Cost Effectiveness and Resource Allocation

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Willingness to pay for cataract surgery and its associated factors in selected medical centers in Urmia, Iran

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Abstract

Introduction Cataracts represent a significant public health issue and are the most prevalent vision disorder following refractive errors. They can restrict the economic, social, and psychological activities of those affected, thereby diminishing their quality of life. This study was undertaken to examine the willingness to pay for cataract surgery and the factors influencing this decision in selected medical centers in Urmia. The two-stage Heckman model was utilized to aid decision-making in financing this service.

Methods This research was a descriptive-analytical study evaluating the economic aspects of health interventions, conducted from the patient's perspective. In this cross-sectional study, a sample size of 217 patients with cataract issues was selected using Michel Carson's table. These patients were from Imam Khomeini Hospital and Aftab Urmia Surgery Center in 2023. Data was collected using a conditional valuation approach to determine the maximum amount patients were willing to pay, as gathered through a questionnaire. The factors influencing the willingness to pay for cataract surgery were estimated using the two-stage Heckman regression model. The final effect value of each variable was calculated using Stata version 14 software.

Results In this study, 81.11% of participants (176 individuals) expressed a willingness to pay for cataract surgery, with the average amount they were willing to pay being $206.3. However, out of the 217 respondents, 41 rejected the proposed amounts and were not willing to pay anything. The results of the Hemken model indicated that the income of patients and the size of their households significantly influenced their willingness to pay for cataract surgery. However, other variables investigated did not have a significant impact.

Conclusion The study results revealed a significant influence of both income and household size on the likelihood of willingness to pay, as well as the extent of willingness to pay for cataract surgery. Consequently, it is crucial to formulate policies and provisions that guarantee access to cataract services, particularly for individuals from large households with low income and high costs.

Keywords Cataract surgery, Contingent valuation, Two-stage Hemken model, Willingness to pay

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Introduction

Cataracts, characterized by the opacity of the eye lens that appears milky or gray, are a common cause of disability in the elderly, alongside heart disease and arthritis [1]. This condition is a significant public health issue, being the most prevalent vision disorder after refractive errors. It can limit individuals' daily activities and, in some cases, even deprive them of economic, social, and psychological activities, significantly impacting the affected person's quality of life [2].

"Based on estimates from the World Health Organization (WHO), approximately 180 million individuals globally are afflicted with visual impairment. Of these, 45 million people (25% of those over 65 years old and 50% of those over 80 years old) experience severe vision loss to the point of blindness [3]. Cataract disease is marked by increasing vision blurriness and visual impairment, with its prevalence rising with age [4].

Globally, 16 million people are blind due to cataracts, and the burden of blindness is higher in developing countries [5]. Iran is no exception to this rule [2], with 90% of blind people with cataracts living in developing countries, and the prevalence of blindness caused by cataracts is increasing in these countries. In Iran, approximately 9.27% of individuals aged over 65 are affected by cataract disease [6]. It is estimated that about 100,000 cataract surgeries are performed annually, indicating the high prevalence of cataracts in Iran [7]. In Iran, a considerable number of people struggle with their health conditions due to the high costs associated with eye treatment. The cost of cataract surgery varies, influenced by factors such as the patient's insurance coverage and whether the service provider is private or public. On average, the cost stands at approximately $2490, with patients typically paying about 40% of this amount out-of-pocket.

The goal of the WHO's Global Eye Care Program is to reduce avoidable blindness and visual impairment. To achieve the WHO global target, strategies should be implemented to decrease the prevalence of vision loss due to cataract and its unequal distribution. These strategies include improving the quantity, quality, and access to cataract services, especially for the lower income deciles. The WHO has set a cataract surgery rate (CSR, cataract surgeries per million population per year) of 3000 as the minimum necessary to eliminate cataract blindness [8]. According to the WHO standards, communities where the rate of cataract surgery is increasing are considered developed in the field of eye health services. The findings show that Iran is not optimal in terms of cataract surgery and is significantly less than the standard amount (3000 surgeries per 1 million people) announced by the WHO. This indicates the country's underdevelopment in the field of ophthalmology services. Therefore, many people in remote areas of Iran have become blind or have low vision due to cataracts, a disease that can be easily treated if diagnosed in time, preventing blindness and disability [9].

In general, people are willingness to pay (WTP) a certain amount to obtain a product or service of a certain quality, thereby increasing their utility and well-being. In this case, the WTP indicates the individual's valuation for the product [10, 11].

