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RESEARCH ARTICLE

Influence of Eye Screening and Treatment in Elementary Schools on Inclusive and Sustainable Child Education in Katsina State

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ABSTRACT

The purpose of this study is to examine the impact of school eye screening and treatment on inclusive and sustainable child education in Katsina State, Nigeria. An experimental quantitative research design was utilised, and primary data was collected, which involved the use of a five-point Likert questionnaire on the beneficiaries. Both tables and graphs were used to present the data, while multiple regression was relevant for data analysis. Inclusive and sustainable child education was captured by pupils' academic performance and teachers' productivity as dependent variables while emphasising eye screening and treatment as independent variables, family size, and parents' occupation as control variables. Out of the 323 samples that returned their questionnaires, 96.9% attest to having participated in the eye screening activities, while 78.9% confirmed having benefitted from the eye treatment activities. Results suggest that eye treatment has a significant positive impact on both teachers' productivity and children's academic performance, which is even better with increasing family size. This implies that Noor Dubai Foundation's (NDF) school eye screening has significantly improved elementary children's educational performance only 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 place more emphasis on the treatment of children's eyes in collaboration with the NDF on eye care interventions for inclusive, sustainable, and quality education.

INTRODUCTION

The World Health Organization (WHO) released a recent statistic on vision impairments and blindness on a worldwide basis. The data revealed that the number of people, including children, affected by preventable vision impairments is increasing at an alarming rate. At least one case of curable blindness is recorded in the world every five seconds (WHO, 2022). However, a high-quality vision is a prerequisite to attaining goal 4 of the Sustainable Development Goal, which aims to achieve equitable and inclusive quality education and the promotion of lifetime learning opportunities for all children (United Nations, 2017). Achieving this goal also requires the presence of trained teachers and the availability of sufficient school facilities. A policy regime shift focusing on the sound eye vision of children in elementary schools is important to achieving inclusive and sustainable education for all. Yet many children, especially in developing countries, have continued to be confronted with poor access to affordable eye health services, which leads to vision impairment and blindness. The leading causes of bendiness among children include cataracts, uncorrected refractive error, corneal scarring, congenital ocular anomalies, and cerebral impairments (Burton et al., 2021).

In response to this, the Noor Dubai Foundation (NDF), which is a non-governmental organisation in collaboration with the Katsina state government in Nigeria, has embarked on providing eye care interventions at elementary schools, including training of school teachers on how to carry out eye screening in various schools in the state. Eye screening of school-age children to detect referral conditions like deficient visual acuity, amblyopia, and strabismus is common in advanced countries. For instance, it is a state policy requirement in Michigan, United States of America (USA) to conduct vision screening at least for kindergarten entry for children between the ages of 3-5 years and for schoolchildren in grades 1–9 (Musch, Andrews, Schumann & Baker, 2020). Any child who does not pass the eye screening test will then be referred to a professional eye care provider for a comprehensive examination. Sound acuity of vision is critical to a child's emotional and educational development. The United States Preventive Services Task Force (PTF) estimated that about 7% of children from the ages of 1–5 have refractive errors and about 4% have amblyopia, which is among the main causes of vision impairments in children (Simon & Kaw, 2001; Su, Marvin, Wang, van Zyl, Elia, Garza, Salchow, & Forster, 2013). Thus, good child eye care is necessary to ensure equitable and inclusive education for children.

This study is informed and motivated by the following important reasons: notably the need to examine the impact of NDF intervention on elementary school eye screening and training of school teachers on eye screening; the need to quantify the monetary value of school eye intervention; the need to minimise vision impaired induced stigma among school-age children; the need for an equitable and gender-balanced inclusive children education toward achieving sustainable development; the need for an optimal eye care facilities to curb the increase in preventable child eye impairments in the state; the paucity in literature in examining the effect of elementary school eye care on inclusive and sustainable child education.

