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Original Research Article

Awareness, prevalence and risk burden of cataract among adults in IDO/OSI local government area, a rural community of Ekiti state, southwest Nigeria

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ABSTRACT

Background: Cataract is characterized by lens opacity, making images look blurred and hazy. It causes increased light sensitivity, decreased vision at night, and seeing double images, leading to total blindness. The WHO also estimates that cataract blindness will reach 40 million by 2025 due to ageing population and longer life expectancy. Developing countries, including Sub-Saharan Africa have the highest number of people who are blind due to cataract. This study aims to determine the awareness, prevalence and risk burden of cataract among adults in Ido/Osi LGA, a rural community of Ekiti State.
Methods: This is a descriptive cross-sectional study. The estimated sample size is 361 and a multi stage sampling technique was used. Data collection was through ophthalmic examinations and questionnaires which were analyzed using SPSS version 25.0.
Results: The mean age of respondents was 54.94±11.17. Most respondents, 287 (79.5%), had a good awareness of cataracts. The prevalence of cataract in this study is 3.9%. Cataract significant Visual Acuity was found in 49 (13.5%) of the respondents. Age (<0.001), visual impairment (<0.001), hypertension (<0.001) and diabetes mellitus (0.003) were the factors associated with having cataracts.
Conclusions: Intersectorial collaboration, health education through the mass media, evidenced based policies and research will help reduce the prevalence of cataract.

Keywords: Adults, Awareness, Cataract, Prevalence, Risk burden, Rural community

INTRODUCTION

A natural lens present inside the eyes reflects the rays of light coming into the eyes and helps us see images clearly. Cataract is a disease in which the lens becomes opaque thereby making images look blurred, hazy, and less colorful. It causes increased light sensitivity, decreased vision at night, double vision and can lead to total blindness.[1] Incidence of cataract increases with age and with increasing life expectancy the prevalence of age related eye diseases and reversible blindness is also expected to increase in future. Blindness due to cataract is a health care condition that adversely affects the productivity of a nation and has severe economic consequencies.[1]

Cataract has been singled out as a global health challenge of the 21st century by many researchers and as the

leading cause of blindness and visual impairment.[2,3] The World Health Organization (WHO) defines cataract as the clouding of the lens of the eye which prevents clear vision.[4] Cataract occurs due to old age, poor diet, exposure to sun rays, radiation, trauma, genetics and medication.[4] It is preventable, however if left untreated can develop into blindness.[5] The WHO estimates that cataract blindness will reach 40 million by 2025 mainly due to ageing population and longer life expectancy.[5]

Currently, WHO estimates, suggest that cataract is the main cause of blindness globally accounting for 47.8% of the world's blindness which translates to 17.7 million blind people.[6,7] Although it is a global concern, developing countries continue to have the highest number of people who are blind due to cataract.[2] It is estimated that blindness affecting about 6 million people in Africa are due to cataract.[2] It affect mainly the elderly hence they account for majority of people who are blind worldwide.[5] In addition, women as compared to men were blind due to cataract and macular degeneration.[8] Cataract remains the leading cause of blindness and low vision worldwide despite advances in the technology and techniques for cataract surgery over the last thirty years.[9]

The frequency of eye diseases starts increasing around 40 years of age, with an even steeper increase among geriatric population.[9] A survey conducted in 2010 shows that out of a total 32.4 million blind and 191 million visually impaired people cataracts was the cause of blindness in 10.8 million and moderately or severely impaired vision in 35.1 million people. The highest percentage of blindness due to cataract was recorded in South Asia (41.7%) and southeast Asia (42%), closely followed by Sub Sahara Africa East, Sub Sahara Africa Central, Sub Sahara Africa West and Sub-Sahara Africa South with 36.7%, 34.8%, 33.4% and 31.2% respectively.[10-15]

Over 90% of cataract cases are concentrated in individuals aged ≥50 years in lower middle income countries (LMICs) where health care access is limited. Similarly, approximately 80% and 90% of cataract related blindness, and visual impairment are concentrated in LMICs respectively.[16,17] In Sub-Saharan Africa, they account for 50% of the 26 million visually impaired people, 5.9 million (22.7%) of whom are blind this was the findings of studies done in Tanzania and Malawi.[18,19]

