Prevalence and Caregivers' Knowledge of Sickle Cell Anemia Among Children in Emohua Local Government Area, Rivers State, Nigeria

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Abstract
This study examined the prevalence and caregivers' knowledge of sickle cell anemia among children in Emohua local government area of Rivers State. Five objectives, five research questions and three hypotheses were stated to guide the study. Literature was reviewed under conceptual review, theoretical framework and empirical review. The study adopted descriptive cross-sectional design and a population which consisted of caregivers of children diagnosed with sickle cell anemia within Emohua LGA. A sample size of 316 was used and multistage sampling procedure was adopted. Data was collected using structured questionnaire and analysis was done using percentage, and Pearson Correlation at 0.05 level of significance. The result showed that more of the respondents 198(66.5%) had sickle cell crisis often while 101(33.5%) had it rarely. The result showed that more than half 199(66.6%) had good knowledge, 30(10.0%) had average knowledge while 70(23.4%) had poor knowledge of sickle cell anemia. The result showed that good knowledge of sickle cell anemia was found more among those aged 30-39 years 70(100%) and 20-29 years 40(66.7%), and those with secondary education (79.8%) and tertiary (53.3%). There was a significant relationship knowledge of sickle cell and prevalence (n = 299, r = 0.13, p = 0.02), age (n = 299, r = 0.23, p = 0.01), and education (n = 299, r = 0.20, p = 0.00. Based on the findings of the study, it was concluded that caregivers of children with sickle cell anemia in Emohua local government area of Rivers State had good knowledge of sickle cell. It was recommended among others that public health practitioners should focus on sickle cell anaemia during their campaign among students to influence their knowledge by organizing programmes for them where they can be counselled appropriately. Psychologists should be invited by the principal to speak to the sickle cell anaemia students to help influence their perception.

Keywords: *Anemia, Caregiver, Knowledge, Prevalence, Sickle Cell.*

Introduction

Sickle Cell Anaemia (SCA) is a serious inherited blood disorder and a major public health concern, particularly in countries with a high disease burden such as Nigeria. It occurs when a child inherits two abnormal haemoglobin genes from both parents, leading to the production of abnormal haemoglobin known as haemoglobin S (HbS) instead of the normal haemoglobin A (HbA). As a result, red blood cells become hard, sticky, and sickle-shaped, especially during low oxygen levels, dehydration, or physical stress. These abnormal cells can block blood vessels and reduce the flow of oxygen to different parts of the body, causing pain and organ

damage (WHO, 2021). Unlike normal red blood cells, which live for about 120 days, sickle-shaped cells survive for only 10–20 days. Their rapid destruction leads to chronic anaemia, which can negatively affect a child's growth, learning ability, and overall quality of life (Adewoyin, 2015). At the global level, Sickle Cell Anaemia constitutes one of the most prevalent genetic disorders, with a disproportionate burden borne by low- and middle-income countries. According to the World Health Organization (WHO, 2021), approximately 300,000 infants are born annually with severe haemoglobin disorders, of which SCA accounts for the overwhelming majority. The global prevalence of the sickle cell gene is estimated at 5–7% of the world's population, with the highest concentrations found in sub-Saharan Africa, the Middle East, the Indian subcontinent, and the Mediterranean basin (Weatherall et al., 2018). It was projected that the annual global birth incidence of SCA could rise to approximately 400,000 by 2050, due to population growth in high-burden regions and insufficient access to preventive genetic counselling (Piel et al., 2013). Sickle Cell Anaemia places a heavy burden on health systems worldwide and is a major cause of death among children under five years of age in regions where the disease is common. Although effective treatments and management strategies such as newborn screening, preventive antibiotics (penicillin), hydroxyurea therapy, and stem cell transplantation are available, many people in low-resource settings have limited access to these services. As a result, the greatest burden of the disease is experienced in developing countries (Piel et al., 2017).

At the regional level, sub-Saharan Africa bears the most substantial burden of Sickle Cell Anaemia, accounting for approximately 75–80% of all global SCA births annually (Nwogoh et al., 2021). In many nations, newborn screening programmes remain unavailable or inadequately implemented, resulting in a high proportion of affected children dying before diagnosis is established. The African region also faces compounding challenges including poverty, inadequate healthcare infrastructure, limited pharmaceutical supply chains, and insufficient trained healthcare personnel, all of which worsen outcomes for children living with SCA (WHO, 2021). Regional health bodies such as the African Union have increasingly recognised SCA as a public health priority in the continent, yet there is limited coordinated policy responses across most member states.

Nigeria has the highest burden of Sickle Cell Anaemia (SCA) in the world. The disease affects about 2–3% of the population with the HbSS genotype, while between 20–30% of Nigerians carry the sickle cell trait. As a result, Nigeria accounts for nearly half of all babies born with SCA globally, with an estimated 150,000 affected newborns each year (Adewoyin, 2015; Nwogoh et al., 2021). SCA is found throughout the country, but its impact is especially significant in the Niger Delta and South-South regions, including Rivers State. Rivers State has many rural and riverine communities where access to healthcare services is often limited. In Emohua Local Government Area (LGA), healthcare facilities are inadequate, health literacy is relatively low, and people's healthcare decisions are often influenced by cultural beliefs and socioeconomic conditions (Eke et al., 2022). Although SCA is expected to be common in communities such as Emohua, accurate information on its prevalence is limited due to poor health record systems and inadequate newborn screening programmes. This lack of reliable data highlights the need for community-based studies to better understand the burden of the disease and support effective health interventions.

