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Determinants of Educational Institution Enrolment Among Orphaned and Vulnerable Children in Namibia: A Multi-Year Analysis 2018–2024

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ABSTRACT

Background: Education significantly reduces poverty, enhances labour productivity, improves health outcomes and facilitates full participation in economic and community development. Orphans and vulnerable children (OVC) encounter numerous obstacles in obtaining education. This study evaluated the OVC's educational institution enrolment rate and associated factors.

Methods: This retrospective cross-sectional study used 2018–2024 programmatic data from OVC participating in PHN's Namibia DREAMS OVC program. The study included OVC aged 0 to 19 years. Data were analysed utilising IBM Statistical Package for Social Sciences (SPSS) version 29. Chi-square tests and bivariate and multivariate logistic regression analyses were conducted.

Results: Among the 16 845 participants included in this analysis, 10 607 (63.0%) participants were enrolled in an educational institution, 95% confidence interval (CI) (62.3%–63.7%). Among the 7393 participants aged 0–6 years, 1735 (23.5%) were enrolled in an educational institution. Participants from Onandjokwe, Tsandi and Katima had a higher likelihood of being enrolled in an educational institution than those in Windhoek, with adjusted odds ratio (AOR) = 1.42, 95% CI (1.07–1.87), AOR = 1.69, 95% CI (1.09–2.61) and AOR = 1.51, 95% CI (1.15–1.98), respectively. Participants aged 7–9 and 10–14 years were more likely to be enrolled in an educational institution than those aged 15–19 years, AOR = 3.02, 95% CI (2.34–3.90) and AOR = 3.29, 95% CI (2.64–4.09), respectively. Participants with male caregivers, HIV-negative caregivers and caregivers who had completed vocational training or tertiary education were more likely to be enrolled in an educational institution, AOR = 1.25, 95% CI (1.07–1.47), crude odds ratio (COR) = 2.67, 95% CI (2.35–3.04) and COR = 2.34, 95% CI (1.09–5.01), respectively. Participants from households with no to moderate hunger, caregivers who had a source of income and those who were not sexually abused were more likely to be enrolled in an educational institution.

Conclusion: It is essential to implement strategies that provide OVC tuition assistance and additional financial resources to meet their basic needs during their education. Providing food support to vulnerable households and meals in schools may enhance educational institution enrolment. Interventions are needed to increase the number of early childhood development (ECD) schools in the country.

Summary

- This study found that only 63% of orphans and vulnerable children (OVC) in Namibia were enrolled in an educational institution between 2018 and 2024, with the lowest enrolment among children aged 0–6 years.
- Caregiver characteristics, household food security and regional differences significantly influenced enrolment, highlighting the role of both social and structural factors.
- Expanding early childhood development (ECD) schools, strengthening financial and food support for vulnerable households, and targeted interventions for older adolescents could improve OVC enrolment rates.

1 | Introduction

The United Nations Convention on the Rights of the Child acknowledges education as a fundamental human right. Article 28 of the Convention stipulates that primary education must be free and compulsory, whereas secondary education should be accessible to all children (United Nations 1989). Access to quality primary education significantly enhances a child's life prospects. Proficiency in reading, writing and basic arithmetic establishes a strong foundation for lifelong learning (Mwoma and Pillay 2016). Education serves as a tool for the social and economic advancement of a nation (Jellenz et al. 2020). Education plays a significant role in reducing poverty (Hofmarcher 2021), enhancing labour productivity (Magableh et al. 2022), improving health outcomes (Gakidou et al. 2010) and facilitating full participation in the economic and developmental activities of communities (Jellenz et al. 2020). Education plays a crucial role in children's social integration and psychosocial well-being (Atkins et al. 2010). Children without access to quality education face disadvantages in income, health and various life opportunities (van Zon et al. 2017).

In 2023, Namibia reported more than 72 000 children aged 0–17 years orphaned as a result of HIV and AIDS (UNAIDS 2023). The Namibian Education Sector Policy for orphaned and vulnerable children (OVC) states that the government provides essential services to OVC, such as social grants, school feeding programs and assistance with school uniforms and textbooks (Ministry of Education 2008). However, due to competing priorities for financial resources, the essential services may not be reaching all OVC. Despite the benefits associated with education, OVC often do not have the same educational opportunities as other children (Mwoma and Pillay 2016). Educational institution attendance aids children who have undergone trauma in restoring a sense of normalcy and mitigating the psychosocial effects of their experiences and disrupted lives (Mwoma and Pillay 2016). OVC encounter multiple obstacles in accessing education. Upon the death of parents, certain orphans may be placed in the custody of elderly grandparents or older siblings, who may lack the financial means to acquire educational resources for them (Fleming 2015). OVC may be denied access to school due to an inability to purchase uniforms, leading to increased dropout rates in primary and secondary education. OVC frequently encounter stigma and discrimination in educational settings, potentially leading to increased dropout rates (Losioki 2020). Illness may impact the school attendance of HIV-positive OVC, particularly among those not receiving antiretroviral therapy (ART) (Zinyemba et al. 2020). In sub-Saharan Africa, the economic challenges, diminished parental support and vulnerability to sexual abuse and exploitation experienced by OVC heighten their risk of HIV acquisition (Kidman and Anglewicz 2016). Educational institutions frequently offer secure settings for OVC, which may decrease the likelihood of HIV transmission (Mwoma and Pillay 2016).