Ethiopia a country in Sub Sahara Africa is believed to have one of the world's highest rates of blindness (1.6%) and low vision (3.7%).[20] Different studies showed that cataract is a problem that is apparent in different countries with different magnitude. For instance: 47.5% in southern India, 11.6% in Puducherry, India, 14.2% in Korea, 39.05% in Ghana.[21-24]

Studies done in Nigeria showed that 19.8% and 20% blindness and visual impairment was due to cataract.[25,26] Despite Sub-Saharan Africa (SSA) having one of the highest prevalence of cataracts and cataract related blindness, it remains a grossly underserved region.[27] Visual impairments can cause disabilities by significantly interfering with one's ability to function independently. These disabilities will limit personal and or socioeconomic independence leading to a visual handicap.[28,29]

A lot of the information on cataract is hospital-based which does not reflect the true picture in the community. Generally speaking, community based research on cataract are few in the country and particularly in Ekiti State and fewer still in rural communities. The number of people blind from cataract in the world is increasing by approximately 1 million per year.[11] Despite major advancements in terms of treatment, and although cataract is relatively easily, safely and cost efficiently treatable especially with surgery, cataract remains a major public health concern in developing countries and a leading cause of blindness and visual impairment.[12] Lack of awareness about cataract and its treatment is still a major hurdle in reducing the burden of cataract in the developing countries especially in the rural areas. Hence, this study aims to determine the awareness, prevalence and risk burden of cataract among adults in a rural community.

METHODS

The state has three senatorial districts (Ekiti South, Ekiti central and Ekiti North) and 16 Local Government Areas. The study area, Ido-Osi Local Government Area, Ekiti state, is in the Ekiti North senatorial zone. The LGA has a total of 11 political wards which are Ido wards 1 and 2, Ifaki wards 1 and 2, Usi, Ilogbo, Osi, Orin/Ora, Igbole/Ifisin/Aaye; and Aiyetoro wards 1 and 2. The headquarters of the LGA is located in Ido town. The LGA is bounded to the North by Otun Ekiti in Moba LGA; in the South and East by Awo-Ekiti and Iworoko-Ekiti in Irepodun/Ifelodun LGA; and lastly to the West by Ijero-Ekiti in Ijero LGA. Using the 2006 population figure of 160,001, the Local Government has a projected population of 240,968 for 2021. The indigenous people of Ido - Ekiti are mainly Yoruba (and speak the Ekiti dialect) with some non-indigenes such as Hausa, Igbos, Ebira and other ethnic groups also co-existing in the state. The people of Ido-Ekiti are involved in various occupations such as the public service, trading, farming, and organized private business owners.[30,31] This study is a descriptive cross-sectional study involving adults above the age of 40 who have been residing in the community for more than six months. The sample size was determined using the Fischer's formula[32]

$$n = \frac{Z^2 \times P (1 - P)}{E^2}$$

Where, Z = standard normal deviate at 95% = 1.96, P = study on prevalence of cataract in Osun State = 30.4[33], E= Level of error = 5%.

$$n = \frac{(1.96)^2 \times 30.4(100-30.4)}{5^2}$$

n = 325, For non-response rate compensation ns = n/0.9 n = 361.

Adults of age 40 years and above residing in the study area for at least 6 months were recruited for the study while seriously ill and bed ridden individuals as well as individuals with cognitive impairment were excluded.

A multi-stage sampling technique involving simple random sampling was used for this study.

Stage 1: Selection of wards: Three wards were selected from the 11 wards that form the LGA by simple random sampling using balloting.

Stage 2: Selection of communities: Two communities were then selected from each of the 3 wards randomly by balloting making a total of 6 communities

Stage 3: Selection of houses in each community: The houses in the communities were first numbered where there are ≤30 houses, the first house was picked by using a table of random numbers, and subsequently alternate houses were sampled. Where the houses are more than 30, the community was divided into 4 quadrants and a quadrant selected using a table of random numbers. Houses in the selected quadrant were then numbered and the first house was picked by using a table of random numbers, subsequently alternate houses were picked

Stage 4: Selection of respondents: In each of the sampled houses, questionnaires were administered to all consenting eligible adults above the age of 40 and who have resided in the community for more than 6 months. Questionnaires for each community was distributed by proportionate allocation.

A semi-structured interviewer administered questionnaire was used for data collection and clinical examination.

