African Vision and Eye Health
ISSN: (Online) 2410-1516, (Print) 2413-3183

Vision health disparities in blindness and visual impairment in Nigeria: A review of the Nigerian National Blindness and Visual Impairment Survey

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Dates:
Received: 05 Jan. 2016
Accepted: 13 Feb. 2017
Published: 28 Mar. 2017

How to cite this article:
Akano OF. Vision health disparities in blindness and visual impairment in Nigeria: A review of the Nigerian National Blindness and Visual Impairment Survey. Afr Vision Eye Health. 2017;76(1), a345. https://doi.org/10.4102/aveh.v76i1.345

Purpose: Blindness and visual impairment have become public health problems with prevalence increasing year after year. Nigeria, the most populated country in Africa, is also very diverse in terms of geographical location, ethnicity and culture. This study looks at and considers the vision health disparities in blindness and visual impairment in Nigeria using socio-demographic factors such as gender, geopolitical zones, place of residence and literacy.

Methods: A comprehensive literature search was conducted on PubMed and Google Scholar databases from May 2014 to May 2015. The search included articles from 2001 to May 2015 as well as a review of the Nigerian National Blindness and Visual Impairment Survey.

Results: The male dominance culture and lower literacy levels among women in Nigeria have led to a higher prevalence of blindness and visual impairment among women compared to men. In Nigeria, eye diseases that lead to blindness and visual impairment occur more in certain geopolitical zones and ecological regions than others. More Nigerians live in remote rural areas, with little or no access to health care, rather than in urban areas where there are more eye care practitioners and better facilities for care.

Conclusion: Differences in gender, geopolitical zones, place of residence and literacy are responsible for existing vision health disparities in blindness and visual impairment in Nigeria.

Introduction

Global estimates of visual impairment (VI) have been on the increase over the years. In 1990, it was estimated that about 148 million people had VI with 38 million blind. By 2002, the estimate of the VI increased to 161 million with 37 million blind.[1] In 2014, the World Health Organization (WHO) estimated that 285 million people were visually impaired, 39 million were blind and 246 million had low vision, with about 90% of those visually impaired living in developing countries.[2]

Nigeria is the most populous country in Africa with an estimated 2013 mid-year population of about 172 million.[3] The population is projected to increase to nearly 210 million by the year 2025.[4] The country is divided into 6 geopolitical zones (GPZ), 36 states and 1 Federal Capital Territory (FCT) of Abuja.[5] In comparing the country's population to the rest of the world, Nigeria ranks 8th with over 250 ethnic groups and over 500 indigenous languages.[6] About 63% of the population live in rural areas and adult literacy rate is at 68%.[7,8] Nigeria has recently emerged as Africa's largest economy with 2013 GDP estimated at $502 billion.[6] Oil has been the major source of government revenue since the 1970s and about 68% of the population live below $1.25 per day.[6,9] According to Sightsavers, about 1 million adults are blind in Nigeria and another 3 million are visually impaired while 42 out of every 1000 adults aged 40 and above are blind; the most common cause of VI and blindness in Nigeria is cataract.[10]

Healthy People 2020 (a health initiative launched by the Department of Health and Human Services in the United States in 2010) contains vision objectives, and one of the main aims is to eliminate health disparities which are differences that occur by sex, education, income, race or ethnicity, disability, geographical location and sexual orientation.[11] Profound health disparities are thus linked to many social determinants such as gender, socio-economic status or having certain health conditions.[12]

The *Nigeria National Blindness and Visual Impairment Survey* was undertaken between 2005 and 2007. Prior to that, there were no accurate and comprehensive population-based data available to guide policy-makers and plan eye care services bearing in mind the extent to which the country

is diverse economically, geographically, ethnically and culturally. The results of this survey reported relationships between blindness, VI and some socio-demographic variables such as age, gender, social status, geopolitical zone and place of residence.[13] This article reviews such inequalities in blindness and VI in Nigeria based on gender, GPZ, literacy and place of residence. A number of studies have looked into vision health disparities in the United States,[11,14,15,16] but to the full extent of my knowledge this is the first detailed insight into vision health disparity in Nigeria with respect to blindness, VI and socio-demographic variables. This review was based on the conceptual framework by the WHO's Commission on Social Determinant of Health, and this framework was an action-based framework that shows how social, economic and political mechanisms lead to socio-economic poverty, health disparity and well-being.[17]

The purpose of this study is to review the social determinants of health, which are contributing factors, responsible for the vision health disparities in blindness and VI in Nigeria. Furthermore, knowledge gaps exist in the understanding of visual health disparity in Nigeria, and this study looks to narrow such gaps and hopefully create an awareness on the need for vision health surveillance programmes and initiatives aimed at reducing the burden of VI and blindness in Nigeria. It is hoped that this can encourage more studies that will help guide public health policies and also start the conversation into ways of narrowing the disparities existing in vision health and access to vision care in Nigeria.

