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RESEARCH ARTICLE

REVISED An empirical investigation on the impact of attitudes towards organ donation in India [version 2; peer review: 2 approved]

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Abstract

Background: Organ shortage is a global issue and it is imperative to take steps to bridge this gap. In the Indian context, despite its demographic dividend, the rate of organ donation has been abysmally low. This emphasizes a need to demystify the antecedents of organ donation intention among the Indian population.
Methods: Using a cross-sectional research design and adopting a post-positivism research philosophy, this study identified 259 respondents by adopting a purposive sampling approach and data on knowledge of organ donation was collected using a structured, pretested questionnaire.
Results: *Awareness of organ donation law in India is low on specific issues and respondents from the health science & medicine discipline scored better on knowledge about organ donation. The findings show that most participants had heard about organ donation and had a favourable attitude toward it.* The primary sources of information on organ donation were television and newspapers, and healthcare service providers. A complementary partial median is established (β = .217, t = 5.889, p < .001) which implies that willingness to discuss with family significantly mediates the association between attitude towards organ & tissue donation and willingness to sign the donor card.
Conclusion: This study revealed that there is a general awareness of organ and tissue donation among the Indian population, but they lack clarity on certain specific issues. Mass media has to be effectively used to build awareness campaigns revolving around enhancing knowledge on a specific issue and building acceptance of the concept of organ and tissue donation.

Keywords
organ donation, attitude, awareness, knowledge, donor card

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REVISED **Amendments from Version 1**

The reviewers' comments have been incorporated, and the changes, wherever necessary, can be observed in the following areas of the manuscript:

1. abstract

2. research gap

4. methodology

5. sample design and sample size calculation

6. references

The comments have strengthened the article.

Any further responses from the reviewers can be found at the end of the article

Introduction

Organ donation is a significant milestone in the process of evolution of modern medicine. The act of donating an organ or a portion of an organ for transplantation to another person is known as organ donation. The Transplantation of Human Organs Act (Section 2), 1994, defines "transplantation as the grafting of any human organ from any living person or deceased person to some other living person for therapeutic purposes". This is the only way to prolong life and enhance the quality of life for people with terminal organ failures (Bedi *et al.*, 2015). When Joseph E Murray and his colleagues performed the very first successful kidney transplant in Boston in 1954, the concept of organ donation gained traction (Watts, 2011). In the seven decades since organ transplantation has emerged to be a successful practice worldwide with kidneys, liver, and heart being the most transplanted solid organs (WHO, 2020) and musculoskeletal grafts & cornea being the most transplanted tissues. The International report on Organ Donation and Transplantation Activities (WHO, 2022) reported 129681 solid organ transplants globally in 2020. Despite this number of reported donations, there is still a supply-demand imbalance in the organ and tissue donation (OTD) space. The report further cites 17 deaths occurring every day due to the non-availability of organ donors and the existing donations are only catering to less than 10 percent of the global need. There is a significant difference between nations in the availability of appropriate transplantation procedures as well as in the level of safety, effectiveness, and quality of human cells and, OTD & transplantation. These systemic factors contribute to broadening the need-availability gap.

Literature review

In the Indian context, despite its demographic dividend, the rate of organ donation has been abysmally low. There is a significant mismatch between the demand and supply status in India. Despite the fact that approximately 180,000 people are estimated to suffer from renal failure each year, only 6,000 kidney transplants are performed (Chang *et al.*, 2020). A timely liver transplant could save approximately 15% of the two lakh individuals who succumb in India every year from liver cancer or liver failure. As a result, India requires between 25,000 to 30,000 liver transplants per year, but only about 1,500 are carried out. Similarly, over 50,000 people die from heart failure each year in India, but only 10% to 15% of heart transplants are performed (Tamuli *et al.*, 2019). Despite a 100,000 need, only approximately 25,000 Cornea transplants are performed each year (Mohan *et al.*, 2020). These figures are not encouraging, regardless of the efforts of the government and voluntary organizations. The government has attempted to bring in a systemic change to ensure a transparent system of OTD and to stop human organ trafficking. The Government legalized organ donation under the "Transplantation of Human Organs Act" (THOA, 1994), and the Act has undergone various amendments since then The National Organ Transplant Program was initiated in the 12th five-year plan of the Government of India to promote organ transplantation (THOA, 1994). The National Organ and Tissue Transplantation Organization (NOTTO) has been established as a nodal agency for this program, and it serves as a national-level registry for organ donation and transplantation.

Organ shortage is a global issue, and it is imperative to take steps to bridge this gap. The Government and Non-Governmental organizations have in tandem taken various steps to encourage people to register for organ donation. Several initiatives that spread fundamental knowledge, and enhance familiarity with and develop positive attitudes toward organ donation have been adopted. For instance, legalising organ donation and organ donation awareness campaigns on various media platforms are examples of initiatives that have been implemented by private and public organizations (Meena *et al.*, 2023).
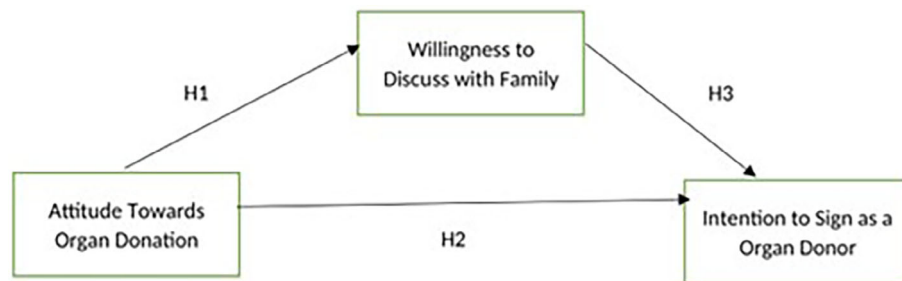
Figure 1. Conceptual Framework.

Intention to donate organs is shaped by an individual's knowledge of organ donation, attitude, and behaviour, and is further influenced by cultural and religious orientations (Chung *et al.*, 2008; Rithalia *et al.*, 2009; Mekahli *et al.*, 2009; Ramadurg & Gupta, 2014; Manish *et al.*, 2015; Vijayalakshmi *et al.*, 2016, Vincent *et al.*, 2022). Age, gender and socio-economic status, and education have been reported to have a significant influence on attitudes toward organ donation (Bilgel *et al.*, 2004; Spigner *et al.*, 2002; Saleem *et al.*, 2009; Balwani *et al.*, 2015). A study undertaken by Gorczyca and Hartman (2017) emphasized the importance of including millennials in a larger conversation about organ donation and transplantation as they could contribute to future campaign tactics at local and national governmental levels. As India has a 34.8 percent representation of millennials in the population, or people aged 17 to 34 (according to the data furnished by the Social Statistics Division of the Central Statistics Office, Ministry of Statistics and Programme Implementation, Government of India, as of 2011), they could contribute to accelerating reach of the campaigns. In a similar study, to this evidence, undertaken by the United States Department of Health and Human Services (2013), it was identified that people above the age of 65 were less likely to sign up for organ donation compared to those of the age group 18-34 years. Loughery *et al.* (2018) have also cited the age and education status of the donor as significant barriers to organ donation. Additionally, a study undertaken by Alex *et al.* (2017) provided evidence of an inadequate level of knowledge on organ donation among medical students served as a barrier to OTD. Hence it is imperative to assess the current knowledge level, attitude, and willingness to register for organ donation among various age groups and whether it varies across the population with the discipline of education.

There exists sufficient research evidence to conclude a positive significant association between willingness to discuss OTD with family and attitudes toward OTD (Knox *et al.*, 2017; Kopfman, 2002; Thompson *et al.*, 2004; Wu & Tang, 2009). Although this association has been established, the details of the discussion are still an enigma. Most of the research evidence indicates a similar influence on the intention of organ donation, although there is a lack of empirical evidence proving this hypothesis. Knowledge of organ donation also has a positive association with discussion intention (Guadagnoli *et al.*, 1999). Among gender, women were more likely to discuss organ donation intention than men (Thompson *et al.*, 2004). Even though there is a direct effect of willingness to discuss with family on intention to enroll as an organ donor, the mediating role of this construct has not been explored. There is a paucity of research evidence that documents awareness and attitude with respect to organ donation in the Indian community. Hence this study intends to explore this further. This study will also explore the mediating role of willingness to discuss organ donation between the attitude toward OTD and the intention to enroll as an organ donor. The conceptual framework that has been proposed is shown below (Figure 1).