The questionnaire was first pretested among 20 adults above the age of 40 in another rural LGA in a different senatorial district (Emure LGA). This LGA was picked by balloting and it has similar characteristics with Ido-Osi LGA. Appropriate corrections were then made on the questionnaire.

Questions in the questionnaire were adapted from the questions asked in similar published studies.[2,6,9,10,14,16,24-29] Four research assistants were trained to assist in the data collection on the field.

Diagnostic criteria

The visual Acuity (VA) of all respondents were tested, any respondent with a Visual Acuity <6/60 which is visually significant for cataract[36] were then tested using a pen touch and ophthalmoscope

Pen torch was used to identify cataract in either of the eyes or both eyes and also to determine the reactivity of the pupils to light

An ophthalmoscope was then used to confirm the presence of cataract as evidenced by the inability to see behind the lens.[34]

To accurately assess the presence or absence of cataract an Ophthalmologist was part of the research team and carried out both the pen torch and ophthalmoscope test while the researcher in conjunction with the ophthalmologist carried out the visual acuity test. In addition, hypertension, diabetes mellitus and BMI were measured with a sphygmomanometer, glucometer, weighing scale and a tape rule respectively. The study was carried out between November 2021 and April 2022.

Data collation and editing was done manually to detect omission and ensure uniform coding. The data entry quality was thereafter checked by running the frequencies of all variables to detect any double or omitted entries and corrections were done by reconciling the imputed data with the specific questions. Data was analyzed using IBM SPSS Statistics version 25.0; frequency tables and cross-tabulations were generated to show the distribution across the socio-demographic variables. Bivariate analysis involving the use of Chi-square, odds ratio with 95% confidence intervals were employed to analyze the association among the variables.

Research approval was obtained from the Ethics and Research Review Committee. Also, the community heads in each of the selected community were informed and approval gotten before administering the questionnaires in each community. Verbal consent for interview were obtained from all respondents after giving them an explanation on the nature, purpose, and benefits of the study, as well as confidentiality issues.

RESULTS

Table 1 shows socio-demographic characteristics of the study respondents The Mean age of the study respondents was 54.94 yrs ±11.17 with an age range of 41-82. Majority of the participants 254 (70.4%) were female. About two third of the respondents had more than primary education with 127 (35.2%) and 112 (31%) having secondary and tertiary education respectively. Also 182 (50.4%) of the respondents had an estimated monthly income of >30000.

Table 2 shows the association between the prevalence of cataract and socio-demographic characteristics, age was found to be significantly associated with having cataract (test statistic<0.001,) similarly estimated monthly income (naira) was also found to be statistically significant at a p value of 0.006.

Table 1: Socio-demographic characteristics of the study respondents (n=361).

Variable	Frequency	Percentage
Age (years)		
<65	275	76.2
≥65	86	23.8
Mean±SD	54.94±11.17	
Sex		
Male	107	29.6
Female	254	70.4
Religion		
Christian	331	91.7
Islam	21	5.8
Traditional	9	2.5
Tribe		
Yoruba	339	93.9
Others	22	6.1
Marital status		
Single	36	10.0
Married	272	75.3
Divorced/ separated	15	4.2
Widow/ widower	38	10.5
Educational status		
Nil formal	57	15.8
Primary	65	18.0
Secondary	127	35.2
Tertiary	112	31.0
Occupation		
Unemployed	19	5.3
Trader	142	39.3
Farmer	52	14.4
Artisan	12	3.3
Civil servant	120	33.2
Clergy	16	4.4
Estimated monthly income		
≤30000	179	49.6
>30000	182	50.4

Table 2: Association between socio-demographic variables and prevalence of cataract.

Variables	Cataract yes	Act no	Total	X^2, P value
	N (%)	**N (%)**	**N (%)**	
Age (years)				
<65	6 (2.2)	269 (97.8)	275 (76.2)	16.431^F, <0.001
≥65	11 (12.8)	75 (87.2)	86 (23.8)	
Sex				
Male	5 (4.7)	102 (95.3)	107 (29.6)	0.258^f, 0.566
Female	9 (3.5)	245 (96.5)	254 (70.4)	
Religion				
Christian	12 (3.6)	319 (96.4)	331 (91.7)	2.176^f, 0.327
Islam	2 (9.5)	19 (90.5)	21 (5.8)	
Traditional	0 (0.0)	9 (100.0)	9 (2.5)	
Tribe				
Yoruba	14 (4.1)	325 (95.9)	339 (93.9%)	0.945^f, 1.000
Others	0 (0.0)	22 (100.0)	22 (6.1%)	

Continued.