A few studies have been conducted in sub-Saharan Africa to determine the factors that influence educational institutional enrolment of OVC. One study conducted in Lesotho revealed that the caregiver's HIV status, his/her source of income, the availability of food in the household and the head of the household influenced school enrolment among OVC (Nyabanyaba 2009). The study revealed that OVC whose caregivers were HIV positive were less likely to be enrolled in school due to a lack of financial resources as a result of illness. Additionally, OVC were reported to drop out of school to take care of their sick caregivers. OVC from child-headed households were also unlikely to be in school due to a lack of financial resources (Nyabanyaba 2009). A Kenyan study revealed that orphanhood reduced females' access to education (Ombuya et al. 2012).

The data on educational institution enrolment of OVC in Namibia is limited. This study employed data from the Project HOPE Namibia (PHN)-led OVC program to assess the OVC's enrolment rate in educational institutions and its associated factors at initial assessment. The study findings can guide appropriate programming interventions to increase educational enrolment for OVC, potentially enhancing their future financial conditions and health outcomes.

2 | Methods

2.1 | Study Design

This study is a retrospective cross-sectional secondary analysis of the 2018–2024 programmatic data collected from OVC participating in PHN's Namibia DREAMS OVC program.

2.2 | Program Intervention and Population

This program defines OVC as children who are affected by HIV and AIDS due to their own or their caregivers' HIV status or other socioeconomic vulnerabilities. The program targeted children and young adults up to the age of 17 years. Program participation is also open to those aged 18 and 19 who are still in secondary school or enrolled in an economic strengthening intervention by the time they turn 18. The OVC program serves as a crucial intervention designed to enhance the welfare of children impacted by HIV, violence, poverty and various other vulnerabilities. The program utilises a systematic case management framework to identify, evaluate and respond to the needs of beneficiaries, thereby promoting their advancement toward independence and completion of program support. Children

prioritised for support include those living with HIV, survivors of violence, particularly sexual violence, children from child-headed households, children with parents or caregivers who are HIV-positive, children of female sex workers and infants exposed to HIV. Beneficiaries undergo assessment at a minimum of twice per year utilising standardised instruments. The assessment encompasses critical domains such as health, education, economic stability, safety and psychosocial well-being. Case plans are formulated according to assessment results. Plans emphasise the importance of addressing critical vulnerabilities, including inadequate school attendance, food insecurity, exposure to violence and unmet health needs. Benchmarks for improvement and graduation objectives are established. The services offered encompass health care linkage, educational support, economic strengthening interventions, psychosocial support and gender-based violence prevention services.

2.3 | Data Source

Anonymised data were obtained from the PHN OVC program database. The data collected during the programs included programmatic details, sociodemographic characteristics of participants and caregivers, vulnerability factors and outcomes associated with the HIV cascade.

2.4 | Outcome Variable

The outcome variable in this study was enrolment in an educational institution. The question in the database answered this variable: 'What is your educational status?' This question had 11 responses, 'bever enrolled,' 'attending secondary school, regular,' 'attending primary school,' 'children under 6 years and in early childhood development (ECD) classes,' 'children under 6 years and not in ECD classes,' 'dropout,' 'attending secondary school to improve grades,' 'attending vocational training,' 'attending tertiary education,' 'completed high school but not enrolled' and 'attending literacy.' We created a new variable, 'enrolment in an educational institution,' with 'yes' or 'no' responses. 'Attending secondary school, regular,' 'attending primary school,' 'children under 6 years and in ECD classes,' 'Attending secondary school to improve grades,' 'attending vocational training,' 'attending tertiary education' and 'attending literacy' were categorised as 'yes,' while 'never enrolled,' 'dropout' and 'completed high school but not enrolled' were classified as 'no.' 'Yes' was assigned code '2,' whereas 'no' was assigned to the code '1.'

2.5 | Explanatory Variables

This study used 16 explanatory variables grouped into participants, caregiver characteristics and vulnerability factors. We chose the variables based on their relevance and significance to enrolment in an educational institution among OVC.

2.6 | Participant and Caregiver Characteristics

Participants' characteristics included age group, sex, district and HIV status. Age, collected as a discrete numerical variable during the program, was categorised into age groups '0–6,' '7–9,' '10–14' and '15–19.' The age group '0–6' was included because in Namibia, ECD programs generally cater to children from birth to 6 years of age. Sex was classified as 'male' and 'female,' and HIV status as 'positive,' 'negative' and 'unknown.' Caregivers' characteristics included sex, marital status, educational level and HIV status. Sex was classified as 'male' and 'female,' while the educational level was categorised as 'dropout,' 'never enrolled,' 'high school or below,' 'attending vocational training or tertiary education' and 'completed vocational training or tertiary education.' Marital status was categorised as 'married'; 'separated, divorced or widowed' and 'single, never married,' while the HIV status was classified as 'negative,' 'positive' and 'do not know.'

2.7 | Vulnerability Factors

The vulnerability factors included in this study were the household hunger scale, the living status of biological parents, whether the child lived in a child-headed household, disability status, whether parents or caregivers had a source of income, sexual abuse, sexual exploitation and TB diagnosis status. All the responses were coded as 'yes' or 'no,' except for the living status of biological parents, which was categorised into 'one parent alive,' 'both parents alive,' 'both parents dead' and 'do not know,' and the household hunger scale, which was categorised into 'little or no hunger,' 'moderate hunger' and 'severe hunger.'

2.8 | Data Quality Assurance (DQA)

The digital system facilitated the automatic generation of BioID (Unique Identifier Code), implemented automated skip rules and conducted validation checks for variables such as age and sex and constraints for mandatory questions. The digital system minimised transcription errors, thereby improving data completeness and quality. DQA mechanisms included periodic programmatic spot checks, desk reviews, data quality reviews and field monitoring by district and regional teams to ensure that reported data met minimum quality standards.