Methods
Ethics
This study was reviewed and approved by the Scientific Committee Manipal Academy of Higher Education, Manipal, India on 16th March 2022. While administering the questionnaire, written informed consent was taken from the participants. Participants were ensured that the collected data would be used for research purposes and that the data would be sufficiently de-identified.

Study design
This proposed research endeavour is cross-sectional by research design and is quantitative by nature. The "post-positivism" research philosophy that is being considered in this study concerns the development of empirical methods for comprehending and investigating human behaviour. The philosophical assumptions in the backdrop of Post positivism approach is that consent from the participants has been taken to uphold the nature of research ethics and it is primarily quantitative nature of the inquiry. The conceptual framework for this study proposes a relationship between the independent, dependent, and mediating factors. Demographic factor like education is considered moderating variables.

Study setting

As per the report submitted by the Health and Family Welfare, Ministry of Karnataka, Karnataka state has been one of the forerunners in terms of organ donation in India (Kute *et al*., 2020). As per the current statistics, 143 organ donations have been recorded in 2022 which has given a fresh lease of life to 397 people. Hence, this study was undertaken in Karnataka state. Footfalls are a metric that indicates the popularity of the mall and also reflects homogeneity in tenant mix and visitors to the mall (Mohan & Tandon, 2015). Hence 4 malls in each of the districts having the highest footfalls were identified to undertake the survey. Further, a simple random technique was employed to identify the malls in Dakshina Kannada and Udupi districts for data collection. The target population for this study was the general population residing in the above districts who were free of organ failure and who knew English. No other inclusion criteria were adopted. A purposive sampling technique was adopted to identify participants at four shopping malls; two located in each district. Participants were approached at the malls and after applying the inclusion criteria, were briefed on the objective of the research. On obtaining consent, the participants were requested to fill out the questionnaire. Data collection was undertaken from November 2022 to January 2023.

Sampling

This investigation used a purposive sampling approach (non-probability by nature), which was adopted due to the absence of a sampling frame. Data was collected from 259 respondents. The study comprises of respondents from three age groups (18-26, 27-42, and 42 and above). Respondents who know English were requested to fill the questionnaire.

The sample size was calculated based on the number of items on the rating scale multiplied by 10 as proposed by Hair *et al.* (2017b). Hence, The sample size was determined by multiplying the number of rating scale elements by ten [15] i.e. 15*10 = 150. Considering 10% of the unanswered sample (i.e.15) gives rise to 165 (150 + 15 = 165). Finally, 259 participant data were collected.

Data gathering

Data was collected using a structured questionnaire. A copy of the questionnaire is also placed the *Extended data* (Nayak & Nayak, 2023). The questionnaire was divided into five parts. Part 1 captured the demographic details of the participants, like age, income, education, and gender. In addition, two questions on participants' awareness of OTD and sources of information on OTD were also incorporated. Part 2 assessed the knowledge of participants on OTD Jacob Arriola *et al*. (2008). This section included eight items with true or false response options, which were further subdivided into four sub-scales: general donation-related statistics (two items), understanding of what signing a donor card entails (three items), medical fitness for donation (two items), and knowledge of religious institutions' approach to donation (one item). The maximum score in this component was 8, with one mark for each correct response. The third part of the questionnaire consisted of seven items to measure attitudes toward OTD (Morgan & Miller, 2001). The next section of the questionnaire inquired about the participant's willingness to talk about OTD with family and friends (Morgan & Miller, 2002). The final part of the questionnaire captured the participant's willingness to sign the organ donor card adopted from Horton and Horton (1991). All responses were coded using a 5-point Likert scale, with 1 representing strong disagreement and 5 representing strong agreement.

Data collection

Prior to the final data collection, the research instrument was subject to a pilot test to assess construct validity. Data were collected from 25 respondents through a purposive sampling technique. Cronbach Alpha was estimated to establish construct validity using IBM SPSS Statistics 27 (RRID: SCR_016479; Armonk, NY: IBM Corp). Cronbach alpha of the endogenous construct (willingness to sign the organ donor card = 0.875) and exogenous constructs (attitudes towards OTD=0.724& willingness to discuss OTD=0.867) were well above 0.7, indicating acceptable levels of internal consistency. Loadings of all factors and communalities were significantly greater than 0.5, and the Kaiser-Meyer-Olkin and Bartletts Test was significant (>0.8).

Data analysis

The negatively worded items were reverse-coded and considered for final data analysis. IBM SPSS Statistics 27 (RRID: SCR_016479; Armonk, NY: IBM Corp) RRID: SCR_016479; Armonk, NY: IBM Corp) was used to undertake a descriptive analysis of the demographic variables and is presented in the results section. To test the hypotheses and perform the mediation analysis, the statistical package SmartPLS4 (RRID: SCR 022040) was used. PLS-SEM is becoming more popular as a statistical package due to its versatility and dependability in analyzing composite and empirical studies. Structural Equation Modelling performed in this study can also be undertaken by using jamovi (RRID: SCR_016142), which is a free source software.

Results

The demographic characteristics of the participants were analysed using IBM SPSS Statistics 27 software (Table 1). For the complete dataset, see *Underlying data* (Nayak & Nayak, 2023). Of the 259 respondents, 173 (67%) were female and 171 were between 18 to 26 years of age. 113 respondents had enrolled or completed their Bachelor's education in the healthcare domain like medicine, life science, nursing, health science, and allied health (Table 1). All the participants reported that they are aware of organ and tissue donation but only 125 (41%) stated that they were aware of OTD (Table 2). A "chi-square test of independence" displayed that there was a significant association between education and awareness of the OTD act in India X2 (1, N = 259 = 6.980, p ≤ 0.05).

Participants' knowledge of OTD was assessed by posing eight questions (Table 3). A majority (96.5%) of the participants were aware of the demand for transplants exceeding availability. They were also aware of the fact that many people were losing their lives due to the non-availability of organs to be transplanted (91.15%). Three questions were posed to the respondents to assess their knowledge of the implications of signing a donor card. The majority (95.8%) were aware they could specify the organs and tissues they want to donate on the donor card but only 33% of them knew that they could change their mind after signing the donor card. Two-thirds of the participants thought that the next of kin (family) must permit donation to occur even if the donor had signed the donor card. Participants were also assessed on their knowledge of how medical viability for donation is determined. More than half of the participants (51.7%) were not aware that the age or medical condition of the donor is important antecedent of becoming an organ donor. Whereas 82% of the participants knew that signing up for organ donation would not change the line of treatment they would receive in the future. Around 68% of the respondents believed that religious people would not oppose OTD. However, the standard deviation and mean of the knowledge score were estimated to be 1.116 and 5.25. The mean of the knowledge score of samples from the healthcare domain (7) was higher than the mean of both medical and non-medical participants put together.

Reliability and validity analysis

The measurement model was evaluated to determine the constructs' reliability and validity (Table 4) and the Structural Model evaluation is presented in Figure 2. First, the factor loadings of all items in the model were checked to ensure that they were greater than the minimum acceptable value of 0.5 (Hair *et al.*, 2017a). Vinzi *et al.* (2010) opine a minimum

Table 1. Demographic characteristics of the participants (N = 259).

Demographics	Components	N	%
Gender	Female	173	67
	Male	86	33
Age	18-26	171	66
	27-42	49	19
	42 & above	39	15
Education	Healthcare domain	113	44
	Non-Healthcare domain	146	56
Income	Below Rs 2,00,000	89	34
	Rs 2 to 5,00,000	56	22
	Rs 5 to 10,00,000	50	19
	Above Rs 10,00,000	64	25

Table 2. Awareness of OTD (N = 259).

Age	Aware of OTD	Aware of organ donation law	
	Yes	Yes	No
18-26	171	73	98
27-42	49	22	27
42 & above	39	30	9
Total	259	125 (41%)	134 (51%)

Table 3. Assessment of participants' knowledge of OTD.

