


# Differential Willingness to Pay for Kidney Transplantation From Living and Deceased Donors: Empirical Study Among End-Stage Kidney Disease (ESKD) Patients

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## Abstract

Kidney transplantation has developed to the stage where it is currently the most cost-effective treatment for patients suffering from end-stage kidney disease (ESKD) and, when available, offers them the highest quality of life. Yet, kidney transplantation is challenged by cultural and traditional beliefs; thus, this study sought to evaluate the willingness to pay for a kidney transplant in a culturally sensitive population. A self-administered survey was completed by 734 end-stage kidney disease (ESKD) patients. A quantitative method and survey design were chosen and employed descriptive, correlational, nonparametric, and multivariate statistical tests. Participants were willing to pay a mean amount of \$40751.36 for a living donor kidney transplant, whereas the mean is considerably lower, \$18350.51, for a deceased donor kidney. Significant predictors of the willingness to pay (WTP) for a kidney transplant from a living donor and a deceased donor were found, among them: religiosity and ethnicity. The participants' willingness to pay for a kidney transplant could attest to significant benefits in enhancing patient well-being. The willingness to pay differentially for a donation from a deceased or a living donor stems from the higher chances of success with a living-donor organ as well as from moral and religious motives. In Israel kidney transplantation is not tradable in the free market and is fully funded by the state. The average cost of kidney transplantation in Israel is \$61714.50. Since the cost exceeds the utility and since the economic literature suggests that the funding of healthcare interventions should be provided up to the point where the costs of that funding equal the benefits that society derives from it, crucial revisions in public health policy should be made. Education may have a significant impact on the approach to kidney donation and organ donation in general.

## Keywords

kidney transplantation, end-stage kidney disease (ESKD), willingness to pay (WTP), cost-benefit analysis (CBA), contingent valuation (CV)

### What do we already know about this topic?

Most of the research regarding the economic assessment of kidney transplantation is about estimating the costs and effectiveness which is measured in quality-adjusted life years (QALY) of kidney transplantation compared with dialysis in adults suffering from end-stage kidney disease.<sup>1-3</sup> Few papers have presented patient perspectives on kidney transplantation, discussing patients' attitudes related to payment for kidney transplantation, describing ESKD patient willingness to pay for a kidney transplant.<sup>4,5</sup> Using a self-administered survey, those papers try to offer a solution to the situation where the current supply of kidneys does not meet the demand and to increase the supply of kidneys by compensating kidney donors.

### How does your research contribute to the field?

There is a scarcity in the literature of studies using cost-benefit analysis (CBA) regarding kidney transplantation. Only a small number of papers<sup>4,5</sup> have presented patients' attitudes related to payment for organs. The papers that dealt with CBA and the applied method contingent valuation (CV), to elicit contingent value suffer from significant methodological and analytic flaws that seriously limit the paper's value. In the current paper we tried to identify, consider and correct the deficiencies in the research that has heretofore been published.

1. Our paper, in contrast to previous papers, was conducted in a country (Israel) that fully funds kidney transplantation. Kidney transplantation in Israel is a perfect example of the need to use the CBA technique, since the CV method



allows estimation of utility in the absence of conventional markets or for services/products which are not traded on the market or where regulatory mechanisms or legal constraints limit market choices and whose market prices fail to reflect their value to society.<sup>6</sup>

2. Our paper compared utility of kidney transplantation to the cost of kidney transplantation in order to examine whether the government should fund kidney transplantation under conditions of limited resources.
3. In our article, conclusions were drawn, and recommendations were made to policy makers regarding kidney transplantation
4. Large sample of ESKD patients
5. The study discusses the WTP for a kidney transplant for both a live-donor and a deceased-donor organ.
6. The study examined the intentions and opinions of different religious-ethnic groups and gives explanations and recommendations regarding their behavior.
7. The study examines the connection between ESKD patients who have been given information regarding kidney transplantation and their income and WTP.
8. New explanatory variables were examined for the WTP for a kidney donation, namely: time since diagnosis of kidney disease, the period of time the patient was on dialysis treatment, and the degree of difficulty/suffering caused by dialysis. Conclusions were drawn that could help the teams administering treatment.

#### **What are your research's implications toward theory, practice, or policy?**

Kidney transplant appears to provide significant benefits toward enhancing patient well-being. Our findings highlight the importance of introducing crucial revisions in public health policy.

Clinicians who understand patients' concerns about health and ESKD can help clarify patients' perceptions about transplantation and help them make more informed treatment decisions. It might take years to change people's attitudes on such a sensitive subject as signing an organ donor card/organ donation. A carefully considered approach must be taken to improve attitudes to organ donation among Israeli Jews and Muslims which is aimed at increasing the number of organ donations. The multicultural approach should include educating each ethnic group appropriately about organ donation, explaining the medical issues, and ensuring that religious authorities are available for consultation and supervision in cases of potential organ donation.

## **Introduction**

End-stage kidney disease (ESKD) is the last stage of chronic kidney disease; therefore, it is considered life-threatening. It critically impairs patients' movement and presents acute financial problems for patients as well as for society.<sup>7</sup>

The most cost-effective treatment for treating ESKD is still kidney transplantation, furthermore, it offers patients the highest quality of life.<sup>1,7-10</sup> However, the demand for kidneys for transplant, whether deceased or living donations, greatly exceeds the supply.<sup>11</sup>

The serious organ shortage has given rise to heated controversy over how to promote organ donation in ways that are both legal and ethical. The literature has heretofore addressed the issue using the gift versus market dichotomy, or altruistic donation versus the market economy.<sup>12-16</sup> The question is: Is organ donation an act of charitable selflessness or can self-interest be involved, making organs marketable goods that

benefit both parties? In a market-based approach, individuals with financial resources will reap the most advantage yet more organs will consequently become available.

In light of the severe shortfall in donated organs, a third way has been proposed to address organ donation, one that combines the gift/market concepts; namely, a regulated system that applies the concept of offering incentives for organ donation. In such a system, the state adopts a policy that actively encourages organ donation and compensates the donor.<sup>15,17</sup> This third way includes the recognition that compensation does not contradict altruism, which remains an important component of the socially beneficial act. Rather than making human organs a tradable good by offering them for sale directly, the state offers incentives to donors as a token of gratitude and appreciation of their willingness to benefit others in need.<sup>18</sup> This approach may also help toward creating a change in attitude and behavior within society.<sup>19-22</sup>

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Public health policy employs various instruments to bring about such changes, which include regulation through legislation, public information campaigns to inform and persuade, and incentives, both positive, for example, tax benefits, subsidies, and negative, for example, levies.<sup>12,23,24</sup> Incentives for registration can be classified as either ex-ante incentives to the potential donors during their lifetime, or ex-post incentives to family members for consent to donate the organs after a relative's death. Likewise, incentives can be classified into 3 types of incentives: non-financial, indirect financial, and direct financial. The first type represents granting priority to registered donors in receiving an organ if necessary.<sup>12</sup> The second type, indirect financial incentives, provides a symbolic reward for declaring one's willingness to donate an organ and may include tax benefits, reduced rates on health insurance policies, and bearing part of funeral costs.<sup>12,25</sup> Few countries have adopted a public policy of incentivizing organ donation by granting allocation priority. Israel is almost singular in offering this incentive to registered donors as public policy.<sup>12</sup> The third type, direct financial incentive resembles a "futures market" for organ donation after death.<sup>12,26</sup> A legally binding contract is signed by the organ donor-seller with the state, which is the only legally permitted client for such a transaction.<sup>12,27</sup> Upon the seller's death, the state is authorized to procure the organs for a price which was determined in advance by the regulatory framework, which is to be paid to the seller's estate or beneficiaries.<sup>12,28</sup> The contract goes into effect after the seller's death on condition that the organs meet the requirements for transplantation.<sup>12,29</sup> Another direct financial incentive for dead and living donation is a "regulated organ market." In a regulated organ market, the state is the sole authorized purchaser ("single buyer concept"). The state buys organs for a fixed price from willing sellers.<sup>11,15,30</sup> The sellers are either close relatives in the case of post-mortem donation or the living donor (or seller) in the case of living donation.

