Knowledge and Attitude to Cornea Donation and Corneal Transplant Among Adults in a Rural Community in Imo State

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ABSTRACT

Background: Globally, blindness secondary to corneal pathology affects about 5.5 million people bilaterally and another 6 million people unilaterally. Inadequate awareness and a poor attitude regarding eye donation among the public have been reported as a major draw-back to corneal donation in Nigeria.

Objective: To assess the knowledge and attitude to eye donation among adults in Umunama community and identify the socio-demographic determinants of the knowledge and willingness or otherwise of adults to eye donation.

Methods: This was a descriptive cross-sectional study. A structured interviewer-administered questionnaire was used to collect data. A total of 361 respondents made up of 55.1% males and 44.9% females (M: F =1.2:1) participated in the study. Data was analyzed using IBM-SPSS Statistics version 25.

Results: About one-third of the respondents had knowledge about eye donation. About 44% of the respondents were willing to donate their eyes, while 42.4% were willing to donate the eyes of their relatives. The commonest reason for willingness to donate was service to humanity (45.5%) while negative cultural beliefs (28.6%) were the major reason for unwillingness to donate eyes. A positive attitude to eye donation was more likely among females and older respondents.

Conclusion: Focused health education by all cadres of health care workers to members of this community especially the males and younger age group on the importance of eye donation is recommended.

Keywords: *Attitude, Eye donation, Knowledge, Respondents*

INTRODUCTION

An estimated 5.5 million people worldwide are bilaterally blind or have moderate to severe visual impairment resulting from corneal opacity with an additional 6.2 million unilaterally blind.[1] In the Nigeria national blindness and visual impairment survey, measles, use of traditional eye medicines and vitamin A deficiency were responsible for 3.7% of blindness while other causes of corneal scarring included trauma (1.1%), trachoma (4.2%) and surgical procedures (2.8%).[2]

The first 'successful' human to human corneal transplant was done in 1903 in the present day Czechoslovakia by Zirm[3] when he transplanted the clear cornea of an eleven-year-old boy to a man who was blinded in both eyes by alkali burns. There had been several attempts at restoring vision by exchanging an opaque cornea with a clear cornea using cornea from other species (xenograft) without success.[4] The significant challenges with xenograft in the past were due to immunological rejection. The recipient's immune system would recognize the xenograft as foreign tissue and mount vigorous immune response, leading to rejection and failure of the transplant.[5] The two recent landmark achievements in xenograft research are xenotransplantation of pig corneas which involves transplanting a pig cornea into human eyes and gene editingfor reduced rejection which involves the use of gene editing techniques such as CRISPR-Cas9 (Clustered Regularly Interspaced Short Palindromic Repeats –

associated protein 9) to modify pig organs and tissue for transplantation into humans.[6-7] The aacceptability of xenograft by people depends on various factors which include ethical and social considerations, aadvancement in science and technology and regulatory frameworks.[8] The technique of corneal transplantation has undergone various changes since then and transformed into a clinically acceptable procedure benefitting the corneal blind.

The lack of adequate awareness and a positive attitude regarding eye donation/corneal graft among the public is a major draw-back to corneal donation in Nigeria.[9,10] A study conducted on 253 individuals drawn from four centres in northern and southern Nigeria to determine the acceptability of post-mortem donation of cornea among Nigerians showed that 66% of the surveyed population had heard of corneal transplantation, but only 37% of the respondents were willing to donate their eyes.[9] The awareness of corneal donation was 100% amongst ophthalmologists in Nigeria, but only 21% were willing to pledge their eyes.[10] This good level of knowledge, but poor attitude to eye donation in Nigeria is in contrast to studies done amongst adults in India and Singapore where the knowledge is also high but people were more favourably disposed to donating their eyes.[11,12] The Federal Government of Nigeria promulgated the decree No. 23 titled Corneal Grafting Decree 1973 to enhance corneal transplant, but not much has been done in that regard as corneal blindness is still one of the major causes of blindness in Nigeria.[2] Thus, there is a need to awaken the public consciousness about corneal donation.

