiency among healthcare professionals, particularly in a context such as Türkiye where family approval, religious considerations, and cultural norms play a central role in organ donation decisions. Previous studies conducted in Türkiye have similarly reported limited formal training on organ donation among physicians and healthcare students, despite generally positive attitudes toward donation. Insufficient education may limit physicians' ability to address patients' ethical, cultural, and religious concerns effectively during clinical encounters [28,29]. Despite the low rate of education on organ donation identified in this study, the proportion of participants who considered organ donation to be ethical and humanitarian and those who expressed willingness to donate was high. This indicates that individual awareness and ethical sensitivity are elevated among obstetrics and gynecology specialists. Although theoretical awareness levels appear high, it is possible that lack of knowledge may play a negative role in translating organ donation intentions into actual behavior [30, 31]. In the examinations of the relative impact of variables on model accuracy made using the Random Forest model, it was worth noting that the psychological attitude scale used as a measurement tool, namely, the Attitude toward Posthumous Organ Donation for Transplantation Scale (APODS), was a stronger predictor than other factors. This observation should be interpreted as reflecting the scale's domain proximity to donation-related attitudes rather than as an indication that attitudinal measures are conceptually superior to empathy as a psychological construct.

It is important to emphasize that the Random Forest analysis was conducted to explore complex patterns within the data rather than to establish causal mechanisms. Variable importance metrics indicate the relative contribution of predictors to model performance but do not imply temporal precedence or theoretical primacy. Therefore, the machine learning findings should be interpreted as hypothesis-generating, complementing the correlational analyses rather than replacing traditional inferential approaches.

Several limitations of the present study should be acknowledged. First, participants were recruited using a snowball sampling strategy through online professional networks. This approach may have introduced selection bias, as physicians who have a greater interest in empathy, ethics, or organ donation topics may have been more likely to respond to the survey. Consequently, the sample may overrepresent individuals who are more positively inclined toward organ donation or who report higher empathy levels. Therefore, the findings should be interpreted with caution when generalizing to the broader population of obstetrics and gynecology physicians.

Second, the cross-sectional and correlational design of the study precludes any causal inferences regarding the relationship between empathy and attitudes toward organ donation. While significant associations were identified, the directionality of these relationships cannot be determined.

Third, empathy levels were assessed using a self-reported questionnaire, which may be subject to social desirability bias. Physicians may report higher levels of empathy due to professional expectations or socially desirable responding. In addition, self-reported empathy reflects perceived empathic disposition rather than directly observed empathic behavior in clinical practice. Therefore, the empathy scores reported in this study should be interpreted as perceived empathy levels rather than objective measures of empathic clinical performance. Thus, the findings should not be interpreted as indicating that empathy changes organ donation

attitudes or that donation-related attitudes shape empathy in a directional manner.

Conclusion

In conclusion, this study demonstrated a statistically significant positive association between empathy levels and attitudes toward posthumous organ donation among obstetrics and gynecology physicians. Participants with higher empathy scores tended to report more favorable donation-related attitudes; however, these findings should be interpreted as correlational rather than causal. Educational initiatives addressing empathy, ethical sensitivity, and organ donation awareness may be valuable, but their effects on attitudes and donation-related behavior should be evaluated in longitudinal and interventional studies. Future research using longitudinal, multi-country, and mixed-method designs is needed to clarify the temporal and contextual relationships between empathy, ethical norms, and donation-related behavior among physicians.

Authors' contributions

Study conception and design: AY, GO, DAD, Data collection: AY, GO, DAD, Data analysis and interpretation: AY, Drafting of the manuscript: AY, GO, DAD, Critical revision of the manuscript: AY, GO, DAD

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Data availability

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Ethics approval and consent to participate

Ethical approval for this study was obtained from the Munzur University Non-Interventional Human Research Ethics Committee (Approval date: 27 May 2025, Decision No: 42). All procedures performed in this study were conducted in accordance with the principles of the Declaration of Helsinki. Written informed consent was obtained from all participants and/or their legal guardians prior to participation.

Competing interests

No potential conflict of interest was reported by the author(s).

Consent for publication

Not applicable.

Clinical trial number

Clinical trial number: not applicable.