This incentive involves a "spot market," as opposed to a "futures market."<sup>12,27</sup> Iran is the only country in the world to legalize a free market in kidneys from living donors, a policy that eliminated Iran's waiting list for kidney recipients.<sup>31</sup>

In Israel kidney transplantation is not tradable in the free market and is fully funded by the state. Since 1995, the National Health Insurance law regulates the rights of residents in Israel, the basket of health services, and supplemental insurance. According to the Israeli Health Insurance Law, the state is responsible for insuring the health of all residents according to a defined basket of health services. According to the law, Renal Replacement Therapy (RRT) is included in the list of "Severe Diseases" and is funded differentially. Therefore, each Israeli resident who requires RRT is entitled to receive the treatment, free of charge, regardless of their socioeconomic status.<sup>32,33</sup>

Six Israeli medical centers currently perform organ transplantations, and all management of donors and organ allocation is channeled through the Israel National Transplant Center (INTC). The INTC was established as a division of

the Ministry of Health in 1994 with the objectives defined as promoting organ transplantation, managing a centralized register with all potential transplant candidates, deciding upon criteria for selecting recipients when organs became available as well as proposing guidelines for selecting recipients and data collection.<sup>4</sup> The Israeli Knesset passed the Organ Transplant Law in 2008, that delineated the conditions for conducting transplantation from living and deceased donors in Israel as well as in foreign countries<sup>34,35</sup> with exacting regulations to prevent organ trafficking as defined by the Declaration of Istanbul.<sup>36</sup>

Another factor in the low rate of organ donation in Israel was related to the almost full reimbursement for transplants performed abroad by Israeli health insurance before 2008. Since the implementation of the Israeli Organ Transplant Law and the Istanbul Declaration, there has been a dramatic drop in the number of Israeli patients undergoing kidney transplantation abroad.<sup>37</sup>

Despite Israel's technological advancement and highly organized health care system, deceased organ donation has been relatively low in comparison to most Western countries. As a multicultural society with diverse religious groups (prominently Jews, Muslims, Christians, and Druze) and numerous ethnicities. The reason most commonly given for unwillingness to donate was usually grounded in faith-based objections.<sup>38</sup>

Muslims have religious and cultural objections to organ donation.<sup>39</sup> Likewise, many Jewish rabbinic authorities prohibit taking organs from deceased donors to use for transplantation.<sup>40</sup> The issue among Jewish religious authorities revolved around the definition of brain death, a definition that many rabbinical authorities did not agree to; this, in contrast to cardiac death, whose definition was universally accepted.<sup>41</sup> In 2008, the Israeli Parliament enacted the Brain-Respiratory Death Law which represents accord between the medical community and the religious authorities in defining criteria for establishing brain death. Although it was implemented with strict adherence to the conditions, the law did not receive the unqualified support of religious leaders, who are reluctant to wholeheartedly advocate organ donation. In recent years, many Jewish rabbinical leaders have come to accept the definition of brain death and regard organ donation a meritorious deed leading to a concomitant rise in the donation rates by families consenting to donating the organs from deceased relatives, the actual number of deceased donors has shown no significant increase.<sup>39</sup>

In Israel as of 2020, 917 patients were awaiting a kidney transplant. The number of live donor donation stood at 173 and deceased donor donation was 257.<sup>42</sup> Only 10% of the population had signed ADI donor consent cards.<sup>43</sup>

While opinion is divided over deceased donor kidney donation, the consensus opinion of nearly all rabbinic authorities encourages altruistic kidney donation by living donors.<sup>44</sup>

Another factor in the low percentage of organ donations is the "free-rider" problem, when those who refuse organ

donation because they object to the concept of brain death avail themselves of the option of applying as candidates for organ transplantation when in need. This attitude has created considerable antagonism in certain sectors toward organ donation, and public opinion surveys in Israel have showed it to be one of the leading causes of the low percentages of consent for organ donation.<sup>38</sup> To bypass this and to give incentives for organ donation from deceased relatives, the amended Organ Transplant Law of 2013 includes a clause assigning 3 levels of priority to transplant candidates: top priority is assigned to those with a first-degree relative who either was a deceased organ donor, or who personally had donated either a kidney or a liver lobe. Next are those who either registered as organ donors for a minimum of 3 years before applying for a transplant, while lower priority is assigned also to candidates who have a first-degree relative who has been a registered as a donor for at least 3 years.

The State of Israel has devised an inventive system of incentives in offering priority in organ allocation to potential donors and their families. Living donors are assured that they will be given priority in receiving an organ donation should future circumstances warrant that need. This is a strong incentive to individuals to register as donors as well as to donate organs of deceased first-degree family members should the opportunity arise. Israel's incentive program is unique in giving allocation priority also to first-degree family members of a potential donor although they did not personally register as donors.<sup>12</sup>

Following the implementation of this policy of incentives, there has been a significant increase in the monthly number of donors newly registered, but more significantly, 2013 showed a substantial upswing in the consent rate for deceased organ donation.

Another factor that can explain why the demand for kidneys from either deceased or living donors outstrips the supply is related to the almost full reimbursement for transplants performed abroad that was given by Israeli health insurance before 2008.

To promote live organ donation in Israel, the Organ Transplant Law allowed incentives that provide reimbursement for earning loss of up to 40 days, calculated on the basis of the donor's average income over the 3-month period prior to donation; reimbursement for travel to and from the hospital during the hospitalization and monitoring; reimbursement for 7 days of recovery in a convalescent facility environment in the 3 months after donation; 5 years reimbursement for medical needs, earning loss, life insurance; and psychological consultation as needed. In the wake of these incentives, there has been a marked upswing in the number of live kidneys donations.<sup>34</sup> Interestingly, up to 30% of the living donors are altruistic, the majority are Jewish religious donors.<sup>39</sup> The INTC is now developing a program to encourage organ donation after circulatory death, as well as applying to participate in kidney exchange programs in European countries. It is also working to introduce programs to eliminate religious and cultural barriers to

organ donation within various religious and ethnic groups, among them: educational workshops on organ donation aimed at the Jewish and Muslim religious leadership and mobilizing a Knesset advocacy group consisting of Jewish and Muslim members.<sup>39</sup>

### Research Objectives

In this study, we investigate the utility from kidney transplantation in Israel with the aim of contributing to the body of research regarding the potential and challenges of this procedure.

An empirical model was employed for evaluating the utility for ESKD patients that was derived from kidney transplantation, applying the Willingness to Pay (WTP) technique. WTP is widely applied of in the field of healthcare services; its advantage is in allowing for an evaluation individual preference to be derived from respondents' answers.

