

Impact of school eye care intervention on the academic performance of school children in Katsina State, Nigeria



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ABSTRACT

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This study aims to examine the impact of the Noor Dubai Foundation (NDF) School Eye Intervention on the academic performance of schoolchildren in Katsina State. The survey research design was utilised, and primary data was collected using a five-point Likert questionnaire on the beneficiaries. Both tables, graphs, and regression were used to analyse the data. The results reveal that 65.13% of the respondents indicated their vision had improved, 61.11% revealed their reading skills had improved, 64.32% revealed their communication skills had improved, and 64.71% showed their comprehension ability had improved after the eye intervention program. More so, 58.54% revealed their exam score performance had improved, and 59.29% indicated that their positions in the class had improved after receiving the NDF eye care intervention in the state. The analysis of the impact of the NDF programme reveals that eye treatment rather than eye screening improves pupils' performance. This implies that NDF school eye intervention has significantly improved students' academic performance after receiving eye treatment and eyeglasses. The policy implication is that poor eye health affects the realisation of schoolchildren's right to education. The government should emphasise partnering and collaborating with the NDF on eye care interventions for sustainable vision and quality education.

Contribution/ Originality: This study contributed to the existing literature by examining the impact of the NDF school eye care intervention on pupils' academic performance using indicators such as improved vision, reading skills, communication skills, comprehension skills, exam scores, and student academic positions. Multiple regression analysis was used to eliminate estimation bias.

1. INTRODUCTION

According to research conducted by the World Health Organization (WHO), uncorrected refractive errors cause 43 percent of all cases of visual impairment. This accounts for a total population of 122.5 million people, of whom 12 million are children [1]. The United Nations Convention on the Rights of the Child (UNCRC) placed a strong emphasis on the fact that children have rights that are uniquely theirs. These include the right to health, treatment, fitness, and rehabilitation; a right to education; and a right to an adequate standard of living [2, 3]. Poor eye health affects the realisation of these rights [4]. The UNCRC has also mandated that communities, civil society, and governments address children's eye health [5].

Equally, the WHO has called for activities to prevent, treat, rehabilitate, and promote children's eye health [1]. These are also enshrined in several of the United Nations' Sustainable Development Goals (SDGs), mainly goals 3, 4, and 5, which emphasise providing good health, quality education, and gender equality. These are the requirements for achieving goal 8, which aims to ensure economic growth by providing good jobs. A recent study has demonstrated that programmes for detecting and treating uncorrected refractive error (URE) among schoolchildren can be achieved cost-effectively [4, 6-8].

Katsina State is one of the 36 states in the Nigerian Federation with suboptimal eye health indicators. Even though education can transform lives and spark societal change, the state lacks an articulated school health program. Children's achievement and learning quality at school could strongly be correlated with their overall health, especially their eye health. This would, in turn, affect children's future quality of life and academic performance. School eye health programmes may provide a unique opportunity to deliver comprehensive eye health services to school-going children Minto and Ho [4]; Reddy and Bassett [7] and Liao, et al. [8]. Rabi, et al. [9] noted that good eye health is a critical factor in determining the standard of living. In contrast, lousy eye health is inversely correlated with economic advantages and life quality.

The Noor Dubai Foundation (NDF), in partnership with the Katsina state government and other interested non-governmental organisations, has started providing comprehensive and sustainable eye care services to address the rising incidence of vision impairment among students and teachers in Katsina state [10]. The first stage includes introducing the school eye programme in the state's three senatorial districts (Katsina Central, Daura, and Funtua). In line with sustainable development goals (SDGs) and the vision of the Noor Foundation to have a world free from preventable forms of blindness, this paper is inspired by the need to evaluate the impact of school eye intervention on schoolchildren's educational performance. It was further motivated by the need for sustainable school eye care programmes in the state and the gap in the existing contemporary studies examining the impact of school eye care services on schoolchildren's educational performance.

Therefore, this paper contributes in several ways: First, the use of a 5-point Likert scale questionnaire, in addition to sidestepping every other technique, suffered a lot of shortcomings. Applying an open data kit (ODK) controls the interviewer's bias to ensure monitoring and transparency in the data collection process. This provides first-hand information directly from the beneficiaries of the NDF school eye health intervention in Katsina State. Secondly, the intervention's impact on school eye care and academic performance indicators such as improved vision, reading skills, communication skills, comprehension skills, exam scores, and students' academic positions are examined. Thirdly, it contributes to building an accurate and reliable database for eye care services in Katsina State. Fourthly, the paper applied regression analysis to measure the impact of the NDF Foundation eye care programme on the performance of schoolchildren unbiasedly. Lastly, the study will fill the gaps in policymaking based on the bottom-top approach.

