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## Research Article

# Impact of Eye Care Intervention on Poverty Reduction in Katsina State

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## Abstract

**Background and Objective:** With the establishment of the WHO Vision 2020, the right-to-sight intervention in 1999, efforts were made to improve eye care services globally. Therefore, this study measures the impact of eye care intervention on poverty reduction in Katsina State. The study tried to examine whether vision impairment is related to poverty. **Materials and Methods:** The study employed survey techniques using a 5-point Likert scale structured questionnaire. It randomly selects a sample of 5% of eye care intervention beneficiaries a population of more than 4000 from the Noor Dubai Foundation African program in Katsina State. **Results:** The beneficiaries with the initial least monthly income of \$11.3 have experienced an improvement in their income to \$113.4. This help to change the status of the beneficiaries that are below the current poverty line of \$2.15 per day and move them out of the vision impairment-induced vicious circle of poverty. More so, the finding also suggested that eye care intervention in the form of cataract surgery and eye treatment reduced poverty through improvement in the measures of quality of life arising from the intervention which includes, productivity, income, employability, knowledge and skill and dignity after the cataract surgery. **Conclusion:** All the indicators of poverty have increased by an average of 91.8%. The policy implications of this study emphasize more on the government to collaborate with more NGOs on eye care intervention programs so as to reduce vision-induced poverty in the state.

**Key words:** Poverty, eye care, interventions, Noor Dubai Foundation, vision impairment

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**Competing Interest:** The authors have declared that no competing interest exists.

**Data Availability:** All relevant data are within the paper and its supporting information files.

## **INTRODUCTION**

According to a recent report by the World Bank 2022, there are about three billion people living on less than USD \$2 a day with nine out of ten people living in the developing world. A vast number of these population of poor live in Africa and over 55% of this population live in rural areas with little or no access to the basic needs of life. They are deprived of access to safe shelter, clean water, basic toilet facilities, or basic health care attention which causes infections and diseases and leads to vision impairments<sup>1,2</sup>. Poor access to eye care facilities leads to eye health problems, leading to vision impairment and blindness.

In addition, the studies by researchers<sup>2-4</sup> suggested that the majority of the preventable eye health problems such as cataracts, trachoma, conjunctivitis and other vision impairment are the major causes of blindness and turn, blindness reduces the chances of productivity, employability, income, accessibility and affordability to treatments which leads to poverty<sup>5</sup>. On the other hand, lack of sanitation, poor or inadequate water supply, malnutrition and lack of income and education are the major causes of blindness. These suggested the existence of a vicious cycle of induced poverty. Thus, improving access to good quality eye health services is a key enabler to achieving the United Nations' sustainable development goals of eradicating poverty and inclusive growth.

In response to this, the Noor Dubai Foundation (NDF) has established a comprehensive eye care program in disadvantaged communities. The foundation in collaboration with the Katsina State Government aims to improve the quality of life and to reduce poverty in Katsina State through eye care interventions. The program is designed to improve the health eye health system through service provision and human resource development. This call for the need to investigate the economic impact of eye care intervention on poverty reduction in Katsina State.

This study is motivated because poverty and vision impairment may be causally related in Katsina State with poverty connected to vision impairment and vision impairment leading to poverty by constraining access to employment opportunities, productivity, income and affordability of cost of treatment. Furthermore, Katsina State is one of the 36 states in the Nigerian Federation with suboptimal eye health indicators and limited eye health facilities, therefore, the Poor are more likely to become blind due to lack of access to health services and they also tend to be more susceptible to eye infections and diseases. Additionally, there are about 45,000 people blind in the state

and another 95,000 with some visual impairment and about 4,000-8,000 people with irreversible visual impairment which may likely lead to poverty. Equally, there is the need to understand the direction of the relationship between individuals with blindness or severe vision impairment and their accessibility to education and other opportunities<sup>6</sup>. Finally, to fill in the gap in the study of researchers<sup>7-9</sup> which focuses more attention on the visual impact of cataract intervention without looking at the multidimensional poverty consequences on blind people in the state.