The empirical model estimates from samples of end-stage kidney disease (ESKD) patients:

1. Monetary assessment of kidney transplantation—what is the maximum amount that the respondent is willing to pay for transplantation for a kidney from a healthy living donor or from a deceased donor.
2. Evaluate the demographic and complementary predictors of the WTP for a donated kidney, from: (1) a living donor, (2) a deceased donor

## Methods

### Measuring Economic Outcomes—Study Design

The empirical model—*Cost-benefit analysis, contingent valuation, and willingness to pay*. This study discusses the ramifications of kidney transplantation and its resultant impact on private welfare by using a cost-benefit analysis (CBA). Over the last decades CBA has been the main practical product of welfare economic theory.<sup>45,46</sup> CBA allows an evaluation of the benefits of an intervention in units that are commensurate with the cost—for example, monetary units. Two main methods can be applied to elicit these values. The first method makes use of market information and is known as the “hedonic” or “revealed preference” technique. The second employs an experimental survey, or what is called the “contingent valuation” (CV) technique. For our current study, we found the CV method to be most appropriate; as a simple, flexible nonmarket valuation method, it has developed into the main technique used for monetary valuation of benefits in healthcare in the absence of conventional markets or for services/goods which are not traded on the market or where regulatory mechanisms or legal constraints limit market choices and where the market price does not accurately reflect the value.<sup>6,47-50</sup> Criticism of the CV method relates primarily to 2 aspects: the validity and reliability of the results, and the effects of various biases and errors. To avoid

the controversy surrounding the CV method's ability to predict the value of kidney transplantation, we were guided by the recommendations and directions published by the US National Oceanographic and Atmospheric Administration (NOAA) panel.<sup>51</sup> The NOAA panel evaluated the CV method for estimating the nonuse values; its conclusion was that the CV technique could be effectively employed to gain important information about the nonuse values, and this, contingent upon following the panel's guidelines in conducting a CV study. This study conducted a WTP survey, and the CV is based on WTP, that is, how much a person is willing to pay to buy a service/product, in monetary units.

CV may be elicited by various techniques: open-ended questions, dichotomous choice-closed-ended questions, bidding technique, and payment card technique (PC). This research used the PC technique; the respondents were presented with various amounts of money and requested to pick their own WTP from the choices. The PC technique method has distinct advantages: it models the purchasing behavior of "shopping" (ie, potential customers compare the prices at a number of stores that sell the same goods and services)<sup>52,53</sup> and it allows for degrees of uncertainty regarding values. Considering the nature of healthcare services, and lack of experience of most respondents with the healthcare service under assessment, it is necessary to make use of a payment ladder, representing a range of values. The payment card approach has, in fact, attracted the interest of health economists in recent years. The "range bias" has been identified as a drawback of the PC method.<sup>54,55</sup> In other words, the WTP responses may be influenced by the range of the amounts offered as choices. To avoid this bias, the range of choices was based on the findings from a previous round using pilot questionnaires.

To measure the net private benefits of kidney transplantation, we used the Cost Benefit Analysis (CBA) in health care which compares the benefits with the costs of an intervention in the field of health. CBA makes it possible to measure outcomes in monetary units.<sup>54</sup> Net benefit is the difference in financial terms between total benefits and total costs. A health intervention or product or service in healthcare is economically feasible when benefits outweigh costs, producing a positive net benefit.

The benefit to an individual of a product/service/intervention (hereinafter, a "good") is measured by that individual's maximum WTP for the good; this is the definition given by welfare economic theory.

The maximum WTP can be appraised directly from consumer buying behavior when it comes to goods traded in private markets. Health care in a private market is expressed as individuals opting for treatments only when their WTP for the improvement in their health is equal to or greater than the cost of the treatment. Accordingly, the cost constitutes the lower limit on the willingness to pay in a private market.

When it comes to evaluating healthcare interventions for which there is no private market, willingness to pay must be established by other, indirect methods.

The contingent valuation (CV) method has been widely adopted for assessing the willingness to pay for goods not traded in private markets. The CV method allows benefit estimation using the WTP "Willingness-to-Pay" technique. This is implemented by asking direct hypothetical questions about the maximum amount of money that the respondents are willing to pay for a good. This technique is used when there are no conventional markets where this good is traded and where this kind of information could normally be collected.

The general use made in health care of the WTP method is to evaluate in monetary terms a health benefit related to a specific intervention; this elicits respondents' values and preferences as well as the public's attitude<sup>54</sup> toward various health interventions and allows an overall evaluation of the perceived health benefits.<sup>46,56-61</sup> The WTP is a measure of the monetary value the individual places on a specific improvement to health. The "value" of the health benefit is measured as the monetary amount the respondent is willing to pay to change their state of health to an improved state. WTP depends on many factors, including having a need for the particular good and being willing and able to purchase improved health.

In this paper, in order to better understand how individuals, perceive kidney transplantation from either a healthy live donor or a deceased donor and to measure their health benefits in terms of increased quality of life, a survey which applied the CV payment card (PC) technique was conducted.

The WTP surveys were designed and conducted in 3 stages of data gathering:

**Primary stage:** Involved identifying the items to be included in the research questionnaires. This was accomplished via in-depth interviews with 5 kidney transplantation experts and 5 ESKD patients. The preliminary design of the questionnaires was grounded in content analysis of interview results.

**Pilot study:** After completing the first version of the research questionnaires (based on the primary stage results), we conducted a pilot study with 38 participants in Israel. The purpose of the pilot study was to evaluate the questionnaire in terms of difficulty and clarity, and the respondents' willingness to answer the questions it posed. This study provided detailed information about kidney transplantation and included personal interviews conducted by the researchers, which supplied important information about the research questions. The research questions often determine the credibility and quality of the values obtained from the WTP surveys. The face-to-face interviews allowed the information to be presented in a supervised way and also garnered responses to many complex factors.

**Main survey:** Based on findings from the pilot study, we modified and adapted the research questions, created the final versions of the survey, and finally, distributed the questionnaires.

The main surveys included questions relating to the WTP and to demographic factors regarded as influencing WTP, for

example, age, gender, educational level (Non-Academic—Elementary School (1st grade-9th grade, age range 6-15) and High school graduate (10th grade-12th grade, age range 16-18); Academic—College degree (college, university), income (USD) (0\$-1592.05\$; \$1592.89\$-3185.18\$), ethnic origin (Jewish; Muslims), place of residence, level of religiosity (Religious—The term “religious” refers to those who follow traditional religion; Secular—Not religiously observant—The term “secular” is not strictly defined, and it can mean either “not religious” or “convinced atheists”), and number of children.

All of the questions on the research questionnaire were composed in multiple-choice format.

### *Sampling, Study Participants, and Sample Size*

The sampling method was snowball and convenience sampling, as the respondents agreed to answer an online questionnaire following an ad we posted in the social media. Inclusion criteria were: (i) age above 18; (ii) end-stage kidney disease (ESKD) patients.

### *Ethical Approval*

The questionnaires were anonymous and self-administered, and participants completed them without interventions. The cover letter accompanying the questionnaire informed the participants that the data collection and analysis were anonymous, that their personal data would be fully protected, and their answers kept confidential, and that after statistical processing they would be used for scientific research only. Participants were free to decide to continue or to refuse to participate. Each participant gave written informed consent for their participation in the study.

Ethical approval was obtained from the IRB ethic committee, Ethical Approval 2020026IRB.

Out of 788 questionnaires distributed, 734 valid questionnaires (93%) were completed by end-stage kidney disease (ESKD) patients.