Item	True	False
Donation-Related (General Awareness)		
K1: For most organs, the demand for transplants is higher than the availability	250 (96.5)	9 (3.5)
K2: People on the waiting list for a transplant die every day because not enough organs are available	236 (91.1)	23 (8.9)
Knowledge of the implications of signing a donor card		
K3: A person can specify on a donor card what organs and tissues they want to donate	248 (95.8)	11(4.2)
K4:Next of kin (family) must permit donation to occur even if I sign a donor card	165 (61.3)	94 (38.7)
K5: Once a person has signed a donor card they cannot change their mind about organ donation	173 (66.8)	86 (33.2)
Knowledge of how medical viability for donation is determined		
K6. Anyone can decide to be a donor regardless of their age or medical condition	125 (48.3)	134 (51.7)
K7. Signing a donor card will not change the medical treatment I receive to save my life at the hospital	230 (88.8)	29 (11.2)
Knowledge Religious implications to donation		
K8. Most religious people oppose organ and tissue donation	82 (31.7)	117 (68.3)
Mean (SD) of overall knowledge score	5.25 (1.116)	

Table 4. Evaluation of the Measurement Model.

		Model loadings	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)	Model weights	VIF
Attitude towards OTD	A2	0.617***	0.759	0.772	0.839	0.512	0.25	1.283
	A3	0.831***					0.314	1.901
	A4	0.715***					0.296	1.5
	A5	0.669***					0.207	1.43
	A7	0.728***					0.322	1.37
Intention to sign	IS1	0.917***	0.88	0.906	0.92	0.745	0.297	4.417
	IS2	0.94***					0.323	4.238
	IS3	0.902***					0.31	3.052
	IS4	0.663***					0.217	1.365
WTD with family	WTD1	0.802***	0.872	0.887	0.911	0.719	0.802	1.519
	WTD2	0.877***					0.877	3.127
	WTD3	0.865***					0.865	3.312
	WTD4	0.845***					0.845	2.325

***p < 0.01.
**p < 0.1.

acceptable factor loading of 0.7 but in social science studies, researchers frequently obtain lower outer loadings. Instead of automatically eliminating the indicators, it would be better to assess the impact of their elimination on the improvement in the reliability and validity of the constructs. Hair *et al.* (2017a) recommend the elimination of the indicators with factor loading in the range of 0.4 to 0.7 only if it increases the value of composite reliability (Average Variance Extracted) beyond the threshold value. In our research endeavour, the removal of item (A1, loading = 0.504 & A6, loading =0.431) had a significant influence on composite reliability and hence was eliminated.

Cronbach's alpha, rho a, and composite reliability were used to assess reliability; statistical values were higher than the recommended threshold value of 0.7 (Wasko & Faraj, 2005). The value of rho_a was found to be in between composite
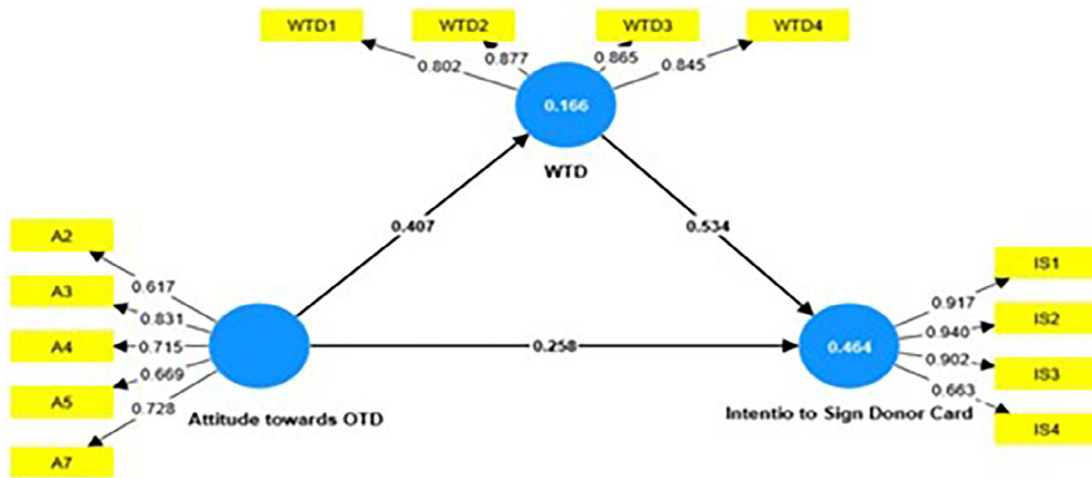
Figure 2. Structural Model Evaluation.

Table 5. Discriminant validity.

Fornell Larcker			
	Attitude towards OTD	**Intention to sign**	**WTD with family**
Attitude towards OTD	0.716		
Intention to Sign	0.475	0.863	
WTD with family	0.407	0.639	0.848

Note: The diagonal italic is the square root of AVE. Below the diagonal elements are the correlations between the construct's values.

reliability (Hair *et al.*, 2017a) and Cronbach's alpha, and was also above 0.7 indicating excellent reliability (Henseler *et al.*, 2016). "Average Variance Extracted" (AVE) was higher than 0.5 hence establishing convergent validity. Fornell & Larcker method was employed to establish discriminant validity (Table 5).

Structural model

The structural model reflects the hypothesised path of the research framework. R^2, Q (Ahlawat *et al.*, 2013), and the significance of the paths are used to evaluate the structural model. The R^2 value, which indicates the strength of each structural path in the model, can be used to assess a model's goodness. Falk and Miller claim (1992), the R^2 value should be equal to or above 0.1. This establishes the predictive capacity of the model. Q^2 value is used to establish the predictive relevance of the endogenous construct. Q^2 value above 0 indicates the predictive relevance of the construct. In the current study, both R^2 and Q^2 values are above this threshold value (Table 6) hence indicating the goodness of the model.

Table 6. Testing Direct Relationships.

	Path coefficient	Standard deviation (STDEV)	t value (bootstrap)	P values	BI
H1: Attitude towards OTD -> Intention to Sign Donor Card	0.258***	0.049	5.220	0.000	(0.159, 0.351)
H2: Attitude towards OTD -> WTD	0.407***	0.062	6.535	0.000	(0.237, 0.518)
H3: WTD -> Intention to Sign Donor Card	0.534***	0.054	9.851	0.000	0.422, 0.636)
R^2 Willingness to Discuss = 0.464	Q^2 Willingness to Discuss = 0.152				
R^2 Intention to Sign Donor Card = 1.666	Q^2 Intention to Sign Donor Card = 0.215				

Abbreviation: BI, bias-corrected.
***p < 0.01.
**p < 0.1.

Furthermore, the "model fit" was evaluated using the Standard Root Mean Square Residual (SRMR). The value of the SRMR residual was 0.084 which was well within an acceptable range (Hair *et al.*, 2017a).

In addition, the hypothesis was tested to explore the significance of the relationship. H1 evaluates if the attitude towards OTD has a significant impact on the intention to sign the donor card. Results revealed that attitude towards OTD has a significant impact on intention to sign the donor card (β = .258, t = 5.220, p < .001). Hence H1 was supported. H2 proposed an association between attitude towards OTD and willingness to discuss with family and was also supported (β = .407, t = 6.535, p < .001). Results also revealed that willingness to discuss with family had a significant positive association with intention to sign the donor card (β = .534, t = 9.851, p < .001). Table 6 shows the 95% confidence interval generated by the study of 5000 resamples. A confidence interval that is not zero indicates that there is a significant relationship.

Mediation analysis

Mediation analysis was performed to check if the willingness to discuss with family mediates the association between attitude towards OTD and willingness to sign the donor card. A complementary partial median is established (H4: (β = .217, t = 5.889, p < .001) which implies that willingness to discuss with family significantly mediates the association between attitude towards OTD and willingness to sign the donor card.

To explore if the attitude towards OTD varied across participants from the health science domain and engineering, management, and humanities, the Mann-Whitney U Test was utilized. The test revealed a significant difference in OTD among participants from the health science domain (Media = 30, n = 113) and engineering, management, and humanities (Media = 29, n = 146), U = 6838, z = 2.367, p = 0.018, r = 0.14). Hence, we can conclude that the discipline of education has a significant influence on attitude towards OTD. Even though education is determined to increase knowledge on OTD, it is suggested by Meier *et al.* (2000) that most donors do not explore organ donation before pledging to donate the organ.

