

The influence of socioeconomic factors on deceased organ donation in Iran

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INTRODUCTION

Organ donation services are part of modern healthcare; however, globally, there is a large gap between the number of potential recipients on waiting lists and the number of available organs for transplant [1]. Transplantation is a surgical procedure requiring the highest level of scientific

Background: There is a large gap between the number of patients on organ waiting lists and the number of available organs for donation. This study investigated the socioeconomic factors in Iran that influenced decisions for organ donation among the families of brain-dead donors.

Methods: This retrospective cross-sectional study was performed among the families of 333 organ donors in Iran. Two trained researchers interviewed family members about the donor's age, sex, cause of brain death, education level, marital status, number of children, history of addiction, the financial status of the donor's family, and reasons for which they considered refusing organ donation.

Results: The mean age of the donors was 37.23±16.59 years. During 2017–2019, significant differences were found according to income ($P<0.001$), marital status ($P<0.001$), sex ($P=0.04$), and occupation ($P=0.04$). More than half of the organ donors were of low socioeconomic status, and nearly half were the sole income earners of large families. Trauma was the most common cause of death (44.6%). The most common reasons for which the families considered refusing organ donation were unfamiliarity with the concept of brain death, denial, and the expectation of a miracle.

Conclusions: The donor's socioeconomic status and availability of social services, such as insurance coverage, psychological services, and mourning therapy courses, play an important role in organ donation. Adequate support for the deceased's family after organ donation is imperative.

Keywords: Organ donation; Socioeconomic; Brain death; Trauma

standards, but factors such as ethics, values, and personal beliefs play a fundamentally important role in the entire process of donation and transplantation. Therefore, extensive research has been conducted on the public's attitudes towards organ donation, and several factors affecting donation have been identified [2].

Nonetheless, the shortage of organ donation is a glob-

HIGHLIGHTS

- More than half of organ donors from Iran were from low socioeconomic status, and nearly half were sole income earners of large families.
- Adequate psychological and social support for the deceased's family after organ donation is imperative.
- Appropriate planning strategies are essential to advocate for donors' families after donation.

METHODS

A study protocol was approved by the Ethical Committee of Tehran University of Medical Sciences (IR. TUMS. IKHC.REC.1399.45). After the researchers approached the participants and concisely explained the purpose of the study, oral consent was obtained from all participants. All donor families who consented to donation at Sina Organ Procurement Unit (OPU) were invited to participate in this study. We excluded people who were unavailable and unwilling to participate in this study.

This retrospective study was performed among the families of 333 actual donors from 2017 to 2019 in one of the most important OPUs (Sina OPU) in Tehran, Iran. An interview of the donor's family was conducted in all brain-dead cases, and family members were asked about the donor's age, sex, cause of brain death, education level, marital status, number of children, history of addiction, and the financial status of the donor's family. Social workers extracted information on families' socioeconomic status, according to indicators such as income, expenses, living arrangements, and family assets [12]. The remaining information was collected by two trained researchers.

In order to analyze the data via descriptive statistics (frequency, percentage, mean, and standard deviation [SD]) and inferential statistics (chi-square test, analysis of variance), SPSS ver. 16 (SPSS Inc., Chicago, IL, USA) was used. A 95% confidence level and a significance level of 0.05 were considered in the analysis. To determine whether continuous variables had a normal distribution, the Kolmogorov-Smirnov test was used.

RESULTS

From 2017 to 2019, the mean±SD age of the deceased was 37.23±16.59 years (range, 2–72 years), and 227 donors (68.2%) were males. Furthermore, 176 (61.9%) of the donors were married, and 187 (50.2%) had children. Fifty-five donors (16.5%) were illiterate and 154 (46.2%) did not have a diploma. During the year of their death, 143 (42.9%) were the sole income earners of their households. Twenty-three donors (11.9%) had a positive history of addiction.

During 2017–2019, significant differences were found in relation to income ($P<0.001$), marital status ($P<0.001$), sex ($P=0.04$), and occupation ($P=0.04$). However, no statis-

al issue, persisting in all countries [3]. It remains a serious international problem, as the number of patients on the waiting list for organ transplants is continually increasing, while the number of donors is insufficient to meet the demand [4]. Unfortunately, there are fewer than 1,000 annual donations (1,074 cases in 2019, 923 cases in 2018) [5], and more than seven to ten patients die every day as a consequence of waiting for a suitable organ [6].