The concept of WTP has become increasingly prevalent in economic evaluation studies and cost-benefit analyses in the health sector, including new health technologies, drugs, and surgical procedures. WTP is a tool used to estimate people's ability to pay, thereby determining the monetary value of a hypothetical healthcare program. Many studies have employed the contingent valuation method to estimate people's WTP for health services. Healthcare researchers often use contingent valuation to value non-market goods and hypothetical therapies [11]. By establishing a hypothetical market and conducting a direct survey, this method determines people's WTP for the desired product or service, primarily influenced by their social and economic conditions [12].

The only available treatment for cataracts is surgery to remove the lens. This surgery is the most common and necessary ophthalmic procedure worldwide, improving people's social and economic well-being by preventing blindness [13]. Studies have shown that the WTP for cataract surgery is influenced by factors such as economic status, gender, age, knowledge about surgery, pre-surgery visual acuity, occupation, and family size. Patients with cataracts often do not receive medical treatment due to various reasons, including cost concerns, fear of surgery, low quality of services, transportation issues, and lack of family support, making them unwilling to pay for cataract surgery [14–18].

WTP varies significantly due to socio-economic status and different study environments, making it challenging to apply research findings from other parts of the world to this study area. Planning for successful cataract treatment should begin as early as possible, with part of the planning process involving assessing demand and people's WTP for treatment. If a patient is unwilling to pay anything, they are removed from the sample size, leading to selection bias. Therefore, it is necessary to use econometric methods of sample selection.

To date, no study has been conducted in Iran to evaluate the WTP for cataract surgery. This cross-sectional study, the first of its kind, takes into account the geographical situation of the region and the fact that most people in Urmia are engaged in agriculture and are thus exposed to more sunlight, a risk factor for cataracts. The study aimed to evaluate the WTP for cataract surgery among patients over 40 years of age who were referred to selected medical centers. The factors affecting this

willingness were assessed using the conditional valuation (CV) method. The goal is to prevent blindness and dangerous complications of this disease through proper planning and management. When managers are aware of the extent to which people are willing to cooperate in the treatment of this disease, they can make more informed decisions. In Iran, many people struggle with their disease due to their inability to afford the high costs of eye treatment. Currently, the payment for cataract surgery service providers in Iran's health system is made through basic, supplementary health insurances, or out-of-pocket payments. Considering that providing this service reduces avoidable blindness related to cataracts and brings socio-economic welfare, it is crucial to evaluate the WTP from the patients' perspective. This understanding of the valuation of cataract surgery is essential for designing a cost recovery model and financing this service.

Methods

Participants were selected from patients referred to public and private centers in Urmia city for cataract surgery. The study included all cataract patients over 40 years of age, excluding those with speech and hearing disorders. Based on the Michel and Carson relationship used in WTP studies, the optimal sample size was determined to be 217.

Data were collected in 2023 through structured questionnaires during face-to-face interviews at selected centers. The Conditional Valuation (CV) bidding game method was used to estimate participants' WTP for cataract surgery. After explaining the valuation of cataract surgery, participants were asked whether they would accept or reject any payment for the surgery. Those who agreed to pay some expenses were asked about their maximum WTP via the bidding game. The study considered various independent variables, including age, gender, residence, marital status, education, employment, household head, household size and income, familiarity with cataract surgery, affected eye(s), preoperative visual acuity, and health insurance.

The two-step Heckman method and Stata version 14 software were used to identify and extract factors influencing payment for cataract surgery. This method assumes that one set of variables can influence the decision to perform an activity, and another set can affect the extent of the activity after the initial decision. These two variable sets are not necessarily the same [19, 20]. Heckman's two-stage method, which includes a probit model and a linear regression model, was used to determine the influential factors and their extent [21]. The probit model included factors that could influence patients' decision on WTP for cataract surgery, while the linear regression model included factors that could affect the extent of WTP. The second model was estimated by adding a new variable, the inverse mills ratio (IMR), to the first stage's independent variables set, which was derived from the first model's estimation [22].

The dependent variable in the probit model (Z_i) is a binary variable with values of zero and one, where one indicates the decision to pay for cataract surgery, and zero indicates the decision not to pay.