Importance Performance Matrix Analysis

The Important-Performance Matrix Analysis (IPMA) elucidates the relative importance and performance of exogenous (attitude towards OTD & willingness to discuss with family) and endogenous constructs (intention to sign the OTD card) in relation to one another. Total effects and index values represent their significance and performance. Importance reveals the overall effect on the endogenous variable. The performance demonstrates the potential of latent variable scores. The X and Y axes are used to quantify importance and performance. The total effect is represented by the X-axis, while performance is represented by the Y-axis. A construct performs better when it has a higher mean value (Hair *et al.*, 2017a; Hock *et al.*, 2010; Rigdon *et al.*, 2011) (Figure 3 and Table 7). The results of IPMA analysis reveal that willingness to discuss with family displays a high performance of 69.581 and a high total effect of 0.534 in comparison with the other exogenous (attitude towards OTD) displaying a performance of 83.028 and a total effect of 0.475. Hence a unit of increase in performance of attitude towards OTD enhances intention to sign donor card from 66.087 to 66.562. Similarly, an increase in one unit of construct, willingness to discuss with family would increase the performance of construct intention to sign OTD card by 0.534 points to 66.621 points. Figure 4 represents the IPMA map.
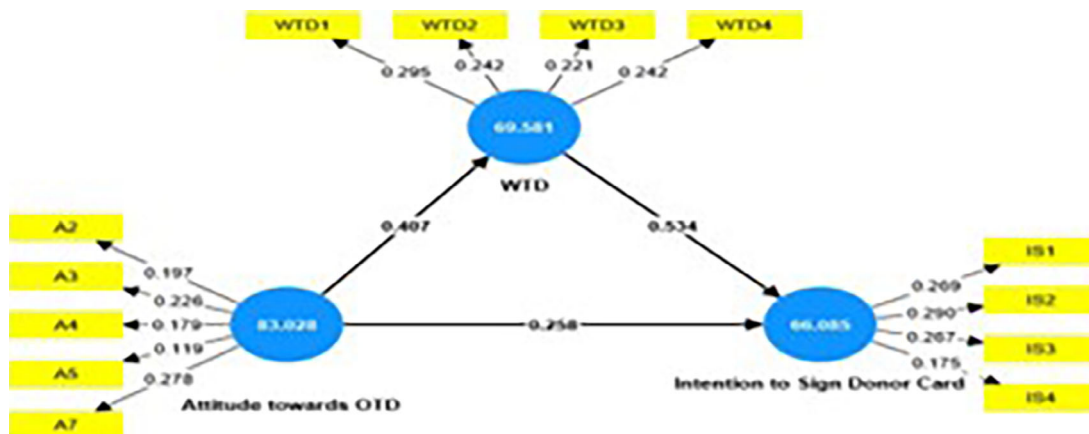

Figure 3. IPMA Analysis.

Table 7. IPMA: Outcome variable – Intention to sign OTD card.

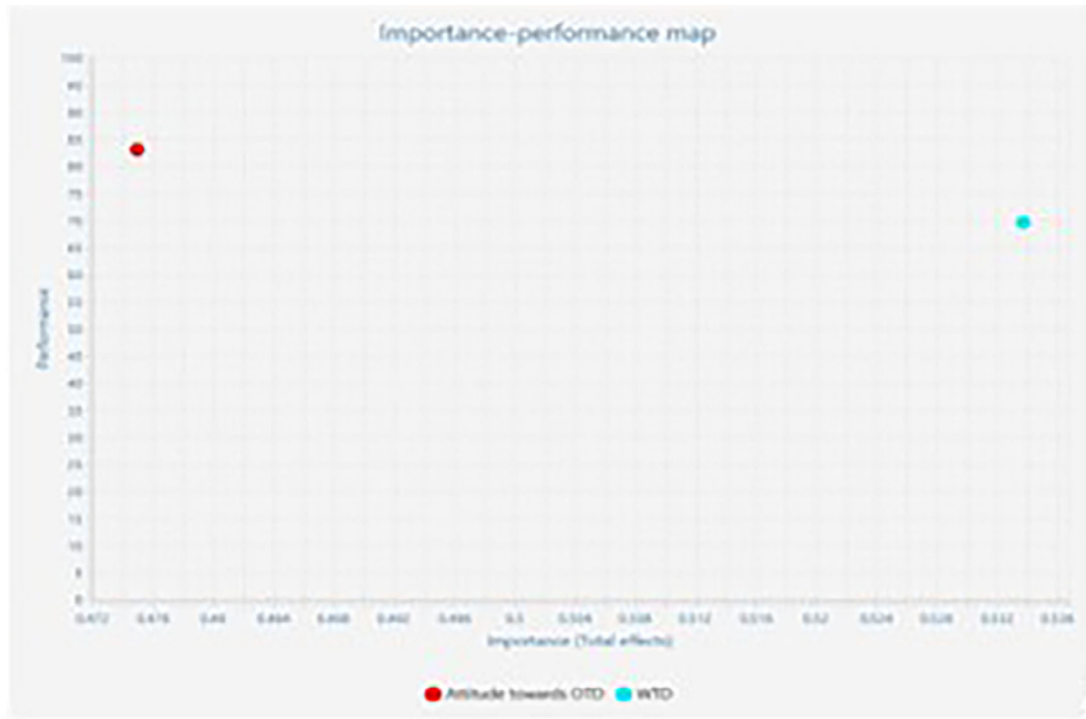| Exogenous Constructs	Total Effect	Performance
Attitude towards OTD	0.475	83.028
WTD	0.534	69.581

Figure 4. Importance Performance Map.

Discussion

This study intended to explore the knowledge of OTD across age groups in the Indian population. The goal was to assess the general public's knowledge and attitude toward organ donation. The findings show that most participants had heard about organ donation and had a favourable attitude toward it. These research findings are similar to results obtained by previous studies by Vijayalakshmi *et al.* (2016), Mithra *et al.* (2013), Sarveswaran *et al.* (2018). Results show that people are aware of OTD but only 41% were aware of the organ donation law in India. Awareness of THOA in 1994 was astonishingly low. The knowledge score was moderate across the population of the study.

In line with previous studies, we observed that the primary sources of information on organ donation were television and newspapers, healthcare service providers, and followed by social media and the internet. In line with the previous studies, healthcare service providers played an integral role in creating awareness of OTD (Vijayalakshmi *et al.*, 2016; Narendran *et al.*, 2022). They could be the primary motivators in raising awareness among their family, friends, relatives, and neighbours. A recent 5-year retrospective case record analysis revealed that only 10 (5%) of 205 patients diagnosed as brain dead had their organs donated (Sawhney *et al.*, 2013). This study again highlights the lack of awareness of the concept of organ donation and the need for the relevant stakeholders to collectively work together to strengthen awareness of OTD. As a result, both governmental and non-governmental organizations should play an active role in raising public awareness about brain death. THOA was enacted in 1995, but only 42% of participants were aware of organ donation legislation. These findings were comparable to previous studies that found 5.7% (Vijayalakshmi *et al.*, 2016) & 13.9% (Pouraghaei *et al.*, 2015). The stakeholders could adopt television and digital campaigns to enhance awareness of OTD, the process involved, and THOA. According to the Global Overview report 2022, 35% of the Indian population resides in the urban landscapes of the country and most of this population has access to television, the internet, and social media (Digital 2022 Global Overview Report, 2022). Hence, emphasis on television and digital campaigns could contribute strongly to creating awareness and registering for OTD as most of the participants (96%) are aware that people are dying

due to lack of availability of organs. In general, the donor will be given the organ donation card after signing it, and if the donor changes their mind about donating organs could tear up the organ donation card (Gungormüs & Dayapoglu, 2014). The majority of our study's participants (66%) believed that once they signed the organ donation card, they couldn't change their minds. As a result, these issues must be addressed when creating public awareness programs. Issues concerning the signing of organ donation cards should be clarified by the government and non-governmental organizations. 68% of all those surveyed believed that various religions oppose OTD. These findings were consistent with the documented literature, which indicated that religious beliefs were the most significant barrier to organ donation (Patthi *et al.,* 2015; Vijayalakshmi *et al.,* 2016). In India, the family traditionally looks after its members, even when they are sick. As a result, the consent of the next of kin is required for organ donation from a deceased donor (Ahlawat *et al.,* 2013). Moreover, 61% of respondents agreed that knowing their family's wishes after their death was important. As a result, family members must have a positive attitude toward organ donation. Around one-third of the respondents thought that various religions opposed OTD. These findings echo the findings of the research endeavours of Vijayalakshmi *et al.* (2016) and El-Menyar *et al.* (2020). Religious prohibitions were reported as a cause of not donating an organ by Hameed *et al.* (2016).

