UMSHA Press

Original Article

Assessment of Organ Donation Intention Among Employees Based on the Theory of Planned Behavior: Application of Structural Equation Modeling

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Abstract

Background: Organ transplantation is one of the options to increase the life expectancy and quality of life (QOL) of patients waiting on the organ transplant list. The lack of body parts for transplants remains a worldwide concern. This study was designed and implemented to assess organ donation intention among the staff of government and non-government offices in Qom based on the theory of planned behavior (TPB).

Methods: Using stratified random sampling, this cross-sectional and analytical study was conducted on 440 employees in Qom, Iran, in 2022. The data collection instrument was a researcher-designed questionnaire, including demographic characteristics, possession of an organ donation card or blood donation history, and constructs of the TPB. The data were analyzed using descriptive statistics, the Pearson correlation coefficient, multiple regression analysis, and structural equation modeling.

Results: The mean ± standard deviation age of participants was 38.21 ± 3.6. The results showed that 29.2% of participants (n = 116) had a signed blood donation card, and 107 participants (27%) had a blood donation history. The structural model fits the data well [$\chi^2/df = 2.84$, $P < 0.001$), CFI = 0.916, GFI = 0.902, RMSEA = 0.053]. The TPB constructs could predict 75% of the variance of the behavioral intention ($P < 0.001$). Finally, no statistically significant relationship was found between knowledge and intention to donate organs ($\beta = 0.003$, $P = 0.93$).

Conclusion: The result of the regression analysis of the relationship between TPB variables and organ donation intention indicated that perceived behavioral control (PBC) had a great influence on the organ donation intention of government and non-government employees.

Keywords: Behavioral intention, Organ donation, Theory of planned behavior, Structural equation modeling

Introduction

Organ transplantation is considered the treatment of choice for patients with end-stage organ dysfunction. This method improves the quality of life (QOL) and increases the life expectancy of organ recipients. Due to the increasing prevalence of chronic diseases worldwide, the need for organ transplantation has increased significantly (1,2). The ideal solution to reduce the mortality rate and improve the QOL is to replace lost organs with healthy organs through the organ transplantation of people who are at the end of life (3–5). Today, despite remarkable advances in organ transplant technology, one-third of transplant patients still die while waiting for organ donation. This mortality rate occurs when the number of organ donors appears to be insufficient. According to the Global Report on Organ Donation and Transplantation (WHO-GODT,

2021), only a small fraction, perhaps less than 15% of these organs, is available, representing 10% of global needs, which is currently the focus of research and is considered a global problem (6,7). It is estimated that approximately 5–7% of people on the transplant list die before receiving an organ transplant (8). According to the existing data, more than 116 000 people were on the transplant waiting list in America in 2017 (9), and 50 000 people are added to the list each year, while fewer than 30 000 transplants are performed in the United States (10). In Iran, 25,000 people were on the organ transplant waiting list in 2014, and there have been 7–10 more people every day (11). According to the World Organ Donation and Transplantation Report (2021), 36 100 cases of organ donation were reported, demonstrating a decrease of 17.6% compared to 2020 (12). However, the lack of organs for transplant left an unresolved global question in most countries around the world, especially in Asian countries (4).

is Improvement in the number of organ donations (13) and increase in the number of people registering to receive organ donation cards are among the most important ways that reduce the gap between supply and demand for organ donation and transplantation (14). Organ donation is the most serious move in the organ transplant process, and many factors influence this issue. Research results demonstrate that organ donation is a complex issue with many factors (15). The decision-making process in such matters relies on strong cognitive foundations such as perceptions of behavioral control and subjective norms (SN) (16, 6). Awareness and available information about organ donation, religious factors, fear, and prejudice can influence the intention to donate organs. In addition, organ donation is influenced by organ donor specifications such as age, gender, educational level, and income level, as well as culture, religion, and social attitudinal factors (17,18). A favorable approach to organ donation can be formed by increasing knowledge about organ donation. Therefore, health science professionals and religious authorities play important roles in organ donation intentions and behavior (19).