One of the most important factors in organ donation is the donor's family. Research conducted in different countries has documented that families refused donation in approximately 50% of cases with suitable organs for donation [7]. A key factor responsible for the shortage of solid organs in Iran is the rate of donation consent by the next of kin, which limits the number of organs available for transplant. Improving the rate of consent is one of the most promising routes to increase the number of donated and received organs [8]. The factors affecting attitudes towards organ donation include social norms, social trust, culture, level of education, beliefs, and motivations [9]. The results of a study conducted in a European country showed that the intention to donate was positively associated with higher levels of education [10]. Likewise, another study in Malaysia revealed that income had an inverse association with the willingness to donate organs after death [11].

Further recognition of the factors affecting organ donation can make a significant contribution to this issue, since a precise and accurate understanding of these factors will enable them to be addressed, thereby making organ donation more widespread. Therefore, this study investigated psychological and socioeconomic factors influencing the decision-making of family members of brain-dead patients with regard to organ donation, with the eventual goal of planning interventions and persuading donor families to agree to organ donation.

Table 1. Demographic data of donors

Variable	2017	2018	2019	P-value
Age (yr)				0.70
<10	6 (5.9)	4 (4.3)	10 (7.2)	
≥10 & <20	13 (12.9)	12 (12.9)	20 (14.4)	
≥20 & <30	18 (17.8)	19 (20.4)	19 (13.7)	
≥30 & <40	18 (17.8)	16 (17.2)	24 (17.3)	
≥40 & <50	22 (21.8)	22 (23.7)	23 (16.5)	
≥50	24 (23.8)	20 (21.5)	43 (30.9)	
Sex				<0.04
Male	69 (68.3)	72 (77.4)	86 (61.9)	
Female	32 (31.7)	21 (22.6)	53 (38.1)	
Marital status				<0.001
Married	65 (64.4)	55 (59.1)	56 (40.3)	
Unmarried	34 (33.6)	38 (40.9)	83 (59.7)	
Other	2 (2)	0	0	
Donors' level of education				0.78
Illiterate	22 (21.8)	6 (6.5)	27 (19.4)	
Less than a diploma	43 (42.6)	52 (55.8)	59 (42.4)	
Diploma	21 (20.8)	29 (31.2)	34 (24.5)	
University education	15 (14.8)	6 (6.5)	19 (13.7)	
No. of children				0.84
None	46 (45.5)	42 (45.16)	58 (42.1)	
1-2	26 (25)	31 (33.33)	43 (31.2)	
3-4	20 (19.8)	15 (16.12)	27 (18.8)	
≥5	9 (9.7)	5 (5.39)	11 (7.9)	
Sole income earner				0.28
Yes	45 (44.6)	45 (48.4)	53 (38.1)	
No	56 (55.4)	48 (51.6)	86 (61.9)	
Occupation				<0.04
Worker	15 (14.9)	16 (17.2)	29 (20.9)	
Employee	14 (13.9)	11 (11.8)	15 (10.8)	
Self-employed	29 (28.7)	29 (31.2)	15 (10.8)	
Student	9 (8.9)	14 (15.1)	36 (25.9)	
Housewife	19 (18.8)	12 (12.9)	25 (18)	
Retired	2 (2)	3 (3.2)	7 (5)	
Unemployed	13 (12.8)	8 (8.6)	12 (8.6)	
Income				<0.001
Low	32 (31.6)	37 (39.8)	39 (28.1)	
Medium	60 (59.6)	45 (48.4)	30 (21.6)	
High	9 (8.8)	11 (11.8)	70 (50.3)	
History of addiction				0.37
No	87 (86.1)	84 (90.3)	119 (85.6)	
Yes	14 (13.9)	9 (9.7)	20 (14.4)	

tically significant differences over time were found for the donor's age (P=0.70), number of children (P=0.84), status as the sole income earner in a household (P=0.28), level of formal education (P=0.78), or history of addiction (P=0.37). Table 1 shows donors' demographic information by year.