Thus, the following research questions were addressed in the course of the study:

- (i) To what degree does eye screening of pupils impact their academic performance in Katsina State?
- (ii) To what extent do eye treatment and glasses impact pupils' academic performance in Katsina State?
- (iii) By what magnitude does parents' occupation mediate the impact of eye intervention on pupils' academic performance in Katsina State?
- (iv) How much does family size mediate the impact of eye intervention on pupils' academic performance in Katsina State?

2. LITERATURE REVIEW

The term "eye screening" describes the methodical examination of the eyes to look for any indications of possible eye illnesses or vision issues. Early identification and intervention to stop or slow the course of eye disorders is the primary goal of eye screening. This procedure is essential for preserving eye health and avoiding

visual impairment Taryam, et al. [10] and Rabi, et al. [11]. Malik, et al. [12] reflect that early testing would improve early identification, referral, and surgery for congenital cataracts, while Al-Aswad, et al. [13] acknowledge the need for eye screening, especially in rural areas. According to Du, et al. [3] and Wilhelmsen and Felder [2] that will improve children's rights to education, a suitable standard of living, health care, exercise, and rehabilitation. Thus, this outlines the essence of this research to evaluate the impact of the Noor Dubai eye intervention on pupils' educational performance in Katsina State. Researchers have conducted some studies that have shed insight into the effects of different types of ocular therapies and eye interventions. According to Ethan and Basch [14] it is estimated that one in every five children in the United States of America has a visual issue. The prevalence of visual problems in children who live in low-income urban areas is twice as high as the average. Eyesight disorders that are not treated may get more severe over time, leading to an irreversible loss of eyesight. Children from families with low incomes have a disproportionately high number of eye impairments and encounter several obstacles when trying to get vision treatment. Basch [15] provided more evidence that eye problems might hinder the academic performance of schoolchildren, particularly those living in rural parts of the United States.

Furthermore, the study pointed out that sensory perceptions, cognition, and school connection are the causative pathways that are responsible for the negative impact that visual difficulties have on academic attainment. Glewwe, et al. [16] estimated that over twenty percent of all children in the United States who are of school age have visual impairments. Children from low-income families and children from minority groups are disproportionately likely to have unmet vision care requirements. Mostly, it was discovered that extra or expanded screening is insufficient to improve students' academic performance in reading and mathematics. On the other hand, screening, free eye examinations, and free spectacles for kids with visual impairments improved student accomplishment as evaluated by standardised test results. According to Liao, et al. [8] school-based vision screening, which teachers carry out, is a method that is both cost-effective and efficient for identifying early visual impairment in school-aged children in regions where resources are very limited. Twenty-four percent of the pupils who participated in this school-based program in central China did not pass the eyesight test. Within three years, however, more than half of the patients had their eyesight cured. The teacher vision program is an excellent tool when evaluating and keeping track of the eye health of schoolchildren. In particular, some studies focus on the effects of eye care treatments conducted in Nigeria. According to Rabi, et al. [9] the data show that poor eye health has a negative relationship with economic advantages and quality of life, while excellent eye health is an essential factor in determining the standard of living. Participating in the labour force, producing commodities, and earning revenue are all difficult to achieve if one does not have excellent eye health. On the other hand, Taryam, et al. [10] indicated that it is possible for considerable eye care intervention to bring about a significant improvement in the quality of life and social inclusion of respondents. These include a decreased reliance on escorts, increased capacity to participate in social activities, the freedom to choose one's life path, reduced discrimination resulting from visual impairment, and an improved ability to live a sustainable life.

There are challenges in evaluating rural regions for eye screening, particularly in Nigeria and most African nations combined. Liu, et al. [17] identified several factors that impede eye screening in rural areas. These factors include the difficulty of managing diabetes, the struggles of family members with the disease, the fear of complications resulting from diabetes, extensive travel distances to receive care, poverty and financial trade-offs, restricted access to healthcare, and infrequent use of healthcare services. Therefore, this calls for the attention of government agencies and donors to help facilitate what the Noor Dubai Foundation has delivered in Katsina State.

3. DATA AND METHOD

3.1. Data Collection Procedure

The study measured the school eye care interventions of the Noor Dubai Foundation on school children's academic performance in Katsina State. We use a 5-point Likert scale to find out how well schoolchildren are doing

in school by looking at how much their writing, communication, and comprehension skills have improved. We also compare their last term's grades to their most recent term's grades after the intervention and their last term's academic class position to their most recent term's academic class position after the interventions.

Furthermore, a total of 1,674 schoolchildren and teachers who received eye treatments and eyeglasses constitute the population frame of the study. Out of this, 1,256 pupils received eye medications, and 5 of them received eyeglasses as an intervention. On the other hand, 410 schoolteachers received eyeglasses as an intervention. A survey research design was utilised in this research. Ethical approval for the study was obtained from the Katsina State Ministry of Health (Approval No. 662).