The aim of this study is to determine the socio-demographic influences on the knowledge and attitude towards donating cornea in the community. The information gathered from this study will not only serve as database for the development of eye banks in Nigeria, but will also help in the formulation of policies that will ultimately get people to donate their eyes freely.

METHODS

This study was a descriptive cross-sectional study conducted among adults in Umunama community in Ezinihitte Local Government Area, Imo state. A cluster sampling technique was used to recruit consenting adults aged eighteen years and older who reside in the community.

Umunama has one major road and four minor roads. A ballot system was used, where all the houses on two out of the four minor roads were chosen randomly as a cluster and all adults $\geq$18years living in that cluster were surveyed until 361 respondents had been interviewed.

This study was approved by the ethics and research committee of the Federal Medical Centre, Owerri. Consent was also obtained from the Chairman of the Local Government Area through the Head of the Department of Health and the traditional ruler of the community.

Written informed consent was obtained from the participants after verbal explanation of the nature and benefits of the study. The participants were also made to understand that they could withdraw at any stage of the study, assured of strict confidentiality and non-use of invasive procedures during the exercise.

A structured interviewer-administered questionnaire, based on the specific objectives of the study was used. This was pre-tested among fifteen adults in Oboama, another community with similar socio-demographic characteristics and necessary modifications made.

The questionnaire was divided into two sections. Section A was for socio-demographic characteristics and the Section B dealt with the knowledge and attitude to eye donation in the community. The questionnaire was then administered to residents in the randomly selected housing units that fell into the cluster. The questionnaire was translated, back-translated and then tested before being administered

Data analysis was done using IBM-SPSS Statistics version 25. Frequencies and proportions were used to summarize categorical variables while mean, median and standard deviation were used for the quantitative variable.

The total knowledge of the respondents was graded by calculating the composite score of their knowledge. One mark was assigned for every positive response ('Yes') to the 12 knowledge questions and zero (0) mark for every negative response ('No' or 'Do not know'). Respondents that scored 6 and above had a total knowledge score of 50% to 100% and were considered to have good knowledge while those with composite score less than 6 (0% to 49%) had poor knowledge.

The respondents were assigned positive, fair or negative attitude depending on their willingness to donate their eyes or that of their relatives. Respondents who answered 'yes' to both questions scored 2 marks (positive attitude), those that answered 'Yes' to either of them had 1 mark (fair attitude) while those that answered 'No' to both questions had 0 mark (negative attitude). The questions used in scoring total knowledge and attitude were internally consistent and reliable with a Cronbach's alpha value of 0.823. The associations between socio-demographic characteristics and participants' knowledge and attitude were tested using the chi-square test. Logistic regression analysis was used to identify significant predictors of their knowledge and attitude. A p –value < 0.05 was considered significant.

RESULTS

A total of 361 respondents participated in the study. The mean age of participants was 43.7 (16.8) years. The age range was 18-96 years. The largest proportion of the respondents (84, 23.3%) was in the 31 – 40 years age group, followed by those in the 21 – 30 years age group (76, 21.1%) while those older than 80 years were the least.

There were more males (199, 55.1%) than females (162, 44.9%) with a male: female ratio of 1.2:1. The Ibos were the most represented tribe (354, 98.0%) followed by Yoruba (3, 0.8%). The largest proportion of the respondents had secondary level of education (118, 32.7%). Majority of the participants were employed (294, 81.4%), and Christianity was the religion of 348 (96.4%) respondents

One hundred and twenty-two (33.8%) respondents had heard about eye donation. The most common source of information of eye donation among the respondents was the mass media (45, 29.8%); followed by friends (40, 26.6%) and family physician (28, 18.5%).