Previous studies use secondary data to draw conclusions. This study intends to contribute to methodology by examining the causal relationship between poverty and eye care intervention through the use of a survey method and a 5-point Likert scale questionnaire to obtain primary data on the economic impact of NDF eye care intervention on poverty reduction. The questionnaire was administered through an Open Data Kit (ODK). Also, to ensure the reliability and validity of the instrument of data collection pilot survey was conducted. This study also contributes to the existing database of eye care programs and poverty reduction in the state and Nigeria. Finally, the result of this study will provide yardstick for policy implications and sustainable eye programs.

## **MATERIALS AND METHODS**

**Data collection approach:** The purpose of this study is to examine the economic impact of the eye care intervention of the Noor Dubai Foundation (NDF) on poverty reduction. The research was conducted in seven months with effects from 25/07/2022 to 25/02/2023, The study employed survey techniques using a 5-point Likert scale questionnaire. This involves the targeted population of eye care intervention beneficiaries of more than 4000 from the Noor Dubai Foundation Program in the state. The questionnaire was adopted with certain modifications in the study of Rabiou *et al.*<sup>1</sup> and Burton *et al.*<sup>10</sup>. The questionnaire was translated and vetted by a research expert before administering it. Competent research assistants were employed for administering the questionnaire, who understand the terrain and locality of the beneficiaries and have the capacities to interact with the beneficiaries in both English and their native language. Before conducting a pilot survey, ethical clearances to conduct the study were formally obtained from the Katsina State Ministry of Health. However, before engaging the selected sample of beneficiaries, consent approval was sought from individuals who agree willingly to participate in the process of answering the questionnaire through their signature after a verbal agreement to participate.

**Sample size and technique:** This research adopted some adjustments from the work of Shekhawat *et al.*<sup>11</sup> with regards to sampling size. Thus, a minimum sample size of 200 approximately representing 5% of the beneficiary's population of 4,000 was selected.

The sampling technique involves the use of a multi-stage cluster of randomised selection technique by using probability proportionate to cluster size sample involving 60 communities on a random selection phase. In each cluster, there are segments comprising the beneficiaries. However, in any case of refusal or absence to participate, another sample of 10 beneficiaries was drawn which constitutes approximately 4% of the initial 200 beneficiaries<sup>10</sup>.

**Parameters of the study and data collection:** The parameters include dependent variables and independent variables<sup>3,12,13</sup>, the dependent variable is the eye care intervention to be explained by the independent variable poverty, measured by productivity and social inclusion indicators.

The data were electronically obtained through the use of Open Data Kit (ODK) software 2023 on an android phone which enables the snapshots of the respondents and monitors the process of data collection at the location. All the data collected were cleaned, organized and categorized for analysis. The collected data were analysed using descriptive statistics and inferential analysis. A combination of software such as SPSS version 25 and STATA 16 2019 was used.

## RESULTS

This study examined how the economic intervention of eye care reduces poverty, therefore, findings explain how the intervention through changes in income and other variables change the status of the poor.

The demographic data revealed that about 43% of the respondents are male while 57% of the respondents are female. The significance of this outcome was that the NDF eye care interventions in Katsina State were gender-sensitive, balanced and inclusive as such in line with the objective of sustainable development goals (SDGs).

The educational level suggested that 69% of the respondents did not attend formal schools, 22% of them attended either primary or secondary school and 7% obtained tertiary education. This finding suggested that cataract vision impairment is more common among illiterate's families.

The monthly income of the respondent in Fig. 1 suggested that about 45% of the respondents earned less than ₦5K per month (\$11.3), 4% earned a monthly income between ₦5-₦20K (\$11.3-\$45.4), 2% of the beneficiaries earned a monthly income between ₦20-₦30K (\$45.4-\$68.1)

while about 48% of the respondents earned a monthly income that is more than ₦30K (>\$68.1). However, this was converted into Dollars based on the official exchange rate of ₦440.8 = \$1 at the time of analyzing this result. This outcome revealed that visual impairment highly affects poor people.

Figure 2 presents the momentary equivalence of the intervention measured in quantitative terms by assigning certain monetary values to the benefit of the eye care services received by the respondents in the questionnaire. The options for the quantitative monetary values range from <₦50K to >₦200K. This was informed by the average range prices of accessing cataract surgery and treatments in the state as shown in Fig. 2.