2.9 | Criteria for Inclusion in Data Analysis

From the 19 054 individuals newly recruited into the program between 2018 and 2024, we excluded those not in the 0–19 age group and who had 25% or more of the included variables without responses. The remaining 16 845 participants were included in the data analysis.

2.10 | Data Analysis

Data were exported from DHIS2 to IBM SPSS version 29 for subsequent analysis. Descriptive statistics, including percentages and frequencies, were utilised to analyse nominal and ordinal data. Chi-square tests assessed the relationships between educational institution enrolment and the participants' characteristics, caregivers' characteristics and vulnerability factors. We analysed statistically significant characteristics identified through chi-square tests via bivariate logistic regression to

TABLE 1 | Frequency distribution of characteristics of participants.

Characteristics	Frequency *n* (%)
Participant's age group (years)	
0–6	7393 (43.9%)
7–9	2467 (14.6%)
10–14	4020 (23.9)
15–19	2965 (17.6)
District	
Eenhana	2344 (13.9)
Engela	4133 (24.5)
Katima	2324 (13.8)
Okahao	291 (1.7)
Okongo	588 (3.5)
Omuthiya	405 (2.4)
Onandjokwe	1761 (10.5)
Oshakati	2159 (12.8)
Oshikuku	612 (3.6)
Outapi	563 (3.4)
Tsandi	310 (1.8)
Tsumeb	492 (2.9)
Windhoek	863 (5.2)
Participant's sex	
Male	7813 (46.4)
Female	9032 (53.6)
Participant's HIV status	
Negative	10 497 (62.3)
Positive	4073 (24.2)
Unknown	513 (3.0)
Missing information	1762 (10.5)
Caregiver's sex	
Male	2011 (11.9)
Female	14 834 (88.1)
Caregiver's marital status	
Married	3308 (19.6)
Separated, divorced, or widowed	966 (5.7)
Single, never married	7455 (44.3)
Missing information	5116 (30.4)
Caregiver's educational level	
Dropout	7225 (42.9)
No formal education	1654 (9.8)
High school or below	1431 (8.5)
Attending vocational training or tertiary education	34 (0.2)
Completed vocational training or tertiary education	191 (1.1)
Missing information	6310 (37.5)
Caregiver's HIV status	
Negative	10 121 (60.1)
Positive	1617 (9.5)
Do not know	9 (0.1)
Missing information/Refused to answer	5098 (30.3)

assess the strength of their associations with educational institution enrolment. Characteristics showing statistically significant associations with educational institution enrolment, as indicated by a *p*-value below 0.05 in binomial logistic regression, were used in multinomial logistic regression to calculate the adjusted odds ratios (AORs). While the caregiver's marital status, educational level, HIV status and the participant's sexual abuse status demonstrated statistical significance in binomial regression, they were excluded from multinomial regression due to a substantial number of participants not responding. Excluding all participants with no responses would have resulted in a markedly reduced sample size for multinomial regression analysis. We presented the associations using the AOR when both the crude odds ratio (COR) and the AOR were statistically significant. However, when the COR was significant and the AOR was not, the COR was presented, together with an explanation that the association was not significant in adjusted analysis.

2.11 | Ethical Considerations

Reach Namibia has been approved by the Namibian Ministry of Health and Social Services (MHSS); the Ministry of Education, Arts and Culture (MoEAC); the Ministry of Gender Equality, Poverty Eradication and Social Welfare (MGEPESW); and the Ministry of Sport, Youth and National Service (MSYNS). Enrolment into the OVC program was entirely voluntary. All minors in the program provided assent, and their parents or caregivers granted consent. OVC of legal age completed a consent form. Data were only collected from the participants after informed consent was obtained. PHN implements a comprehensive privacy management framework by mandating that all personnel sign a nondisclosure agreement, safeguarding all collected data. Access to DHIS2 was granted based on defined roles and criteria. Each user was assigned a unique username and password-protected login credentials. De-identified or aggregated data were employed when data sharing was necessary. Approval from an institutional review board was not

TABLE 2 | Frequency distribution of vulnerability factors among participants.

Characteristics	Frequency *n* (%)
Household hunger scale	
Little or no hunger	4889 (29.0)
Moderate hunger	8442 (50.1)
Severe hunger	3514 (20.9)
Are your parents alive?	
Both parents alive	14 334 (85.1)
One parent alive	1630 (9.7)
Both parents dead	309 (1.8)
Do not know	220 (1.3)
Missing information	352 (2.1)
Is the child living in a child-headed household?	
Yes	86 (0.5)
No	12 522 (74.3)
Missing information	4237 (25.2)
Do you have any disability?	
Yes	364 (2.2)
No	16 481 (97.8)
Does the parent/caregiver have a source of income?	
Yes	10 369 (61.6)
No	6476 (38.4)
Have you ever been sexually abused?	
Yes	81 (0.4)
No	12 544 (74.5)
Missing information	4220 (25.1)
Have you ever been sexually exploited?	
Yes	37 (0.2)
No	12 532 (74.4)
Missing information	4276 (25.4)
Is the child a presumptive or diagnosed TB case?	
Yes	158 (0.9)
No	12 299 (73.0)
Missing information	4388 (26.1)

required for the secondary data analysis due to the utilisation of anonymous programmatic data.

3 | Results

3.1 | Characteristics of Participants and Their Caregivers

Among the 16 845 participants in the study, most were females ($n = 9032$; 53.6%), aged 0–6 years ($n = 7393$; 43.9%) and were HIV-negative ($n = 10 497$; 62.3%). Most participants' caregivers were female ($n = 14 834$; 88.1%) and HIV-negative ($n = 10 121$; 60.1%). More details are in Table 1.