Among those who knew about eye donation, 61 (51.7%) knew the meaning of eye donation to be service to mankind, 51 (43.2%) knew it meant giving sight to the blind, while 6 (5.1%) knew its meaning as the donation of eyes after one's death. Forty-eight (39.3%) of them knew that eyes can only be donated after death, 37 (30.3%) knew that the ideal time to retrieve eyes after death is within 6 hours, while 52 (42.6%) knew that the next of kin can give consent for eye donation.

One hundred and sixty (44.3%) of the respondents were willing to donate their eyes after death, while 42.2% were willing to donate the eyes of their close relatives after death. The most common reason for willingness to donate eyes was "to do some good to humanity" (148, 45.4%); followed by possibility of living on after death (71, 21.8%) while the most common reason for not being willing to donate eyes was negative cultural belief (120, 28.6%); followed by family reasons (105, 25.0%). Forty-six (12.7%) respondents had a good total knowledge score while 315 (87.3%) had poor knowledge score. One hundred and fifty (41.6%) of respondents had a total positive attitude score, fair score was observed in 13 (3.6%) and negative score in 198 (54.8%) respondents.

Respondents in the age group d" 20 years had the largest proportion of those with good knowledge (25%), followed by 19.7% in the age group 21 – 30 years, while those in the age group 61 years and above had no participant with good knowledge. This finding was statistically significant (p = 0.039).

The proportion of female respondents (13.0%) with good knowledge was similar to that of the males (12.6%); there was no statistically significant difference (p = 0.910). A larger proportion of those with tertiary level of education had good knowledge (31.7%) compared to other levels of education; this difference was statistically significant (p = <0.001). A larger proportion of the respondents who were unemployed had good knowledge (22.4%), compared to those who were employed (10.5%); this difference was statistically significant (p = 0.009)

The respondents aged ≥80 years had the largest proportion of those with a positive attitude (83.3%), followed by those in the age group 71 – 80 years (76.5%), while those in the age group d"20 years had the least proportion of respondents with a positive attitude (20.0%). This finding was statistically significant (p = 0.002). Respondents with primary level of education had a higher proportion of those with positive attitude (52.4%) compared to other levels of education. This difference was statistically significant (p = 0.026). The other analyses of the associations between the sociodemographic characteristics

Table 1: Association between Socio-Demographic Characteristics and Attitude towards the Eye Donation among the respondents

Socio-demographic characteristics	Total attitude score (%) Positive	Fair	Negative	p-value*
Age group (years)				
≤ 20	4 (20.0)	2 (10.0)	14 (70.0)	0.002*
21 – 30	25 (32.9)	2 (2.6)	49 (64.5)	
31 – 40	35 (41.7)	2 (2.4)	47 (56.0)	
41 – 50	25 (37.9)	0 (0.0)	41 (62.1)	
51 – 60	18 (36.7)	3 (6.1)	28 (57.1)	
61 – 70	25 (58.1)	3 (7.0)	15 (34.9)	
71 – 80	13 (76.5)	1 (5.9)	3 (17.6)	
> 80	5 (83.3)	0 (0.0)	1 (16.7)	
Sex				
Male	76 (38.2)	7 (3.5)	116 (58.3)	0.337
Female	74 (45.7)	6 (3.7)	82 (50.6)	
Tribe				
Ibo	146 (41.2)	13 (3.7)	195 (55.1)	0.294
Yoruba	3 (100.0)	0 (0.0)	0 (0.0)	
Hausa	0 (0.0)	0 (0.0)	2 (100.0)	
Others	1 (50.0)	0 (0.0)	1 (50.0)	
Marital status				
Married	79 (41.4)	5 (2.6)	107 (56.0)	0.068
Single	39 (35.5)	4 (3.6)	67 (60.9)	
Widowed	32 (53.3)	4 (6.7)	24 (40.0)	
Educational status				
No formal education	8 (21.6)	1 (2.7)	28 (75.7)	
Primary	55 (52.4)	5 (4.8)	45 (42.9)	0.026*
Secondary	47 (39.8)	3 (2.5)	68 (57.6)	
Tertiary	40 (39.6)	4 (4.0)	57 (56.4)	
Occupation				
Employed	131 (44.6)	10 (3.40	153 (52.0)	0.052
Unemployed	19 (28.4)	3 (4.5)	45 (67.2)	
Religion				
Christianity	145 (41.7)	12 (3.4)	191 (54.9)	
Islam	0 (0.0)	0 (0.0)	3 (100.0)	
African traditional religion	5 (50.0)	1 (10.0)	4 (40.0)	0.260