### *Data Collection and Study Questionnaire*

We created an online version of the research questionnaire using the Qualtrics software. Links to the survey were distributed on social media, and respondents shared the link with other potential participants and invited them to take part in the research project. Data was collected over a 6-month period, from October 2020 to April 2021.

For the chapters in the questionnaire that are relevant to the current paper, please see Supplemental Appendix 1. In Supplemental Appendix 1, we present:

1. The preliminary section to the questionnaire.
2. The Monetary Evaluation of Kidney transplantation.
3. The Demographic, and Socio-Economic Characteristics

### *Statistical Analysis*

All the analyses were carried out using SPSS (version 26.0 for Windows, SPSS, Inc., IL, USA). In brief, we utilized (1) frequency analyses for the demographical data, (2) paired-samples *t*-test for testing the difference between willingness to pay to a kidney transplant from a live versus a deceased donor, and (3) several multiple ordinary-least squares linear regression models to predict the willingness to pay based on a few groups of predictors: gender, age, marital status, number of children, ethnicity, religiosity, education, employment status and income, time since diagnosis (“How long since you were diagnosed with a kidney disease?”; continuous variable),

How long on dialysis (“How long have you been receiving dialysis treatments?”; continuous variable) and suffering due to current diagnosed situation (7-point Likert scale; 1 = not at all, 7 = definitely).

However, due to multicollinearity issues (Tolerance <0.40), which might confound the results, with a few predictors—number of children, ethnicity, time since diagnosis, How long on dialysis, and suffering due to current diagnosed situation—the models were run separately. (Having these in the same model leads to instable and inaccurate regression models, thus confounding the interpretation of the results). Specifically, these prospects (time since diagnosed, how long on dialysis, and suffering due to current diagnosed situation) have been found to be critical for patients and their willingness to pay for a treatment<sup>4,62</sup> and therefore will be analyzed in a separate model.

Tables 2 to 8 depict the results of the analyses.

## **Results**

### *Demographics*

Out of 788 questionnaires distributed, 734 valid questionnaires (93%) were completed by end-stage kidney disease (ESKD) patients. Of the 734 ESKD patients who completed the questionnaire, 49.6% were females and 50.4% males between the ages of 28-76 years ( $M=54.36$ ,  $SD=12.48$ ). Most (84.7%) are in some kind of couple relationship (eg, married, cohabiting), while 15.3% are not in any kind of couple relationship (eg, divorced, single), with number of children between 1 and 9 ( $M=4.61$ ,  $SD=2.21$ ). Most of the patients were Muslims (60.5%), the rest were Jewish; the majority were religious (71.7%), while the rest were not; most did not possess an academic degree/education (69.2%), while the rest did; most of them are collecting disability (88.6%) and the rest are pensioners; most of them (69.5%) have a monthly income of 0\$-1592.05 (USD), the rest have an income of \$1592.89\$-3185.18 (USD - All currency conversions are updated to the date of 12.04.21; <https://www.xe.com/>. \$1=3.296 NIH (New Israeli Shekel). Table 1 presents the Descriptive demographical statistics of the sample.

**Table 1.** Descriptive Demographical Statistics of the Sample.

Variable	Category	N	%	M	SD	R
Gender	Male	370	50.4	-	-	-
	Female	364	49.6	-	-	-
Marital status	In a couple relationship	622	84.7	-	-	-
	Not in a couple relationship	112	15.3	-	-	-
Nationality	Jewish	290	39.5	-	-	-
	Arab	444	60.5	-	-	-
Religiosity	Not Religious	208	28.3	-	-	-
	Religious	526	71.7	-	-	-
Education	Non-academic	508	69.2	-	-	-
	Academic	226	30.8	-	-	-
Government stipend	Disability	650	88.6	-	-	-
	Pension	84	11.4	-	-	-
Income	0\$-\$1592.05 (USD)	510	69.5	-	-	-
	\$1592.89 -\$3185.18	224	30.5	-	-	-
Age	-	-	-	54.36	12.48	28-76
Number of Children	-	-	-	4.61	2.21	1-9

Note. N=frequency; %=relative percent; M=mean; SD=standard deviation; R=range.

**Table 2.** Willingness to Pay for a Kidney Transplant From a Live or a Deceased Donor.

Answer category	A	B	C	D	E
Living donor	198 (27%)	79 (10.8%)	239 (32.6%)	175 (23.8%)	43 (5.9%)
Deceased donor	348 (47.4%)	178 (24.3%)	165 (22.5%)	43 (5.9%)	0 (0%)

Note. The table shows frequencies and their relative proportion out of the total sample (N=734). Answer categories are based on the abovementioned legend.

**Willingness to pay.** Participants were asked 2 independent questions regarding their willingness to pay for a kidney transplant, donated from: (1) a *living donor*, (2) a *deceased donor*—based on their income. Answers were given as follows: (A) \$0 (USD), (B) \$3296-\$30339.81, (C) \$30340.11-\$60679.61, (D) \$60679.92-\$91019.42, and (E) \$91019.72-\$121359.22. Table 2 shows the frequencies of each category based on the participants' response for the 2 questions.

The mean amount that participants were willing to pay for a kidney transplant from a *live donor* is \$40751.36 (SD=\$32734.56) while in the case of a *deceased donor* the mean is significantly lower (M=\$18350.51, SD=\$22851.53). The difference has statistical significance, based on a paired-samples *t*-test:  $t(733)=37.04, P=.000$ .

Three multiple regression models (OLS method) were created in order to predict the WTP for a kidney transplant, donated from: (1) a *living donor*, (2) a *deceased donor*. The predictors included: gender, age, marital status, number of children, ethnicity, religiosity, education, employment status and income, time since diagnosis, how long on dialysis, and suffering due to current diagnosed situation—separated into 3 tables/models due to multicollinearity considerations (as was mentioned in the Statistical analyses section).

Table 3 shows that there are 4 significant predictors of the willingness to pay for a kidney transplant from a *living donor*: (1) gender (women are more willing to pay than men),

(2) age (as age increases, the willingness to pay decreases), (3) number of children (as the number of children rises, the WTP declines), and (4) religiosity (not religious people are more willing to pay than their religious counterparts).

Table 4 shows that there are 3 significant predictors of the willingness to pay for a kidney transplant from a *living donor*: (1) gender (women are more willing to pay than men), (2) age (as age increases, the willingness to pay decreases), and (3) Ethnicity (Jewish participants are more willing to pay than their Arab counterparts).

Table 5 shows that all of the predictors of the willingness to pay for a kidney transplant from a *living donor* are statistically significant: (1) diagnosis (the longer the person has been diagnosed with a kidney disease – they may be less willing to pay), (2) dialysis (the longer the person has been receiving dialysis treatments—they may be less willing to pay), and (3) suffering (the more suffering the person experiences due to the medicinal treatment—they may be less willing to pay). Notable is the considerable difference in the strength of the predictor Diagnosis (beta=-.47), as opposed to Dialysis (beta=-.14) and to Suffering (beta=-.06), indicating its high relative importance in predicting the willingness to pay for a kidney transplant from a *living donor*.