As shown in Fig. 1, among the organ donations at Sina Hospital during 2017–2019, the most prevalent cause of brain death was trauma (148, 44.6%) followed by hemorrhagic cerebrovascular accidents (93, 28%), hypoxia (40, 12%), toxicity (28, 8.4%), ischemic cerebrovascular accidents (16, 4.8%) and brain tumors (7, 2.1%). No statistically significant relationships were found in the cause of brain death during 2017–2019 (P=0.11). Fig. 2 shows the rate of donation, transplantation, and waiting list numbers during the 3-year period of 2017–2019. Due to the increased number of donations in 2019, the number of patients on the waiting list decreased.

The family members stated that the most common reasons for which they considered refusing organ donation were unfamiliarity with the concept of brain death, denial, and the expectation of a miracle.

DISCUSSION

The purpose of this study was to identify the psychological and socioeconomic factors that influenced the decision-making processes regarding organ donation among the families of brain-dead donors.

Head trauma was the most common cause of brain death, and young drivers have higher risks of traffic accidents [9]. Motor vehicle accidents comprised 71% of the causes of brain death [13]. One reason for the high prevalence of trauma in the brain-dead donors can be attributed to the high number of motor vehicle accidents in Iran. In a study by Afzal-Aghaee et al. [14], accidents comprised 71% of the causes of brain death. In a study carried out in Saudi Arabia, accident trauma accounted for 43% of cases and was found to be the primary cause of brain death [15].

Therefore, the causes of brain death vary across countries, which highlights the significance of deploying variable approaches to organ donation to achieve favorable results. In cases of accident-associated brain deaths, the time between the accident and informing the family of their deceased loved one may be very short. This limited time makes decision-making extremely difficult for families compared to cases where patients have been hospital-

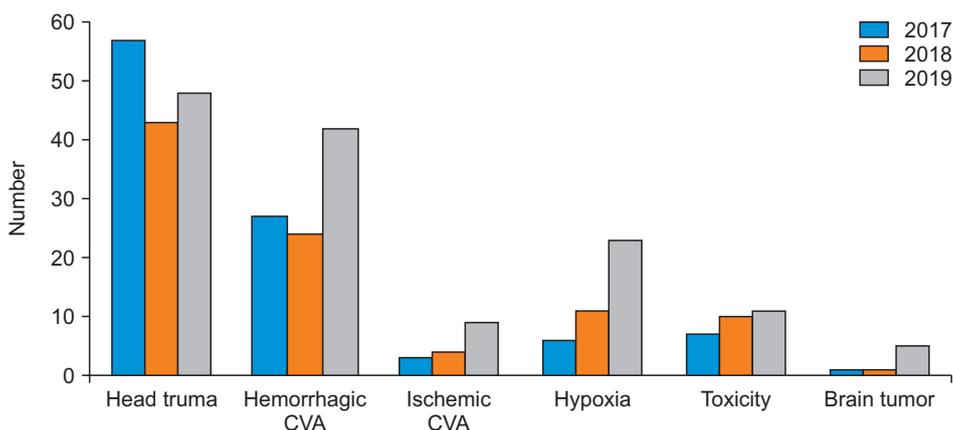


Fig. 1. Causes of brain death at the Sina Organ Procurement Unit during 2017–2019. CVA, cerebrovascular accident.

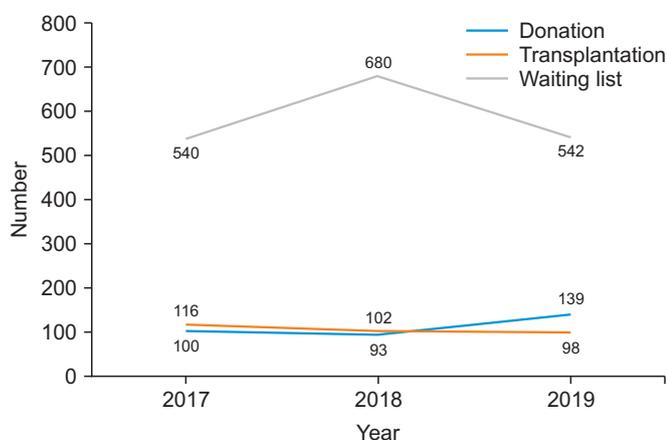


Fig. 2. The number of donations, transplantations, and patients on the waiting list at the Sina Organ Procurement Unit (2017–2019).

ized for some time. The results of Frutos et al. [16] showed that the organ donation approval rate increased when a trained coordinator more frequently held meetings with the family after the confirmation of brain death. Family education about organ donation may also help to improve the organ donation consent rate [17]. Hence, to accomplish favorable outcomes in the shortest possible time, families should have a high level of awareness and a positive attitude towards brain death and organ donation.