According to a report by NDF, refractive errors arising from an inability to see clearly are one of the main causes of vision impairment among schoolchildren. Although this condition can easily be addressed by eyeglasses, it has affected the academic performance of schoolchildren and led to dropouts in some cases. Eyeglasses, which are one of the most effective children's eye interventions, reduce the chances of failing academic activities by 44% (NDF, 2021; Chung, Snitzer, Prioli, Pizzi, Zhang & Levin, 2021). Therefore, the Katsina state government should give its maximum cooperation to set up school eye health facilities and eye screening institutes in all three senatorial zones in Katsina State, Nigeria. This will enable the immediate eye screening of approximately 80,000 schoolchildren and the training of up to 320 schoolteachers on eye screening by NDF in the state. Also, as established in Wong, Singh, Khanna, Ravilla, Kuyyadiyil, Sabherwal, Sil, Dole, Chase and Frick (2022), this tends to be more cost-effective, especially for eye care services in rural areas, while at the same time improving the health of the populace for better economic contribution.

The inadequate eye care facilities and personnel, especially in developing countries, have led to a surge in the cases of curable eye impairments among schoolchildren to about 1.2% globally. A decrease in visual acuity has been found to be strongly correlated with reduced literacy and academic performance in schoolchildren (Wang, Bianchet, Carter, Hopman, & Law, 2022). Equally, the gap in the existing studies that investigate the link between elementary school eye care services and equitable and inclusive child education in Katsina has also informed this study. For instance, studies (Su et al., 2013; Shakarchi & Collins, 2019; Silverstein et al., 2020; Ness, Johansson, & Psouni, 2020; Chung et al., 2021; Musch et al., 2020; Ståhlberg-Forsén, Latva, Leppänen, Lehtonen & Stolt 2022; Levantini et al., 2022; Wang et al., 2022; Meer et al., 2022) have assessed related areas, but a specific study for eye screening in elementary schools in Katsina has not been found in the literature. Thus, this study will contribute to filling this research gap. The contribution of this study will also provide a wholesome policy shift toward addressing school-age eye care in the state and the country at large.

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. Shekhawat, Stock, Baze, Daly, Vollman, Lawrence and Chomsky (2017) noted that eye treatment tends to improve quality of life. It was amplified in Welling, Newick and Tabin (2013) and Rabiu, Taryam, Yusuf and Maji (2023) that adequate eye treatment and rural African villages enables adequate labour participation. School eye health programmes may provide a unique opportunity to deliver comprehensive eye health services to school-going children (Minto & Ho, 2017; Reddy & Bassett, 2017; Liao et al 2018). However, sustaining the child's education would require consistent improvement in the teacher's productivity. Therefore, in another contribution, this paper assessed the influence of NDF on teachers' productivity in Katsina State, Nigeria. This paper provides first-hand information directly, from the beneficiaries of school eye health interventions in Katsina State. It also measured the impact of the NDF eye care intervention on teachers' productivity indicators with respect to social well-being, recognition, ease of understanding, motivation, various methods, student efforts, guides to slow learners, and encouragement.

METHODOLOGICAL NOTES

Data Collection and Sampling

The study measured school eye care interventions by the Noor Dubai Foundation on schoolchildren's academic performance as well as teachers' productivity in Katsina State. These were measured with the aid of a 5-point Likert scale survey instrument. First, the pupils' academic performance was evaluated by assessing improvement in writing skills, improvement in communication skills, and improvement in comprehension ability, comparing last term's scored marks of schoolchildren to the recently scored marks after the interventions, and comparing last term's class position to their recent term position after interventions. On the other hand, teacher productivity was measured using four approaches. One is the use of structured classroom observations. two, the teacher's contribution to school pupils' achievement; three, students' perception and their evaluation of the teacher's effectiveness; and four, evaluating the teacher's class instructional materials.

An experimental quantitative research design (Pangarso & Setyorini 2023) and a survey approach were utilised in this research. A total of 1,674 schoolchildren were screened, which constituted the population frame of the study. Thus, the sample size of schoolchildren was selected proportionately to their population. Chung et al (2021) and Rabiu et al. (2023) sampling techniques were augmented with Yamane's (1967) sampling method to obtain a sample size that was approximate for the study. Therefore, a sample of 323 beneficiaries was recruited for the study. Proportionately, therefore, 298 beneficiaries were selected from schoolchildren as the sample of the study.