The two patterns derived from the separation of the Tobit pattern are represented by the following relationships:

Probit model:

$$Z_i = \beta' X_i + V_i \quad i = 1, 2, \cdots, N \tag{1}$$

$$Z_i = 1 \text{ if } Y_i^* > 0$$

$$Z_i = 0 \text{ if } Y_i^* < 0$$

Linear regression model:

$$Y_i = \beta' X_i + \sigma \lambda_i + e_i \quad i = 1, 2, \cdots, N \tag{2}$$

In these two models, β' and σ are the model parameters and V_i and e_i are the error terms in the above models, which are independent of explanatory variables assuming a normal distribution with zero mean and constant variance σ^2. λ_i is also the inverse of the mills ratio, which is calculated from Eq. (3) using the estimated parameters of the probit model for all observations $Y_i > 0$.

$$\lambda_i = \frac{\varnothing\left(\frac{\beta' X_i}{\sigma}\right)}{\Phi\left(\frac{\beta' X_i}{\sigma}\right)} \tag{3}$$

In the above relation,

$$\Phi\left(\frac{\beta' X_i}{\sigma}\right)$$

and

$$\varnothing\left(\frac{\beta' X_i}{\sigma}\right)$$

represent the density function and standard normal variable distribution function, respectively.

The inverse of the mills ratio in the linear regression model addresses the issue of heteroscedasticity, enabling the use of the Ordinary Least Squares (OLS) estimator. By applying the OLS method, we can identify the variables that influence willingness to pay, as determined by estimating Eq. 2. It's important to note that the coefficients of Eq. 1, estimated using the probit method, cannot be interpreted directly. They are used solely to determine the direction of the relationship (positive or negative). To examine the impact of independent variables on the expected value of the dependent variable, the marginal effects were estimated.

In the second stage, the values of the dependent variable revert to their original state before the first stage changes. Observations with a dependent variable below the censoring threshold are then removed from the estimation process. Only observations with a dependent variable above the censoring threshold are used to estimate the regression. The inverse mills ratio's coefficient represents the error caused by sample selection. If this coefficient is statistically greater than zero, removing zero observations from the dataset will bias the model's estimated characteristics. If the coefficient is not significant, removing zero observations will not bias the estimated characteristics, but it will reduce the efficiency of the estimator. The results from the previous stage were then analyzed to identify and measure the factors influencing willingness to pay for cataract surgery.

In order to provide an accurate estimation of the direct costs related to cataract surgery, we utilized patient files and cataract surgery tariffs. This includes the costs associated with visits, surgeries, tests, and medical items. The basis for these tariffs was the 2023 tariff book, the relative value of services, and the professional opinions of ophthalmologists.

Results

Upon examining the demographic information of the patients, it was discovered that the majority of the research sample consisted of male participants (64.52%). A significant portion of these participants (57.6%) had formal education, and 70.05% were heads of households. A large number of participants reported their visual acuity to be less than 50 (96.31%), indicating a high prevalence of eye health problems. Approximately 73.27% of respondents have undergone cataract surgery, and only 17.51% had cataracts in both eyes. Out of 217 people, 141 are employed and 174 are married. Nearly half of the surveyed individuals (48.85%) reported that their income is below the poverty line. More than half of the participants (51.61%) live in rural areas, and 55.76% were not familiar with cataract surgery.

The average time spent with these conditions was less than a year. About 63.13% of the participants did not report any eye disease other than cataract, and 40.55% did not report any systemic disease. More than half of the participants (52.53%) stated that they are not covered by basic health insurance services. The majority of the participants (81.57%) have sought treatment for their eye disease at government medical centers. In this study, 81.11% of participants (176 people) expressed willingness to pay for cataract surgery, with the average amount being $206.3. However, 41 out of the 217 respondents rejected the proposed amounts, stating that they were WTP nothing and considered it the government's responsibility. The average family size among the participants was five.

Table 1 presents the estimation results from the first stage of the two-stage Heckman model (probit model). The significance of the overall regression was checked using the likelihood ratio (LR) statistic, which was found to be 55.66. Given that the probability of the LR statistic is less than 5%, it can be inferred that this model is significant and highly reliable at the 95% confidence level.

The coefficients reported in this table only indicate the direction of the influence of independent variables on patients' decision to pay for cataract surgery. According to the results, the estimated coefficient for the household size variable is negative and equal to 0.1 at the 5% error level. This suggests a significant negative relationship between household size and the probability of patients' WTP. The estimated coefficient for the income status variable is positive and equal to 1.35 at the 1% error level, indicating a significant positive relationship between income status and the likelihood of patients' WTP.

