Original Article

Economic and social factors that influence households not willing to undergo cataract surgery

Muralikrishnan Radhakrishnan, Rengaraj Venkatesh[1], Vijayakumar Valaguru[2], Kevin D Frick[3]

Purpose: Literature investigating barriers to cataract surgery is mostly done from the patient's point of view. However, many medical decisions are jointly taken by household members, especially in developing countries such as India. We investigated from the household head's (or representative's) perspective, households' view on those not willing to undergo cataract surgery along with the economic and social factors associated with it. **Materials and Methods:** A cross-sectional survey of four randomly selected village clusters in rural areas of Theni district, Tamil Nadu, India, was conducted to elicit the willingness to pay for cataract surgery by presenting "scenarios" that included having or not having free surgery available. The presentation of scenarios allowed the identification of respondents who were unwilling to undergo surgery. Logistic regression was used to estimate relationships between economic and social factors and unwillingness to undergo cataract surgery. **Results:** Of the 1271 respondents, 49 (3.85%) were not willing to undergo surgery if they or their family members have cataract even if free surgery were available. In the regression results, those with good understanding of cataract and its treatment were less likely to be unwilling to undergo cataract surgery. Those not reporting household income were more likely to be unwilling to undergo cataract surgery. **Conclusions:** As a good understanding of cataract was an important predictor of willingness to undergo cataract surgery, health education on cataract and its intervention can improve uptake.

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Economic and social factors have been reported as a barrier preventing patients from undergoing cataract surgery in developing countries.[1-4] The various barriers to cataract surgery include poverty, lack of transportation infrastructure, gender, low awareness levels, accessibility, and cost.[3,5-8] Lack of social support, such as finding an escort or obtaining permission from other family members, especially husbands for women patients, has also been reported as a barrier to obtain surgery.[4,9,10]

Many high-risk, elderly cataract patients in the developing countries including India, might not have their own money and may be dependent on their family for support.[4,11] Literature also reports that the success of strategies for reducing cataract backlog are related not only to surgical considerations but also to equally important issues related to the levels of education, economic wealth, and occupation for cataract patients and their guardian(s).[2] Research in India has also shown that a significant proportion (around 40%) of people with eye problems report reasons such as "God's Will," "Too Old," "No point," and other "Miscellaneous Reasons" for nonuse of eye care services.[3] Perhaps, this is indicating that a person's understanding of cataract and its treatment is an important explanatory factor for the nonuse of eye care services.

King's Health Economics, The David Goldberg Centre, London SE5 8AF, United Kingdom, [1]Aravind Eye Hospital and Postgraduate Institute of Ophthalmology, Puducherry, [2]Lions Aravind Institute of Community Ophthalmology, Madurai, Tamil Nadu, India, [3]Johns Hopkins Carey Business School, Baltimore, Maryland, USA

Correspondence to: Dr. Rengaraj Venkatesh, Aravind Eye Hospital and Postgraduate Institute of Ophthalmology, Puducherry, India. E-mail: venkatesh@pondy.aravind.org

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Most of the studies investigating barriers to the use of eye care services have taken the patients' point of view, but not the household's view. Literature states that, "some of the factors determining acceptance of surgery involve complex family and social processes unfolding over several months or sometimes years," in spite of the fact that cataract surgery benefits not only patients but also the family members.[4] We tried to investigate the household's point of view through a cross-sectional survey to understand what among the potential explanatory factors influences unwillingness to undergo cataract surgery in rural India.

Materials and Methods

The study used data from a larger cross-sectional survey to investigate population-based willingness to pay (WTP) for cataract surgery in rural India.[12] The cross-sectional survey was conducted in the rural areas of one district, Theni in Tamil Nadu state, India in 2005. According to the census of India survey-2001, Theni has a total population of 1,093,950 (rural: 45.90%, urban: 54.1%). After listing all respective census villages in rural areas (total population: 502,109), they were divided into 384 sampling clusters (population range between 1250 and 1750). To estimate the required sample size