Figure 2 showed that, 21% of the respondents revealed that the monetary value of the eye care benefit (cataract and follow-up treatments) they received is less than ₦50K, equivalent to \$113.4. About 11% of the respondents agree that the monetary value of the eye care intervention they received from NDF is between ₦50K -₦100 (equivalent to \$113.4-\$226.8). Equally, 21.3% of the respondents revealed that the monetary values benefit they received from cataract surgery and follow-up treatments falls within ₦100K-₦150K which is equivalent to \$226.8-\$340.2. On the other hand, 24.3% of the respondents revealed that the monetary benefit they received from NDF cataract vision impairment interventions falls within the range of ₦150K-₦200K which was equivalent to \$340.2-\$453.7.

Nevertheless, about 22% of the respondents revealed that the monetary value they received from the interventions is greater than ₦200K (i.e., >\$453.7). The conversion from Naira to Dollar was based on the official exchange rate of ₦440.8 = \$1 as contained on the Central Bank of Nigerian website during the time of this analysis. The respondent that revealed higher monetary values were further asked the reason why they suggested choosing that and their further response was: They have valued the intervention not only in terms of extrinsic economic value such as the price of the surgery and all follow-up treatment but also in terms of intrinsic economic monetary value which is in terms of regaining vision inclusion that enhances and revitalized their economic activities such as their ability to do business, work and earn income and their ability to engage in craft and local productivity that resuscitate their lost income. Therefore, the monetary value gained from NDF eye health intervention has further reduced cataract impairment poverty induced vicious circle in Katsina.

Figure 3 presented the impact of cataract eye care intervention on poverty reduction in Katsina by considering certain indicators that improves standard of life and reduce poverty. These indicators CQL1-CQL5 are productivity, income,