Based on the results, apart from the variables of income status and household size, other variables did not significantly affect the willingness of patients to pay for cataract surgery.

Due to the uninterpretability of the probit results, to investigate the effect of the independent variables on the probability of patients' WTP for cataract surgery, the marginal effects of the variables that actually indicate elasticity were averaged to obtain the effect of the variables, whose values are shown in Table 2.

The second stage of the two-stage Heckman model, presented as a linear regression model, is estimated and the results are displayed in Table 3. In this stage, the inverse coefficient of the mills ratio is calculated for patients who have a positive WTP, based on the probit model results. This coefficient is considered as a significant variable influencing patients' WTP for cataract surgery. The estimation results highlight the substantial impact of this variable on patients' WTP, underscoring the necessity of employing the Heckman's two-stage model to avoid sample selection bias. The parent statistic

Table 1 The estimation results of the first stage of the two-stage Heckman model (probit model)

Row	Variable		Coefficient	Standard error	z	*P*>|z|
1	Constant		-0.442927	1.099755	-0.4	0.687
2	Sex		0.559064	0.6733877	0.83	0.406
3	Marital status		0.5864231	0.3669433	1.6	0.11
4	Residence		-0.315015	0.8064054	-0.39	0.696
5	Health insurance status		-0.285952	0.8120848	-0.35	0.725
6	Income status		1.351659	0.2943545	4.59	0
7	History of cataract surgery		-0.034654	0.3161874	-0.11	0.913
8	Employment status	farmer (1)	ref.			
		day-laborer (2)	0.4270107	0.3586724	1.19	0.234
		employee (3)	0.1115752	0.5810532	0.19	0.848
		unemployment/retired (4)	0.7058779	0.5838559	1.21	0.227
9	Educational status		0.4306897	0.2637001	1.63	0.102
10	Family size		-0.10075	0.0522524	-1.93	0.05
11	Family head		0.0173702	0.3665863	0.05	0.962
12	Familiarity with cataract		-0.004938	0.2705899	-0.02	0.985
13	Type of treatment center		0.4459119	0.4201671	1.06	0.289
14	Eye affected by cataract	right (1)	ref.			
		left (2)	0.0993777	0.2696921	0.37	0.713
		both (3)	0.2109893	0.3586127	0.59	0.556
15	Time spent with cataract		-0.280168	0.2940173	-0.95	0.341
16	Preoperative visual acuity		-0.020275	0.6476432	-0.03	0.975
17	Self-reported eye complications		0.3423426	0.2627849	1.3	0.193
18	Self-reported systemic eye disease		0.1761758	0.2563241	0.69	0.492
19	Number of observations		217			
20	Logarithm of probability		-78.78961			
21	Pseudo R2		0.261			
22	LR chi2 (21)		55.66			
23	Prob > chi2		0			

Table 2 The results of estimating the marginal effect of the probit model on the average of the independent variables

Row	Variable		dy/dx	standard error	z	*P*>|z|
1	Sex		0.117083	0.1544032	0.76	0.448
2	Marital status		0.135994	0.0999217	1.36	0.174
3	Residence		-0.060219	0.1559867	-0.39	0.699
4	Health insurance status		-0.053834	0.152289	-0.35	0.724
5	Income status		0.2685904	0.0546545	4.91	0.000
6	History of cataract surgery		-0.006507	0.058754	-0.11	0.912
7	Employment status	farmer (1)	ref.			
		day-laborer (2)	0.096028	0.0811074	1.18	0.236
		employee (3)	0.0293108	0.1490757	0.2	0.844
		Unemployed / Retired (4)	0.1364857	0.1078986	1.26	0.206
8	Educational status		0.0852101	0.0536175	1.59	0.112
9	Family size		-0.019104	0.0099401	-1.92	0.05
10	Family Head		0.0032797	0.0689238	0.05	0.962
11	Familiarity with cataract		-0.000937	0.0513361	-0.02	0.985
12	Type of treatment center		0.0710008	0.0537204	1.32	0.186
13	Eye affected by cataract	right (1)	ref.			
		eye (2)	0.0195579	0.0532073	0.37	0.713
		both (3)	0.0388302	0.0625346	0.62	0.535
14	Time spent with cataract		-0.057631	0.0652731	-0.88	0.377
15	Preoperative visual acuity		-0.003889	0.1256136	-0.03	0.975
16	Self-reported eye complications		0.0686282	0.0545727	1.26	0.209
17	Self-reported systemic eye disease		0.0327518	0.0468073	0.7	0.484