3.2 | Vulnerability Factors of Participants

The most common source of vulnerability among the participants was having parents or caregivers without a source of income ($n = 6476$; 38.4%), followed by severe hunger ($n = 3514$; 20.9%). The least common vulnerabilities were child-headed households ($n = 86$; 0.5%), sexual abuse ($n = 81$; 0.4%) and sexual exploitation ($n = 37$; 0.2%). More details are in Table 2.

TABLE 3 | Frequency distribution of educational institution enrolment by district among participants.

District	Educational institution enrolment *n* (%)
Eenhana	1484 (63.3)
Engela	2609 (63.1)
Katima	1514 (65.1)
Okahao	182 (62.5)
Okongo	374 (63.6)
Omuthiya	255 (63.0)
Onandjokwe	1033 (58.7)
Oshakati	1353 (62.7)
Oshikuku	462 (75.5)
Outapi	402 (71.4)
Tsandi	211 (68.1)
Tsumeb	237 (48.2)
Windhoek	491 (56.9)
Total	10 607 (63.0)

TABLE 4 | Frequency distribution of educational institution enrolment by district among participants aged 0–6 years.

District	Educational institution enrolment *n* (%)
Eenhana	247 (23.9)
Engela	430 (24.0)
Katima	274 (27.1)
Okahao	22 (19.8)
Okongo	71 (26.4)
Omuthiya	32 (20.6)
Onandjokwe	209 (22.9)
Oshakati	241 (24.7)
Oshikuku	31 (20.3)
Outapi	36 (21.1)
Tsandi	28 (23.1)
Tsumeb	38 (14.0)
Windhoek	76 (18.3)
Total	1735 (23.5)

3.3 | Educational Institution Enrolment Rate Among Participants

Among the 16 845 participants included in this analysis, 10 607 (63.0%) participants were enrolled in an educational institution, with a 95% confidence interval (CI) (62.3%–63.7%), while 6238 (37.0%) were not, 95% CI (36.3%–37.7%). Oshikuku had the highest educational institution enrolment rate (75.5%), while Tsumeb had the lowest (48.2%). More details are in Table 3.

We conducted a subgroup analysis of the enrolment rate among participants aged 0–6 years. Among the 7393 participants, 1735 (23.5%) were enrolled in an educational institution, with a 95% CI (22.5%–24.5%), while 5658 (76.5%) were not, 95% CI (75.5%–77.5%). Katima had the highest educational institution enrolment rate (27.1%), while Tsumeb had the lowest (14%). More details are in Table 4.

3.4 | Determinants of Educational Institution Enrolment Among Participants

Chi-square tests revealed statistically significant associations between educational institution enrolment and the participant's age group, HIV status and district ($p < 0.05$). Caregiver characteristics statistically significantly associated with educational institution enrolment in Chi-square tests were sex, marital status, educational level and HIV status ($p < 0.05$). Vulnerability factors that were statistically significantly associated with educational institution enrolment in chi-square tests were household hunger scale, presence of biological parents, caregiver's source of income and sexual abuse ($p < 0.05$).

Participants from Onandjokwe, Tsandi and Katima had a higher likelihood of being enrolled in an educational institution than those in Windhoek, with AOR = 1.42, 95% CI (1.07–1.87), AOR = 1.69, 95% CI (1.09–2.61) and AOR = 1.51, 95% CI (1.15–1.98), respectively. Participants aged 7–9 and 10–14 years were more likely to be enrolled in an educational institution than those aged 15–19, AOR = 3.02, 95% CI (2.34–3.90), and AOR = 3.29, 95% CI (2.64–4.09), respectively. In contrast, participants aged 0–6 years or HIV-positive were less likely to be enrolled in an educational institution, AOR = 0.04, 95% CI (0.036–0.05), and COR = 0.25, 95% CI (0.23–0.27). However, the relationship between the participant's HIV status and educational institution enrolment was not statistically significant in adjusted analysis. Participants with male caregivers, HIV-negative caregivers and caregivers who had completed vocational training or tertiary education were more likely to be enrolled in an educational institution, AOR = 1.25, 95% CI (1.07–1.47), COR = 2.67, 95% CI (2.35–3.04), and COR = 2.34, 95% CI (1.09–5.01), respectively. Furthermore, participants with caregivers who were married or those separated, divorced or widowed were also more likely to be enrolled in an educational institution, COR = 1.47, 95% CI (1.35–1.60), and COR = 2.04, 95% CI (1.75–2.37), respectively.

Participants from households with little to no hunger, moderate hunger, with caregivers who had a source of income and those who were not sexually abused had a higher likelihood of being enrolled in an educational institution, AOR = 1.17, 95% CI (1.01–1.36), AOR = 1.19, 95% CI (1.04–1.36), AOR = 1.34, 95% CI (1.21–1.49), and COR = 1.94, 95% CI (1.20–0.15), respectively. In contrast, participants whose parents were both dead were less likely to be enrolled in an educational institution than those whose parents were both alive, AOR = 0.63, 95% CI (0.56–0.78). More details are in Table 5.

TABLE 5 | Determinants of educational institution enrolment among participants.