Table 6 shows that there are 6 significant predictors of the willingness to pay for a kidney transplant from a *deceased donor*:

**Table 3.** Results of Regression Model (1) in Predicting Willingness to Pay for a Kidney Transplant From a Live Donor.

Predictor	B	SE	Beta	t-test	Sig.
Constant	5.52	0.53	-	10.44	.000
Gender	0.37	0.07	.15	5.38	.000
Age	-0.02	0.00	-.16	-4.36	.000
Marital status	0.08	0.09	.02	0.86	.390
No. of children	-0.37	0.02	-.65	-20.75	.000
Religiosity	-0.32	0.08	-.11	-4.19	.000
Education	0.05	0.08	.02	0.64	.524
Employment status	-0.13	0.13	-.03	-0.97	.331
Income	0.11	0.07	.04	1.45	.147
Model summary	$F(8, 725) = 126.86, P = .000, R^2_{Adj.} = .58$				

Note. Gender (1 = male, 2 = female). Marital status (1 = in some kind of a couple relationship, 2 = not in any kind of couple relationship). Religiosity (1 = not religious, 2 = religious). Education (1 = non-academic, 2 = academic). Employment status (1 = collecting disability, 2 = pensioner). Income (1 = 0\$-1592.05\$, 2 = 1592.89\$-3185.18\$).

**Table 4.** Results of Regression Model (2) in Predicting Willingness to Pay for a Kidney Transplant From a Living Donor.

Predictor	B	SE	Beta	t-test	Sig.
Constant	8.32	0.45		18.67	.000
Gender	0.32	0.06	.13	5.53	.000
Age	-0.03	0.00	-.34	-10.51	.000
Marital status	0.01	0.08	.00	0.09	.926
Ethnicity	-1.97	0.07	-.77	-29.23	.000
Religiosity	-0.12	0.07	-.04	-1.81	.071
Education	-0.14	0.07	-.05	-1.96	.051
Employment status	-0.16	0.11	-.04	-1.46	.145
Income	-0.03	0.06	-.01	-0.48	.630
Model summary	$F(8, 725) = 206.62, P = .000, R^2_{Adj.} = .69$				

Note. Gender (1 = male, 2 = female). Marital status (1 = in some kind of a couple relationship, 2 = not in any kind of couple relationship). Religiosity (1 = not religious, 2 = religious). Education (1 = non-academic, 2 = academic). Employment status (1 = collecting disability, 2 = pensioner). Income (1 = 0\$-1592.05\$, 2 = 1592.89\$-3185.18\$).

donor: (1) gender (women are more willing to pay than men), (2) age (as age increases, the willingness to pay decreases), (3) number of children (as the number of children rises, the willingness to pay declines), (4) religiosity (not religious people are more willing to pay than their religious counterparts), (5) Education (academically-educated are more willing to pay than people without an academic education), and (6) employment status (pensioners are more willing to pay than those collecting disability—The National Insurance Institute of Israel (NII), the agency responsible for collecting health tax in Israel) divides patients with kidney disease into those who are of working age and those who are not (pensioners). Dialysis patients who are of working age are entitled to 2 types of allowance – a special services allowance and a 100% disability allowance. Dialysis patients of working age in Israel automatically receive the status of

**Table 5.** Results of Regression Model in Predicting Willingness to Pay for a Kidney Transplant From a Living Donor.

Predictor	B	SE	Beta	t-test	Sig.
Constant	5.39	0.21		25.66	.000
Diagnosis	-0.11	0.01	-.47	-10.19	.000
Dialysis	-0.06	0.02	-.14	-2.96	.003
Suffering	-0.11	0.05	-.06	-2.02	.043
Model summary	$F(3, 730) = 121.31, P = .000, R^2_{Adj.} = .33$				

Note. Diagnosis = "How long have you been diagnosed with a kidney disease?." Dialysis = "How long have you been receiving dialysis treatments?." Suffering (7-point Likert-type scale; 1 = not at all, 7 = definitely) = "Are you suffering from the medicinal treatment you receive?."

**Table 6.** Results of Regression Model (1) in Predicting Willingness to Pay for a Kidney Transplant From a Deceased Donor.

Predictor	B	SE	Beta	t-test	Sig.
Constant	2.94	0.38		7.71	.000
Gender	0.24	0.05	.12	4.81	.000
Age	-0.01	0.00	-.09	-2.71	.007
Marital status	0.07	0.07	.03	1.02	.310
No. of children	-0.31	0.01	-.72	-24.08	.000
Religiosity	-0.34	0.05	-.16	-6.14	.000
Education	0.15	0.06	.07	2.58	.010
Employment status	0.20	0.10	.07	2.02	.044
Income	-0.08	0.05	-.04	-1.61	.108
Model summary	$F(8, 725) = 152.95, P = .000, R^2_{Adj.} = .62$				

Note. Gender (1 = male, 2 = female). Marital status (1 = in some kind of a couple relationship, 2 = not in any kind of couple relationship). Religiosity (1 = not religious, 2 = religious). Education (1 = non-academic, 2 = academic). Employment status (1 = collecting disability, 2 = pensioner). Income (1 = 0\$-1592.05\$, 2 = 1592.89\$-3185.18\$).

100% medical disability from the NII. Kidney patients in earlier stages receive a disability pension of varying percentages of disability, according to NII regulations. The benefit package also contains an exemption from income tax for kidney patients who are working (up to an income of NIS 497000 per year), discounts on property tax payments, and additional benefits).

Table 7 shows that there are 6 significant predictors (ie, all of them) of the willingness to pay for a kidney transplant from a *deceased* donor: (1) gender (women are more willing to pay than men), (2) age (as age increases, the willingness to pay decreases), (3) marital status (those who are not in a couple relationship are more willing to pay than those who are in a marital relationship), (4) religiosity (not religious people are more willing to pay than their religious counterparts), (5) education (those with an academic education are more willing to pay than people without an academic education), (6) income (those with higher income, \$1592.89\$-\$3185.18, are more willing to pay than those with lower income, \$0-\$1592.05).



**Table 7.** Results of Regression Model (2) in Predicting Willingness to Pay for a Kidney Transplant From a Deceased Donor.

Predictor	B	SE	Beta	t-test	Sig.
Constant	1.76	0.28		6.31	.000
Gender	0.19	0.07	.10	2.89	.004
Age	-0.01	0.00	-.12	-3.09	.002
Marital status	0.51	0.09	.19	5.90	.000
Religiosity	-0.70	0.07	-.33	-9.68	.000
Education	0.51	0.08	.25	6.51	.000
Income	0.22	0.07	.11	3.34	.001
<i>Model summary</i>	$F(6, 727) = 49.62, P = .000, R^2_{Adj.} = .29$				

Note. Gender (1 = male, 2 = female). Marital status (1 = in some kind of a couple relationship, 2 = not in any kind of couple relationship). Religiosity (1 = not religious, 2 = religious). Education (1 = non-academic, 2 = academic). Employment status (1 = collecting disability, 2 = pensioner). Income (1 = 0\$-1592.05\$, 2 = 1592.89\$-3185.18\$).

Table 8 shows that all of the predictors of the willingness to pay for a kidney transplant from a *deceased* donor are statistically significant: (1) diagnosis (the longer the person has been diagnosed with a kidney disease—they may be less willing to pay), (2) dialysis (the longer the person has been receiving dialysis treatments – they may be less willing to pay), and (3) suffering (the more suffering the person experiences due to the medicinal treatment—they may be less willing to pay). Notable is the considerable difference in the strength of the predictor Diagnosis (beta = -.51), as opposed to Dialysis (beta = -.09) and to Suffering (beta = -.06), indicating its high relative importance in predicting the willingness to pay for a kidney transplant from a *deceased* donor.