Table 3 The estimation results of the second stage of the two-stage Heckman model (linear regression model)

Row	Variable		Coefficient	standard error	z	*P*>|z|
1	Constant		0.146226	1.028661	0.14	0.887
2	Sex		0.4842669	0.63862	0.76	0.448
3	Marital status		0.5029652	0.3447849	1.46	0.145
4	Residence		-0.2201143	0.7845788	-0.28	0.779
5	Health insurance status		-0.2850529	0.7873446	-0.36	0.717
6	Income status		1.28558	0.2818277	4.56	0.000
7	Employment status	farmer (1)	Ref.			
		day laborer (2)	0.3342178	0.3499275	0.96	0.34
		employee (3)	0.05269	0.5651545	0.09	0.926
		Unemployed / Retired (4)	0.5117448	0.5564928	0.92	0.358
8	Educational status		0.3194747	0.2490572	1.28	0.2
9	Family size		-0.1002315	0.0501733	-2	0.046
10	Family head		0.0102589	0.3485236	0.03	0.977
11	Type of treatment center		0.2871371	0.3974957	0.72	0.47
12	Time spent with cataract		-0.2276048	0.2528077	-0.9	0.368
15	Number of observations		176			
16	Inverse of mills ratio		-3,113,127	1,231,399	-2.53	0.011
17	Rho		-0.87078			
18	Sigma		3,575,121			
19	Wald chi2 (10)		46.21			
20	Prob > chi2		0.0000			

coefficient is 46.21, significant at the 1% level, indicating that the explanatory variables included in the model are significantly non-zero and have the ability to explain the dependent variable.

Discussion

The high prevalence of cataract in Iran necessitated research to understand the factors determining patients' WTP for surgery in the medical centers of Urmia city in West Azarbaijan province. In this study, 81.11% of participants (176 individuals) expressed a willingness to pay for cataract surgery, with the average amount they were willing to pay being $206.3. However, out of the 217 respondents, 41 rejected the proposed amounts and were not willing to pay anything.

According to the marginal effect estimation of the probit model, income status had the highest correlation with the WTP. An increase in income level increased the probability of WTP by 0.27%. Essentially, patients with more income sources have a higher financial capacity, leading to a higher probability of WTP. Marital status and gender were the next influential variables. Men had a 0.12% higher probability than women, and married individuals had a 0.13% higher probability than singles to express WTP. Among the variables investigated, being the head of the household had the least positive effect on the WTP. However, the probability of WTP was 0.33% higher for patients who were heads of households compared to those who were not. These patients have more job opportunities and income sources. In contrast, patients who are not heads of households are less likely to be employed and rely more on support from their children or pensions. Consequently, these patients have a lower probability of WTP. The status of health insurance had a negative and insignificant effect on the probability of patients' WTP for cataract surgery. Patients without insurance had 5.38% less probability of WTP for surgery than those with insurance. The effect of surgery history and familiarity with cataract disease was negative and insignificant compared to patients with no history of cataract surgery and unfamiliarity with the disease. No significant relationship was observed between WTP probability and complications and systemic eye disease. However, patients without complications and systemic eye disease had 6.86% and 3.27% more probability of WTP, respectively, than the reference group.

Considering the inverse relationship between household size and the probability of patients' WTP for cataract surgery, it can be stated that due to the strong inflation growth in recent years, the cost effects of household size outweigh its income effect. As the size of the household increases, the probability of willingness to pay decreases. With an increase in the number of family members, the expenses for food, clothing, education, etc. inevitably increase. Therefore, such households had a lower probability of WTP.

The second stage of the two-stage Heckman model (a linear regression model) yielded results where all coefficients were insignificant, except for income status and household size variables. As anticipated, an increase

in the number of family members negatively impacted the WTP, with each additional member reducing WTP amount by 10%. The income status of patients positively influenced their WTP amount. The sample was divided into two income groups: those below the poverty line and those at or above the poverty line. The group below the poverty line was removed from the independent variables as the base group. The results indicated that patients with an income at or above the poverty line have a WTP amount that is approximately 128.5% higher than those below the poverty line.