3.2. The Sample Size and Techniques

The sample size of schoolchildren and teachers is selected proportionate to their population. The Chung, et al. [6] and Rabi, et al. [9] sampling techniques were augmented with the Yamane [18] sampling method to obtain a sampling size that approximates the population of the study. Therefore, a sample of 323 beneficiaries was recruited for the study. Proportionately, therefore, 298 beneficiaries were selected from schoolchildren, and 25 teachers were also selected as the sample for the study.

Moreover, a multi-stage sampling technique was used to administer the questionnaire. In the first stage, the beneficiaries were grouped into the three cities where the school eye programme runs. In the second sampling stage, 15 schools were randomly selected from each city. In the third stage, 7 beneficiaries, comprising 5 schoolchildren and 2 teachers, received eye treatments and eyeglasses from each selected school using a systematic random sampling technique. To achieve this, all the benefiting schoolchildren and teachers were listed, respectively, and one sample was selected at an interval of 7 to arrive at the total sample of the population.

3.3. Model Specification

One of the contributions of this research is to estimate through regression the impact of the NDF eye care intervention on the academic performance of pupils from Katsina. Consequently, it is imperative to establish a model that needs to be estimated. Thus:

$$AP = F(NDF \text{ Eye Care})(1)$$

In Equation 1, AP is the dependent variable, which stands for the pupil's academic performance. In this instance, the NDF intervention consists of eye screening and treatment exercises. Substituting the two elements into the equation, we have:

$$AP = F(ES, TG)(2)$$

ES represents eye health screening, while TG stands for eye treatment (which also includes the provision of eyeglasses). Representing Equation 2 in econometric form, we have:

$$AP = \alpha_0 + \beta_1 ES_i + \beta_2 TG_i + \mu_i(3)$$

From Equation 3, α_0 is the constant, and μ_i is the error term, which is assumed to be uniformly distributed. To avoid over-parameterising the β_1 and β_2 which are the coefficients to be estimated; the research would like to add two control variables from the demographic factors. Thus, the parent's occupation (PO) and family size (FS) are considered. Therefore, the new Equation 4 is represented as follows:

$$AP = \alpha_0 + \beta_1 ES_i + \beta_2 TG_i + \beta_3 PO_i + \beta_4 FS_i + \mu_i \quad (4)$$

3.4. Techniques of Data Analysis and Hypotheses Testing

Experts initially reviewed and pre-tested the designed questionnaire, but they made no further recommendations. At the same time, experienced research assistants were retrained to translate the questions into the beneficiary's native language. SPSS 27 was used for the descriptive statistics and the regression analysis. Ethical permission was obtained from the Katsina State Ministry of Health, while the consent of pupils was sought

through their teachers. Teachers offered their consent before administering the questionnaires. The paper determined the reliability of the research instruments through Cronbach's alpha for each question of the questionnaire. In this regard, first, a pilot test was done, and second, the alpha was determined with all the responses to the returned questionnaire, with the result posted in [Appendix 1](#). Following [Sulaiman, et al. \[19\]](#) and [Firoj, et al. \[20\]](#) tables and figures were used to present results and demographic analysis while multiple regression analysis was used to test the hypothesis in line with [Restiatun, et al. \[21\]](#).

Table 1. Demographic information of school eye intervention of the beneficiaries.

Demographic variables	Categories	Frequencies	Percentage (%)
Gender			
1	Male	174	53.87
2	Female	149	46.13
Age			
1	1 - 5 years	4	1.24
2	5 - 10 years	119	36.84
3	10 - 15 years	185	57.28
4	18 and above	15	4.64
Class			
1	Primary 1	6	1.86
2	Primary 2	82	25.39
3	Primary 3	37	11.46
4	Primary 4	48	14.86
5	Primary 5	37	11.46
6	Primary 6	113	34.98
Type of intervention			
1	Eye treatments	307	95.05
2	Eyeglasses	16	4.95
Parent occupation			
1	Civil servant	103	31.89
2	Farming	18	5.57
3	Business (Trade)	80	24.77
4	Others	122	37.77
School fees per term			
1	Free	323	100.00
Family size			
1	Nuclear family	236	73.07
2	Extended family	87	26.93

4. RESULTS AND DISCUSSION

4.1. Demographic Analysis

All the 323 questionnaires administered were retrieved, cleaned, coded, and analysed with the aid of Microsoft Excel and SPSS 27. The analysis began with the presentation of the demographic information of the respondents. These include gender, age, education level, intervention types, parent occupation, and family size. This is presented in [Table 1](#), which reveals that about 53% of the respondents are male and 46% of the respondents are female. The main message of this result is that the Noor Dubai Foundation's (NDF) eye interventions in the state are inclusive and not biased towards any gender.