References

1. Özkan, Ş., Aba, G., & Çelik, Y. Destek Personellerinin İletişim Becerileri ve Empati Düzeylerinin Belirlenmesi: Kamu Hastanelerinde Bir Uygulama. *OPUS International Journal of Society Researches*, 13(19), 1430-1446. <https://doi.org/10.26466/opus.561414> (2019).
2. Howick, J., Moscrop, A., Mebius, A., Fanshawe, T. R., Lewith, G., Bishop, F. L., Mistiaen, P., Roberts, N. W., Dieninytė, E., Hu, X. Y., Aveyard, P., & Onakpoya, I. J. Effects of empathic and positive communication in healthcare consultations: a systematic review and meta-analysis. *Journal of the Royal Society of Medicine*, 111(7), 240-252. <https://doi.org/10.1177/0141076818769477> (2018).
3. Winter, R., Ward, A., Norman, R. I., & Howick, J. A survey of clinical empathy training at UK medical schools. *BMC medical education*, 23(1), 40. <https://doi.org/10.1186/s12909-022-03993-5> (2023).
4. Umair, S., Ho, J. A., & Waqas, U. Posthumous Organ Donation Decision: The Role of Empathy and Knowledge on the Attitude and Willingness to Donate among University Students in Pakistan. *Saudi journal of kidney diseases and transplantation : an official publication of the Saudi Center for Organ Transplantation, Saudi Arabia*, 32(6), 1552-1561. <https://doi.org/10.4103/1319-2442.352415> (2021).
5. Ersoy E, Köşger F. Empati: Tanımı ve Önemi / Empathy: Definition And Its Importance. *Osmangazi Journal of Medicine*, 38(2), 9-17. DOI: <http://dx.doi.org/10.20515/otd.33993> (2016).

6. Soylu, D., Soylu, A., & Şen, S. Two significant concepts in organ donation: Empathic tendency and altruism. *Transplant immunology*, 75, 101731. <https://doi.org/10.1016/j.trim.2022.101731> (2022).
7. Qian, L., Li, M. T., King, K. L., Husain, S. A., Cohen, D. J., & Mohan, S. Healthcare students support opt-out organ donation for practical and moral reasons. *Journal of medical ethics*, 48(8), 522-529. <https://doi.org/10.1136/medethics-2020-107053>. (2022).
8. Yıldız T, Yıldırım AA, Asıl A, Birginal G, Görgülü M, Özdemir N, et al. Sosyal hizmet öğrencilerinin empatik eğilim düzeyleri ve organ bağış tutumları arasındaki ilişki. *Tıbbi Sosyal Hizmet Dergisi*, (5), 34-45. (2015).
9. Oğuz Güner, Y., & Ciceralli, E. E., Organ Bağışında Psikolojik ve Kültürel Etmenler. *OPUS Uluslararası Toplum Araştırmaları Dergisi*, no.18, 5735-5763. <https://doi.org/10.26466/opus.525842> (2020).
10. Moudatsou, M., Stavropoulou, A., Philalithis, A., & Koukouli, S. The Role of Empathy in Health and Social Care Professionals. *Healthcare (Basel, Switzerland)*, 8(1), 26. <https://doi.org/10.3390/healthcare8010026> (2020).
11. World Health Organization. Health Topics: Transplantation. Available from: https://www.who.int/health-topics/transplantation#tab=tab_3 (2025).
12. Kemal Harzif, A., Maidarti, M., Silvia, M., Mariana, A., Dewi Mutia, H., & Wiweko, B. Knowledge, attitude, intention, and religion aspect toward fertility preservation among obstetrics and gynecology residents in Indonesia: A cross-sectional study. *International journal of reproductive biomedicine*, 18(1), 47-56. <https://doi.org/10.18502/ijrm.v18i1.6199> (2020).
13. Esezobor, C. I., Disu, E., & Oseni, S. B. Attitude to organ donation among healthcare workers in Nigeria. *Clinical transplantation*, 26(6), E612-E616. <https://doi.org/10.1111/ctr.12032> (2012).
14. Ajzen, I. The Theory of Planned Behavior. *Organizational Behavior and Human Decision Processes*, 50, 179-211. [https://doi.org/10.1016/0749-5978\(91\)90020-t](https://doi.org/10.1016/0749-5978(91)90020-t) (1991).
15. Cohen, J. *Statistical Power Analysis for the Behavioral Sciences* (2nd ed.). Routledge. <https://doi.org/10.4324/9780203771587> (1988).
16. Gökkaya, D., & Karaman, M. Ölüm Sonrasına Yönelik Organ Bağış Tutum Ölçeğinin Türkçe Geçerlilik ve Güvenirlilik Çalışması. *Süleyman Demirel Üniversitesi Vizyoner Dergisi*, 14(39), 831-846. <https://doi.org/10.21076/vizyoner.1258235> (2023).
17. İnal, G. Sağlık Çalışanlarının Organ Bağışına Tutumu. *Journal of 5N1Quality*, 1(1), 39-45. <https://doi.org/10.5281/zenodo.7760105> (2023).
18. Holman A. Development of a scale to measure the attitude toward posthumous organ donation for transplantation in Romania. *An Stiint Univ Alexandru Ioan Cuza Iasi Psihol*, 2, 23-40, (2012).