**statistically significant*

and the attitude of the respondents is presented in Table 1.

The predictors in the model were responsible for 17.8% to 33.4% of the variation observed in the outcome variable i.e. good knowledge of eye donation (Table 2). For each one-year increase in the age of the respondents, the likelihood of having good knowledge decreased by a factor of 0.957 (p = 0.009). The respondents with tertiary education were 15 times more likely to have good knowledge compared to those who did not have formal education (p=0.010).

With regard to having a positive attitude towards eye donation, the predictors in the model were responsible for 10.6% to 14.3% of the variation observed in the outcome variable (Table 3). For each one-year increase in the age of the respondents, the likelihood of having a positive attitude increased by a factor of 1.037 (p = <0.001). The female respondents were 1.6 times

Table 2: Determinants of Good Knowledge of Eye Donation among the Respondents

Predictors coefficient)	B (regression	p-value	Odds Ratio	95% C.I. for Odds ratio Lower	Upper
Age (years)	-0.044	0.009	0.957	0.926	0.989
Sex					
Female	-0.355	0.325	0.701	0.346	1.422
Male*			1		
Educational level					
Secondary	1.191	0.273	3.289	0.391	27.660
Tertiary	2.721	0.010	15.193	1.940	118.994
No formal education*			1		
Employment status					
Unemployed	0.732	0.099	2.080	0.871	4.970
Employed*			1		
Tribe					
Other tribes	0.430	0.729	1.537	0.135	17.467
Ibo*			1		
Marital status					
Single	-0.665	0.165	0.515	0.201	1.315
Ever married*			1		
Constant	-1.517	0.225	0.219		

**Reference category, R^2 = 17.8% - 33.4%, C.I. = confidence interval*

more likely to have a positive attitude when compared to males (p = 0.034). The respondents with primary education were about 4 times more likely to have a positive attitude compared to those without formal education (p = 0.005). The respondents who were unemployed were about 0.510 times less likely to have a positive attitude compared to those who were employed (p = 0.043). The respondents with other religion were less 0.393 times likely to have a positive attitude compared to Christians p = 0.156).

The respondents who were not Ibos were about 5 times more likely to have a positive attitude compared to Ibos (p = 0.071).The respondents who were single were 1.688 times more likely to have a positive attitude compared to those who were ever married (p = 0.106).

DISCUSSION

This study revealed that 33.8% of the respondents had heard about eye donations. This is in agreement with a study done in a rural population in India where the knowledge of eye donation was 30.7%.[13] This poor awareness might be due to the remoteness of the town.

It is however, in contrast to some other studies done in the urban communities in Nigeria, Middle East and Europe where the respondents had good knowledge.[9,10,14,15,16.] This may be due to the fact that these other studies were carried out among enlightened and educated people with access to information on mass media and other forms of enlightenment and education.

In this study, only 44.3% of the respondents were willing to donate their eyes while 42.4% were willing to donate close relatives' eyes. The poor attitude to eye donation or unwillingness to donate was also reported by several studies done in Nigeria, Middle East and Spain.[9,10,17,18] Singh *et al*[16] and Gupta *et al*[19] in contrast to the findings in this study, reported a high willingness to donate among medical and nursing students in India.