The demographic information on the age of the respondents suggests that 57% are above 10 years old, while the remaining 43% fall within the age range of 5-10. This is not surprising, as the target beneficiaries are within the primary range of 1 to 6. The level of education suggests that about 69% of the respondents are in Primary 6, about 1% of them are in Primary 5, about 7% are in Primary 4, 11% are in Primary 3, and 10% of them are in Primary 2 (see [Table 1](#)). These findings suggest that vision impairment is prominent among pupils in primary school in Katsina State.

The types of interventions received by the respondents were either eye treatments or eyeglasses. However, about 95% of the beneficiaries indicated that they received eye treatment, while only 4% indicated receiving eyeglasses. However, about 31% of the respondents indicate that their parents are civil servants. In comparison, about 5% of the respondents indicate that their parents are farmers, about 24.77% indicate that their parents are businesspeople, and 37% indicate other occupations. With regards to the types of family and family size of the beneficiaries, the results indicate that 26% of the respondents came from the extended family, while about 75% of the respondents came from the nuclear family, which indicates that most of those with vision impairments are from the nuclear family.

Responses

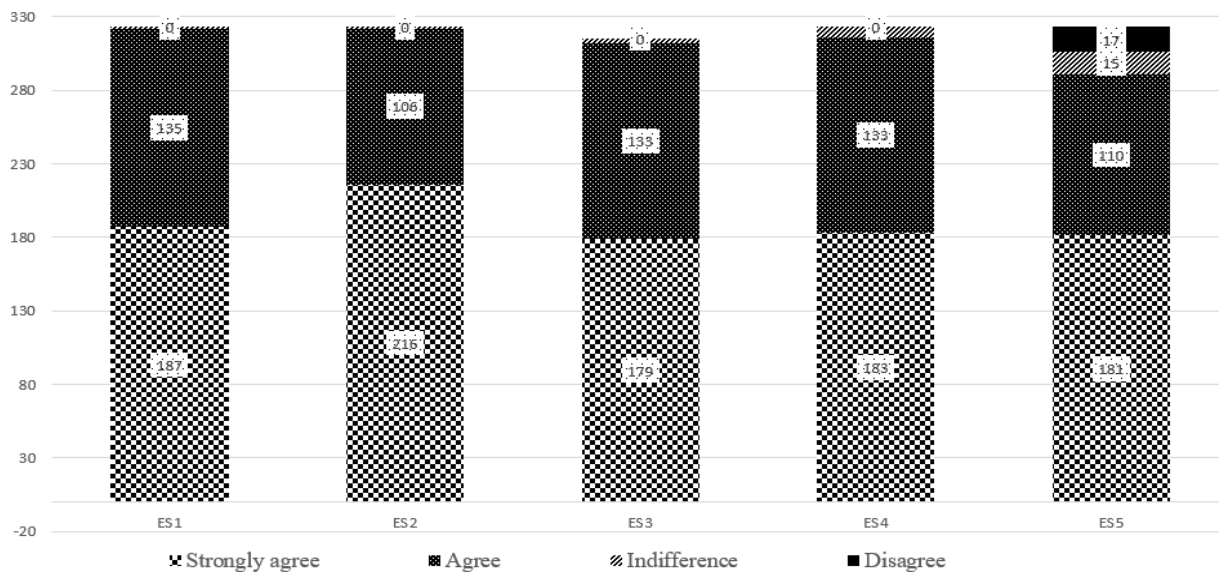


Figure 1. Response to school eye care intervention.

4.2. Analysis of the Questionnaire

In the first instance, the responses to the eye health screening exercise were assessed, and the result is reflected in Figure 1. Figure 1 indicates that 187 responses strongly affirm that the NDF agents came to their school for eye health care screening (ES1), while 135 responses further testify to that Effect, which implies that the NDF agents were present to conduct the eye screening tests. The responses also show that 216 respondents strongly testified that their eyes were screened to determine their health condition by NDF (ES2), while 106 respondents also affirmed. Figure 1 also reflects that other schoolchildren's eyes were also screened by NDF (ES3), with 179 respondents strongly agreeing and 133 agreeing. With a total of 316 respondents, there was evidence that NDF (ES4) also screened the school teacher's eyes. Finally, the response indicated that teachers were trained on how to carry out eye care screening (ES5). This came with 181 responses that strongly agreed, while 110 responses agreed to that Effect.