### Supplementary Analyses

This section is comprised of post-hoc analyses that are outside the research objectives but may be gleaned from the data and other parameters measured. In other words, presented here are a few supplementary analyses that may be of interest for the research topic but were not a part of the original research agenda. Specifically, household income has been demonstrated to be directly and positively linked to WTP for medical procedures. This is corroborated by the findings in Table 7. However, the rest of the tables (2-7, excluding 6) did not provide this support. This led us to suspect that another factor might be relevant for explaining WTP but interacts with the level of income. To this end, the literature argues that the respondents value information,<sup>63,64</sup> given about medical procedures, and the information itself has a positive effect on WTP.<sup>65-69</sup> As such, in order to test the effect that (1) income (low/high) and (2) the answer to “Did your physician present the possibility of a kidney transplant to you?” (yes/no) might have on the willingness to pay for a kidney transplant (both from a living or a deceased donor), a two-way MANOVA was conducted because of its ability to assess

**Table 8.** Results of Regression Model in Predicting Willingness to Pay for a Kidney Transplant From a Deceased Donor.

Predictor	B	SE	Beta	t-test	Sig.
Constant	3.94	0.16		24.80	.000
Diagnosis	-0.09	0.01	-.51	-11.25	.000
Dialysis	-0.03	0.02	-.09	-2.06	.040
Suffering	-0.08	0.04	-.06	-2.04	.041
<i>Model summary</i>	$F(3, 730) = 126.85, P = .000, R^2_{Adj.} = .34$				

Note. Diagnosis = “How long have you been diagnosed with a kidney disease?” Dialysis = “How long have you been receiving dialysis treatments?” Suffering (7-point Likert-type scale; 1 = not at all, 7 = definitely) = “Are you suffering from the medicinal treatment you receive?”

**Table 9.** Descriptive Statistics for Willingness to Pay for a Kidney Transplant.

Criterion	Income	Information	M	SD	N
Willingness to pay, kidney from a <i>living</i> donor	Low	Yes	2.94	1.31	228
		No	2.31	1.31	282
	High	Yes	2.98	0.95	107
		No	2.97	0.99	117
Total	Yes	2.95	1.21	335	
	No	2.50	1.26	399	
Willingness to pay, kidney from a <i>deceased</i> donor	Low	Yes	2.07	1.06	228
		No	1.65	0.92	282
	High	Yes	2.02	0.80	107
		No	1.87	0.86	117
Total	Yes	2.05	0.98	335	
	No	1.71	0.91	399	

Note. (1) Information = the answer to “Did your physician present the possibility of a kidney transplant to you?” (yes/no).

the interaction between 2 independent factors. The descriptive statistics are presented in Table 9.

The results show that the multivariate *F*-test for the main effect of income is statistically significant:  $F(2, 729) = 19.59, P = .000$ , Wilk’s  $L = .96$ . The univariate *F*-tests for the willingness to pay for a kidney transplant from a living donor is statistically significant:  $F(1, 730) = 12.66, P = .000, h^2 = .02$ . This finding indicates that those with a higher income ( $M = 2.97, SD = 0.97$ ) are more willing to pay for a kidney transplant from a living donor than those with a lower income ( $M = 2.59, SD = 1.35$ ). In addition, the univariate *F*-tests for the willingness to pay for a kidney transplant from a deceased donor is nonsignificant:  $F(1, 730) = 1.35, P = .246, h^2 = .00$ .

Moreover, the multivariate *F*-test for the main effect of physician (ie, the answer to the question “Did your physician present the possibility of a kidney transplant to you?”; 1 = yes, 2 = no) is also statistically significant:  $F(2, 729) = 6.94, P = .001$ , Wilk’s  $L = .98$ . The univariate *F*-tests for the willingness to pay for a kidney transplant from a living donor is statistically significant:  $F(1, 730) = 10.75, P = .001, h^2 = .01$ .

**Table 10.** Income  $\times$  Physician Group Differences for Willingness to Pay for a Kidney Transplant From a Living Donor.

Living donor			Deceased donor				
INT Group 1		INT Group 2	Sig.	INT Group 1		INT Group 2	Sig.
Low + Yes	=	High + Yes	.977	Low + Yes	=	High + Yes	.979
Low + No	<	High + No	.000	Low + No	=	High + No	.190
Low + Yes	>	Low + No	.000	Low + Yes	>	Low + No	.000
High + Yes	=	High + No	.985	High + Yes	=	High + No	.994

Note. INT=interaction (combination of the 2 main effects' groups) (1) Low=low-income group. (2) High=high-income group. (3) Yes and No are the answers to the question "Did your physician present the possibility of a kidney transplant to you?."

This finding indicates that those who were presented with the possibility of a kidney transplant by their physician ( $M=2.95$ ,  $SD=1.21$ ) are more willing to pay for a kidney transplant from a living donor than those who were not presented with that possibility ( $M=2.50$ ,  $SD=1.26$ ). Further, The univariate  $F$ -tests for the willingness to pay for a kidney transplant from a deceased donor is statistically significant:  $F(1, 730)=13.88$ ,  $P=.000$ ,  $h^2=.02$ . This finding indicates that those who were presented with the possibility of a kidney transplant by their physician ( $M=2.05$ ,  $SD=0.98$ ) are more willing to pay for a kidney transplant from a living donor than those who were not presented with that possibility ( $M=1.71$ ,  $SD=0.91$ ).

Finally, the multivariate  $F$ -test for the interaction effect (income  $\times$  physician) is statistically significant:  $F(2, 729)=6.53$ ,  $P=.002$ , Wilk's  $L=.98$ . The univariate  $F$ -tests for the willingness to pay for a kidney transplant from a living donor is statistically significant:  $F(3, 730)=16.19$ ,  $P=.000$ ,  $h^2=.06$ . In addition, the univariate  $F$ -tests for the willingness to pay for a kidney transplant from a deceased donor is statistically significant:  $F(3, 730)=9.35$ ,  $P=.000$ ,  $h^2=.04$ .

Table 10 presents the findings and shows the significance levels including the direction of differences as follows: (1) "=" symbol indicates no significant difference between groups, (2) "<" or ">" symbols indicate a significant difference between groups and its direction (ie, which group is higher in the criterion).

Table 10 indicates the following:

For willingness to pay (WTP) for a kidney transplant from a *living* donor:

- When information is given about the transplant, there is no difference in WTP between low- and high-income individuals.
- When *no* information is given about the transplant, those with a higher income are more willing to pay than those with a lower income.
- For individuals with a *lower* income, those who received information about the transplant are more willing to pay than those who were not given this information.
- For individuals with a *higher* income, there is no difference in WTP between those who received information about the transplant and those who did not.

For willingness to pay (WTP) for a kidney transplant from a *deceased* donor:

- When information is given about the transplant, there is no difference in WTP between low- and high-income individuals.
- When *no* information is given about the transplant, there is no difference in WTP between low- and high-income individuals.
- For individuals with a *lower* income, those who received information about the transplant are more willing to pay than those who were not given this information.
- For individuals with a *higher* income, there is no difference in WTP between those who received information about the transplant and those who did not.

## Discussion

In this study, we evaluated the private benefit of receiving a kidney transplant in Israel with the aim of understanding the economic forces which are operating and exploring the WTP for kidney transplantation. The results and conclusions of this study, using Israel as a microcosm, may be relevant to organ markets in other countries. They reflect views of religious belief and morality as well as ethical and legal claims. This suggests that an examination and explanation of the organ markets should be carried out with respect to these factors.