Variables	Cataract yes	Act no	Total	X^2, P value
Marital status				
Single	0 (0.0)	36 (100.0)	36 (10.0)	3.635[f], 0.229
Married	10 (3.7)	262 (96.3)	272 (75.3)	
Divorced/ separated	1 (6.7)	14 (93.3)	15 (4.2)	
Widow/ widower	3 (7.9)	35 (92.1)	38 (10.5)	
Occupation				
Unemployed	0 (0.0)	19 (100.0)	19 (5.3)	9.489[f], 0.050
Trader	12 (8.5)	130 (91.5)	142 (39.3)	
Farmer	0 (0.0)	52 (100.0)	52 (14.4)	
Artisan	0 (0.0)	12 (100.0)	12 (3.3)	
Civil servant	2 (1.7)	118 (98.3)	120 (33.2)	
CLERGY	0 (0.0)	16 (100.0)	16 (4.4)	
Estimated monthly income (naira)				
<30000	12 (6.7)	167 (93.3)	179 (49.6)	7.605[F], 0.006
>30000	2 (1.1)	180 (98.9)	182 (50.4)	

χ2: Chi square test; F: Fisher's exact test.

Table 3: Association between risk burden and prevalence of cataract.

		Cataract			
Variables		**Yes N (%)**	**No N (%)**	**Total N (%)**	**χ^2, P value**
Visual impairment	Yes	14 (23.0)	47 (77.0)	61 (16.9)	71.63[F], <0.001
	No	0 (0.0)	300 (100.0)	300 (83.1)	
Hypertension	Yes	11 (10.9)	90 (89.1)	101 (28.0)	13.812[F], 0.001
	No	5 (1.9)	255 (98.1)	260 (72.0)	
Diabetes mellitus	Yes	7 (13.7)	44 (86.3)	51 (14.1)	11.670[F], 0.003
	No	7 (2.3)	299(97.7)	306 (84.8)	
	Don't know	0 (0.0)	4 (100.0)	4 (1.1)	
Radiation exposure	Yes	0 (0.0)	4 (100.0)	4 (1.1)	0.792[F], 1.000
	No	14 (4.0)	339 (96.0)	353 (97.8)	
	Don't know	0 (0.0)	4 (100.0)	4 (1.1)	
Alcohol	Yes	2 (11.8)	15 (88.2)	17 (4.7)	2.977 [F], 0.130
	No	12 (3.5)	332 (96.5)	344 (95.3)	
Smoking	Yes	0 (0.0)	11 (100.0)	11 (3.1)	0.458[F], 1.000
	No	14 (4.0)	336 (96.0)	350 (96.9)	
Obesity	Yes	0 (0.0)	13 (100.0)	13 (3.6)	0.544[F], 1.000
	No	14 (4.0)	334 (96.0)	348 (96.4)	
Trauma history	Yes	0 (0.0)	7 (100.0)	7 (1.9)	0.288[F], 1.000
	No	14 (1.1)	340 (98.9)	354 (98.1)	
Steroid use	Yes	0 (0.0)	7 (100.0)	7 (1.9)	0.299[F], 1.000
	No	14 (4.1)	328 (95.9)	342 (94.7)	
	Don't know	0 (0.0)	12 (100.0)	12 (3.3)	

χ2: Chi square test; F: Fisher's exact test.

Table 3 shows the association between risk burden and the prevalence of cataract with visual impairment, hypertension and diabetes mellitus being statistically significant at p-values of <0.001, 0.001 and 0.003 respectively. Table 4 shows that hypertension and BMI were found to be statistically significant at a p value of 0.019 and 0.014 respectively as a predictor of the occurrence of cataract among the study participants using the binary logistic regression.

Figure 1 shows the level of awareness among the study respondents 287 (79.5%) had good awareness as against 74 (20.5%) with poor awareness. Figure 2 shows the visual acuity of the respondents, majority of the respondents 264 (73.1%) had a VA of 6/6-6/18, while 49 respondents had cataract significant visual acuity with the breakdown as follows 38 (10.5%) of the study respondents had a VA of <6/60 - ≥3/60 and 11 (3.0%) of the respondents had a VA of <3/60 - LP

Table 4: Binary logistic regression for the predictors of the occurrence of cataract among respondents.