Again, the responses to eye treatments and eyeglasses were examined, and the result is reflected in Figure 2. Figure 2 shows that 171 of the respondents strongly agree that they got eye care or glasses from NDF (TG1), and another 32 respondents agree, which means that treatment happened after the screening. However, 63 respondents disagreed, and 56 respondents strongly disagreed. From Figure 2, the responses also show that 171 responses strongly affirm having used the eye treatments or glasses as prescribed by the ophthalmologist (TG2), while 32 responses affirm too, which implies that they were following the treatment as specified after the screening exercise. However, 63 respondents disagreed, and as many as 56 respondents strongly disagreed. Figure 2 also reflects that follow-up treatments and checks were scheduled to monitor improvement (TG3), with 135 respondents strongly

agreeing and 96 agreeing. Again, there was an indication that the treatments or glasses have improved your academic performance (TG4), with 313 respondents affirming that. Finally, the response indicated that other pupils with eye impairments also received the eye treatments (TG5). This came with 135 responses that strongly agreed, while 188 responses agreed to that effect.

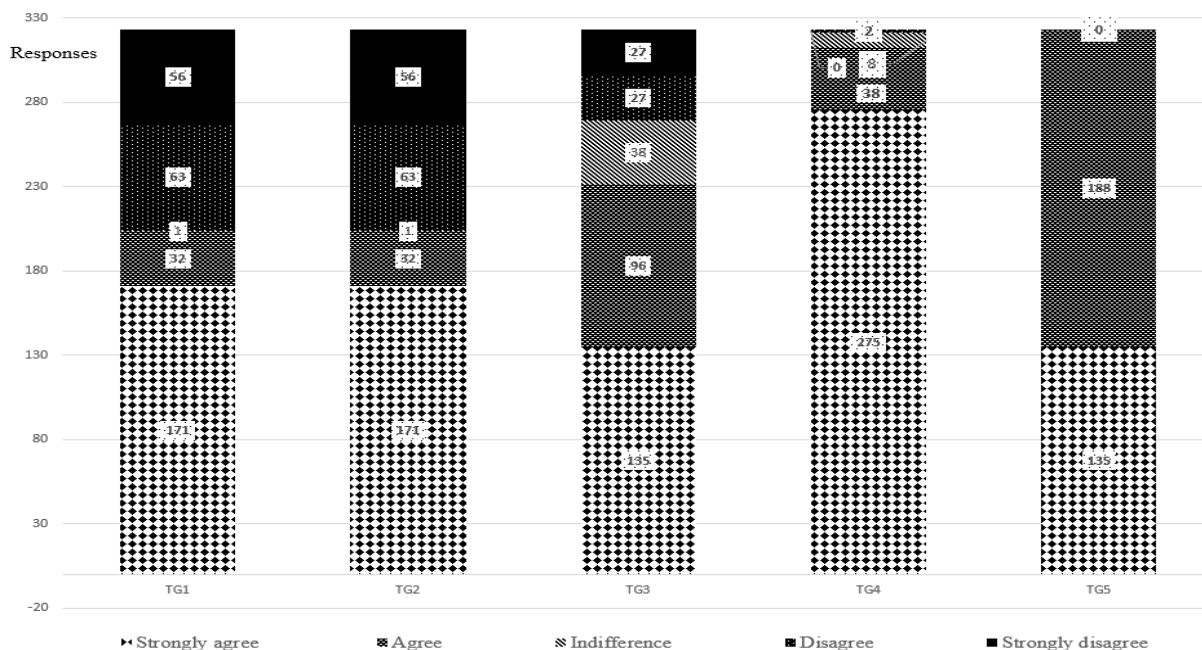


Figure 2. Response to eye treatments and eyeglasses.

Table 2 presents the result of the impact of school eye intervention on academic performance, which answers the hypothesis (H1) that academic performance can be improved through school eye care intervention in Katsina State. The indicators for measuring academic performance are improved vision, improved reading skills, improved communication skills, improved comprehension ability, improved exam scores, and improved position in the class. First, the research examines the respondents to ascertain whether their vision has improved after receiving the school eye care interventions.

The result, as presented in Table 2 and Figure 3, reveals that (n=198) 61.3% strongly agree, (n=117) 36.2% agree, (n=3) 0.93% respondents are indifferent, and (n=4) 1.24% respondents disagree that the school eye care intervention has improved their vision. While (n=198), 61.3% strongly agree, (n = 114), 35.9% agree, and (n=6) 1.9% are indifferent that the school eye care intervention has improved their reading skills. Again, (n=185) 57.3% of respondents strongly agree, (n=106) 32.8% agree, (n=28) 8.7% are indifferent, and (n=4) disagree that the school eye care intervention has improved their communication skills. While (n=187) 57.9% of respondents strongly agree and (n=99) 30.7% agree, (n=31) 9.6% are indifferent, though (n=6) 1.9% disagree that the school eye care intervention had improved their comprehension ability. Equally, (n = 205) 63.5% of respondents strongly agree, and (n= 66) 20.4% agree. In comparison, (n= 47) 14.6% are indifferent, only (n=4) 1.24% of respondents disagree that the school eye care intervention has improved their exam scores after the intervention, and finally (n=210) 65% strongly agree. In comparison, (n= 65) 20.1% agree, and (n=48) 14.9% show indifference, but no one disagrees that the school eye care intervention has improved their position at the end of the term examination in the school after receiving the eye care intervention in the state.