Babalola et al[9], Waziri-Erameh *et al*[10], and Okoye *et al*[20] in their studies reported that respondents were more willing to give consent for retrieval of the eyes of their close relatives than their own eyes. This is in contrast to the findings in this study where participants were more willing to pledge their eyes (44.3%) than the eyes of their close relatives (42.4%). This could be due to the fact that most

Table 3: Determinants of positive Attitude Towards Eye Donation among the respondents

Predictors	B (regression coefficient)	p-value	Odd Ratio	95% C.I.for Odd ratio Lower	Upper
Age (years)	0.036	<0.001	1.037	1.018	1.055
Sex					
Female	0.495	0.034	1.640	1.039	2.590
Male*			1		
Educational level					
Primary	1.322	0.005	3.752	1.505	9.357
Secondary	1.170	0.013	3.223	1.279	8.123
Tertiary	1.032	0.029	2.806	1.113	7.078
No formal education*			1		
Employment status					
Unemployed	-0.674	0.043	0.510	0.266	0.978
Employed*			1		
Religion					
Other religion	-0.935	0.156	0.393	0.108	1.427
Christianity*			1		
Tribe					
Other tribes	1.582	0.071	4.863	0.871	27.154
Ibo*			1		
Marital status					
Single	0.524	0.106	1.688	0.895	3.183
Ever married*			1		
Constant	-3.262	<0.001	0.038		

**reference category, R^2 = 10.6% – 14.3%, C.I = confidence interval*

of the other studies were done among professionals who were more concerned about their own eyes

The most common reason for willingness to donate eyes was to do some good to humanity while negative cultural beliefs were the main reason for being unwilling to donate their eyes. There are prevalent cultural beliefs about reincarnation which indicates that if someone's eyes are donated, the person will be reincarnated without eyes in after life. The community is a richly cultural one and this could account for their reason of unwillingness to eye donation.

Our observation is similar to findings in other studies done in Nigeria, Spain and Middle-East where service to mankind was the main reason for willingness to donate the eyes and cultural beliefs were the major reason for unwillingness to donate their eyes. However, Babalola et al[9] Yuen et al[14] and Duggal *et al*[21] in their studies found religious beliefs to be the main reason for unwillingness to donate eyes among their study participants.

In the analysis to determine predictors of total knowledge and attitude scores of eye donation, it was found that age, educational status and occupation had statistically significant associations. Younger respondents were likely to have good knowledge while those above 60 years were the least likely to have good knowledge, but this did not translate to a greater likelihood of positive attitude among younger residents as the respondents who were 60 years and above were more likely to have a positive attitude to eye donation. This may be in a bid to do some good to humanity considering their age. This is similar to findings by Babalola *et al*[9] but in contrast to studies done by Dandona *et al*[11], Yew et al[12], Conesa et al[17] and Duggal *et al*[21] where the willingness to eye donation was lower in the older age group

In conclusion, this study showed a poor level of knowledge of eye donation reflecting the need for

awareness campaigns. Appropriate strategies like Information Education and Communication (IEC) activities have to be developed to increase the knowledge about eye donation. Advancing age, female gender, educational status and higher socioeconomic status are important predictors of good attitude. The government at all levels together with the eye care specialists should plan appropriate strategies to enhance eye donation which will include educating and enlightening more people on the importance of eye donation. Males who are the heads of their families, the unemployed and the young adults whose attitude towards donation was poor despite appreciable knowledge should be specially targeted.

It is therefore recommended that public enlightenment campaigns should be carried out by the eye care team using the mass media, posters in schools and public places such as markets and churches on the burden of corneal blindness and the benefits of eye donations. The reverse side of driver's license can carry information on eye donation and telephone number of an eye bank.

Also, the findings of this study should be utilized by Nigerian policy makers with a view to adopting a modified version of 'Presumed Consent Law' and 'required request law' being practiced in USA as well as publicizing the already existing Corneal Grafting Decree of 1973[22] and the Nigerian National Health Act of 2014.[23]

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