In line with the previous research evidence (Vijayalakshmi *et al.,* 2016; Pouraghaei *et al.,* 2015; Narendran *et al.,* 2022) it is proved that attitude toward organ donation is significantly associated to becoming an organ donor (Hyde & White 2013; Teoh *et al.,* 2020). In research studies undertaken in India, all have reported positive attitudes toward OTD and a considerable amount of awareness of OTD. The challenge encountered in developing regions like India is that despite the population being considerably aware of OTD, very few registered for organ donation. Having a positive attitude toward OTD is a significant antecedent to registering for OTD. The research undertaken by Topic *et al.* (2006) and Sengul and Sahin (2022) present evidence for the fact that the nature of education was significantly associated with attitude towards OTD. It was observed that health science professionals had a more positive attitude towards OTD in comparison to their colleagues from other professional disciplines. Our study echoes this evidence as it is observed that respondents from a medical and health science domain had a more positive attitude towards OTD. Hence there is a need to create awareness and build a positive attitude toward OTD among the non-health/medical science population as attitude defines the intention to be an organ donor.

Willingness to discuss with family is reported to have a positive mediation between attitude towards OTD and intention to be an organ donor. Hence there is a need for government and non-governmental stakeholders to normalize the discussion on OTD in society. There appears to be a lack of consideration for the topic which creates a communication barrier (Feeley & Servoss, 2005). An OTD-friendly environment and family can increase the willingness to donate organs. Seeing family approval and willingness may help individuals make positive decisions about the subject (Sengul & Sahin, 2022) As a consequence, it is essential to explain the issue to all family members through community educational activities using plans and brochures for all family members. It may be beneficial to plan mass communication campaigns to strengthen acceptance of the topic among the population at large.

Conclusion
This study provides several insights into the OTD scenario in India. This study revealed that there is a general awareness of OTD among the Indian population but they lack clarity on certain specific issues. The majority of participants were unaware of the legislation or the donation process & clarity on the role of family when the donor had signed the donor card was ambiguous. It was established that the willingness of the donor to discuss with family played an instrumental role in strengthening the intention to donate an organ. Attitudes toward organ donation was significantly different among people with health science or medical backgrounds and from engineering, management, and humanities domains. This situation highlights the need for governmental and non-governmental institutions to take up the mandate of creating awareness that could lead to bridging the demand-supply gap of organs in India.

The cross-sectional research design serves as a limitation of this research endeavour. Further studies could adopt qualitative or experimental approaches to explore the rationale of OTD. Future studies could investigate if the knowledge, attitude towards OTD, and organ donation intention varied across Generation Z (born between 1996-2000) and Millennials (born between 1981 to 1995) (Thangavel *et al.,* 2021). Further, this research endeavour has been undertaken in the urban setting, which might limit the generalizability to the rural population. This will enable stakeholders to design appropriate campaigns and adopt the most appropriate media to create awareness of OTD thereby bridging the demand-supply gap.

Data availability
Underlying data
Figshare: Dataset, https://doi.org/10.6084/m9.figshare.22099580 (Nayak & Nayak, 2023).

This project contains the following underlying data:

- Organ Donation Raw Data.xls

Extended data

Figshare: Dataset, https://doi.org/10.6084/m9.figshare.22099580 (Nayak & Nayak, 2023).

This project contains the following extended data:

- Questionnaire with codes.docx

References

Ahlawat R, Kumar V, Gupta AK, *et al.*: **Attitude and knowledge of healthcare workers in critical areas towards deceased organ donation in a public sector hospital in India.** *The National Med. J. India.* 2013; **26**(6): 322–326.

Alex P, Kiran KG, Baisil S, *et al.*: **Knowledge and attitude regarding organ donation and transplantation among medical students of a medical college in South India.** *Int. J. Community Med. Public Health.* 2017; **4**(9): 3449–3454.
Publisher Full Text

Balwani MR, Gumber MR, Shah PR, *et al.*: **Attitude and awareness towards organ donation in western India.** *Ren. Fail.* 2015; **37**(4): 582–588.
PubMed Abstract | **Publisher Full Text**

Bedi KK, Hakeem AR, Dave R, *et al.*: **Survey of the knowledge, perception, and attitude of medical students at the University of Leeds toward organ donation and transplantation.** *Transplantation proceedings.* Elsevier; 2015, March; (Vol. **47**(No. 2): pp. 247–260).

Bilgel H, Sadikoglu G, Goktas O, *et al.*: **A survey of the public attitudes towards organ donation in a Turkish community and of the changes that have taken place in the last 12 years.** *Transpl. Int.* 2004; **17**(3): 126–130.
PubMed Abstract | **Publisher Full Text**

Chang JH, Diop M, Burgos YL, *et al.*: **Telehealth in the outpatient management of kidney transplant recipients during the COVID-19 pandemic in New York.** *Clin. Transpl.* 2020; **34**(12): e14097.
Publisher Full Text

Chung CK, Ng CW, Li JY, *et al.*: **Attitudes, knowledge, and actions with regard to organ donation among Hong Kong medical students.** *Hong Kong Med. J.* 2008; **14**(4): 278–285.

Digital 2022 Global Overview Report: **We Are Social and Hootsuite.** 2022. (accessed on February 2,2023).
Reference Source

Esposito Vinzi V, Trinchera L, Amato S: **PLS Path Modeling: From Foundations to Recent Developments and Open Issues for Model Assessment and Improvement.** Vinzi VE, Chin WW, Henseler J, *et al.*, editors. *Handbook of Partial Least Squares: Concepts, Methods and Applications.* Berlin, Germany: Springer Berlin Heidelberg; 2010; (47–82).

El-Menyar A, Al-Thani H, Mehta T, *et al.*: **Beliefs and Intention to Organ Donation: A Household Survey.** *Int. J. Appl. Basic Med. Res.* 2020; **10**(2): 122–127.
PubMed Abstract | **Publisher Full Text** | **Free Full Text**

Feeley TH, Servoss TJ: **Examining college students' intentions to become organ donors.** *J. Health Commun.* 2005; **10**(3): 237–249. Global overview report.
PubMed Abstract | **Publisher Full Text** | **Reference Source**

Falk RF, Miller NB: *A primer for soft modeling.* University of Akron Press; 1992.

Guadagnoli E, Christiansen CL, DeJong W, *et al.*: **The publics willingness to discuss their preference for organ donation with family members.** *Clin. Transpl.* 1999; **13**(4): 342–348. (1) (PDF) A Systematic Literature Review and Research Agenda for Organ Donation Decision Communication. [accessed Dec 22 2022].
PubMed Abstract | **Publisher Full Text** | **Reference Source**

Gorczyca M, Hartman RL: **The new face of philanthropy: The role of intrinsic motivation in millennials' attitudes and intent to donate to charitable organizations.** *J. Nonprofit Publ. Sect. Market.* 2017; **29**(4): 415–433.
Publisher Full Text

Gungormüs Z, Dayapoglu N: **The knowledge, attitude and behaviour of individuals regarding organ donations.** *TAF Prev. Med. Bull.* 2014; **13**: 133–140.
Publisher Full Text

Hair JF Jr, Hult GT, Ringle CM, *et al.*: *A primer on partial least squares structural equation modeling (PLS-SEM).* 2nd ed. Sage publications; 2017a.

Hair JF Jr, Sarstedt M, Ringle CM, *et al.*: *Advanced issues in partial least squares structural equation modeling.* Sage Publications; 2017b.