Considering that different factors can influence organ donation intention in different cultural and social contexts, there is a need to predict these factors within the framework of behavioral theories and models (11). In the analysis of the effective factors of the members, studies have used the theory of planned behavior (TPB) to understand and identify these factors (20). This theory was developed by Ajzen in 1991 and presented as the TPB. Based on this theory, attitude constructs, SN, and perceived behavioral control (PBC) predict behavioral intentions. Furthermore, behavior is predicted directly by intentions and indirectly by PBC. The determinant of a particular behavior is the intention to perform that behavior (21). Attitude is a person's favorable or unfavorable view of a particular behavior. SN is a person's mental perception of approval or disapproval of another person's behavior. PBC is the degree of ease or difficulty of a particular behavior (22). Behavioral intention is defined as a person's desire and motivation to perform a behavior (23). The behavior of organ donation and its influencing factors seem to be important in every demographic group because there are many influencing factors such as culture, economics, attitudes, and beliefs. Furthermore, insufficient information about the imagination or emotions influences people's decisions to donate organs (24).

Materials and Methods
Study Design and Setting
This cross-sectional study was conducted on 440 staff of government and non-government offices in Qom, Iran, from July 1 to October 30, 2022.

Sampling
The method of sampling was based on the objectives of the research and the use of a stratified random sampling method. The research community included the staff of government and non-government offices in Qom. For this purpose, all government and non-government offices were considered one class, and several samples proportional to the number of employees present in it were randomly selected from each class (office). Therefore, to calculate the sample size concerning the studies of Barcellos et al (25) and Ferguson et al (26), the ratio estimation formula with the following presuppositions was used, and the sample examined in this study was estimated to be 440 people ($P = 46\%$, $\alpha = 0.05$, $d = 0.05$, attrition of 15%). The criteria for entering the study included employees of government and non-government offices, the delivery of informed consent to participate, and the lack of having a specific disease due to which organ donation is impossible or harmful to the person. The exclusion criteria were not being satisfied with participating in the research and having a specific disease.

Data Collection Instruments and Strategy
A researcher-developed questionnaire, based on previous studies (11,27), was used to collect data, and its validity and reliability were subsequently examined. For further, easier, and faster access by the participants to the questionnaire, the link and QR code of the questionnaire were shared through the organizational automation network and the government network. The questionnaire was also completed by self-completion. Questions related to demographic characteristics, blood donor history, and organ donation in relatives were included in the first part of the questionnaire. The second part contained awareness items in the general field of organ donation and transplantation, as well as the rules and regulations of organ donation (awareness questions were classified into three scales [yes, no, and I don't know], and one score was given for the yes option, and zero scores were given otherwise). The third part contained questions based on TPB constructs. Questions about religious beliefs about organ donation were raised in the final part. For TPB

structures, the Likert-type scale was utilized in different degrees, from 5 agree to 1 completely disagree. The structures included attitudes (donation is a member of humanitarian and God-friendly work), religious beliefs (I believe that organ donation is interfering with God's destiny), and SN (Many people who are important and valuable to me expect me to receive an organ donation card). The other structures were PBC (Even if my family opposes my organ donation, I prefer to have an organ donation card) and behavioral intention (I plan to get an organ donation card in the next month).

Data Analysis

All analyses were performed using SPSS, version 23. Descriptive statistics were presented as means ± standard deviations (SD) and frequencies (percentages). Regression analysis was used to assess the effect of variables on behavioral intention. Factors associated with organ donation intention were assessed using structural equation modeling (SEM). The model fit was assessed to determine the "goodness of fit" using two highly important indicators, including the chi-square to the degrees of freedom and the root mean square error of approximation (RMSEA). A P value of less than 0.05 was considered statistically significant.

Results

Demographic specifications are presented in Table 1. Overall, 396 (out of 440) participants participated in this study (a 10% non-response rate). The average age was

Table 1. Demographic Characteristics of Participants (n = 396)

Demographic Characteristics		Number	Percent
Age (year)	20–30	90	22.7
	31–40	137	34.6
	41–50	142	35.9
	≥50	27	6.8
Gender	Male	202	51.0
	Female	194	49.0
Marital status	Single	291	26.5
	Married	105	73.5
Educational status	Associate degree	3	.8
	B.Sc.	52	13.1
	M.Sc. and Ph.D.	341	86.1
Possession of an organ donation card	No	280	70.8
	Yes	116	29.2
Blood donation	No	289	73
	Yes	107	27
Organ transplantation in first relatives	No	387	97.7
	Yes	9	2.3
Organ donation in first relatives	No	385	97.2
	Yes	11	2.8
Organ donation in second relatives	No	373	94.2
	Yes	23	5.8

38.21 ± 3.6 years. Among all the participants, 116 people (29.2%) had an organ donation card. Based on the data, 107 of the participants (27%) had a history of donating blood, and 2.3% of them reported a history of organ transplantation in first-degree relatives.