Method

A comprehensive literature search was conducted on PubMed and Google Scholar databases from May 2014 to May 2015. The search also included articles from 2001 to May 2015. Inquiries were made using the following keywords in various combinations: 'Nigeria', 'blindness', 'visual impairment', 'socio-demographic factors' and 'vision health disparity'. Articles not published in English (for the sake of convenience and comprehension) and brief summaries and abstracts were excluded. The review was organised using the following themes, socio-demographic factors, derived from the Nigerian National Blindness and Visual Impairment Survey, 2005–2007: gender, GPZ, place of residence and literacy. Articles included in this review were associated with these themes.

Discussion

Gender

According to the International Agency for the Prevention of Blindness (IAPB), about two-thirds of the world's blind are women.[18] A systematic review and meta-analysis of the global population-based blindness survey carried out from 1980 to 2000 showed that blindness is more common in women than men by 40% irrespective of age.[19] The inequalities in VI and blindness between women and men in Nigeria can be seen in Table 1[20] where the prevalence of mild to moderate VI and blindness was higher for women than men, while the prevalence of severe VI was higher among men than women. These results reflect that VI is not consistently higher among women compared to men. In my opinion, men might disregard or ignore their vision problems until they become severe before seeking medical attention. Women had a higher prevalence of blindness (4.4%) compared to men (4.0%). This gender inequality in blindness and VI is probably as a result of social, cultural and economic differences between men and women, and also the life expectancy factor, with that of men at 52 years and women at 54.1 years.[6,21] In traditional Nigerian communities and families, the lower social status of women can result in difficulties in making decisions about their own health. Some depend entirely on men for financial assistance and are not allowed to move around freely unless accompanied by men. Women may spend most of their time taking care of their children, their husbands and their homes that they rarely have time to leave home. These are very common among developing countries like Nigeria and in impoverished, highly traditional and cultural communities.[21,22] Vision disorders have been known to increase with age, and because women have a longer life expectancy than men, it will be expected that more vision problems will be found in women especially those that occur later in life.[21] Cataract is the most common cause of severe VI and blindness in Nigeria and accounts for 45.3% and 43.0%, respectively.[5] Evidence does exist as to a higher prevalence of cataract among women than in men, and it is suspected that hormonal differences may be a factor.[21,23] Another reason given for the gender disparity is the lower cataract surgical coverage rate for women than men in developing countries, which was found to be 1.2–1.7 times higher for men than for women.[24] Women are less likely to travel outside their communities or villages to the cataract surgical sites compared to men, and also the women in the rural areas may be poor and rely heavily on men for money and decision-making.[24]

Geopolitical zones

There are six GPZ in Nigeria: North Central, North East, North West, South East, South South and South West zones (Figure 1[13]). The Nigeria National Blindness and Visual Impairment Survey reports that the South West zone has the lowest prevalence of blindness (2.8%), whereas the North East zone has the highest prevalence of blindness (6.1%).[5] One of the reasons given for the higher prevalence of blindness in the northern GPZ is the increase in the practice of couching on individuals, which appears to be a more common practice in the northern GPZ, especially the North East, than in the southern GPZ.[25] Ecological factors such as climatic conditions may favour certain eye diseases and could account for existing disparities in blindness across the various GPZ.[5] The Sahel region (North East zone) has the highest temperature of all regions and also the highest prevalence of blindness (6.6%), whereas the delta region (South West zone) with a mean monthly temperature in the range of 25 °C – 28 °C has the lowest prevalence of blindness (3.3%).[5] Cataract was found to be the most common cause of blindness in all the ecological zones, with the highest

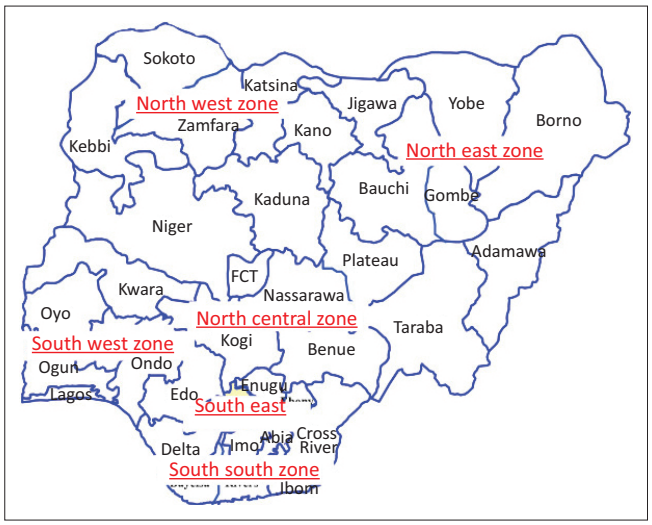
TABLE 1: Association between socio-demographic variables and presenting visual acuity in the better eye.