19. Spreng, R. N., McKinnon, M. C., Mar, R. A., & Levine, B. The Toronto Empathy Questionnaire: scale development and initial validation of a factor-analytic solution to multiple empathy measures. *Journal of personality assessment*, 91(1), 62-71. <https://doi.org/10.1080/00223890802484381> (2009).
20. Totan T, Doğan T, Sapmaz F. The Toronto Empathy Questionnaire: Evaluation of psychometric properties among Turkish university students. *Eurasian J Educ Res*, 46, 179-98, (2012)
21. Lewis CD. *Industrial and business forecasting methods: a practical guide to exponential smoothing and curve fitting*. (Butterworths, 1982).
22. Montaña Moreno, J. J., Palmer Pol, A., Sesé Abad, A., & Cajal Blasco, B. Using the R-MAPE index as a resistant measure of forecast accuracy. *Psicothema*, 25(4), 500-506. <https://doi.org/10.7334/psicothema2013.23> (2013).
23. Moya-Salazar, J., Goicochea-Palomino, E. A., Porras-Guillermo, J., Cañari, B., Jaime-Quispe, A., Zuñiga, N., Moya-Salazar, M. J., & Contreras-Pulache, H. Assessing empathy in healthcare services: a systematic review of South American healthcare workers' and patients' perceptions. *Frontiers in psychiatry*, 14, 1249620. <https://doi.org/10.3389/fpsy.2023.1249620> (2023).
24. Nembhard, I. M., David, G., Ezzeddine, I., Betts, D., & Radin, J. A systematic review of research on empathy in health care. *Health services research*, 58(2), 250-263. <https://doi.org/10.1111/1475-6773.14016> (2023).
25. Oliver, M., Woywodt, A., Ahmed, A., & Saif, I. Organ donation, transplantation and religion. *Nephrology, dialysis, transplantation : official publication of the European Dialysis and Transplant Association - European Renal Association*, 26(2), 437-444. <https://doi.org/10.1093/ndt/gfq628> (2011).
26. Doerry, K., Oh, J., Vincent, D., Fischer, L., & Schulz-Jürgensen, S. Religious and cultural aspects of organ donation: Narrowing the gap through understanding different religious beliefs. *Pediatric transplantation*, 26(7), e14339. <https://doi.org/10.1111/petr.14339> (2022).
27. Soylu, D., Özdemir, A., & Soylu, A. Does religious attitude affect organ donation and transplantation?. *Transplant immunology*, 71, 101555. <https://doi.org/10.1016/j.trim.2022.101555> (2022).
28. Hu, D., & Huang, H. Knowledge, Attitudes, and Willingness Toward Organ Donation Among Health Professionals in China. *Transplantation*, 99(7), 1379-1385. <https://doi.org/10.1097/TP.0000000000000798> (2015).
29. Fontana, F., Massari, M., Giovannini, L., Alfano, G., & Cappelli, G. Knowledge and Attitudes Toward Organ Donation in Health Care Undergraduate Students in Italy. *Transplantation proceedings*, 49(9), 1982-1987. <https://doi.org/10.1016/j.transproceed.2017.09.029> (2017).

30. Soylu, Ayşe & Soylu, Dilek. The Effect of Education and Positive Social Behaviour on Attitudes to Organ Donation: A Quasi-Experimental Study. PREPRINT (Version 1) available at Research Square <https://doi.org/10.21203/rs.3.rs-3745012/v1> (2023).

31 Bertocchi, L., Petrucci, C., Calzetta, M. A., Dante, A., Curcio, F., Lancia, L., & Aviles Gonzalez, C. I. Knowledge and Attitudes Toward Organ Donation and Transplantation Among Nursing Students: A Multicentre Cross-Sectional Study. *Nursing reports* (Pavia, Italy), 15(6), 181. <https://doi.org/10.3390/nursrep15060181> (2025).

Table 1 Comparisons of TEQ and APODS Scores Based on Descriptive Characteristics

		TEQ				APODS		
Demographic Characteristics		X±SD	Median	U/KW	p	X±SD	Median	U/KW
Gender	Female	57.41±6.92	59.00	1910.00	0.023*	4.43±0.55	4.65	2033.00
	Male	54.67±8.06	56.00			4.30±0.59	4.35	
Age (years)	22-34	55.78±8.09	58.00	0.696	0.706	4.38±0.51	4.47	4.246
	35-47	57.00±7.13	57.50			4.30±0.66	4.47	
	48 or above	55.87±6.02	57.00			4.58±0.50	4.76	
Professional experience (years)	0-9	55.44±8.23	58.00	0.960	0.619	4.34±0.54	4.41	4.882
	10-18	56.85±6.94	58.00			4.32±0.69	4.53	
	19 or above	57.83±5.78	58.50			4.58±0.40	4.76	