	B	p value	AOR	95% CI	
Variables				**Lower**	**Upper**
Age (years)					
<65 (ref)	-1.272	0.123	0.280	0.056	1.411
≥ 65			1		
Estimated monthly income (naira)					
<30000 (ref)	1.670	0.073	5.310	0.856	32.932
>30000			1		
Hypertension					
Yes	2.650	**0.019**	14.158	1.552	129.170
No			1		
Diabetes mellitus					
Yes	1.525	0.227	4.596	0.386	54.680
No			1		
FBS					
Normal			1		
Impaired	1.368	0.329	3.928	0.251	61.358
Diabetic	0.459	0.735	1.582	0.111	22.515

B: Coefficient of binary logistic regression; AOR: Adjusted Odds Ratio; 95% CI: 95% Confidence Interval; Ref: reference category

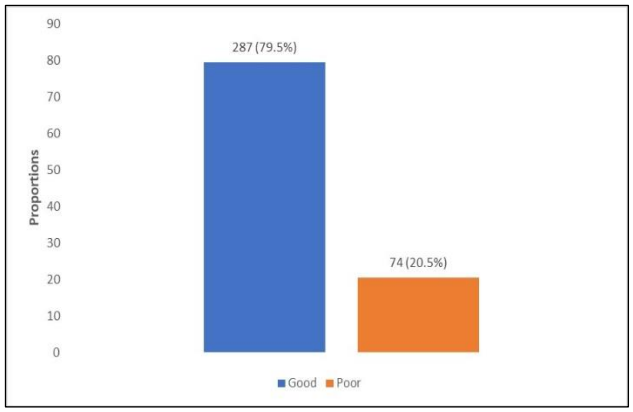

Figure 1: Awareness about cataract (n=361).

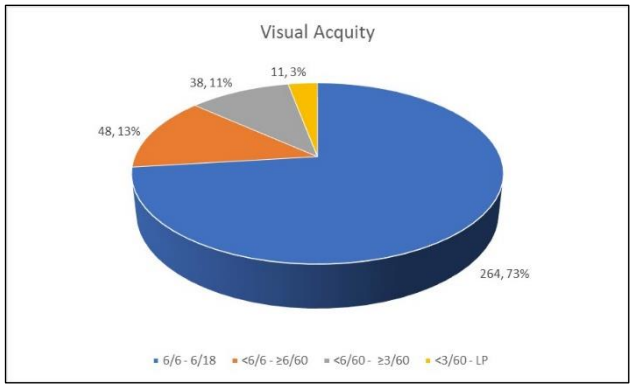

Figure 2: Visual Acuity (VA) of the study participants (n=361).

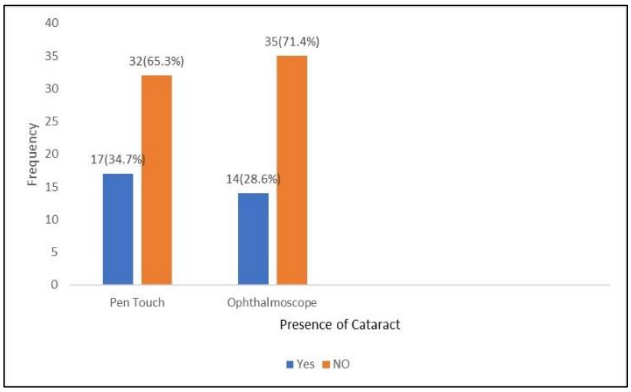

Figure 3: Prevalence of cataract by pen touch and ophthalmoscope.

Figure 3 shows the prevalence of cataract by pen touch and ophthalmoscope, using the pen touch 17 (4.7%) of the respondents were observed to have cataract in one or both eyes. A confirmatory test using an ophthalmoscope showed that 14 (3.9%) of the respondents were confirmed to have cataract in one or both eyes.