According to WTP theory, the monetary amount of money an individual is willing to pay for a particular benefit in health care is an indicator of what value the individual places on that health benefit.<sup>70</sup> According to the US National Oceanographic and Atmospheric Administration (NOAA, 1993) panel, different motivations affect WTP decisions, including ethical and moral considerations.<sup>51</sup> Moral dilemmas influence the consumers' willingness to pay.<sup>71</sup> The presence of social norms and personal norms such as moral obligation has a significant impact on the stated WTP.<sup>72</sup> Contingent valuation responses reflect the willingness to pay for the moral satisfaction of contributing to public goods.<sup>73</sup>

The regulatory state has become a cost-benefit state, in the sense that under prevailing executive orders, agencies

must catalog the costs and benefits of interventions before issuing them, and in general, must show that their benefits justify their costs.<sup>74</sup> Evaluating the WTP for kidney transplantation alongside the costs of kidney transplantation is important for policy makers when they come to consider state funding for kidney transplantation out of the limited resources of the national medical budget. The research findings show that end-stage kidney disease (ESKD) patients present a positive WTP for kidney transplantation, whether from a healthy living donor or from a deceased donor. Receiving a kidney transplant is seen to provide significant benefits toward enhancing patient well-being. The mean amount participants were willing to pay for a kidney transplant from a living donor is \$40 751.36. The mean amount participants were willing to pay for a kidney transplant from a deceased donor is considerably lower, \$18 350.51. The difference in the WTP for a kidney transplant from a living donor and for a deceased donor may be based on the conventional wisdom that a living donor is always better than a deceased donor but is also based on medical findings that an organ from a living donor provides a better clinical outcome, more timely access to transplantation, and better patient and allograft survival when compared with deceased-donor transplantation.<sup>75-77</sup>

In the USA where kidney transplantation is not subsidized by the government and is determined by the market, the cost of kidney transplantation varied by donor type. For the recipient of a kidney from a deceased donor, the average cost of transplantation is approximately \$209 389, while the average cost from living donors was estimated as \$279 766.<sup>1</sup> In Israel where kidney transplantation is fully funded by the government and is not determined by the market, the average cost of kidney transplantation is \$61 714.50.<sup>78</sup> Thus, the cost exceeds the utility.

The economic literature suggests that the funding of healthcare interventions should be provided up to the point where the costs of that funding equal the benefits that society derives from it.<sup>70</sup> Even though the research findings suggest that government policymakers should consider fully stopping the funding of kidney transplantation and only subsidize them, the complexity and moral aspects of organ donation should be considered. The market approach would provide an organ to everyone who can pay for it, either with their own funds or through private insurance. This approach sets a high value on individual rights, and the principles of equality and fairness are rated very low. This approach has been criticized on several counts, among them: (1) Transplant technologies have received funding from the public's taxes in the R&D that developed them; (2) If medical resources are used for transplantation, less will remain available for providing other urgent medical treatment; and (3) Having sufficient financial means does not justify demanding a kidney transplant. But the most problematic is its total disregard for the principles of fairness and equity. Having financially challenged patients

forced to run public campaigns to raise funds for a transplant is degrading both to the patients themselves but more so to the society that allows it. Making financial ability the deciding factor declares that society is willing to put a price on human life, and this should be paid by the individual whose life is threatened. Neither attitude is acceptable in a society where income is inequitably distributed.<sup>79</sup>

One argument that has been put forward for ensuring that everyone has equal access to organ transplantation is the concept that the organs are donated for public welfare. The appeal to the public is to donate organs no matter what their financial status is. Thus, organs are considered a public resource and as such, must be equally available to everyone and not exclude those who cannot afford to pay for the medical procedure.<sup>80</sup>

An interesting insight regarding the findings of the willingness to pay compared to actual costs is that the research findings that show that the willingness to pay for a kidney transplant falls short of the costs, reflecting Israel's unique policy in rewarding donors by offering incentives. The discrepancy between the costs and the WTP represents the incentives offered by the state. These incentives costs that exceed the WTP for kidney transplantation express the understanding in Israel that a variety of motives underlie the act of organ donation.<sup>81</sup> Co-existence of altruistic intent and interest is conceptually inherent in the act of donation. Considering its serious consequences for patients and society as a whole, the organ shortage is defined as a public health problem and a "critical public health challenge."<sup>12,82</sup> Therefore the state is responsible must take responsibility and should intervene in order to promote organ donation through incentives. Well-conceived state incentives reflect the mixed motives underlying organ donation. The average sum that respondents state they are willing to pay for a kidney transplantation is affected and takes into account the state's offering financial incentives for organ donation. Thus, even if respondents theoretically have to pay for kidney transplantation, they know they would not be required to bear all the costs because of state incentives.

An interesting result of the regression model regarding the significant predictors of the willingness to pay for a kidney transplant from a living donor and from a deceased donor pertains to Ethnicity and Level of religiosity.

Ethnicity shapes perceptions of identity and belonging, which, in like manner, shape attitudes toward organ donation.<sup>83,84</sup> "Religion" is formally defined as believing in a Divinity and feeling a commitment to a specific organized religion.<sup>85</sup> There are 2 major religions in Israel: Judaism, and Islam. Both religions assign supreme value to human life as well as to the value of saving a life. Moreover, many Muslim religious authorities have come to accept the medical definition of brain death and thus, sanction deceased donor organ donation.<sup>86</sup> Similarly, many Jewish religious authorities actively promote organ donation among their adherents. However, both religions prohibit the violation of the human

body, whether live or after death. As a result, religiously observant Muslims and Jews may be reluctant to donate organs for fear of violating this interdiction.<sup>87,88</sup> For ultra-Orthodox Jews, the definition of the time of death is a controversial issue, the question being whether brain death or cardiorespiratory death is what establishes the definitive end of life. In the traditional Jewish view, removing a deceased person's organs is tantamount to altering the divine image of God, which is a desecration of the sacred<sup>89</sup> Likewise, a significant number of Muslims believe that Islamic religious forbids organ donation, since the Quran does not refer to it. Furthermore, there is a deeply rooted belief that only God can make decisions about the fate of a dead body. The "intactness of the body in the afterlife" is of cardinal importance for observant Muslims.<sup>90</sup> In addition, Muslims explain their reluctance to consider organ donation by their view that (1) after death, the body is resurrected and thus must be left whole; (2) the diseased can only be healed if God wills it, and (3) organ donation would delay the funeral, which is a further desecration.<sup>91</sup>

The results of the present study show that Jewish participants have a higher WTP for kidney transplantation than their Arab counterparts; this means that Jewish respondents had more positive attitudes toward kidney transplantation than Muslims. The findings of this study reinforced the findings of previous studies that showed ethnic differences in the attitudes to organ donation. Another factor underlying negative attitudes to organ donation was the feeling of estrangement or not fully being part of the wider society.<sup>83</sup>

Thus, religious beliefs shape a person's attitudes to organ donation.<sup>89-94</sup> The most common reason for refusal to donate had traditionally been based on religious objections.<sup>38,39</sup> The findings of our study show that non-religious people are more willing to pay than their religious counterparts.