Table 2 provides the mean and score range of TPB constructs. According to the results, the PBC structure obtained the highest percentage of the average score, accounting for 68.5% of the maximum achievable score, and almost 50% stated that they do not know about the organ donation law.

Table 3 presents the findings of the Pearson correlation analysis. Based on the data, there was a correlation between all TPB constructs and organ donation intention. Among TPB constructs, PBC demonstrated the strongest positive and significant correlation with organ donation intention ($r = 0.759$, $P < 0.001$). Further, two significant positive correlations were observed between constructs, namely, organ transplantation in first relatives with organ donation in first relatives ($r = 0.38$, $P < 0.001$) and organ donation in second relatives with organ donation in first relatives ($r = 0.22$, $P < 0.001$).

According to the findings of multiple linear regression (Table 4), an increase of one unit in the PBC increased the probability of intention to donate organs by 0.71 ($\beta = 0.71$). According to the obtained data in Table 4 and Figure 1, the TPB constructs could predict 75% of the variance of the intention to donate organs ($P < 0.001$). The results demonstrated no statistically significant relationship between knowledge and the intention to donate organs ($\beta = 0.003$, $P = 0.93$).

Table 5 provides the standardized path coefficients between the variables of the model based on SEM. According to the results, PBC contributed more to predicting organ donation intention ($\beta = 0.52$). The model fit is generally acceptable. Therefore, two highly important indicators were included in the model ($\chi^2/df = 2.84$ and RMSEA = 0.053). The goodness of fit index (GFI = 0.902), adjusted goodness of fit (AGFI = 0.878), and comparative of fit index (CFI = 0.916) were also reported as acceptable (CMIN = 1366,720, DF = 480, TLI = 0.908, NFI = 0.877).

Discussion

Regarding the purpose of this study to assess the intention

Table 2. Means, Standard Deviations, and Score Ranges of the TPB Constructs (n = 396)

Variables	Mean	Standard Deviation	Score Range	Mean Percentage
Knowledge	11.5	3.84	1–22	50
Religious beliefs	11.3	2.97	5–25	31.5
Attitude	46.4	5.64	16–70	57.8
Subjective norms	15.9	4.81	6–30	51.3
Perceived behavioral control	18.7	5.04	5–25	68.5
Intention	10.05	3.40	3–15	58.3

Note. Calculation: (Mean–Minimum) ÷ (Maximum–Minimum) × 100.

Table 3. Pearson Correlation Coefficients Between Constructs of TPB and Demographic Characteristics (n = 396)

Variables		1	2	3	4	5	6	7	8	9
Organ transplantation in first relatives	Correlation	1								
	P value	-								
Organ donation in first relatives	Correlation	0.387	1							
	P value	0.001**	-							
Organ donation in second relatives	Correlation	0.107	0.221	1						
	P value	0.033*	0.001**	-						
Religious beliefs	Correlation	-0.073	0.036	0.045	1					
	P value	0.147	0.469	0.369	-					
Knowledge	Correlation	0.110	0.035	0.055	0.116	1				
	P value	0.028*	0.489	0.369	0.021*	-				
Attitude	Correlation	-0.077	-0.075	-0.029	0.008	0.148	1			
	P value	0.128	0.136	0.639	0.113	0.001	-			
Subjective norms	Correlation	0.070	-0.124	0.024	0.080	0.116	0.367	1		
	P value	0.164	0.014*	0.639	0.113	0.021	0.001	-		
Perceived behavior control	Correlation	-0.037	-0.013	-0.015	-0.272	0.201	0.496	0.363	1	
	P value	0.465	0.792	0.763	0.001**	0.001**	0.001**	0.001**	-	
Intention	Correlation	-0.106	-0.068	-0.025	-0.207	0.159	0.411	0.313	0.759	1
	P value	0.036*	0.177	0.616	0.001**	0.001**	0.001**	0.001**	0.001**	-

Note. TPB: Theory of planned behavior.
**Correlation is significant at the 0.01 level
*Correlation is significant at the 0.05 level

Table 4. Predictors of the Intention to Organ Donation Based on the Multiple Linear Regression (n = 396)

Variables	B	SE	Beta	*P* Value	95% CI	
					Lower Limit	Upper Limit
Religious believes	-0.018	0.041	-0.016	0.658	-0.099	0.062
Attitude	0.025	0.024	0.042	0.284	-0.021	0.072
Subjective norms	0.028	0.026	0.040	0.279	-0.023	0.079
Perceived behavior control	0.481	0.028	0.712	0.001	0.425	0.536
Knowledge	0.003	0.030	0.003	0.920	-0.057	0.063

Note. CI: Confidence interval; SE: Standard error.
Adjusted R^2 = 0.564, R = 0.755, *P* < 0.001.