Regardless of cultural and religious beliefs, the general level of knowledge on organ donation among people in different parts of the world ranges from 60% to 80% [18]. Eighty-eight percent of Americans had knowledge of organ donation [19], whereas the study of Aghayan et al. [20] in Iran found that while 63.63% of nurses claimed they were willing to have a donation card, only 15.15% actually carried one. Ghaffari et al. [21] showed that perceived be-

havioral control was correlated with students' intention for organ donation. An important problem is the lack of sufficient knowledge and appropriate attitudes towards organ donation among members of the Iranian general public in public society to organ donation, as a study found that only 62% of relatives of patients referred to the emergency department had appropriate attitudes to organ donation. One of the major causes of disagreement in that study was the diagnostic criteria of brain death [22].

In the present study, differences were found according to the level of education and sex during 2017–2019. Numerous studies have shown that the level of education plays an important role in shaping attitudes towards organ donation. According to these studies, attitudes towards organ donation were enhanced after an increase in the level of education and public awareness [5]. Previous studies reported that individuals with more formal education were more likely to donate than those with less formal education [11,19]. Based on our results, people with a lower education predominated among organ donors in Iran.

A previous study in Iran found men more frequently died in road traffic accidents than women [23]. As described above, most of the donors in this study were men who developed brain death due to car accidents; furthermore, people from families with low social and economic status and men predominated among organ donors in this study.

Another significant finding of our study is that almost half of the donors were the sole income earner of a household with three or more children. Moreover, most donor families had financial problems in addition to lower levels of education; this pattern may be associated with the high rate of brain death due to motor vehicle accidents in their areas of residence because of the non-observance of safety principles, lack of suitable vehicles, and risky behaviors

[24]. Heydari et al. [23] reported a significant relationship between education level and car or motorcycle accidents in Iran. Sehat et al. [25] also showed that lower economic levels were associated with a higher incidence and mortality of car accidents in Iran. In contrast, another study in Brazil demonstrated that families with higher incomes were more willing to donate organs [26]. Siminoff et al. [27] reported that there was no association between the consent rate and families' income.

Family refusal of organ donation is still common in many countries, including Iran [28]. The refusal rate of organ donation in Tehran was 74% in 2009 [29]. The most reason for family refusal was unfamiliarity with the concept of brain death. Similar to the results of this study, Najafizadeh et al. [7] showed that unfamiliarity with the concept of brain death was the most important factor in family refusal of donation and lack of acceptance of brain death in Iran. According to our results, pediatric donations were less common than donations from other groups. Unlike adults, children are less likely to provide first-person consent for organ donation. Therefore, parents usually must make a donation decision in the absence of knowledge about their child's donation intention [30].

According to our results, fewer sole income earners donated than non-sole income earners. According to Yousefi et al. [31], in Iran, it is more difficult for the family to accept the absence of the sole income earner, and they strongly hope for the sole income earner's recovery. Nevertheless, families with economic problems and a lack of support from relevant systems can have adverse effects on the attitudes of society towards organ donation. The absence of the head of the household in donor families can consequently lead to financial and social difficulties. Thus, if donor families were appropriately supported, their conditions would improve, which would also promote the culture of organ donation. The reluctance of some families to participate in this study was also a limitation of the study, which we overcame by introducing the research aims.

The rate of cadaveric donation in Iran has considerably improved during these years, and over the past years, the donation rate has increased in all groups in Iran [5]. The results of this study help to establish an initial understanding of the socioeconomic factors that influence organ donation. According to the results of this study, more than half of organ donors were of low socioeconomic status, and nearly half were sole income earners of large families. As a result, adequate psychological and social support, such as insurance coverage, psychological services, and holding mourn-

ing therapy courses for the deceased's family after organ donation, is imperative. Appropriate planning strategies are essential for advocating for donors' families after donation.

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Conflict of Interest

No potential conflict of interest relevant to this article was reported.

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Additional Contribution

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