A similar study conducted in Ethiopia investigated the factors affecting the WTP. The main reasons for unwillingness to pay and inability to seek eye care services in the past were lack of financial resources, lack of awareness about accessing cataract surgery services, and waiting for a campaign [23]. Research in Nepal showed that poverty (44.4%) was the primary barrier to WTP for cataract surgery. Other reasons included lack of family support (28.9%), lack of knowledge about surgery and belief in its unnecessariness (15.6%), and expectation of receiving free surgery services (11.1%). Despite sufficient awareness of available treatment and services, poverty was the main reason people were unwilling to pay for surgery and use the facility. Therefore, a holistic approach is needed to change patient attitudes in Nepal, considering the cultural, social, and economic background of the society [24].

Comparing the WTP in this study with other studies shows a significant difference in the amount of WTP for cataract surgery in Urmia city compared with other countries and regions. This result was comparable to studies conducted in Jimma, Ethiopia ($12.4) [25], and in northern Nigeria ($18.5) [26]. On the other hand, the WTP amount of this study is higher than that of the campaign-based studies conducted in Tanzania ($2.3) [27], Malawi ($3) [28], and Nepal ($7) [15]. The research method and other factors appear to significantly influence the estimation of WTP amount for cataract surgery. Most of the studies referenced were conducted with a minimum sample size selected by non-random sampling, which could account for the inconsistency in the results across this field. However, the findings of this research were lower than those of studies conducted in Hong Kong ($552) [16] and China ($968) [17]. Both of these studies included cataract patients on hospital waiting lists and used the conditional valuation proposal game method to determine WTP. Their target price was relatively higher compared to this study, suggesting that a difference in target price could justify interventions in the field of cataract surgery. It's worth noting that China and Hong Kong have a higher per capita income and health expenditure compared to African countries such as Ethiopia, Tanzania, Malawi, and Nigeria. Consequently, residents of these two Asian countries demonstrate a greater WTP for health services, particularly cataract surgery [16, 17].

Our study found that out of 217 respondents, 41 individuals rejected the suggested amounts for cataract surgery, expressing a WTP of zero. These individuals believed that it was the government's responsibility to support patients who required cataract surgery. This finding aligns with the research by Ibrahim et al., which indicated that the WTP for cataract surgery among adults with operable cataracts in a village in Zamfara state is significantly lower than the current surgery costs. Widows, who were predominantly women, were WTP the least. This study underscores the need for increased financial support from the central government to make cataract surgery accessible to the public [26].

One limitation of our research is the potential non-cooperation of some patients in providing information. In such cases, the interviewer provided explanations to emphasize the importance of this research in evaluating financial support and financing methods for this treatment, encouraging full participation from the statistical community. One potential government support policy could involve mandating insurance companies to provide coverage for these individuals without the necessity for them to pay insurance premiums.

Moreover, participants, on average, expressed a willingness to pay $206.3 for cataract surgery. However, the average cost of treating this disease stands significantly higher at $2490. The derived amounts are rational, considering that the willingness to pay is directly influenced by the patients' ability to pay. The substantial discrepancy between these figures underscores the necessity for implementing government support policies.

Conclusions

This research investigated several factors influencing the willingness to pay for cataract surgery. The results indicated a significant relationship between the willingness to pay and two variables: income and household size. It was observed that individuals with low income lack the financial capacity to afford cataract surgery and thus require government support. There was a notable correlation between the willingness to pay for cataract surgery and the patients' monthly income. It appears that due to financial constraints, low-income individuals are less willing to undergo cataract surgery. However, these individuals are more vulnerable due to their deteriorating vision, imposing substantial costs on the health system, patients, and their families. Therefore, it is necessary to consider support arrangements for cataract surgery for low-income individuals. Additionally, large families, due to high costs, lack sufficient access to health services, including cataract surgery, and should also receive support. Other variables were also examined as influential

factors on the willingness to pay for cataract surgery. These factors should be taken into account by managers and health policy makers when setting tariffs, determining costs, and providing stable financial resources for this treatment service.

Abbreviations

WHO World Health Organization
WTP Willingness to Pay
CV Conditional Valuation

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Author contributions
All authors played a role in the conception and design of the study. F.R. and H.Y. performed the data analysis. H.Y., C.A., B.F. and F.R. collected the data and drafted the manuscript. H.Y. and F.R. critically revised the manuscript for important intellectual content. All authors have read and given their approval for the final manuscript.

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Data availability
No datasets were generated or analysed during the current study.

Declarations

Ethics approval and consent to participate
This study was approved by the Ethics Committee of the Urmia University of Medical Sciences (IR.UMSU.REC.1401.236).

Consent for publication
Not applicable.

Competing interests
The authors declare no competing interests.

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