Table 5. Regression Coefficients Obtained Using Structural Equation Modeling for the Main Constructs of TPB (n = 396)

Independent Variable	Relationship	Dependent Variable	Estimate	SE	t	*P* Value
Attitude	→	Intention	0.25	0.086	3.87	<0.001
Subjective norms	→	Intention	0.04	0.048	1.37	0.17
Perceived behavior control	→	Intention	0.52	0.064	8.45	<0.001
Religious beliefs	→	Intention	0.04	0.055	1.03	0.30

Note. Standard error; TPB: Theory of planned behavior.

to donate organs among employees of government and non-government offices based on the TPB model and using SEM, the findings showed a positive and direct relationship between the constructs of TPB regarding the intention to donate organs. The results proved that only 29.2% of the participants had an organ donation card, 27% of the participants had a history of donating blood, and almost 50% indicated that they did not know about the organ donation law. Consistent with the present findings, Khoshravesh et al reported that only 20% of them had an organ donation card (11). In line with the present findings,

the results of Aksoy et al demonstrated that 98.6% of the participants had no organ donation card, and 64.6% were unfamiliar with the organ transplant law (28). Gaining knowledge can change people's opinions about organ donation. Therefore, educational programs about organ donation can be an important way to fill the knowledge gap, better understand the cultural or religious content, and make your own choice (29). It seems that having sufficient knowledge and awareness about organ donation as an appropriate and necessary human behavior increases the probability of organ donation intention.
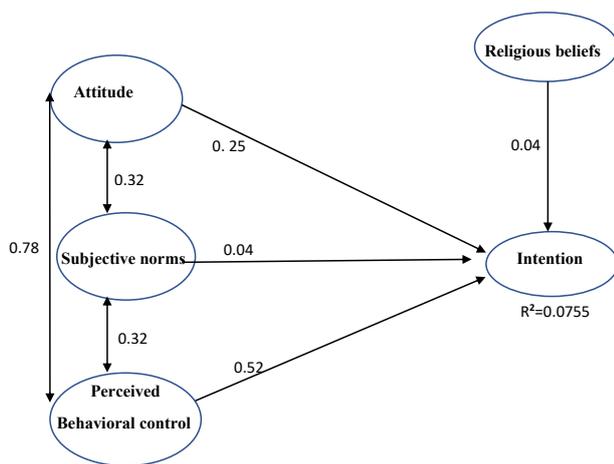
Figure 1. Structural Equation Model of Planned Behavior on Organ Donation Intention. *Note*. RMSAE: Root mean square error of approximation; χ2/df: Relative chi-square; DF: Degree of freedom; CFI: Confirmatory factor analysis; GFI: Goodness of fit index; TLI: Tucker-Lewis Index; NFI: Normed fit index; AGFI: Adjusted goodness of fit index. Chi-square: 1366.720, DF: 480; RMSAE: 0.053; χ2/df: 2.84; CFI: 0.916; GFI: 0.902; TLI: 0.908; NFI = 0.877; AGFI: 0.878.

In the current study, the highest mean score obtained in the constructs of TPB belonged to the PBC construct, which was reported as 68.5% (Score range of 5–25 and mean score of 18.7 ± 5.04), indicating that the control belief of the participants regarding the intention to donate organs even in difficult conditions is at the optimal level. In line with the current findings, the results of Moradian indicated that after the attitude construct, PBC had the highest mean score among the TPB constructs (30). This result conforms to the findings of Rocheleau (31). It seems that the continuity of PBC, or self-efficacy, in addition to being effective in blood donation, also has an effect.

Consistent with the hypothesis of this study, the constructs of TPB exhibited positive correlations with intention to donate organs with a *P* value of < 0.05. The results revealed that PBC has the strongest correlation with organ donation intention. Agreeing with the findings of the present study, the results of studies by Aksoy et al (28) and El-Menyar et al (20) confirmed that there was a positive and significant correlation between intention to donate organs and attitude, SN, and PBC. The results of the study by Ghaffari et al (32) match those of the present study. The findings of the study by Rocheleau also indicated that there was a strong and positive correlation between the constructs of the TPB and behavioral intention (31).