Hamed H, Awad ME, Youssef KN, *et al.*: **Knowledge and attitudes about organ donation among medical students in Egypt: A questionnaire.** *J. Transplant. Technol. Res.* 2016; **6**(1): 1–4.

Henseler J, Hubona G, Ray PA: **Using PLS path modeling in new technology research: updated guidelines.** *Ind. Manag. Data Syst.* 2016; **116**: 2–20.
Publisher Full Text

Hock C, Ringle CM, Sarstedt M: **Management of multi-purpose stadiums: Importance and performance measurement of service interfaces.** *Int. J. Serv. Technol. Manag.* 2010 Jan 1; **14**(2-3): 188–207.
Publisher Full Text

Horton R, Horton P: **A model of willingness to become a potential organ donor.** *Soc. Sci. Med.* 1991; **33**: 1037–1051.
PubMed Abstract | **Publisher Full Text**

Hyde MK, White KM: **A test of three interventions to promote people's communication of their consent for organ donation.** *Psychol. Health.* 2013; **28**(4): 399–417.
Publisher Full Text

Jacob Arriola KR, Robinson DHZ, Perryman JP, *et al.*: **Understanding the relationship between knowledge and African Americans' donation decision-making.** *Patient Educ. Couns.* 2008; **70**: 242–250.
Publisher Full Text

Kopfman JE, Jansky SA: **The influence of family discussion on individual intent to become a potential organ donor: using Theory of Reasoned Action's subjective norm to change intent. Paper presented at: Annual Convention of the National Communication Association, New Orleans, La.** November 2002.

Knox K, Parkinson J, Pang B, *et al.*: **A systematic literature review and research agenda for organ donation decision communication.** *Prog. Transplant.* 2017; **27**(3): 309–320.
PubMed Abstract | **Publisher Full Text**

Kute V, Ramesh V, Shroff S, *et al.*: **Deceased-donor organ transplantation in India: current status, challenges, and solutions.** *Exp. Clin. Transplant.* 2020; **18**(Suppl 2): 31–42.
PubMed Abstract | **Publisher Full Text**

Loughery C, Zhang N, Smith AH, *et al.*: **Organ donation attitudes and practices among older adults participating in evidence-based health programs.** *Arch Transplant.* 2018; **2**: 1.

Mekahli D, Liutkus A, Fargue S, *et al.*: **Survey of first-year medical students to assess their knowledge and attitudes toward organ transplantation and donation.** *Transplantation proceedings.* Elsevier; 2009, March; (Vol. **41**(No. 2): pp. 634–638).
Publisher Full Text

Meena P, Kute VB, Bhargava V, *et al.*: **Social media and organ donation: Pros and cons.** *Indian J. Nephrol.* 2023; **33**(1): 4–11.

Mithra P, Ravindra P, Unnikrishnan B, *et al.*: **Perceptions and attitudes towards organ donation among people seeking healthcare in tertiary care centers of coastal South India.** *Indian J. Palliat. Care.* 2013; **19**(2): 83–87.
PubMed Abstract | **Publisher Full Text** | **Free Full Text**

Mohan L, Thanga T, Selvam P: **Perspective on organ donation in India: a comprehensive review.** *J. Community Heal Manag.* 2020; **7**(3): 73–76.
Publisher Full Text

Mohan M, Tandon K: **Mall Management: An analysis of customer footfall patterns in Shopping Malls in India.** *Int. J. Sci. Res. Pub.* 2015; **5**(3): 1–15.

Morgan S, Miller J: **Communicating about gifts of life: The effect of knowledge, attitudes, and altruism on behavior and behavioral intentions regarding organ donation.** *J. Appl. Commun. Res.* 2002; **30**(2): 163–178.
Publisher Full Text

Meier DE, Schulz K, Kuhlencordt R, *et al.*: **Effects of an educational segment concerning organ donation and transplantation.** *Transplant. Proc.* 2000; **32**: 62–63.
PubMed Abstract | **Publisher Full Text**

Morgan SE, Miller J: **Beyond the organ donor card: The effect of knowledge, attitudes, and values on willingness to communicate about organ donation to family members.** *Health Commun.* 2001; **14**: 121–134.

National Organ and Tissue Transplant Organisation: **Act and rules of transplant of human organs act (THOA).**
Reference Source

Narendran V, Padmavathi S, Sangeetha S, *et al.*: **Knowledge, awareness and attitude of eye donation among non-clinical staff of a tertiary eye hospital in South India.** *Indian J. Ophthalmol.* 2022; **70**(10): 3490–3495.
PubMed Abstract | **Publisher Full Text** | **Free Full Text**

Nayak S, Nayak VC: Dataset. [Dataset]. *figshare.* 2023.
Publisher Full Text

Patthi B, Jain S, Singla A, *et al.*: **Beliefs and barriers for organ donation and influence of educational intervention on dental students: A questionnaire study.** *J. Indian Assoc. Public Health Dent.* 2015; **13**(1): 58.
Publisher Full Text

Pouraghaei M, Tagizadieh M, Tagizadieh A, *et al.*: **Knowledge and attitude regarding organ donation among relatives of patients referred to the emergency department.** *Emergency.* 2015; **3**(1): 33–39.
PubMed Abstract

Ramadurg UY, Gupta A: **Impact of an educational intervention on increasing the knowledge and changing the attitude and beliefs towards organ donation among medical students.** *J. Clin. Diagn. Res.* 2014; **8**(5): JC05–JC07.
PubMed Abstract | **Publisher Full Text**

Rigdon EE, Ringle CM, Sarstedt M, *et al.*: **Assessing heterogeneity in customer satisfaction studies: Across industry similarities and within industry differences.** *Adv. Int. Mark.* 2011; **22**: 169–194.

Rithalia A, McDaid C, Suekarran S, *et al.*: **Impact of presumed consent for organ donation on donation rates: a systematic review.** *BMJ.* 2009; **338**: a3162.
PubMed Abstract | **Publisher Full Text** | **Free Full Text**

Sarveswaran G, Sakthivel MN, Krishnamoorthy Y, *et al.*: **Knowledge, attitude, and practice regarding organ donation among adult population of urban Puducherry, South India.** *J. Educ. Health Promot.* 2018; **7**.

Saleem T, Ishaque S, Habib N, *et al.*: **Knowledge, attitudes and practices survey on organ donation among a selected adult population of Pakistan.** *BMC Med. Ethics.* 2009; **10**: 1–12.
Publisher Full Text

Sengul S, Sahin MK: **The willingness and attitudes of medical students regarding organ donation and transplantation: a cross-sectional study from Turkey.** *Rev. Assoc. Med. Bras.* 2022;

68: 1631–1637.
PubMed Abstract | **Publisher Full Text** | **Free Full Text**

Sawhney C, Kaur M, Lalwani S, *et al.*: **Organ retrieval and banking in brain dead trauma patients: Our experience at level-1 trauma centre and current views.** *Indian J. Anaesth.* 2013; **57**(3): 241–247.
PubMed Abstract | **Publisher Full Text**

Spigner C, Weaver M, Cardenas V, *et al.*: **Organ donation and transplantation: ethnic differences in knowledge and opinions among urban high school students.** *Ethn. Health.* 2002; **7**(2): 87–101.
PubMed Abstract | **Publisher Full Text**

Teoh JYC, Lau BSY, Far NY, *et al.*: **Attitudes, acceptance, and registration in relation to organ donation in Hong Kong: a cross-sectional study.** *Hong Kong medical journal = Xianggang yi xue za zhi.* 2020; **26**(3): 192–200.
PubMed Abstract | **Publisher Full Text**

The Transplantation of the Human Organs Act: 1994. ([Last accessed on March 16, 2023).
Reference Source

Thompson TL, Robinson JD, Kenny RW: **Family conversations about organ donation.** *Prog. Transplant.* 2004; **14**(1): 49–55.
Publisher Full Text

Topic I, Brkljacic T, Grahovac G: **Survey of medical students about attitudes toward organ donation.** *Dialysis & transplantation.* 2006; **35**(9): 571–574.
Publisher Full Text