Characteristics	Crude odds ratios	95% CI[a]	Adjusted[b] odds ratios	95% CI[a]	Chi-square test *p*
Participant's age group (years)					< 0.01
0–6	**0.04**	**0.03–0.041**	**0.04**	**0.036–0.05**	
7–9	**2.61**	**2.08–3.28**	**3.02**	**2.34–3.90**	
10–14	**2.88**	**2.36–3.50**	**3.29**	**2.64–4.09**	
15–19	Reference	Reference	Reference	Reference	
Participant's sex					0.18
Male	NC	NC	NI	NI	
Female	NC	NC	NI	NI	
District					< 0.01
Eenhana	**1.31**	**1.12–1.53**	1.26	0.97–1.65	
Engela	**1.30**	**1.12–1.51**	1.14	0.89–1.48	
Katima	**1.42**	**1.21–1.66**	**1.51**	**1.15–1.98**	
Okahao	1.27	0.96–1.66	0.80	0.51–1.26	
Okongo	**1.32**	**1.07–1.64**	1.40	0.99–1.97	
Omuthiya	**1.29**	**1.01–1.64**	0.95	0.64–1.40	
Onandjokwe	**1.08**	**0.91–1.27**	**1.42**	**1.07–1.87**	
Oshakati	**1.27**	**1.08–1.49**	1.15	0.87–1.51	
Oshikuku	**2.33**	**1.86–2.93**	1.30	0.91–1.87	
Outapi	**1.89**	**1.51–2.37**	1.23	0.85–1.76	
Tsandi	**1.62**	**1.23–2.12**	**1.69**	**1.09–2.61**	
Tsumeb	**0.70**	**0.56–0.88**	1.03	0.88–1.19	
Windhoek	Reference	Reference	Reference	Reference	
Participant's HIV status					< 0.01
Positive	**0.25**	**0.23–0.27**	1.03	0.88–1.19	
Negative	Reference	Reference	Reference	Reference	
Caregiver's sex					< 0.01
Male	**1.16**	**1.01–1.32**	**1.25**	**1.07–1.47**	
Female	Reference	Reference	Reference	Reference	
Caregiver's marital status					< 0.01
Married	**1.47**	**1.35–1.60**	NI	NI	
Separated, divorced, or widowed	**2.04**	**1.75–2.37**	NI	NI	
Single, never married	Reference	Reference	Reference	Reference	
Caregiver's educational level					< 0.01
Dropout	1.14	0.57–2.25	NI	NI	
No formal education	1.18	0.59–2.36	NI	NI	
High school or below	1.32	0.66–2.63	NI	NI	

(Continues)

TABLE 5 | (Continued)

Characteristics	Crude odds ratios	95% CI[a]	Adjusted[b] odds ratios	95% CI[a]	Chi-square test *p*
Completed vocational training or tertiary education	**2.34**	**1.09–5.01**	NI	NI	
Attending vocational training or tertiary education	Reference	Reference	NI	NI	
Caregiver's HIV status					< 0.01
Negative	**2.67**	**2.35–3.04**	NI	NI	
Positive	Reference	Reference	Reference	Reference	
Household hunger scale					< 0.01
Little or no hunger	**1.33**	**1.22–1.46**	**1.17**	**1.01–1.36**	
Moderate hunger	**1.18**	**1.09–1.28**	**1.19**	**1.04–1.36**	
Severe hunger	Reference	Reference	Reference	Reference	
Are your biological parents alive?					< 0.01
One parent alive	1.37	0.97–1.82	0.83	0.54–1.28	
Both parents alive	Reference	Reference	Reference	Reference	
Both parents dead	**0.29**	**0.24–0.44**	**0.63**	**0.56–0.78**	
Do not know	1.08	0.86–1.77	1.34	0.94–1.56	
Is the child living in a child-headed household?					0.35
Yes	NC	NC	NI	NI	
No	NC	NC	NI	NI	
Do you have any disability?					0.57
Yes	NC	NC	NI	NI	
No	NC	NC	NI	NI	
Does the parent/caregiver have a source of income?					< 0.01
Yes	**1.59**	**1.49–1.69**	**1.34**	**1.21–1.49**	
No	Reference	Reference	Reference	Reference	
Have you ever been sexually abused?					< 0.01
Yes	Reference	Reference	NI	NI	
No	**1.94**	**1.20–3.15**	NI	NI	
Have you ever been sexually exploited?					0.99
Yes	NC	NC	NI	NI	
No	NC	NC	NI	NI	
Is the child a presumptive or diagnosed TB case?					0.22
Yes	NC	NC	NI	NI	
No	NC	NC	NI	NI	

Note: Bolded numbers mean the results are statistically significant.
Abbreviations: NC, not computed due to non-significance in the chi-squared tests; NI, not included due to non-significance in the binomial logistic regression analysis;
[a]CI is the 95% confidence interval.
[b]Adjusted for the district, participants' age group, caregivers' source of income, participants' HIV status, household hunger scale, caregivers' sex and presence of biological parents.

4 | Discussion

This study revealed that 63% of the participants were enrolled in an educational institution. Oshikuku had the highest educational institution enrolment rate, while Tsumeb had the lowest. However, the enrolment rate among OVC aged 0–6 years was 23.5%. The highest enrolment rate among the 0–6-year-olds was in Katima, while the lowest was in Tsumeb. Determinants of educational institution enrolment identified in this study include participants' age group, district, HIV status and their caregivers' sex, HIV status, educational status and marital status. Other determinants revealed include household hunger score, caregivers' source of income, sexual abuse and the presence of biological parents.