A multi-stage sampling technique was used to administer the questionnaire. In the first stage, the state was divided into 3 cities. In the second stage, the cities were divided into beneficiary primary schools, and 45 schools were randomly selected. To achieve this, all the benefiting schoolchildren were respectively listed, and 1 sample was selected at intervals of every 7 to arrive at the total sample of the population. The designed questionnaire was first vetted and pre-tested, while experienced research assistants were retrained to translate the questions into the beneficiary's native language. SPSS was used for the descriptive statistics and regression analysis. Ethical permission was obtained from the Katsina State Ministry of Health (Approval No. 662), while consent from respondents was obtained before administering the questionnaires.

Model Specification

One of the contributions of this research is the estimation through regression on the impact of NDF eye care intervention on sustainable education. Consequently, it is imperative to establish a model that needs to be estimated. Thus;

$$SE = F(NDF\ Eye\ Care) \quad (1)$$

Where SE is the dependent variable which stands for sustainable education. In this research, sustainable education is captured in two perspectives: pupil's academic performance (AP) and teacher's productivity (TP). In this instance, the NDF intervention is measured from two standpoints: eye screening and eye treatment exercises. Thus, substituting the two elements of independent variables into the equation we have:

$$SE = F(ES, ET) \quad (2)$$

ES represents eye health screening while ET stands for eye treatment (which also includes the provision of eyeglasses). Representing this equation in econometric form, we have;

$$SE = \alpha_0 + \beta_1 ES_i + \beta_2 ET_i + \mu_i \quad (3)$$

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 coefficient to be estimated dependent variables, the research would like to add two control variables from the demographic factors. Thus, parents' occupation (PO) and family size (FS) are considered. Therefore, the new equation 4 is represented as follows:

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

Considering that family size and parents' occupation would impact sustainable education, it is therefore imperative to ascertain the influence of these variables, given the impact of NDF eye intervention. In other words, how these control variables influence the performance of both eye screening and eye treatment exercise on both the academic performance of the children and teachers' productivity. To achieve this, the control variables (family size and parents' occupation) were interacted with both eye screening and eye treatment exercise. Equation 5 would appear thus:

$$SE = \alpha_0 + \beta_1 ES_i + \beta_2 ET_i + \beta_3 PO_i + \beta_4 FS_i + \beta_5 (ES * PO)_i + \beta_5 (ES * FS)_i + \beta_5 (ET * PO)_i + \beta_5 (ET * FS)_i + \mu_i \quad (5)$$

2.3 Techniques of Data Analysis and Hypotheses Testing

The designed questionnaire was first vetted and pre-tested by experts, while 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 inferential 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. Correlation and multiple regression analysis were used to test the hypothesis (Musthofa, Nasikhin, & Hasanah, 2023).

Table 1. Demographic information of the 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 Screening	307	95.05
2	Eye treatment	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

Source: Author's Computation Using SPSS 27

DATA PRESENTATION, ANALYSIS AND DISCUSSION

Demographic Analysis

The educational level 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 and Figure 1). These findings suggest that vision impairment is prominent among pupils in primary schools in Katsina State. Figure 2 presents the types of interventions received by the respondent, which indicate almost the entire sample population passes through eye screenings. Some either receive eye treatment or eyeglasses after the screening exercise. However, about 95% of the beneficiaries indicated they received eye treatment, while only 4% indicated they received eyeglasses.

Data Presentation

In the first instance, we assessed the responses to the eye health screening exercise, and the result is reflected in Figure 1. Figure 1 indicates that 187 responses strongly affirm that NDF agents came to their school for eye health care screening (ES1), while 135 responses 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. Again, there was an indication that school teachers' eyes were also screened by NDF (ES4), with a combined 316 respondents affirming that. 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. This shows that 96.9% of the sample attested to having participated in the eye screening activities.