Table 2. Impact of school eye care intervention on academic performance in Katsina State.

Indicators	Vision		Reading		Communication		Comprehension		Scores		Position	
	Frequency	%	Frequency	%	Frequency	%	Frequency	%	Frequency	%	Frequency	%
Strongly agreed	198	61.3	198	61.3	185	57.3	187	57.9	205	63.5	210	65.0
Agreed	117	36.2	114	35.9	106	32.8	99	30.7	66	20.4	65	20.1
Indifference	3	0.93	6	1.9	28	8.7	31	9.6	47	14.6	48	14.9
Disagree	4	1.24	5	1.5	4	1.24	6	1.9	4	1.24	0	0
Strongly disagree	0	0	0	0	0	0	0	0	0	0	0	0
Total	323	100	323	100	323	100	323	100	323	100	323	100

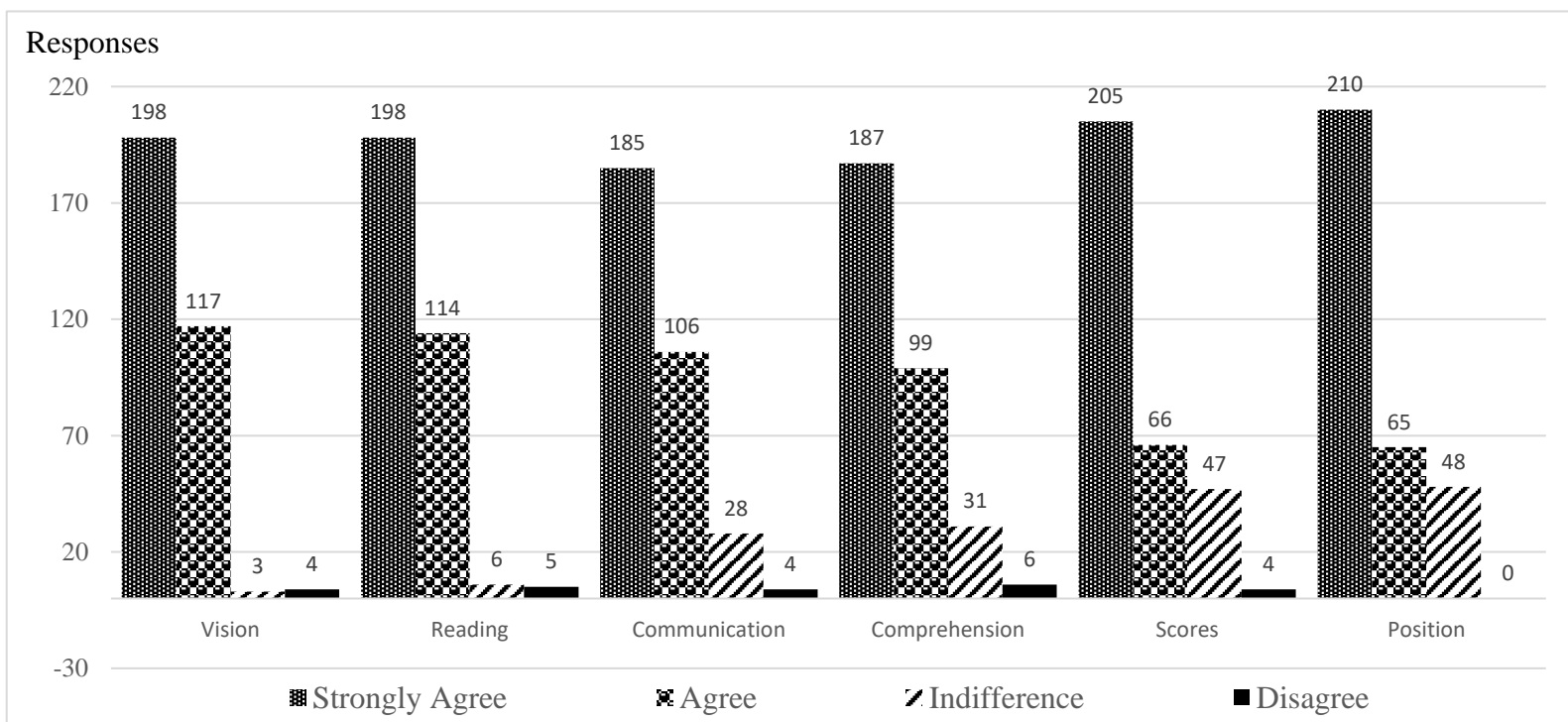


Figure 3. Impact of school eye care intervention on academics' performance.