The educational institution enrolment rate of 63% revealed in this study is lower than the average enrolment for Namibia for individuals between 6 and 24 years, which was reported at 76% in 2023 (Namibia Statistics Agency 2023). The lower enrolment rate revealed in this study reflects OVC's challenges in accessing educational opportunities, such as financial, stigma and discrimination (Fleming 2015; Losioki 2020). Participants in the predominantly rural district of Onandjokwe, Tsandi and Katima exhibited a higher likelihood of enrolling in an educational institution than those in Windhoek. This finding may stem from the assistance offered by rural extended families of the orphans, especially aunts and uncles (Karimli et al. 2012). Urbanisation has diminished the extended family structure, potentially leading to neglect and limited support for orphans in urban environments (Ringson and Chereni 2020). Districts like Windhoek may need additional resources or programs to boost educational enrolment rates. This study revealed a 23.5% early education development enrolment rate among OVCs aged 0–6 years. The low enrolment among this age group might reflect the country's ECD school shortage. The shortage of ECD schools may be attributed to less government investment for this educational level in terms of human and financial resources. Interventions are, therefore, needed to increase ECD schools in the country. Another explanation may also be that the enrolment of children aged 0–6 years in educational institutions is not mandatory in the country.

Households experiencing little or no hunger and those with moderate hunger demonstrated a greater likelihood of educational institution enrolment among participants. This finding aligns with a study conducted in Ghana, which reported that household food security was associated with increased educational institution enrolment and reduced absenteeism (Baiden et al. 2019). This finding may be due to children from food-secure families not needing to seek employment to procure food for the household. Providing food support to vulnerable households and meals in schools may enhance educational institution enrolment (Gelli 2015).

The finding that participants aged 10–14 years were more likely to be enrolled in an educational institution than those aged 15–19 years may be attributed to free primary and secondary education provided in Namibia (Shikoha et al. 2023). However, in some regions, secondary schools are far from their usual residence and may require money for transport or accommodation. Moreover, individuals enrolled in vocational training or tertiary education may face challenges in maintaining their enrolment without support from family, caregivers or other benefactors, as they must manage tuition fees alongside their daily necessities. Strategies should be implemented to assist OVC with tuition fees and additional financial resources to meet their basic needs while attending school.

The participants' HIV status was identified as a determinant of educational institution enrolment in this study. The association between participants' HIV status and educational institution enrolment was not significant in adjusted analysis, possibly because of confounders. HIV-positive participants are less likely to be enrolled in an educational institution, possibly due to illnesses, especially those not on ART (Parchure et al. 2016). Another reason for the lower likelihood of educational institution enrolment among HIV-positive participants might be the fear of stigma and discrimination (Baxen and Haipinge 2015). To enhance enrolment in educational institutions for HIV-positive OVC, it is essential to engage communities in raising awareness about the challenges faced by OVC, thereby reducing stigma and discrimination. Decreased stigma and discrimination may lead to increased ART uptake, potentially reducing morbidity among OVC living with HIV and facilitating their continued enrolment in school (Toska et al. 2019).

Participants lacking a surviving parent exhibited lower educational institution enrolment rates. This is due to reduced support and care from caregivers compared with what they would have received from their parents (Pufall et al. 2014). Caregivers may face challenges in offering equivalent support to biological parents due to their own parental responsibilities. Participants who had a history of sexual abuse had a lower likelihood of being enrolled in an educational institution. A Malawian study reported similar findings, indicating that females with a history of sexual abuse were more likely to drop out of school (Psaki et al. 2017). Sexual abuse trauma can result in mental health issues such as depression, substance abuse and social stigma, potentially causing OVC to discontinue their education (Mekuria et al. 2015).

The caregivers' HIV status was identified as a determinant of educational institution enrolment in this study. This finding aligns with a study conducted in Botswana, which indicated that HIV-positive children had a lower likelihood of attending school (Anabwani et al. 2016). Caregivers who are HIV-positive may struggle to have the financial means to send OVC in their care to school, primarily due to difficulties in securing employment within their communities due to stigma and discrimination. Furthermore, some of the caregivers, especially those not on ART or not adhering to ART, may be ill most of the time, making it difficult to remain employed and have a stable income (Thomas et al. 2019). In contrast, as revealed in this study, those whose caregivers had completed vocational training or tertiary education were more likely to be enrolled in educational institutions. This association is attributed to the higher employment rates of such caregivers, which enables them to provide financial support for the educational needs of OVC (Friderichs et al. 2023). Participants whose caregivers were married were more likely to be enrolled in school, potentially due to the ability of married couples to combine resources to meet the educational needs of OVC in their care (Fomby 2024). Participants whose caregivers lacked a source of income exhibited a lower

likelihood of educational institution enrolment. This finding aligns with a South African study indicating that household poverty affects school enrolment and educational performance (Timæus et al. 2012). This may result from insufficient financial resources for tuition fees and other necessary educational materials.

One of the limitations of this study is that we used a program dataset, which limited the number of variables we included in the study. The study could not identify the reasons for the participants' non-enrolment. Social desirability bias may have influenced the findings because the responses were self-reported. Due to the cross-sectional nature of the study design used, no causal relationships could be inferred. Additionally, the findings cannot be generalised to all OVC in the country because the data used were limited to participants in the OVC program. A future quantitative study that includes a representative sample of OVC in the general population is required to produce findings that are generalisable to all OVC in Namibia. Furthermore, a future qualitative study should investigate the factors contributing to non-enrolment among OVC.

5 | Conclusion

Education significantly reduces poverty, enhances labour productivity, improves health outcomes and facilitates full economic and community development participation. Children without access to quality education face disadvantages in income, health and various life opportunities. OVC encounter numerous obstacles in accessing education. The study found that 63% of participants were enrolled in an educational institution. This study revealed several determinants of enrolment in educational institutions, including household hunger score, caregivers' source of income, instances of sexual abuse and the presence of biological parents. Furthermore, other identified determinants of school enrolment in educational institutions included male caregivers, HIV-negative caregivers and caregivers who had completed vocational training or tertiary education. It is essential to implement strategies that provide OVC with tuition assistance and additional financial resources to meet their basic needs during their education. Communities must be sensitised about the plight of OVC so that stigma and discrimination can be reduced. Providing food support to vulnerable households and meals in schools may enhance school enrolment and address food security. Caregiver, family or guardianship support is essential for enrolment in educational institutions among OVC. There is a need to enhance caregiver support, particularly for single caregivers and those with limited education or income. Addressing income instability and sexual abuse may improve educational enrolment rates. Furthermore, interventions are needed to increase the number of ECD schools in the country.