Tamuli RP, Sarmah S, Saikia B: **Organ donation–"attitude and awareness among undergraduates and postgraduates of North-East India".** *J. Family Med. Prim Care.* 2019; **8**(1): 130.
Publisher Full Text

Thangavel P, Pathak P, Chandra B: **Millennials and Generation Z: A generational cohort analysis of Indian consumers.** *BIJ.* 2021; **28**: 2157–2177.
Publisher Full Text

U.S. Department of Health and Human Services, Health Resources and Services Administration, Healthcare Systems Bureau: *National Survey of Organ Donation Attitudes and Behaviors.* Rockville, MD: U.S. Department of Health and Human Services; 2013.
Reference Source

Vijayalakshmi P, Sunitha TS, Gandhi S, *et al.*: **Knowledge, attitude and behaviour of the general population towards organ donation: An Indian perspective.** *Natl. Med. J. India.* 2016; **29**(5): 257–261.
PubMed Abstract

Vincent BP, Randhawa G, Cook E: **Barriers towards deceased organ donation among Indians living globally: an integrative systematic review using narrative synthesis.** *BMJ Open.* 2022; **12**(5): e056094.
PubMed Abstract | **Publisher Full Text** | **Free Full Text**

Wasko MM, Faraj S: **Why should I share? Examining social capital and knowledge contribution in electronic networks of practice.** *MIS Q.* 2005; **29**: 35–57.
Publisher Full Text

Watts G: **Joseph Murray: innovative surgeon and pioneer of transplantation.** *Lancet.* 2011; **377**(9770): 987.
Publisher Full Text

Wu AMS, Tang CS: **Solving the dilemma: family communica-tion about organ donation among Chinese, Japanese, and Cau-casian American College students.** *J. Appl. Soc. Psychol.* 2009; **39**(7): 1639–1659. (1) (PDF) A Systematic Literature Review and Research Agenda for Organ Donation Decision Communication. [accessed Dec 22 2022].
Publisher Full Text | **Reference Source**

World Health Organization: **Human organ and tissue transplantation.** 2020.
Reference Source

World Health Organization: **The International report on Organ Donation and Transplantation Activities.** 2022.
Reference Source

Open Peer Review

Current Peer Review Status: ✓ ✓

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Version 2

Reviewer Report 15 June 2023

https://doi.org/10.5256/f1000research.148586.r176798

✓ **Alok Atreya** (iD)

Lumbini Medical College, Palpa, Nepal

Dear Authors,

Thank you for your detailed response to my feedback. I appreciate the efforts you have made to address the concerns and improve the manuscript. Based on your responses, I believe the manuscript has significantly benefitted and is now ready for indexing.

I agree with the changes you have made to the introduction section, including the incorporation of the research objective derived from the research questions. This addition helps to clarify the aims and objectives of your study.

Regarding the sampling technique, I appreciate the clarification provided on the selection of the four malls. The explanation of using footfalls as a metric to identify popular malls and reflect homogeneity in tenant mix and visitors to the mall is appropriate. Additionally, the mention of employing a simple random technique to identify the malls in Dakshina Kannada and Udupi districts for data collection further enhances the transparency and rigour of your methods.

I am also satisfied with the explanation you provided for the sample size calculation. The use of the proposed approach by Hair, Sarstedt, Ringle, and Gudergan (2017) to determine the sample size based on the number of items on the rating scale multiplied by 10 is appropriate. Your justification for considering 10% of the unanswered sample and resulting in a final sample size of 259 participants is sound.

I appreciate your efforts in providing additional details on the questionnaire used for data collection. The inclusion of construct-wise details in the Data Gathering section is helpful. Moreover, the fact that the detailed questionnaire is publicly available through Figshare, with the DOI mentioned in the manuscript, ensures transparency and allows for future replication and validation of the instrument. The mention of the reliability and validity of the scales being assessed through the pilot study, with the results presented in the "Data Collection" section, further strengthens the robustness of your methods.

Regarding the choice of statistical analysis methods, I understand and support your decision to use SmartPLS4 for PLS-SEM analysis, considering the blend of probability and nonprobability sampling techniques and the presence of a mediator in your conceptual framework. The mention of jamovi as an alternative free-source software for structural equation modelling provides valuable information for researchers who may want to replicate or build upon your study using different analytical tools.

I am glad to see that you have addressed the biases by presenting them as limitations of your research work in the Results section. By acknowledging these limitations, you demonstrate a clear understanding of the potential impact on the generalizability and interpretation of your findings.

Lastly, I appreciate the improvements made in the discussion section, particularly the mention of cross-sectional research design and the suggestions for future research directions, including experimental and qualitative research. The clarification on the generalizability of the results within the defined scope and research setting, as well as the suggestion for future research from a geographical perspective, adds value to your study.

In summary, I believe the manuscript has significantly improved based on your responses. You have adequately addressed the concerns raised, providing additional information, clarification, and justifications where needed. Given the changes made, I am pleased to approve the manuscript for indexing.

Once again, I commend you on your diligent revisions, and I look forward to seeing your research contribute to the field of organ donation in India.

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: My area of research is Forensic Medicine & Toxicology. Other broad areas of interest are injury, violence, trauma, abuse, medical ethics, medical education, forensic pathology, forensic anthropology, criminal law, etc.

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard.

Reviewer Report 12 June 2023

https://doi.org/10.5256/f1000research.148586.r176799

✓   **Soumya Swaroop Sahoo** 🆔

Department of Community & Family Medicine, All India Institute of Medical Sciences, Bathinda, Punjab, India

Madhur Verma

All India institute of medical sciences Bathinda, Bathinda, India

I thank the authors for their detailed response to the reviewer's comments. The authors have made the necessary changes in the manuscript in line with the suggestions.

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: My areas of research are Non-Communicable Diseases (Cancer, Diabetes), HIV, Tuberculosis, One Heath, and Health systems.

We confirm that we have read this submission and believe that we have an appropriate level of expertise to confirm that it is of an acceptable scientific standard.

Version 1

Reviewer Report 16 May 2023

https://doi.org/10.5256/f1000research.144514.r171950

? **Soumya Swaroop Sahoo** (iD)

Department of Community & Family Medicine, All India Institute of Medical Sciences, Bathinda, Punjab, India

Madhur Verma

All India institute of medical sciences Bathinda, Bathinda, India

Title:
- The study was conducted in two districts of India, so writing it as attitude towards Organ Donation in India is misleading. The authors can write as " South India"

Abstract:
- The abstract is structured and well articulated. However, they need to mention the actual numbers and percentages in the results section rather than "*Awareness of organ donation law in India is low on specific issues and respondents from the health science & medicine discipline scored better on knowledge about organ donation. The findings show that most participants had heard about organ donation and had a favourable attitude toward it.*"

Introduction:
- The introduction is extensive and aptly describes the background and rationale of the study.

Methods:
- The sample size calculation with formula needs justification.

- The post positivism approach needs to be explained more to justify its use here.

- How were the malls selected in the two cities? Justify.

- Since apparently malls have visitors from urban population, it should be mentioned in the limitations.

Results:
- The results are well described with the appropriate use of statistical tests.

- *"A "chi-square test of independence" displayed that there was a significant association between education and awareness of the OTD act in India X2 (1, N = 259) = 6.980, p = 0.06)."* - How was this significant as a p-value less than 0.05 is considered significant?

Discussion:
- The discussion might include more studies conducted on the Indian population in recent times.

- Biases affecting the study results should be mentioned in the limitations.

Overall:

The manuscript is well written with a comprehensive literature review, good statistical analysis, and clear interpretation of the results. However, the gaps and suggestions outlined above might be given consideration.

Is the work clearly and accurately presented and does it cite the current literature?
Yes

Is the study design appropriate and is the work technically sound?
Yes

Are sufficient details of methods and analysis provided to allow replication by others?
Yes

If applicable, is the statistical analysis and its interpretation appropriate?
Yes

Are all the source data underlying the results available to ensure full reproducibility?
Yes

Are the conclusions drawn adequately supported by the results?
Yes

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: My areas of research are Non-Communicable Diseases (Cancer, Diabetes), HIV, Tuberculosis, One Heath, and Health systems.