DISCUSSION

WHO estimates, suggest that cataract is the main cause of blindness globally accounting for 47.8% of the world's blindness which translates to 17.7 million blind people.[6,7] Although it is a global concern, developing countries including Sub Saharan Africa continue to have the highest number of people who are blind due to cataract.[2] It is estimated that blindness affecting about 6 million people in Africa are due to cataract.[2]

The prevalence of cataract among individuals aged 40years and above has been reported to vary widely between 0.5% to 53.1% by various authors from different parts of the world.[35-47] However, the national prevalence of cataract in Nigeria is 19.8% and this increases with age and was higher in females and those with little or no education.[28] The prevalence of cataract in this study was however found to be 3.9%. this is higher than the prevalence in a study done in rural Ethiopia were the prevalence was 3.2% and another study done in Egbedore Local Government Area of Osun State, Nigeria where the prevalence was 3.6%.[35,36] Also, higher than another study done in Ethiopia which found the prevalence of cataract to be 2.4%.[37] This is however, lower than the prevalence in a study done in India where the prevalence of cataract was found to be 7%.[36] Possible reasons for the 3.9% prevalence of cataract in this study might be due to the high level of education of the study respondents as 127 (35.2%) of the respondents had secondary level of education and 112 (31%) had tertiary level of education. Similarly, the estimated monthly income of majority 182 (50.4%) of the study respondents was >30,000, with increase income access to health care is likely to increase. In addition, there is a tertiary health center facility in the locality which carries out regular community outreaches

to the community and also does cataract surgery. These factors may be responsible for the 3.9% prevalence of cataract in the study.

Furthermore, the prevalence of cataract blindness in this study was also lower than that of some African countries which ranged between 4.5% and 4.9%.[38] A 2.5% prevalence of cataract blindness was reported from Malawi and Zanzibar.[39,40] Lower prevalence of cataract blindness was similarly reported from studies done in Southwestern parts of Cameroon (1%), Kenya (0.84%), Rwanda (1.2%), Kilimanjaro, Tanzania (1.2%).[41-44]

Varying prevalence values has also been reported in other parts of the world, Pakistan (2.0%), Turkmenistan (0.5%), Oman (0.5%), and India (7.0%).[45-47,36] Various reasons have been adduced for the wide variation in the prevalence values, some of which are well established and better cataract intervention programs and higher cataract surgical coverage as documented by studies done in Asia and some African countries.[36,39,40,46] These differences may also be due in part to the methodology used in the various studies, familiar disposition, tribe, prevailing climatic conditions and presence of other medical conditions.

This study also found out that the awareness of the respondents about cataract was good as eight in ten respondents had a good awareness. Nine in ten respondents believe cataract is a disease, this is likely to increase healthcare utilization and, this is similar to findings in a study carried out in Saudi Arabia where 80.8% of the study participants considered cataract to be an eye disease also in Ghana were 133 (62.15%) perceived cataract as an eye disease, in another study carried out in Nigeria, majority of the respondents 57% perceived cataract to be an eye disease.[48-50]

Majority of the respondents 247 (68.4%) in this study believe that cataract is preventable while another 335 (92.8%) believe that it can be treated with surgery again this will likely lead to an increase in healthcare utilization. These findings are however dissimilar to findings in studies done in Ghana where only 96 (44.86%) of the study participant believed that cataract can be treated with surgery, a vast majority 118 (55.14%) believed that medication/spectacles was the treatment of choice.[49]

Age is one of the major risk factors for cataract, a study done in Ghana reported this and was further collaborated by this study with a significant p value of <0.001.[49] This is in keeping with the age of the respondents in this study which is 40 years and above. Furthermore, this study found that hypertension, diabetes mellitus and body mass index were statistically significantly associated with the prevalence of cataract at p values of <0.001, <0.001 and 0.003 respectively which is in keeping with earlier studies.[6,21,23,25,29]

CONCLUSION

This study found the following factors to be associated with the prevalence of cataract in the community, increasing age, hypertension, diabetes mellitus and BMI showing that the cause of cataract is multifactorial. To mitigate the problem of cataract in rural communities an intersectoral approach is advocated involving all tiers of government and different ministries such as the Ministry of Health, Ministry of Education, Ministry of communication, Non-governmental Organizations and the community to create adequate awareness on the causes and importance of early diagnosis and treatment. Specific activities include prevention of risk factors for diabetes, obesity and hypertension. Health education on the importance of regular eye care including early diagnosis and treatment of eye infection and also adequate nutrition. This can be achieved using the mass media and through community outreach. Further research on cataract is also recommended as this will help the government to put in place evidence based interventions and policies.

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