4.3. Hypothesis Testing

This subsection commenced with pre-estimation and correlation results reported in Table 3. It demonstrates the correlation between eye treatments and pupils' academic performance. The inter-correlation matrix reflects that none of the independent variables are highly correlated. It was indicated by Azu, et al. [22] and Azu and Nwauko [23] that when the independent variables are highly corrected, independent regression is suggested for each of the correlated variables. Hence, as posted in Table 3, the result would mean that the necessary estimation would require a single regression equation, as no issue of multicollinearity is expected. Table 3: Panel B presents the reliability test (Panel B) of the relevant variable included in the research. The Cronbach's alpha for the 33 questionnaire items used to form our variables is 0.906, which is above the minimum requirement. Therefore, the questionnaire passed the reliability test for both the pilot test and the entire questionnaire reported herein. By implication, the respondents' understanding of the questionnaire was consistent. The report of the individual items is reported in Appendix 1.

Table 3. Correlation matrix and reliability statistics.

Panel A: Inter-item correlation matrix					
Variables	PO	FS	ES	TG	AP
PO	1.000	0.008	0.211	0.184	0.187
FS	0.008	1.000	-0.323	-0.395	0.025
ES	0.211	-0.323	1.000	0.774	0.258
TG	0.184	-0.395	0.774	1.000	0.375
AP	0.187	0.025	0.258	0.375	1.000
Panel B: Reliability statistics					
Cronbach's alpha	Cronbach's alpha based on standardised items		N of items	N	
0.906	0.926		33	323	

Note: PO-Parents occupation; FS-Family size; ES-Eye screening; TG-Eye treatment and glasses; AP-Academic performance.

The essence of the hypothesis testing is to express, in econometric terms, the influence of NDF eye intervention on the pupil's academic performance in Katsina. The regression result is reported in Table 4. According to the R-Square, these independent variables have a 69.8% chance of influencing the dependent, which is relatively relevant. In other words, eye health screening, eye care, eyeglasses, parents' occupation, and family size explained 69.8% of the variation in students' performance. The residuals from the statistical regression analysis do not exhibit autocorrelation, according to the Durbin-Watson (DW) statistic test. The value of 1.99, which is higher than 1.8 and indicates that there was no autocorrelation in the selected sample, serves as evidence for this. This also affirms the stability of the model employed in testing the hypothesis. In other words, it demonstrated that the model fits the data effectively.

Table 4. Regression estimation of the impact of NDF school eye intervention on pupil's academic performance.

Variables	Unstandardised coefficients		Standardised coefficients	T	Sig.
	B	Std. error	Beta		
(Constant)	0.567	0.158		3.599	0.000
PO	0.051	0.024	0.113	2.172	0.031
FS	0.252	0.072	0.193	3.495	0.001
ES	-0.117	0.102	-0.092	-1.144	0.253
TG	0.330	0.054	0.501	6.098	0.000
R-square	0.6981	Adjusted R square	0.5647	Durbin-Watson	1.992

The regression estimation reflects that eye health screening (ES) has a coefficient of -0.117 but is not statistically significant. This shows a potential negative effect on pupils' performance, though not statistically significant. Thus, one cannot completely affirm that eye health screening has a negative impact on pupils' performance. This reflects the finding of Glewwe, et al. [16] that eye screening alone could not improve the

performance of schoolchildren. On the other hand, eye treatment and eyeglasses (TG) have indicated a positive coefficient of 0.330 and are statistically significant at one percent. This implies that as eye treatment and eyeglasses increase by one percent, pupils' performance increases by 33 percent, all things being equal. It, therefore, suggests that eye treatment and eyeglasses improved pupils' performance in the area covered in this research. The outcome here is similar to the findings of Rabi, et al. [9] and Taryam, et al. [10] which highlighted that eye treatment (in this case, cataracts) improves the quality of life as well as the economic benefits of the beneficiaries. Eye screening is a step towards eye treatment and, therefore, essential. Still, eye treatment properly yields the utmost economic benefit, such as improved quality of life and educational performance among pupils in primary school.

Table 5. Regression estimation of the economic importance of parent occupation and family size impact on NDF school eye intervention on pupil's academic performance.