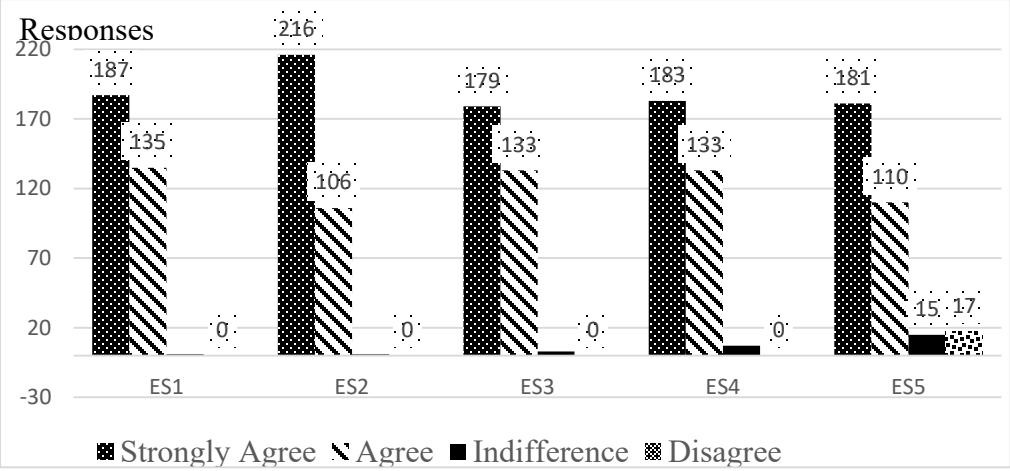

Figure 1: Figure 1 Response to School Eye Screening Exercise

Source: Authors' Compilation

Again, we assessed the responses to eye treatments and eyeglasses, and the result is reflected in Figure 2. Figure 2 shows that 171 of the responses strongly agree that they got eye care or glasses from NDF (ET1), and another 32 responses agree, which means that treatment happened after the screening exercise. However, 63 respondents disagreed as much as 56 respondents strongly disagreed. Also, Figure 2 shows that 171 strongly agree that they had used the eye treatments or glasses as prescribed by the ophthalmologist (ET2), and 32 also agree, which means that they were following the treatment as prescribed after the screening exercise. 63 respondents disagreed as much as 56 respondents strongly disagreed. Figure 2 also reflects that there were follow-up treatments and checks scheduled to monitor improvement (ET3), with 135 respondents strongly agreeing while only 96 agreed. Again, there was an indication that the treatments or glasses have contributed to improving your academic performance (ET4), with a combined 313 respondents affirming that. Finally, the response indicated that other pupils with eye impairments also received the eye treatments (ET5). This came with 135 responses that strongly agreed, while 188 responses agreed to that effect. In summary, 78.9% of the sample attested to having participated in eye treatment activities.