In this study, a negative, moderate, and significant correlation was found between religious beliefs and organ donation intention. In line with the results of the present study, the findings of DuBay and colleagues' study showed that religious beliefs are a common barrier to organ donation (33). Contrary to the present study, Lei and colleagues' study demonstrated that religion and culture play a dual role in promoting organ donation, and it is important to understand the positive and negative effects of religion and culture on organ donation (29). Even though the present study was conducted in Qom,

a completely religious and religious city, the degree and type of the correlation between religious beliefs and behavioral intention had a weak and negative correlation, highlighting that religious beliefs and beliefs are not the most important predictors of intention or behavior, and the structure of PBC and self-efficacy, which is interpreted as a person's judgment about his abilities to perform behavior, is the foundation of a person's intention and action.

The TPB suggests that the most proximate determinant of behavior is intention. Intention refers to a person's motivation in the sense of his conscious decision and effort to perform a behavior (34). No positive and strong relationship was observed between attitude and intention to donate organs in this study. In line with this study, the results of Ghaffari et al revealed that attitude toward organ donation is not a strong predictor of organ donation (32). Contrary to the present findings, previous studies established that attitude predicted organ donation behaviors (11,31,35). In contrast to the findings of the current study, the results of studies by Aksoy et al (28) and El-Menyar et al (20) showed that there was a statistically significant relationship between attitude and intention to donate organs.

According to the TPB, the determination of behavioral intention relies on SN, which entails individuals' perceptions of whether important others believe he/she should engage in a particular behavior (21). Our findings confirmed that there was no statistical correlation between SN and the intention to donate body organs. In contrast to the results of this study, the findings of Khoshravesh et al (11) approved that SN had a significant and direct influence on the sponsor's card-signing intention, but the direction of this relationship was a negative predictor of signing a donor card. However, in the study of Ghaffari et al, SN was used as a predictor of intention to donate organs (32). The results of studies by Aksoy et al (28) and El-Menyar et al (20) also indicated that there was a positive statistical correlation between SN and the intention to donate organs.

PBC refers to a person's expectation that the implementation of the behavior is under his control. This variable has a direct relationship with behavioral intention (36). In this study, it was found that intentions had a more pronounced relationship with the perception of behavioral control. Based on the results, the construct of PBC could predict the behavioral intention to donate organs more accurately. PBC with a standardized beta weight of 0.71 was the only and most effective factor in determining and predicting of the intention to donate organs.

Consistent with the current study, previous research (31,37) reported that PBC was the strongest predictor of organ donation intention, suggesting that participants believed in their personal control and ability to donate organs. Conversely, in the study of Khoshravesh et al, the PBC construct did not predict signing the donor card directly (11).

The findings of studies by Aksoy et al (28) and El-Menyar et al (20) revealed that there was a positive statistical relationship between PBC and the intention to donate organs, which is in line with the findings of this study. Similarly, the findings of Ghaffari et al demonstrated that the structure of PBC was the most important predictor of organ donation intention (32). With an increase of one unit in the PBC score, the mean intention score will increase significantly (20).

The standard regression coefficients have shown that TPB could significantly predict organ donation intentions, with a higher value being placed on PBC and its role. According to the results of the path analysis of model fit, the path coefficient related to PBC and attitude toward behavioral intention to donate organs was statistically significant. The concept of PBC contributes more to predicting organ donation intention, which conforms to the results of some studies (26,37).

Based on our results, a complex range of factors can affect a person's willingness and intention to donate organs, especially in specific and religious cultures and beliefs such as Iran. The identification of barriers and facilitators for organ donation and the development of intervention measures to overcome such factors are vital health priorities, considering that there is a significant difference in need as well as intentions and behavior toward organ donation. A limitation of the study is that it was cross-sectional, and the observed correlations do not indicate causation. The popularization of the results is limited because we have not been able to obtain a sufficient sample size, even when using an experimental sampling method for recruiting participants.

Conclusion

Among the constructs of the TPB model, PBC was a positive and strong predictor of organ donation intention. In addition, religious beliefs had a negative and inverse effect on the intention to donate organs. Attitude and PBC showed a statistically significant relationship with donating organs. Moreover, awareness and information alone could not have that much effect on the intention to donate organs. Therefore, the need for more and deeper studies is felt, and it is suggested that the views of people and influential and important groups of society who have a higher level of awareness should be taken into consideration. Perhaps an appropriate strategy to promote organ donation can be devised to positively influence this intention.

Authors' Contribution
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Writing–review & editing: Ehsan Vesali-Monfared, Siamak Mohebbi.

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