We confirm that we have read this submission and believe that we have an appropriate level

of expertise to confirm that it is of an acceptable scientific standard, however we have significant reservations, as outlined above.

Author Response 22 May 2023

smitha nayak

We thank you for your valuable feedback. We have discussed the feedback and incorporated changes, wherever necessary, in the manuscript. We present our response to your comments below:

1. Abstract: The quantified output is presented in the abstract and changes are incorporated in the manuscript. This has added value and brought clarity to the manuscript.

Methods :

2. Sample size calculation. The sample size was calculated based on the number of items on the rating scale multiplied by 10 as proposed by Hair, Sarstedt,Ringle, & Gudergan(2017). The same has been incorporated in the manuscript and added to the reference list.(Hair JF Jr, Sarstedt M, Ringle CM, et al.: Advanced issues in partial least squares structural equation modeling. Sage Publications; 2017)

3. Post positivism approach: The philosophical assumption in the backdrop of Post positivism approach is that consent from the participants has been taken to uphold the nature of research ethics and it is primarily quantitative nature of inquiry. Hence, we have undertaken this research in Post positivism approach. The same has been incorporated in the manuscript.

4. Malls selection: Footfalls is a metric that indicates the popularity of the mall and also reflects homogeneity in tenant mix and visitors to the mall (Mohan and Tandon, 2015). Hence 4 malls in each district with the highest footfalls were identified to undertake the survey. Further, a simple random technique was employed to identify the malls for data collection.

Mohan, M., & Tandon, K. (2015). Mall Management: An analysis of customer footfall patterns in Shopping Malls in India. *International Journal of Scientific and Research Publications*, *5*(3), 1-15.

5. Limitations: Since apparently malls have visitors from the urban population, it should be mentioned in the limitations.
This has been addressed and mentioned in the limitations section of the manuscript.

6. Results:
The results are well described with the appropriate use of statistical tests.
 "A "chi-square test of independence" displayed that there was a significant association between education and awareness of the OTD act in India $X2$ (1, N = 259) = 6.980, p = 0.06)."
- How was this significant as a p-value less than 0.05 is considered significant?
Due apologies for the typo error. We have incorporated the changes.

7. Overall Structure :
The purpose of the research is strengthened in the manuscript.

We hope we have incorporated/justified the revisions made in the manuscript.

Competing Interests: NA

Reviewer Report 12 May 2023

https://doi.org/10.5256/f1000research.144514.r171952

? **Alok Atreya** (iD)
Lumbini Medical College, Palpa, Nepal

Abstract:
The abstract is well-structured, presenting the background, methods, and results. It provides a clear overview of the study's objectives and findings.

Introduction:
The manuscript provides a clear and detailed introduction to the topic of organ donation and transplantation, including the current state of affairs, challenges faced, and existing initiatives undertaken by governments and NGOs to promote organ donation.

Methodology:
The methodology section is also comprehensive, describing the study design, data gathering, and data analysis techniques used. However, there are some areas where the manuscript could benefit from improvement or clarification.

1. The manuscript would benefit from a clear and concise research question, which is missing from the introduction section. While the overall goal of the study is clear, a specific research question would help to focus and guide the study and make the authors' aims and objectives more explicit.

2. The sampling technique used could be improved. The authors state that a purposive sampling approach was adopted due to the absence of a sampling frame, but it is unclear how the four shopping malls were selected. It would have been better to state clearly the criteria for selecting these malls and why they were chosen. Additionally, the sample size calculation could be explained more clearly and justified in the methods section.

3. The authors could provide more detail on the questionnaire used for data collection. While the items included in the questionnaire are briefly described in the methods section, a

clearer explanation of how the questionnaire was developed and validated would help to establish its reliability and validity.

4. The authors should provide more detail on the data analysis methods used. While it is stated that SmartPLS4 and jamovi were used for data analysis, the statistical tests used, and their justification should be described in more detail.

Results:
This section is well-written and provides a comprehensive analysis of the research study findings. The authors use appropriate statistical methods to analyze the data and report their results in a clear and concise manner. However, it is essential to note that the manuscript section does not provide information on the sampling strategy used to select the participants, which can impact the generalizability of the results. Additionally, the authors do not mention any potential biases that may have affected the results, such as response bias or social desirability bias.

Discussion:
There are also some limitations to the study that need to be considered. The cross-sectional research design can limit the ability to establish causal relationships or determine changes over time. Moreover, the study participants were only from urban areas, so the findings may not be generalizable to the entire population. Lastly, the manuscript did not provide detailed information on the sample size or the sampling procedure, which makes it difficult to evaluate the representativeness of the sample or the potential for bias.

In General:
The manuscript has several strengths, including a clear and concise writing style, a comprehensive literature review, and a well-organized presentation of the study results. The authors also make some important recommendations for future research, including exploring the knowledge, attitudes, and intentions of organ donation across different generations and investigating the reasons for the low donation rates in India.

Overall, the manuscript is well-written and provides valuable insights into the knowledge, attitudes, and intentions of organ donation in India. However, the limitations of the study should be considered, and future research should address these limitations to build on the findings presented in this manuscript.

Is the work clearly and accurately presented and does it cite the current literature?
Yes

Is the study design appropriate and is the work technically sound?
Yes

Are sufficient details of methods and analysis provided to allow replication by others?
Yes

If applicable, is the statistical analysis and its interpretation appropriate?
Yes

Are all the source data underlying the results available to ensure full reproducibility?

Yes

Are the conclusions drawn adequately supported by the results?
Yes

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: My area of research is Forensic Medicine & Toxicology. Other broad areas of interest are injury, violence, trauma, abuse, medical ethics, medical education, forensic pathology, forensic anthropology, criminal law, etc.

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however I have significant reservations, as outlined above.

Author Response 14 Jun 2023
smitha nayak

Thank you for the feedback provided for our manuscript; each has significantly added value to it. We have responded to each one of them and presented our responses below:

1. Introduction: no changes suggested

2. Methodology:

a. The research objective derived from the research questions has been incorporated in Pg 4 of the manuscript. The need for the study has been included as follows: "Hence it is imperative to assess the current knowledge level, attitude, and willingness to register for organ donation among various age groups and whether it varies across the population with the discipline of education"

b. Sampling: Clarity on each point and the appropriate changes incorporated in the manuscript
Mall identified: "Footfalls are a metric that indicates the popularity of the mall and also reflects homogeneity in tenant mix and visitors to the mall (Mohan and Tandon, 2015). Hence 4 malls in each of the districts having the highest footfalls were identified to undertake the survey. Further, a simple random technique was employed to identify the malls in Dakshina Kannada and Udupi districts for data collection

c: Sample size calculation: "The sample size was calculated based on the number of items on the rating scale multiplied by 10 as proposed by Hair, Sarstedt, Ringle, & Gudergan(2017). Hence, The sample size was determined by multiplying the number of rating scale elements by ten [15] i.e. 15*10 = 150. Considering 10% of the unanswered sample (i.e.15) gives rise to 165 (150 + 15 = 165). Finally, 259 participant data were collected."

3: Questionnaire: Construct wise details have been presented in the Data Gathering section

of the manuscript. The items of each construct (detailed questionnaire) is uploaded in Figshare, hence publicly available. The DOI of the same has been mentioned in the manuscript.
The reliability and validity of the scales was done through the pilot study, the results of which are presented in the "Data Collection" section of the manuscript.

4 PLS: as we have opted for a blend of probability and nonprobability sampling techniques, and the presence of a mediator in the conceptual framework, PLS-SEM was the tool chosen against Jamovi or AMOS.

"To test the hypotheses and perform the mediation analysis, the statistical package SmartPLS4 (RRID: SCR 022040) was used. PLS-SEM is becoming more popular as a statistical package due to its versatility and dependability in analyzing composite and empirical studies. Structural Equation Modelling performed in this study can also be undertaken by using jamovi (RRID:SCR_016142), which is a free source software."

5. Results: The biases are presented as limitations of the research work undertaken.

6. Discussion: Cross section research design: has been employed in the study. Experimental and Qualitative research has been suggested as a direction for future research. The results are generalizable as the scope and research setting are justified in the manuscript. Future research is suggested from a geographical perspective of the study.

Competing Interests: No competing interests were disclosed.

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