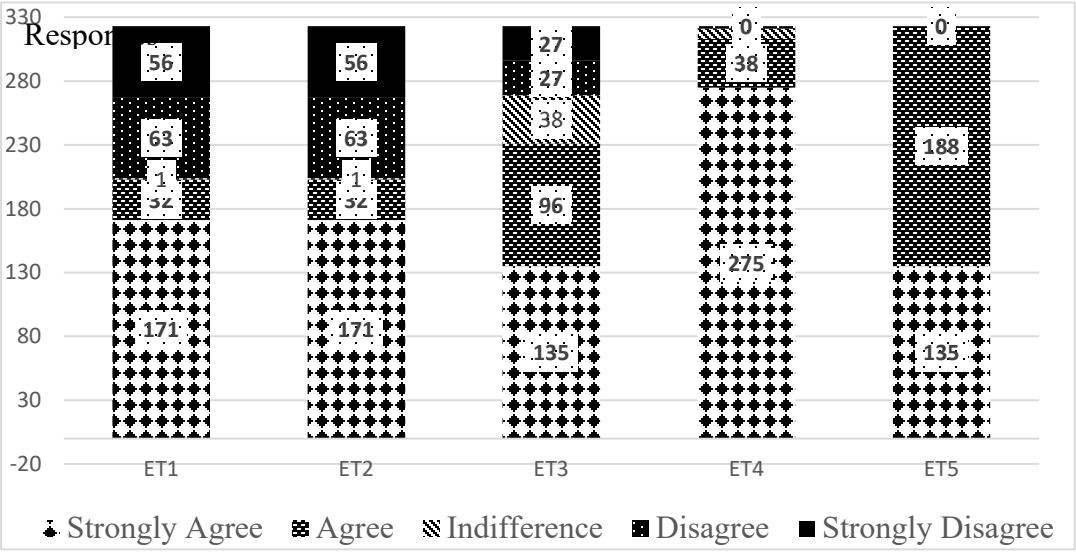

Figure 2 Response to Eye Treatments and Eyeglasses

Source: Authors' Compilation

Data Analysis and Hypothesis Testing

Table 3 displays the preliminary estimates and correlations found in this section. It shows that students who have eye exams and/or use corrective lenses have better academic outcomes. None of the independent variables show substantial connections in the intercorrelation matrix. According to Azu, Jelivov, Aras, and Isik (2020) and Azu and Nwauko (2021), it is recommended to use independent regression for each correlated variable after the independent variables have been significantly adjusted. Since no multicollinearity problem is predicted based on the results shown in Table 3, all that is needed for the estimate is a single regression equation.

Panel B of Table 3 displays the results of the reliability test conducted on the study's key variables. We have a higher-than-required Cronbach's alpha of 0.906 for the 33 items that make up our variables. Therefore, both the pilot test and the full questionnaire published here passed the reliability test.

Table 2 Correlation Matrix and Reliability Statistics

Panel A: Inter-Item Correlation Matrix

Variables	PO	FS	ES	ET	AP	TP
PO	1.000	0.008	0.211	0.182	0.201	0.293
FS	0.008	1.000	-0.323	-0.410	-0.018	-0.055
ES	0.211	-0.323	1.000	0.771	0.315	0.460
ET	0.182	-0.410	0.771	1.000	0.403	0.583
AP	0.201	-0.018	0.315	0.403	1.000	0.561
TP	0.293	-0.055	0.460	0.583	0.561	1.000

Panel B: Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items	N
0.863	0.886	25	323

Sources: Authors Compilation 2023, Using SPSS 27

The purpose of the experiment is to investigate the hypothesis that the NDF eye intervention has no impact on sustainable education in Katsina State. Results from the regression analysis shown in Table 4 highlight the impact of NDF eye intervention on pupils' academic performance. The R-Square statistic suggests that these independent factors have a 20.2% probability of affecting the dependent variable. Thus, factors such as eye screening and treatment, parental employment status, and the number of children in the household, accounted for 20.2% of the variance in kids' grades. The Durbin Watson (DW) test indicates that the residuals from the statistical regression analysis do not show autocorrelation. The fact that there was no autocorrelation in the selected sample is shown by the value of 1.951, which is greater than 1.8. This proved that the model provides a good match to the data.

According to the estimated regression coefficient, eye screening (ES) has a coefficient of -0.009 but is not statistically significant. This suggests a possible detrimental effect on student performance, albeit not significant. As a result, it would be premature to conclude that having your eyes checked would negatively affect pupils' ability to focus on their academics. However, corrective lenses for the eyes, which represent eye treatment (ET), have shown a positive coefficient of 0.209, which is significant at the 1% level. All else being equal, this means that a 1% increase in the use of corrective lenses and spectacles leads to approximately a 21% improvement in pupil performance. Therefore, the results of this study provide credence to the idea that corrective lenses and medical eye care might enhance pupils' function. This attests to the findings of Chung et al. (2021) that eyeglasses,

which are one of the most effective children's eye interventions, reduce the chances of failing academic activities by 44%.