Panel A: Economic importance of parent occupation on impact on NDF school eye					
Variables	Unstandardised coefficients		Standardised coefficients	t	Sig.
	B	Std. error	Beta		
(Constant)	0.311	0.260		1.194	0.233
PO	0.145	0.078	0.318	1.847	0.066
FS	0.251	0.072	0.192	3.483	0.001
ES	0.094	0.275	0.074	0.344	0.731
TG	0.317	0.133	0.481	2.373	0.018
PO*ES	-0.073	0.089	-0.305	-0.819	0.414
PO*TG	0.003	0.044	0.022	0.075	0.940
Panel B: Economic importance of family size on impact on NDF school eye					
Variables	Unstandardised coefficients		Standardised coefficients	t	Sig.
	B	Std. error	Beta		
(Constant)	1.507	0.349		4.316	0.000
PO	0.029	0.023	0.063	1.266	0.207
FS	-0.701	0.284	-0.537	-2.468	0.014
ES	0.896	0.290	0.704	3.095	0.002
TG	-1.168	0.235	-1.773	-4.971	0.000
FS*ES	-0.811	0.212	-0.906	-3.833	0.000
FS*TG	1.391	0.214	2.133	6.501	0.000

The regression results also demonstrate that a parent's occupation and family size could positively influence the pupil's performance. Parents' occupation has a coefficient of 0.051 and is statistically significant at five percent, while family size has a coefficient of 0.252 and is statistically significant at one percent. These coefficients reflect that the more independent parents' occupation, the better the pupils' performance, while an extended family could be more productive with regards to improving pupils' performance.

The paper also tried to affirm if the parents' occupation and family size could alter the impact of eye health screening, eye treatment, and eyeglasses. To achieve this, we interact with the concerned variables—first, parents' occupation with the impact of eye health screening, eye treatment, and eyeglasses. The results are posted in Table 5. Panel A of Table 5 shows that parents' occupation does not have significant control over the influence of either eye health screening or eye treatment and eyeglasses, as the reported coefficients are not statistically significant. On the other hand, family size interacted with eye health screening, eye treatment, and eyeglasses. The results are posted in Table 5, Panel B. It shows that family size could significantly mediate the influence of eye health screening, eye treatment, and eyeglasses, as the reported coefficients are statistically significant. In the first instance, without family size, eye health screening would positively impact pupils' academic performance. After the interaction of family size and eye health screening, the influence of family size became negative (coefficient = -0.701 and significant at 5%). In comparison, eye health screening became positive (coefficient = 0.896 and significant at 1%), and the resulting interacted variable had a negative impact (coefficient = -0.811 and significant at 1%).

Therefore, family size negatively influences the impact of eye health screening on pupils' academic performance. Secondly, family size, eye treatment, and eyeglasses would positively impact pupils' academic performance. After the

interaction of family size and eye treatment and eyeglasses, the influence of family size became negative (coefficient = -0.701 and significant at 5%). In comparison, eye treatment and eyeglasses became negative (coefficient = -1.168 and significant at 1%), and the resulting interaction variable had a positive impact (coefficient = 1.391 and significant at 1%). Therefore, family size positively influences the impact of eye treatment and eyeglasses on pupils' academic performance.

5. CONCLUSION AND POLICY RECOMMENDATIONS

The study examines the impact of school eye care interventions in Katsina State. The study employs a 5-Likert scale survey method, and the findings suggest that school eye care interventions significantly improved the academic performance of the beneficiaries. These findings support the work of Minto and Ho [4]. The findings also suggest that poor eye health affects the realisation of schoolchildren's right to education. Poor eye health affects teachers' contribution to high-quality education. NDF school eye care interventions have significantly improved schoolchildren's academic performance in Katsina State.

The finding suggests that eye treatment and eyeglasses improve pupils' performance in the area covered in this research. Family size could influence how eye screening and treatment would impact the pupils' performance in Katsina State. Vision impairment has a positive correlation with academic performance. Good eye health is more important for teachers' productivity. Poor vision militates against the United Nations SDG and WHO goal of achieving education for all and children's right to education.

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APPENDIX

Appendix 1. Item-total statistics.

Variables	Scale mean if item deleted	Scale variance if item deleted	Corrected item-total correlation	Cronbach's alpha if item deleted
Cities	55.59	158.648	0.883	0.896
Gender	56.29	176.167	0.027	0.908
Age	55.10	175.601	0.054	0.908
Class	53.61	171.122	0.065	0.919
Type of intervention	56.70	177.002	-0.048	0.907
PO	55.07	167.700	0.227	0.910
FS	56.48	180.150	-0.299	0.910
ES1	56.32	167.078	0.729	0.901
ES2	56.41	168.934	0.611	0.902
ES3	56.29	167.154	0.700	0.901
ES4	56.29	166.667	0.703	0.901
ES5	56.15	165.905	0.491	0.902
TG1	55.36	144.548	0.741	0.898
TG2	55.36	144.548	0.741	0.898
TG3	55.62	153.525	0.687	0.898
TG4	56.56	175.643	0.069	0.907
TG5	56.16	168.236	0.648	0.902
AP1	56.32	168.830	0.498	0.903
AP2	56.31	169.304	0.444	0.903
AP3	56.20	166.157	0.556	0.902
AP4	56.19	165.338	0.569	0.901
AP5	56.21	167.613	0.420	0.903
AP6	56.25	168.167	0.419	0.903

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