Author Contributions

TD: conceptualisation, data analysis, writing original draft. **EMo:** conceptualisation, data analysis, writing original draft. **HM:** data abstraction, writing review and editing. **EMe:** conceptualisation, writing review and editing. **ST:** data abstraction, writing review and editing. **BH:** writing review and editing. **RI:** writing review and editing. **PM:** writing review and editing. **KP:** writing review and editing.

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The authors have nothing to report.

Ethics Statement

Reach Namibia has been approved by the Namibian Ministry of Health and Social Services (MHSS), the Ministry of Education, Arts and Culture (MoEAC), the Ministry of Gender Equality, Poverty Eradication and Social Welfare (MGEPESW) and the Ministry of Sport, Youth and National Service (MSYNS). Enrolment into the OVC program was entirely voluntary. All minors in the program provided assent, and their parents or caregivers granted consent. OVC of legal age completed a consent form. Data were only collected from the participants after informed consent was obtained. PHN implements a comprehensive privacy management framework by mandating that all personnel sign a nondisclosure agreement, safeguarding all collected data. Access to DHIS2 was granted based on defined roles and criteria. Each user was assigned a unique username and password-protected login credentials. De-identified or aggregated data were employed when data sharing was necessary. Approval from an institutional review board was not required for the secondary data analysis due to the utilisation of anonymous programmatic data.

Data Availability Statement

These data are available upon reasonable request from the lead author.

Conflict of Interests

The authors declare no conflicts of interest.

References

Anabwani, G., G. Karugaba, and L. Gabaitiri. 2016. "Erratum to: Health, Schooling, Needs, Perspectives and Aspirations of HIV Infected and Affected Children in Botswana: A Cross-Sectional Survey." *BMC Pediatrics* 16, no. 1: 132. https://doi.org/10.1186/s12887-016-0676-9.

Atkins, M., K. Hoagwood, K. Kutash, and E. Seidman. 2010. "Toward the Integration of Education and Mental Health in Schools." *Administration and Policy in Mental Health* 37, no. 1–2: 40–47. https://doi.org/10.1007/s10488-010-0299-7.

Baiden, P., G. O. Boateng, M. Dako-Gyeke, C. K. Acolatse, and K. E. Peters. 2019. "Examining the Effects of Household Food Insecurity on School Absenteeism Among Junior High School Students: Findings From the 2012 Ghana Global School-Based Student Health Survey." *African Geographical Review* 39, no. 2: 107–119. https://doi.org/10.1080/19376812.2019.1627667.

Baxen, J., and E. Haipinge. 2015. "School Experiences of HIV-Positive Secondary School Learners on ARV Treatment in Namibia." *International Journal of Educational Development* 41: 237–244. https://doi.org/10.1016/j.ijedudev.2014.11.002.

Fleming K. 2015. "Improving Access to Education for Orphans or Vulnerable Children Affected by HIV/AIDS." Accessed: 29 December 2024. https://unesdoc.unesco.org/ark:/48223/pf0000232423.

Fomby, P. 2024. "Prioritize Families, Not Marriage." *Journal of Policy Analysis and Management* 43, no. 4: 1284–1289. https://doi.org/10.1002/pam.22630.

Friderichs, T., G. Keeton, and M. Rogan. 2023. "Decomposing the Impact of Human Capital on Household Income Inequality in South Africa: Is Education a Useful Measure?" *Development Southern Africa* 40, no. 5: 997–1013. https://doi.org/10.1080/0376835X.2022.2163228.

Gakidou, E., K. Cowling, R. Lozano, and C. Murray. 2010. "Increased Educational Attainment and Its Effect on Child Mortality in 175 Countries Between 1970 and 2009: A Systematic Analysis." *Lancet* 376, no. 9745: 959–974. https://doi.org/10.1016/S0140-6736(10)61257-3.

Gelli, A. 2015. "School Feeding and Girls' Enrollment: The Effects of Alternative Implementation Modalities in Low-Income Settings in Sub-Saharan Africa." *Frontiers in Public Health* 3: 76. https://doi.org/10.3389/fpubh.2015.00076.

Hofmarcher, T. 2021. "The Effect of Education on Poverty: A European Perspective." *Economics of Education Review* 83: 102124. https://doi.org/10.1016/j.econedurev.2021.102124.

Jellenz, M., V. Bobek, and T. Horvat. 2020. "Impact of Education on Sustainable Economic Development in Emerging Markets—The Case of Namibia's Tertiary Education System and Its Economy." *Sustainability* 12, no. 21: 8814. https://doi.org/10.3390/su12218814.

Karimli, L., F. Ssewamala, and L. Ismayilova. 2012. "Extended Families and Perceived Caregiver Support to AIDS Orphans in Rakai District of Uganda." *Children and Youth Services Review* 34, no. 7: 1351–1358. https://doi.org/10.1016/j.childyouth.2012.03.015.

Kidman, R., and P. Anglewicz. 2016. "Are Adolescent Orphans More Likely to Be HIV-Positive? A Pooled Data Analyses Across 19 Countries in Sub-Saharan Africa." *Journal of Epidemiology and Community Health* 70, no. 8: 791–797. https://doi.org/10.1136/jech-2015-206744.