Table 3 Impact of NDF School Eye Intervention on Academic Performance

Variables	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	0.392	0.101		3.873	0.000
ES	-0.006	0.065	-0.007	-0.093	0.926
ET	0.209	0.037	0.455	5.569	0.000
PO	0.035	0.015	0.119	2.312	0.021
FS	0.140	0.047	0.165	2.989	0.003
R-square	0.202	Adjusted R Square	0.192	Durbin-Watson	1.951
Sources: Authors Compilation 2023, Using SPSS 27					

The regression findings also show that parental employment and family size may have a beneficial effect on the student's academic achievement. Significant at the 5% level is a coefficient of 0.035 for parents' employment, and at the 1% level, a coefficient of 0.14 for family size. These results suggest that a large, supportive family is associated with higher academic achievement for students and that parental independence is positively correlated with student success.

The article also aimed to confirm whether or not parental profession or occupation and family size influenced the effectiveness of eye health screenings, treatments, and glasses. To achieve this, we interacted with the variables of interest. To begin, eye screening was interacted with family size and parents' occupations, and eye treatment and glasses were also interacted with the professions of their parents and family. Table 5 displays the findings, and the R-Square statistic suggests that these independent factors have a 30% probability of affecting the dependent variable. The Durbin-Watson (DW) test indicates that the residuals from the statistical regression analysis do not show autocorrelation. The fact that there was no autocorrelation in the selected sample is shown by the value of 1.9, which is greater than 1.8.

Table 5 Influence of Parent Occupation and Family Size on NDF School Eye Intervention on Pupil's Academic Performance

Variables	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	0.819	0.260		3.144	0.002
ES	0.718	0.222	0.869	3.232	0.001
ET	-0.958	0.203	-2.090	-4.713	0.000
PO	0.061	0.050	0.204	1.223	0.222
FS	-0.412	0.181	-0.486	-2.274	0.024
PO*ES	-0.021	0.054	-0.138	-0.393	0.694
PO*ET	-0.007	0.029	-0.064	-0.242	0.809
FS*ES	-0.552	0.143	-0.950	-3.866	0.000
FS*ET	1.124	0.179	2.359	6.261	0.000
R-square	0.298	Adjusted R Square	0.280	Durbin-Watson	1.900
Sources: Authors Compilation 2023, Using SPSS 27					

As can be seen in Table 5, the reported coefficients for the effect of parents' work on either eye health screening or eye treatment and eyeglasses are not statistically significant. However, the interaction

of family size with eye screening and eye treatment displays opposing results. In the first instance, there is a negative impact after accounting for the interaction of family size and eye health screening (coefficient = -0.552 and significant at 1%), with family size having a negative influence (coefficient = -0.412 and significant at 5%) and eye health screening having a positive influence (coefficient = 0.718 and significant at 1%). This means that the positive effect of an eye examination on a child's academic achievement is mitigated by the size of the family. Secondly, having access to eye care and corrective lenses has been shown to improve student achievement across a variety of contexts, including family size. The interaction between family size and access to eye treatment results in a positive effect (coefficient = 1.124 and significant at 1%). Thus, the effect of eye treatment and glasses on kids' academic performance is bolstered by the size of the family. This indicates education could be sustained with increasing family size and children's eyes being treated.

Table 6 Impact of NDF School Eye Intervention on Teachers Performance

Variables	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	0.357	0.066		5.377	0.000
ES	-0.001	0.043	-0.001	-0.016	0.987
ET	0.222	0.025	0.635	9.038	0.000
PO	0.040	0.010	0.177	3.990	0.000
FS	0.132	0.031	0.204	4.297	0.000
R-square	0.410	Adjusted R Square	0.403	Durbin-Watson	1.918
Sources: Authors Compilation 2023, Using SPSS 27					

Table 6 highlights the impact of NDF school eye intervention on teachers' performance. The R-Square statistic suggests that these independent factors have a 40% probability of affecting the dependent variable. The Durbin Watson (DW) test indicates that the residuals from the statistical regression analysis do not show autocorrelation. That there was no autocorrelation in the selected sample is shown by the value of 1.918, which is greater than 1.8.