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of >900 households, we used a conservative proportion (to yield the highest possible sample size) of 50% of the households unwilling to undergo cataract surgery, along with a design effect of 2 to adjust for clustering, an anticipated response rate of 80% for each cluster, a margin of error of 5%, and confidence levels of 95%. Expecting an average of 300 households/cluster, four clusters were randomly selected from the list of 384 rural clusters. The sampling units were households, represented by the household head/representative. The representation of only one respondent per household is due to the fact that medical decisions such as the acceptance of surgery involve complex family and social processes, and most of the adult family members participate in the decision-making process.[4] In this current study, a single individual's (household head or their representative) response on WTP for cataract surgery on behalf of all household members was considered to be representative of the entire household's view, if any person in the household were to undergo cataract surgery. This methodology was adopted for pragmatic reasons and it was felt that household head's view would adequately reflect the entire household's view, especially with pooled income/expenditure practices being prevalent in the rural areas of India. A household head is defined as the member of the household who plays the key role in making the important financial decisions of the household. The household heads or their representatives (if the household head was not available) were interviewed at their homes by field workers, after obtaining free and informed consent. Ethical clearance for the study was given by the Institutional Review Board of the Aravind Eye Hospital and Postgraduate Institute of Ophthalmology, Madurai, India.

The survey collected information on household characteristics (location, house and land ownership, annual household income, ownership of household assets, and access to loans) and respondent characteristics (gender, age, marital status, education, and occupation). Many households were also expected not to disclose income, and hence a dummy variable for missing income was also included. Any previous family history with cataract surgery was also expected to influence cataract surgery preference and was included as an independent variable. For instance, a household that had a history of using only "free surgery" was expected to be unwilling to pay for the surgery. Further, assessment of respondent's knowledge about the cataract disease condition, its intervention and treatment were also conducted. This assessment was done on a four-point scale: "Very high," "high," "low," and "very low," after a standard scientific explanation of cataract, its intervention and treatment using local terminology (validated by clinicians participating in the study), by the field workers. Respondents were then asked to explain about cataract disease condition, its intervention and treatment to the field workers, before the assessment was done. For respondents who did not understand the scientific explanation for the first time, a maximum of three repeated scientific explanations were given, before categorization of their understanding by field workers. All respondents who were assessed to have "very high" and "high" understanding were categorized as respondents with "Good Understanding" of cataracts and their interventions. Following the assessment, respondents were presented with the following scenario questions: If you or any of your household members have cataract, are you willing to pay money for the surgery? If the initial response was "no," the following questions were then asked: Are you or your household members willing to undergo free cataract surgery? If the response was "no," the respondents were categorized as "not willing" for any cataract surgery and were included in a logistic regression model as the dependent variable. The study sites were serviced by eye care providers who provided fully free cataract surgeries (include transportation back and forth to base hospital, surgery, and hospitalization cost), mainly financed through the District Blindness Control Societies, the institutional structure of National Program for the Control of Blindness. Thus, the population understood what "free surgeries" meant during the interviews. Fig. 1 provides an overview of the elicitation process. Household, respondent, and cataract-specific characteristics were the independent variables included as multiple covariates in the logistic regression model. As a part of the study, those categorized as "not willing" to undergo cataract surgery were also asked to cite their reasons, which were qualitatively elicited during interviews. Statistical analyses were conducted using STATA 10.1 software (STATA Corporation, College Station, Texas, USA).

Results

Table 1 presents the characteristics of the households, respondents, and the cataract-specific variables of those "not willing" for cataract surgery compared to all others. Among those who were "not willing" to undergo surgery, only 3 (6.12%) owned any land, and a majority of them, 36 (73.47%) had none of the listed household wealth items. Only 7 (14.29%) reported having access to loans without any difficulty. Ten (20.41%) of them reported having no access to loans at all. A majority of those "not willing" to undergo surgery (30, 61.16%) had an annual household income <Rs. 24,000. Twelve (24.49%) did not report their annual incomes.

Of the respondents "not willing" to undergo surgery, a majority of 38 (77.55%) were females; 42 (85.71%) were above 40-year-old, and 21 (42.86%) were married. A majority of the 34 (69.39%) respondents were household heads. A large proportion, 40 (81.63%) did not have any schooling, and 27 (55.10%) were not working, were retired or dependents. Only 17 (34.69%) had a good understanding of cataracts and their intervention and 39 (79.59%) had no family cataract surgery history. Among those households who had a family history of