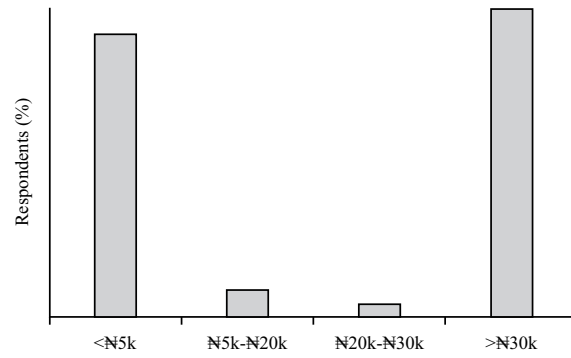


Fig. 1: Monthly income of beneficiaries

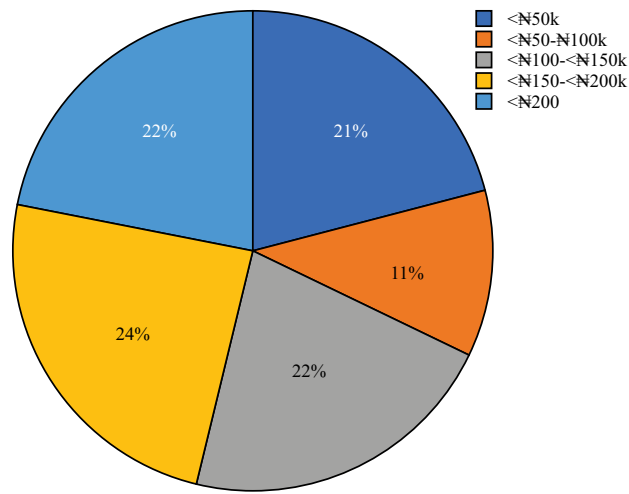


Fig. 2: Naira equivalence of Intervention of NDF

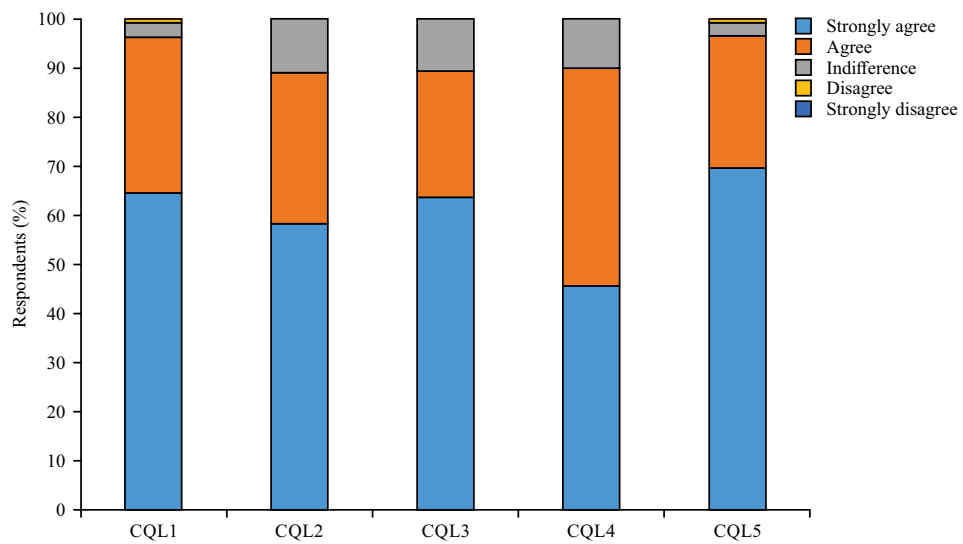


Fig. 3: Impact of cataract surgery on poverty reduction  
 CQL1-CQL5 represent productivity, income, employability, dignity and skills

employability, dignity and skills. Figure 3 observed that, majority of the respondents for all the indicators agreed that their economic condition has improved as a result of eye care intervention. Thus, results concluded that eye care intervention in the state has a positively improve the economic wellbeing of vision impaired people and thus reduce their level of poverty.

## DISCUSSION

The results showed that productivity, income, employability, dignity and skills of beneficiaries have improved significantly after the cataract surgery. This study supported the work of Kuper *et al.*<sup>8</sup> which investigated cataract surgery and poverty. The findings of this study also support other related studies on prevalence and causes of blindness and how they relate to poverty<sup>6,10,11,14,15</sup>. The finding of this study supported the study of Wong *et al.*<sup>3</sup>, who revealed that in India any strategies to combat avoidable blindness must take into account the socio-economic condition within which people live. However, in a related development, the findings of this paper confirmed the argument in the study of Burton *et al.*<sup>10</sup>, which indicated that eye diseases causing preventable blindness are often the result of a combination of factors such as poverty, lack of education and inadequate health care services. However, finding from the study of Wong *et al.*<sup>3</sup> and Kuper *et al.*<sup>8</sup> produced a similar results with this study.

Thus, the interventions have enormously transformed the income position of most beneficiaries above the United Nations poverty index. This means that vision impairment is highly related to income vulnerability which leads to a vicious circle of poverty. Therefore, a further partnership of Katsina State government with charitable eye health organizations is important. This will assist in reducing income loss of the vision impaired people and accelerate towards achieving equitable and sustainable development. The implication is that without good eye health, it is hard to participate in the labour force, produce goods and earn money. Hence, there is a need for the state government to improve level of awareness of good eye health to reduce poverty and enhance inclusive development.

The implication of the study is that vision impairment is highly correlated with vicious cycle of poverty. This is because vision impairment reduces the chances to participate in economic activities and thus increases income vulnerability. This study recommended that the state government should increase eye care intervention in other to hasten its chance of achieving inclusive development. One of the limitations of the

study was the inability to reach out to a few respondents that are in security changed areas.

## CONCLUSION

This study examines the impact of eye care intervention on poverty reduction in Katsina State. The interventions are targeted toward achieving equitable and inclusive development in the state. A survey method using a five-point Likert scale questionnaire was employed. A multi-stage sampling technique was employed to draw 200 samples from more than 4000 lists of NDF eye health intervention beneficiaries. The study concluded that vision impairment is highly connected to income vulnerability that leads to a vicious circle of poverty. This study suggested that future studies should focus on investigating the causal linkage between vision impairment, quality of life and poverty.

## SIGNIFICANCE STATEMENT

First, this study is inspired to measure the NDF's eye care interventions and its impact on poverty reduction of the beneficiaries. Achieving this will give the Katsina State government an idea of the purchasing power parity (PPP) equivalence of the interventions. This will also assist in assessing the improvement in the wellbeing of beneficiaries out of the vicious cycle of poverty associated with cataract vision impairments. Second, the need for a disability and gender-inclusive education and equitable eye care program in the state that will reduce vulnerabilities and accelerate the achievement of the state SDGs has also motivated this inquiry. Therefore, this research contributes to the existing body of knowledge by employing a survey method to collect direct information from beneficiaries.

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