The regression estimation reflects that eye health screening (ES) has a coefficient of -0.001 but is not statistically significant. Thus, one cannot completely affirm the influence of eye health screening on teachers' productivity. On the other hand, eye treatment and eyeglasses (ET) have indicated a positive coefficient of 0.222 and are statistically significant at one per cent. This implies that as eye treatment and eyeglasses increase by one per cent, teachers' productivity increases by 22.2 per cent all things being equal. It therefore suggests that eye treatment and eyeglasses improve teachers' productivity in the area covered in this research. This is expected since both the pupils and teachers are beneficiaries of the NDF program in Katsina state. Again, the result is in line with the findings of Rabiu, et al. (2023) and Taryam, et al. (2023) which highlighted that eye treatment (in this case cataract) improves the quality of life as well as economic benefits of the beneficiaries. Eye screening is a step towards eye treatment and therefore essential, but eye treatment properly yields the utmost economic benefit such as quality of life and educational performance among pupils in primary school.

Table 7 Influence of Parent Occupation and Family Size on the Impact of NDF School Eye Intervention on Teachers Performance

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	0.078	0.168		0.462	0.644
ES	0.841	0.144	1.334	5.856	0.000
ET	-0.452	0.131	-1.293	-3.440	0.001

PO	0.111	0.032	0.491	3.468	0.001
FS	0.122	0.117	0.189	1.045	0.297
PO*ES	-0.057	0.035	-0.488	-1.643	0.101
PO*ET	0.001	0.019	0.010	0.045	0.964
FS*ES	-0.542	0.092	-1.223	-5.873	0.000
FS*ET	0.609	0.116	1.677	5.253	0.000
R-square	0.298	Adjusted R Square	0.280	Durbin-Watson	1.900
Sources: Authors Compilation 2023, Using SPSS 27					

The results also demonstrate that parents' occupation and family size could positively influence teachers' productivity. Parents' occupation has a coefficient of 0.040 and is statistically significant at one per cent, while family size has a coefficient of 0.132 and is statistically significant at one per cent. These coefficients reflect that the more independent parents' occupations, the better the teachers' productivity, while an extended family could be more productive with regard to improving teachers' performance.

In another dimension, this 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. From the regression result as posted in Table 7, the R-Square statistic suggests that these independent factors have approximately a 30% probability of affecting the dependent variable. The Durbin-Watson (DW) test indicates that the residuals from the statistical regression analysis do not show autocorrelation. The fact that there was no autocorrelation in the selected sample is shown by the value of 1.9, which is greater than 1.8.

First, the influence of parents' occupation on the impact of eye health screening, eye treatment, and eyeglasses. The results suggested that parents' occupation does have significant control over the influence of either eye health screening or eye treatment and eyeglasses on teachers' productivity, as the reported coefficients are not statistically significant. However, the interaction of family size with eye screening and eye treatment displays opposing results. In the first instance, there is a negative impact after accounting for the interaction of family size and eye health screening (coefficient = -0.542 and significant at 1%), with family size having a positive influence (coefficient = 0.122 but not statistically significant) and eye health screening having a positive influence (coefficient = 0.841 and significant at 1%). This means that the positive effect of an eye examination on teachers' productivity reduces with increasing family size. Secondly, having access to eye care and corrective lenses has been shown to improve teachers' productivity, given the size of the family. The interaction between family size and access to eye treatment results in a positive effect (coefficient = 0.609 and significant at 1%). Thus, the effect of eye treatment and glasses on teachers' productivity is also bolstered by the size of the family. This indicates education could be sustained with increasing family size and children's eyes being treated.

CONCLUSION AND POLICY RECOMMENDATION

The study examines the role of eye screening in elementary schools in inclusive and sustainable child education 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 & Ho (2017). The findings also suggest that a lack of eye health screening and treatment affects the realisation of schoolchildren's right to education. NDF school eye care interventions have significantly improved school children's academic performance as well as teachers' productivity in Katsina State, especially with respect to eye treatment. The finding suggests that eye treatment improves pupils' performance and teachers' productivity in elementary child education in Katsina, even with increasing family size.

Good eye health is more important in the pursuit of child education. Poor vision militates against the United Nations SDG and WHO goal of achieving education for all and children's right to education. Therefore, this study recommends that the government tighten its collaboration and partnership with the Noor Dubai Foundation on school eye screening in the state.

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