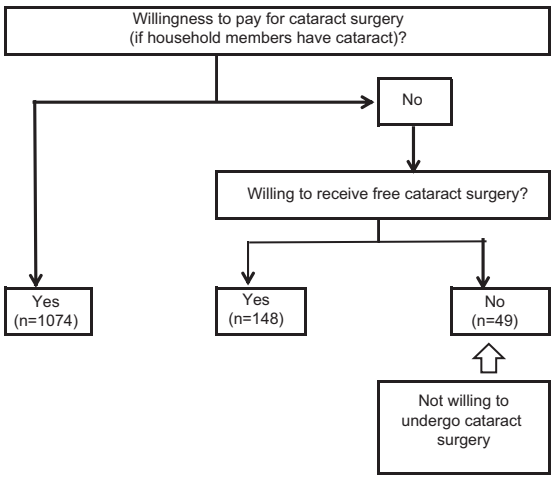

Figure 1: Willingness to undergo cataract surgery elicitation process

Table 1: Distribution of household, respondent, and cataract-specific characteristics

	Not willing (*n*=49) (%)	All others (*n*=1222) (%)	Total (*n*=1271) (%)	*P*
Region/village				
Village (Anaikaraipatty)	15 (4.90)	291 (95.10)	306 (100)	0.275
Village (Kottur)	11 (3.32)	320 (96.68)	331 (100)	0.559
Village (Muthalapuram)	15 (4.64)	308 (95.36)	323 (100)	0.394
Village (Rayapanpatty)	8 (2.57)	303 (97.43)	311 (100)	0.176
Household characteristics (wealth and income)				
Good house roof	41 (3.57)	1109 (96.43)	1150 (100)	0.098
House ownership	43 (3.99)	1036 (96.01)	1079 (100)	0.568
Land ownership	3 (0.96)	311 (99.04)	314 (100)	0.002
Bicycle ownership	10 (2.00)	489 (98.00)	499 (100)	0.006
Household items (none)	36 (6.83)	491 (93.17)	527 (100)	<0.001
Household assets (1 item)	7 (1.64)	421 (98.36)	428 (100)	0.003
Household assets (2 items)	5 (3.40)	142 (96.60)	147 (100)	0.761
Household assets (3 items or more)	1 (0.59)	168 (99.41)	169 (100)	0.018
Loan access (without difficulty)	7 (1.77)	388 (98.23)	395 (100)	0.010
Loan access (with difficulty)	32 (3.96)	776 (96.04)	808 (100)	0.797
No loan access	10 (14.71)	58 (85.29)	68 (100)	<0.001
Household income (≤12,000)	14 (4.40)	304 (95.60)	318 (100)	0.558
Household income (12,001-24,000)	16 (3.19)	486 (96.81)	502 (100)	0.318
Household income (≥24,001)	7 (1.73)	397 (98.27)	404 (100)	0.007
Household income (missing data)	12 (25.53)	35 (74.47)	47 (100)	<0.001
Respondent characteristics				
Male	11 (2.58)	415 (97.42)	426 (100)	0.094
Female	38 (4.50)	807 (95.50)	845 (100)	
Age (years)				
≤20	1 (6.25)	15 (93.75)	16 (100)	0.017
21-40	6 (1.09)	544 (98.91)	550 (100)	<0.001
41-60	18 (3.45)	504 (96.55)	522 (100)	0.529
>60	24 (13.11)	159 (86.89)	183 (100)	<0.001
Household head	34 (5.85)	547 (94.15)	581 (100)	0.001
Household head (representative)	15 (2.17)	675 (97.83)	690 (100)	<0.001
Marital status (married)	21 (2.04)	1007 (97.96)	1028 (100)	
Marital status (unmarried/others)	28 (11.52)	215 (88.48)	243 (100)	<0.001
Education (no schooling)	40 (8.00)	460 (92.00)	500 (100)	<0.001
Education (primary school)	4 (1.04)	380 (98.96)	384 (100)	0.001
Education (higher secondary and above)	5 (1.29)	382 (98.71)	387 (100)	0.002
Not working/retired/dependent	27 (5.56)	459 (94.44)	486 (100)	0.013
Occupation (unskilled)	18 (3.25)	535 (96.75)	553 (100)	0.329
Occupation (skilled/others)	4 (1.72)	228 (98.28)	232 (100)	0.062
Cataract-specific variables				
Good understanding	17 (1.95)	855 (98.05)	872 (100)	<0.001
Poor understanding	32 (8.02)	367 (91.98)	399 (100)	<0.001
Family surgery history (free)	6 (5.36)	106 (94.64)	112 (100)	0.387
Family surgery history (paid)	4 (4.71)	81 (95.29)	85 (100)	0.673
No family surgery history	39 (3.63)	1035 (96.37)	1074 (100)	0.333

surgery, 6 (12.24%) had free surgery history and 4 (8.10%) had paid surgery history.