Other results of interest are (1) diagnosis (the longer the person has been diagnosed with kidney disease—the lower their WTP, The reason for this might be that the long-time patients who were diagnosed with kidney disease, in time might feel they are managing on dialysis; they did not perceive ESKD as a problem worth fixing, they feel themselves to be in good health, adjusted to and comfortable with dialysis, and don't need a kidney transplant. Another reason that is related to the length of time since being diagnosed with kidney disease is that the longer the time that has passed since diagnosis, the more the patients were exposed to other patients and know about successful as well as unsuccessful kidney transplants. Unsuccessful transplant recipients who were compelled to revert to dialysis are indisputable proof that transplants do not work. Patients who knew about unsuccessful transplant recipients. were deterred from seeking to undergo transplantation after witnessing the recipients' disappointment.<sup>95,96</sup>

(2) Dialysis (the longer the person has been receiving dialysis treatments, the less willing they may be to pay). As expected, patients' treatment decisions were related to the

number of years they were on dialysis. Anti-transplant patients were on dialysis longer than pro-transplant patients. The relationship between length of time on dialysis and treatment choice can be explained by the fact that anti-transplant patients are generally older than pro-transplant patients and some prefer not to undergo changes in their treatment status at their advanced age.<sup>75,95,96</sup>

(3) Suffering (the more suffering the person experiences due to the medical treatment—the less willing they may be to pay). "Suffering" is one of the statistically significant predictors of the willingness to pay for a kidney transplant from either a live-organ donor or from a deceased donor. The results indicate that the more suffering the person experiences due to the medical treatment (dialysis)—the less that person is willing to pay for kidney transplantation. Although we might expect that the more side-effects a person experiences from dialysis treatment and the more they suffer from this treatment, the more likely they are to want a kidney transplant and be willing to pay more for it, research shows that choosing to undergo kidney transplantation depends on the perceptions held by dialysis patients regarding its potential outcome.<sup>97,98</sup> One may conclude from this that people with bad experiences with dialysis, who probably have comorbidities associated with end-stage kidney disease, might be afraid to undergo kidney transplantation since they assume that certain comorbidities interfere with the surgical treatment or prognosis. People who have difficulties with dialysis will tend to fear complications, rejection of the graft, and even death<sup>96</sup> since they may see themselves as are more sensitive and fragile. An important issue and contribution to the literature deals with the association between the WTP for a kidney donation, on the one hand, and income and the physician presenting the option of a kidney transplant with information about the process, on the other.<sup>4</sup>

In our study as in other studies that assessed income,<sup>6,70,99,100</sup> there was a statistically significant association between income and WTP. In cases where income was related to WTP, the tendency is for higher WTP to be associated with higher incomes.

The results show that respondents value information and have a positive WTP for information, so that information was positively and statistically related to WTP.<sup>60</sup> Participants valued information and were willing to buy it.<sup>64</sup> Corresponding to previous studies<sup>63-69</sup> this study also confirms that respondents reveal a positive WTP at a significant level for information.

An examination of the interaction between income, information, and the willingness to pay yields interesting findings. According to the results of the study, for respondents with a high-income, the willingness to pay for a kidney transplant (either from a living or dead donor) does not depend on the physician raising the possibility of a kidney donation, whereas for low-income respondents, the physician raising the possibility of a kidney donation (either from a living or dead donor) had an effect on WTP, namely, the person presented with the option was willing to pay more for the kidney

donation. When the possibility of kidney transplantation was raised among the respondents, no difference was found in the WTP for a kidney donation (from either a living or dead donor) between high income and low-income respondents. When the possibility of a kidney donation was not raised of kidney donation from a living donor, those with high incomes are willing to pay more than those with low incomes. Regarding a kidney donation from a dead donor, no difference was found in the WTP for a kidney donation (from either a living or dead donor) between those with a high income and those with a low income.

## Conclusions

Licensing authorities have begun to show an interest in CBA (which is based on WTP) for evaluating patients' willingness to take risks by undergoing innovative treatments which they hope will prove more effective.<sup>101</sup> The WTP method is used for evaluating the benefits of healthcare treatments, using carefully formulated questions to prompt the patients to reveal their values and preferences toward the medical care on offer. This makes it possible to assess the patients' perception of the value of these health benefits.<sup>46,56-60,102</sup> The kidney transplant procedure is fully state funded in Israel.<sup>103</sup> However, the issue of willingness to pay—which indicates the benefit of the process as compared to the costs—allows for further public examination and re-discussion of funding or subsidy of a procedure that is already funded or subsidized. This information is of great importance due to the limited resources available for health services.

This study demonstrates the variety of motives involved in the willingness to donate organs. Its findings regarding WTP for receiving an organ for transplant corroborates Israel's stance in incentivizing organ donation as a way to resolve the organ shortage and the health crisis it entails. The example presented by Israel in legislation may offer a model for other countries to emulate, considering its success.<sup>12</sup>

This study found that the cost outweighs the benefit, leading to the conclusion that perhaps fully funding kidney transplantations should be stopped and replaced by only subsidizing them. However, since we found that kidney transplantation does contribute to social welfare and due to the complex ethical aspects mentioned above, our recommendation is to continue to fully fund the procedure.

Yet our results highlight the cardinal importance of making significant changes in public health policy. In Israel, for example, policymakers might re-evaluate the transplant law with an eye to allowing a co-payment by the patient for receiving a living-donor kidney along with the state subsidy.

Dialysis professionals should become more informed about factors influencing patients' treatment decisions. Cultural, ethnic, and religious factors; the number of years on dialysis; the number of years the patient has been diagnosed with kidney disease, and the suffering caused by dialysis must all be taken into account so that clinicians who understand patients' concerns about health and ESRD can

help clarify patients' perceptions about transplantation and help them make more informed treatment decisions.

It might take years to change people's attitudes on such a sensitive subject as organ donation. A multicultural approach should be taken to improve public attitudes toward organ donation. This should include educating each religious and ethnic group as to how their traditional values (the sanctity of human life, the obligation to save life) are promoted by organ donation.<sup>104</sup> Medical institutions should also ensure that religious leaders are available for consultation and supervision when the possibility of organ transplant arises.

## Limitations

This study has several limitations:

- (a) Patients participated in the survey by answering a questionnaire on the study website. This had the effect of limiting participation to only those patients with internet access.
- (b) More participants who are interested in a market in kidneys may have responded to a survey on purchasing a kidney as compared to participants without any particular interest in this market.
- (c) Complex and lengthy questionnaires might have affected the number of subjects who completed them, although it is still very high, relative to similar studies.

## Significance

This study's findings have important ramifications for many institutions and individuals concerned with kidney transplantation. The findings give insight into the utility for end-stage kidney disease (ESKD) patients. This type of analysis and research may also serve health economists who are involved in designing economic instruments to assess the utility of other kinds of medical interventions.

Because there are differing opinions regarding the validity and reliability of the methodology used here, our study could contribute to establishing and validating this methodology.

## Author's Note

Pazit Azuri is now affiliated to The faculty of Business, College of Management Academic Studies, Israel.

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## Availability of Data and Materials

Any information regarding data and material will be displayed upon request.

## Declaration of Conflicting Interests

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## Ethics Approval and Consent to Participate

The research conforms to the legal and ethical standards of the country in which it was performed. The author states that he has obtained appropriate institutional review board approval and has followed the principles outlined in the Declaration of Helsinki for all human experimental investigations. For investigations involving human subjects, informed consent has been obtained from the participants involved. Ethical approval was obtained from the Tel Aviv-Yaffo Academic College IRB ethic committee, Ethical Approval 2020026IRB.

## Consent to Publish

Not applicable.

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## Supplemental Material

Supplemental material for this article is available online.

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