Characteristics of Empathic Attitudes and Organ Donation		X±SD	Median	U/KW	p	X±SD	Median	U/KW
Has knowledge of organ donation	Yes	56.76±7.21	58.00	2030.00	0.329	4.39±0.56	4.59	2094.50
	No	55.27±8.07	57.00			4.34±0.60	4.41	
Empathy level	Low-moderate	52.70±7.70	54.50	1245.00	0.000*	4.19±0.60	4.35	1572.50
	High	58.57±6.45	60.00			4.49±0.52	4.65	
Thinking of organ donation	Yes	57.60±6.49	59.00	1219.00	0.000*	4.53±0.43	4.65	817.00
	No	52.28±8.92	53.50			3.93±0.69	4.09	
Empathy affects one's decision about organ donation	Yes	56.48±7.43	58.00	479.00	0.148	4.40±0.55	4.50	483.50
	No	53.20±8.44	56.50			4.07±0.73	4.21	
Finds organ donation ethical and humanitarian	Yes	56.56±7.19	58.00	879.50	0.406	4.42±0.56	4.59	555.50
	No	53.88±9.69	58.00			4.02±0.58	4.21	
Has received education about organ donation	Yes	56.08±7.44	58.00	1845.00	0.767	4.25±0.74	4.50	1754.00
	No	56.31±7.58	58.00			4.42±0.49	4.47	
One's religious belief affects one's decision about organ donation	Yes	57.08±7.00	59.00	1826.00	0.403	4.22±0.65	4.29	1554.00
	No	55.94±7.71	57.00			4.43±0.53	4.59	

* $p < 0.05$, U=Mann-Whitney U Test, KW=Kruskal-Wallis Test

Values are presented as mean ± standard deviation unless otherwise indicated.

Figure 1 Attitudes toward Organ Donation: Prominent Participant Profiles

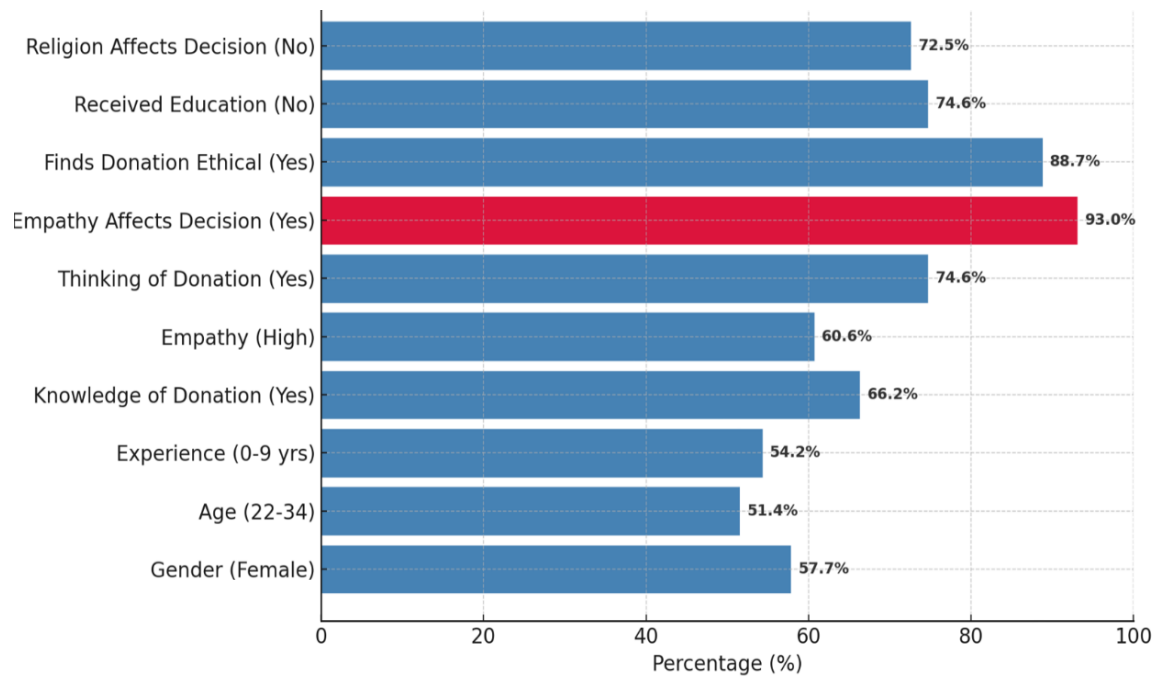


Figure 2 Predictive Performance Plot. The plot illustrates the agreement between observed and predicted empathy scores in the test dataset.