In the logistic regression model [Table 2], with the dependent variable being an indicator for "not willing" to accept cataract surgery, there were only few significant associations between the socioeconomic variables and the outcomes. Respondents being in Muthalapuram village and being married were less likely to be "not willing" for surgery, but both the variables were only marginally significant. Those who did not report the income were more likely to be "not willing" for cataract

Table 2: Logistic regression results

Variables	OR (95% CI)*
Village (Kottur)	0.66 (0.26-1.69)
Village (Muthalapuram)	0.34 (0.13-0.84)
Village (Rayapanpatty)	0.50 (0.18-1.40)
Good house roof	0.80 (0.32-2.00)
House ownership	1.61 (0.61-4.27)
Land ownership	0.27 (0.07-1.04)
Bicycle ownership	0.86 (0.35-2.11)
Household assets (1 item)	0.59 (0.22-1.60)
Household assets (2 items)	1.48 (0.44-4.97)
Household assets (3 items or more)	0.68 (0.07-6.91)
Loan access (without difficulty)	1.19 (0.31-4.48)
Loan access (with difficulty)	1.77 (0.62-5.05)
Household income (12,001-24,000)	1.36 (0.58-3.15)
Household income (>24000)	0.90 (0.32-2.59)
Household income (missing data)	5.81 (1.89-17.81)
Male	0.89 (0.29-2.78)
Age (years)	
21-40	0.16 (0.01-1.87)
41-60	0.36 (0.03-3.91)
>60	0.91 (0.08-10.13)
Household head	1.46 (0.47-4.56)
Marital status (married)	0.40 (0.14-1.18)
Education (no schooling)	1.77 (0.55-5.71)
Education (primary school)	0.33 (0.08-1.41)
Occupation (unskilled worker)	0.96 (0.43-2.19)
Occupation (skilled worker/small business/others)	1.24 (0.35-4.42)
Cataract-specific (good understanding)	0.32 (0.15-0.69)
Family surgery history (free)	0.87 (0.31-2.48)
Family surgery history (paid)	1.53 (0.44-5.33)
Log-likelihood	−146.70571
LR χ^2 ($P>\chi^2$)	121.74 (<0.001)
Pseudo R^2	0.2932
Number of observations	1271

For reference variables shown in Table 1. *CI: Confidence interval, OR: Odds ratio, LR: Likelihood ratio

Table 3: Reported reasons for "Not Willing" for cataract surgery

Reason	*n* (%)
No sufficient income	32 (65.31)
No help/escort	12 (24.49)
Already operated	4 (8.16)
Not interested	1 (2.04)
Total	49 (100)

surgery (odds ratio [OR] 5.81; 95% confidence interval [CI] 1.89–17.81; *P* - 0.002). Those with a good understanding of cataracts were less likely to be "not willing" to undergo cataract surgery (OR 0.32; 95% CI 0.15–0.69; *P* - 0.003).

Among the 49 respondents who were "not willing" to undergo free surgery, a majority of them reported that they did not have sufficient income, followed by the nonavailability of any support or help, especially from relatives during surgery. The remaining 5 (10.2%) had either already undergone or were not interested in the surgery [Table 3].

Discussion

In this study, only 49 (3.85%) out of the 1271 respondents were categorized as "not willing" to undergo cataract using a WTP elicitation methodology. Since, the methodology is a novel method to estimate those not willing for cataract surgery, there could be uncertainty whether the methodology would appropriately estimate those not willing for surgery. A study done in India in the same state (Tamil Nadu) where these study sites were located, revealed that overall acceptance of cataract surgery in the sites with regular outreach activities was 94.6%.[13] This brings the unwillingness to 5.4%, which is closer to this study estimates. Given that the current study was done on respondents who may or may not have cataract using hypothetical scenarios, the current method is evidenced as an appropriate method to estimate those not willing for cataract surgery. This novel method is an important contribution to literature.