Losioki, B. 2020. "Education Opportunities and Support for Orphans and Vulnerable Children in Bagamoyo District Tanzania." *East African Journal of Education Studies* 2, no. 1: 187–197. https://doi.org/10.37284/eajes.2.1.250.

Magableh, S., M. Alalawneh, and U. Alqalawi. 2022. "An Empirical Study on the Effect of Education on Labor Productivity." *Journal of Governance and Regulation/Volume* 11, no. 2: 301–308. https://doi.org/10.22495/jgrv11i2siart9.

Mekuria, A., A. Nigussie, and M. Abera. 2015. "Childhood Sexual Abuse Experiences and Its Associated Factors Among Adolescent Female High School Students in Arbaminch Town, Gammo Goffa Zone, Southern Ethiopia: A Mixed Method Study." *BMC International Health and Human Rights* 15: 21. https://doi.org/10.1186/s12914-015-0059-6.

Ministry of Education. 2008. "Education Sector Policy for Orphaned & Vulnerable Children." Accessed 4 August 2025. https://www.npc.gov.na/wp-content/uploads/2022/06/Education-Sector-Policy-for-OVC-Aug-2008.pdf.

Mwoma, T., and J. Pillay. 2016. "Educational Support for Orphans and Vulnerable Children in Primary Schools: Challenges and Interventions." *Issues in Educational Research* 26, no. 1: 82–97.

Namibia Statistics Agency. 2023 "Population and Housing Census: Preliminary Report." 2024. Accessed: 29 December 2024. https://nsa.org.na/wp-content/uploads/2024/07/Preliminary-Report-2023-Population-and-Housing-Census_compressed.pdf.

Nyabanyaba, T. 2009. "Factors Influencing Access and Retention in Secondary Schooling for Orphaned and Vulnerable Children and Young People: Case Studies From High HIV and AIDS Prevalence Contexts in Lesotho." Accessed: 4 August 2025. https://assets.publishing.service.gov.uk/media/57a08b4640f0b652dd000bd0/60431_LesothoCaseStudy.pdf.

Ombuya, B. D., J. M. Yambo, and O. T. Mboya. 2012. "Effects of Orphanhood on Girlchild's Access and Retention in Secondary School Education: A Case of Rongo District, Kenya." *International journal of Academic Research in Progressive education and Development* 1, no. 4: 149–168. https://doi.org/10.6007/IJARPED/v1-i4/12009.

Parchure, R., V. Jori, S. Kulkarni, and V. Kulkarni. 2016. "Educational Outcomes of Family-Based HIV-Infected and Affected Children From Maharashtra, India." *Vulnerable Children And Youth Studies* 11: 332–338. https://doi.org/10.1080/17450128.2016.1218097.

Psaki, S., B. Mensch, and E. Soler-Hampejsek. 2017. "Associations Between Violence in School and at Home and Education Outcomes in Rural Malawi: A Longitudinal Analysis." *Comparative Education Review* 61, no. 2: 354–390. https://doi.org/10.1086/691117.

Pufall, E. L., C. Nyamukapa, J. W. Eaton, et al. 2014. "The Impact of HIV on Children's Education in Eastern Zimbabwe." *AIDS Care* 26, no. 9: 1136–1143. https://doi.org/10.1080/09540121.2014.892564.

Ringson, J., and A. Chereni. 2020. "Efficacy of the Extended Family System in Supporting Orphans and Vulnerable Children in Zimbabwe: An Indigenous Knowledge Perspective." *African Journal of Social Work* 10, no. 1: 99–108.

Shikoha, V., R. Shanyanana-Amaambo, and M. Chirimbana. 2023. "Challenges and Opportunities in the Implementation of Free Secondary Education (FSE) in Oluno Circuit, Oshana Region, Namibia." *Indiana Journal of Arts & Literature* 4, no. 11: 8–14. https://doi.org/10.5281/zenodo.10205515.

Thomas, R., R. Friebel, K. Barker, et al. 2019. "Work and Home Productivity of People Living With HIV in Zambia and South Africa." *AIDS* 33, no. 6: 1063–1071. https://doi.org/10.1097/QAD.0000000000002160.

Timæus, I. M., S. Simelane, and T. Letsoalo. 2012. "Poverty, Race, and Children's Progress at School in South Africa." *Journal of Development Studies* 49, no. 2: 270–284. https://doi.org/10.1080/00220388.2012.693168.

Toska, E., L. Cluver, M. Orkin, et al. 2019. "Screening and Supporting Through Schools: Educational Experiences and Needs of Adolescents Living With HIV in a South African Cohort." *BMC Public Health* 19, no. 1: 272. https://doi.org/10.1186/s12889-019-6580-0.

UNAIDS. 2023. "Namibia." Accessed: 26 December 2024. https://www.unaids.org/en/regionscountries/countries/namibia.

United Nations. 1989. "Convention on the Rights of the Child." Accessed: 29 December 2024. https://www.ohchr.org/en/instruments-mechanisms/instruments/convention-rights-child.

van Zon, S., S. Reijneveld, C. F. Mendes de Leon, and U. Bültmann. 2017. "The Impact of low Education and Poor Health on Unemployment Varies by Work Life Stage." *International Journal of Public Health* 62, no. 9: 997–1006. https://doi.org/10.1007/s00038-017-0972-7.

Zinyemba, T., M. Pavlova, and W. Groot. 2020. "Effects of HIV/AIDS on Children's Educational Attainment: A Systematic Literature Review." *Journal of Economic Surveys* 34, no. 1: 35–84. https://doi.org/10.1111/joes.12345.