Parameters	Normal/near normal (95% CI)		Mild VI (95% CI)		Moderate VI (95% CI)		Severe VI			Blind		
	N	%	*n*	%	*n*	%	*n*	%	95% CI	*n*	%	95% CI
Age (years)												
40–49	4662	95.3	103	2.1	82	1.7	6	0.1	0.004–0.3	37	0.8	0.5–1.1
50–59	3076	86.0	232	6.5	189	5.3	25	0.7	0.5–1.0	56	1.6	1.2–2.1
60–69	1825	65.8	319	11.5	446	16.1	52	1.9	1.4–2.5	131	4.7	3.9–5.8
70–79	719	43.5	243	14.7	444	26.9	65	3.9	3.1–4.9	182	11.0	9.6–12.6
≥ 80	173	24.7	105	15.0	203	29.0	55	7.9	6.1–10.0	163	23.3	20.2–26.7
F	-	-	-	-	-	-	-	-	-	-	-	222.72
p	-	-	-	-	-	-	-	-	-	-	-	< 0.001
Sex												
Male	5023	80.4	362	5.8	522	8.4	92	1.5	1.2–1.8	248	4.0	3.5–4.6
Female	5432	73.9	640	8.7	842	11.5	111	1.1	1.2–1.8	321	4.4	3.9–4.9
F	-	-	-	-	-	-	-	-	-	-	-	22.23
p	-	-	-	-	-	-	-	-	-	-	-	< 0.001
GPZ												
South West	2170	79.5	195	7.1	263	9.6	24	0.9	0.6–1.3	76	2.8	2.2–3.5
South South	1351	72.9	154	8.3	254	13.7	33	1.8	1.2–2.5	60	3.2	2.4–4.4
South East	1159	69.7	174	10.5	218	13.1	34	2.0	1.5–2.8	77	4.6	3.6–5.9
North Central	1648	81.2	126	6.2	144	7.1	35	1.7	1.2–2.5	76	3.7	3.0–4.7
North West	2837	78.9	233	6.5	297	8.3	53	1.5	1.1–1.9	174	4.8	4.1–5.8
North East	1290	74.6	120	6.9	188	10.9	24	1.4	1.0–2.0	106	6.1	4.7–7.9
F	-	-	-	-	-	-	-	-	-	-	-	6.36
p	-	-	-	-	-	-	-	-	-	-	-	< 0.001
Place of residence												
Urban	2408	78.9	210	6.9	272	8.9	44	1.4	1.0–2.0	117	3.8	3.1–4.7
Rural	8047	76.3	792	7.5	1092	10.4	159	1.5	1.3–1.8	452	4.3	3.8–4.8
F	-	-	-	-	-	-	-	-	-	-	-	1.62
p	-	-	-	-	-	-	-	-	-	-	-	0.18
Literacy†												
Reads and writes easily	2626	89.5	115	3.9	134	4.6	16	0.6	0.3–0.9	43	1.5	1.0–2.1
Reads and writes with difficulty	2544	85.2	150	5.0	188	6.3	26	0.9	0.6–1.3	78	2.6	1.9–3.5
Illiterate	5276	68.9	736	9.6	1042	13.6	161	2.1	1.8–2.5	446	5.8	5.3–6.5
Total	**10 455**	**76.9 (75.8–77.9)**	**1002**	**7.4 (6.9–7.9)**	**1364**	**10.0 (9.4–10.7)**	**203**	**1.5**	**1.3–1.7**	**569**	**4.2**	**3.8–4.6**

Source: Adapted from Kyari et al.[20] Reprinted with permission from ARVO

GPZ, geopolitical zones; VI, visual impairment; CI, confidence interval.

†, Literacy status could not be determined in 12 individuals.