The primary reasons cited by respondents for their unwillingness to undergo cataract surgery were economic and logistical constraints and were similar to those found in other studies in similar developing countries such as Nepal.[2,14] However, measures of income, wealth, and resources to pay for surgery were not significant in the logistic model. Though household income was not predicting outcomes in the regression, insufficient income was cited as the main reason when qualitatively elicited. These mixed results indicate that the insufficient reason cited is more of an excuse rather than a real reason. A study in Africa showed that patients who told health workers that they were too poor to pay for surgery gave additional reasons when they were interviewed at home by someone who was not from the health service.[14] This supports that case that "lack of income" serves as a more convenient and acceptable explanation for unwillingness to undergo surgery that would not be challenged. Citing insufficient income as the major reason for not undergoing surgery indicates that respondents might also fear a loss of income (possible productivity costs) due to the surgery more than the actual cost of the surgery. Income loss can occur not only for the patients but also for immediate relatives/attenders who accompany patients to the surgery. This highlights the fact that free of charge at the time of utilization does not in any way imply free of other needed resources. There could also be fears such as complications of surgery, which was not captured in this study. This needs to be thoroughly investigated through a full-fledged qualitative study. A detailed qualitative study is recommended as a future area of research. The primary aim of this study was to predict the factors that influence unwillingness to undergo cataract surgery. To the best of our knowledge, this study is the first to model the influence of factors such as "good understanding of cataract and its intervention" on unwillingness to undergo cataract surgery and is an important contribution to literature.

Since a good understanding of cataracts and their intervention was a significant predictor, policy should focus on improving the understanding of cataracts and

their consequences through community-based education opportunities, to increase the use of surgery. A qualitative study on the cataract surgery in Tanzania using focus group discussion found "that the main factors behind WTP for cataract surgery are the perceived need for sight and for surgery and the family relations involved in mobilizing the resources for surgery."[4] A study in India using data on the low use of eye care services in rural India report that many persons with cataracts were unaware of their diagnosis, with 73% complaining only of blurred vision.[3] This, along with the community view of blurred vision as a problem of old age with only minor effects on daily life, suggests that this symptom may not be accorded adequate importance. Further, if people do not understand cataracts and their symptoms, they might not be willing to undergo surgery, since they might not see a perceived need for vision and cataract surgery.

Missing income and a good understanding of cataracts significantly drove the choice of unwillingness for cataract surgery in the regression model. The descriptive statistics reveals that respondents who were categorized under this choice were predominantly females, married, and with no school education. With a majority of them not having a good understanding of cataracts and their intervention, there is a high chance that respondents could have misunderstood the purpose of collecting data on monetary values (such as household income) and hence a substantial proportion, 24.5% did not report incomes.

The responses in the study were based on hypothetical situations rather than revealed in actual situation. This might be a reason that the proportion of those unwilling is low. It could also reflect attitudes that most people are willing to undergo cataract surgery, and there are external factors that influence the uptake in actual care situations. Though there is no assurance that households will behave as stated in the surveys, it is likely that the stated preferences are most likely to end up the same way in an actual situation, as evidenced for other health care goods such as insecticide-treated nets for malaria treatment.[15] This is an area for future research. Further, it was assumed that a single individual's (head or representative) response would be representative of the entire household's view. However, whether this response is a representation of a joint response or whether the single individual was making a decision on the behalf of all the household members were not adequately captured in this study and remains a limitation of the study. Further, the present study had household respondents who may or may not have had a cataract. Hence, the reasons cited for those not willing for cataract surgery is rather hypothetical for most of the respondents, except for 8.16% of the respondents who were already operated for cataract.

Charitable organizations can provide free transport for surgery and also motivate patients who have already undergone surgery to encourage their own relatives and community members who have cataracts to get the surgery done. Charitable organizations can also motivate the potential treatment beneficiaries via health education and counseling to undergo surgery. Promoting the benefits of cataract treatment for older adults in households and in the community can also help in increasing the use of the surgery. Providing cost-effective, sutureless surgeries such as the manual small incision cataract surgery can help reduce the postoperative procedures and follow-up treatment.[16,17] Facilitating a quick return to day-to-day responsibilities can help increase the use of surgery.

Households' view on cataract surgery is an important aspect, which has an influence on whether cataract patients undergo surgery or not. Any intervention that tries to decrease the proportion of people who say they would not accept even free surgery need to be multi-faceted focusing on multiple determinants such as those suggested by our regression analysis and by the reported reasons.

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Conflicts of interest

There are no conflicts of interest.

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