Source: Adapted from Dineen et al. (Open access article)[13]

FIGURE 1: The map of 36 states of Nigeria and the 6 geopolitical zones.

temperature in the Sahel region, having a 3.8 times higher risk compared to residents of the rain forest.[26] It has been suggested that the increased risk of cataract is because of increased exposure to ambient UVB radiation.[26] Differences in VI and blindness have also been attributed to unequal and inadequate distribution of human resources across the various GPZs, with the South West zone said to have as much as four times the number of health workers compared to the North East zone even though their population sizes are not very different.[27]

Place of residence

The Nigeria National Blindness and Visual Impairment Survey reported a higher prevalence of VI and blindness in rural areas compared to urban areas.[5] Access to eye care services is very much limited in the rural areas of Nigeria and also among the urban poor.[5] Table 1 shows a higher prevalence of severe VI and blindness in rural areas (1.5% and 4.3%, respectively) compared to urban areas (1.4% and 3.8%); however, the differences were not significant. A lower rate of eye care utilisation has been reported among those living in rural areas compared to urban areas.[28,29] This could be attributed to difficulty in finding eye care providers in the rural areas as many live and work in urban areas. Poverty, inadequate and inaccessibility of health care facilities have led to unorthodox traditional practices such as couching, which accounts for about 10.2% of bilateral blindness, resulting in an increase in VI and blindness in the rural areas.[28,29] Eye care facilities are limited in rural communities and unfortunately they are often not fully utilised. This non-utilisation has been linked to lack of awareness among those living in these rural communities and also cultural beliefs that treating some eye conditions can actually lead to blindness.[29] This lack of awareness among people in the rural areas can be attributed to their lower literacy level compared to those in the urban area. Adult literacy based on ability to read English is lower among rural dwellers than among urban dwellers (49.5% and 73.6%, respectively). Based on the ability to speak any other language, the literacy rate was 83.0% among urban dwellers and 65.5% among rural dwellers.[30] In Nigeria, there are approximately 400 ophthalmologists servicing the entire population (approximately one per 400 000 people) with a large number of ophthalmologists residing in the urban areas (80%) while about 70% of the Nigerian population live in rural areas.[27]

Literacy

In Nigeria, the overall literacy rate is 68% with male literacy (69.2%) and female literacy (49.7% – for ≥ 15 years of age).[6,8] There is evidence that illiteracy and poor literacy levels are associated with VI and blindness,[5,31,32] and Table 1 shows a higher prevalence of severe VI and blindness (2.1% and 5.8%, respectively) among the illiterate compared to the literate (0.6% and 1.5%, respectively). Without the ability to read and write, it may be more difficult to understand medical information and comply with treatment regimens of various eye diseases like cataract, glaucoma and diabetic retinopathy that could lead to VI and blindness.[32] More importantly, understanding the seriousness of the disease and accepting the available treatment would not be possible.[33] Table 1 shows that the North West and North East GPZ, compared to other GPZs, have a higher prevalence of blindness (4.8% and 6.1%, respectively), and these two zones have been reported to have the lowest adult literacy rates among men and women.[30] Due to economic and social reasons, most illiterates cannot afford eye care services and most of the time they depend on other well-to-do family members for financial support and decision-making.[24,34] Risk factors for cataract in two population studies in Nigeria showed that illiteracy was significantly associated with cataract, with a higher prevalence of cataract found among those who cannot read or write, and the study also revealed that a longer period of education is associated with a decreased risk of cataract.[35]

Possible limitations of this article are that only a few specific keywords were used in the search for studies, and only articles in English were considered; this might have reduced the chance of identifying relevant and important studies for review.

Conclusion

This review using the Nigerian National Blindness and Visual Impairment Survey shows that there are existing vision health disparities in blindness and VI in Nigeria as explained with socio-demographic factors such as gender, GPZ, place of residence and literacy. This review highlights the factors likely responsible with the differences in blindness and VI in Nigeria by gender, GPZ, place of residence and literacy. Addressing these factors would likely narrow the existing vision health disparities and reduce the burden of blindness and VI in Nigeria. Results herein may promote and further encourage surveillance programmes aimed at reducing disparities in vision and eye health in Nigeria and other developing countries. This review could be a useful source of knowledge for policy-makers and can help in

resource allocation aimed at narrowing the existing gaps in vision disparity which will go a long way in reducing the prevalence of blindness and VI in Nigeria. This review is aimed at establishing an association and not a causal relationship between the socio-demographic factors and VI or blindness. Further studies reviewing vision health disparity from other socio-demographic factors, especially socio-economic status and ethnicity, on blindness and VI in Nigeria are encouraged.

Acknowledgements

Competing interests

The author declares that he has no financial or personal relationships that may have inappropriately influenced him in writing this article.

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