Effective management of Sickle Cell Anaemia (SCA), especially in rural and low-resource communities, depends greatly on the knowledge of caregivers. Caregivers, who are often mothers, grandmothers, aunts, or other guardians, are primarily responsible for the daily care of children with SCA and are usually the first to respond when complications occur. Their understanding of the disease, its triggers, home care measures, and when to seek medical attention plays a major role in determining the quality of care received by affected children (Adegoke & Kuteyi, 2020). Research has shown that caregivers with adequate knowledge of

SCA are more likely to recognize warning signs early, administer medications correctly, attend routine clinic appointments, and adopt preventive care practices that reduce complications (Adewoyin et al., 2021). On the other hand, poor knowledge of the disease is often associated with delayed healthcare seeking, dependence on ineffective traditional remedies, poor adherence to treatment, and a higher risk of preventable hospital admissions and deaths (Olatunya et al., 2022).

Sickle Cell Anaemia (SCA) constitutes one of the most significant genetic public health challenges in Nigeria, with a disproportionate burden borne by children in rural and semi-urban communities where healthcare access, health literacy, and supportive infrastructure are severely limited. Despite the enactment of national health policies that recognise SCA as a priority disease, implementation gaps at the community level have meant that the majority of caregivers in rural communities remain ill-equipped with the knowledge necessary for the effective home and clinical management of the condition. The absence of a functional newborn screening programme across most developing nation further compounds the problem by delaying early diagnosis and, consequently, deferring the initiation of prophylactic interventions that are critical to preventing life-threatening complications in the first years of life. The consequences of inadequate caregiver knowledge of SCA are manifold and severe. Children whose caregivers possess limited disease knowledge are significantly more likely to experience delayed presentations to health facilities during acute crises, resulting in higher rates of stroke, severe anaemia, acute chest syndrome, and infection-related deaths. Poor caregiver knowledge is also associated with suboptimal adherence to prophylactic folic acid and penicillin regimens, irregular follow-up visits, and inappropriate reliance on herbal remedies and traditional healing practices, all these independently worsen clinical outcomes. In some communities in southern Nigeria, Sickle Cell Anaemia (SCA) is often believed to be caused by spiritual or ancestral factors rather than genetic inheritance. Such beliefs can discourage the use of proper medical care and lead caregivers to rely on ineffective or harmful traditional treatments. As a result, children with SCA may experience frequent illness, repeated hospital admissions, chronic pain, poor growth and development, and interruptions in their education. These challenges can place a significant financial and emotional burden on families, contributing to poverty and widening health inequalities among affected households.

Caregivers from higher-income households are generally more able to afford regular medical check-ups, medications, and proper nutrition, which increases their interaction with healthcare services and improves their understanding of the disease (Piel et al., 2017). In contrast, those from low-income families often face challenges such as transportation costs, limited access to health education programmes, and financial pressures that reduce their ability to seek health information and care (Olatunya et al., 2022). In rural communities like Emohua LGA, where many families depend on farming and fishing for survival, the cost of managing SCA can be overwhelming. Studies have shown that low SES is associated with poor knowledge of SCA complications and emergency warning signs (Ibrahim et al., 2023). Therefore, reducing economic barriers is essential for improving caregiver knowledge and child health outcomes.

Emohua Local Government Area (LGA) is largely made up of rural and semi-urban communities with limited access to specialist healthcare services, low health literacy levels, and widespread socioeconomic challenges. These conditions can negatively affect caregivers' understanding of Sickle Cell Anaemia (SCA). At the community level, the burden of SCA contributes to poor school attendance, reduced productivity, and increased pressure on already limited healthcare services. Furthermore, the lack of reliable local data on caregivers' knowledge and management practices makes it difficult for health authorities to develop targeted interventions. Therefore, this study seeks to generate evidence that support effective interventions by assessing the prevalence and knowledge of sickle cell anaemia among caregivers in Emohua LGA. The study provided answers to the following research questions:

1. What is the prevalence of sickle cell anemia among children in rural communities of Rivers State?
2. What is the level of knowledge of sickle cell anemia among caregiver's in rural communities of Rivers State?
3. What is the relationship between prevalence and knowledge of sickle cell anemia among caregiver's in rural communities of Rivers State?
4. What is the level of knowledge of sickle cell anemia among caregiver's in Emohua local government area of Rivers State based on age?
5. What is the level of knowledge of sickle cell anemia among caregiver's in Emohua local government area of Rivers State based on caregivers level of education?

Hypotheses

The following hypotheses were formulated and tested at 0.05 level of significance:

1. There is no significant relationship between prevalence and knowledge of sickle cell anemia among caregiver's in Emohua local government area of Rivers State.
2. There is no significant relationship between age and level of knowledge of sickle cell anemia among caregiver's in Emohua local government area of Rivers State.
3. There is no significant relationship between educational level and level of knowledge of sickle cell anemia among caregiver's in Emohua local government area of Rivers State.

Methodology

A descriptive cross-sectional research design was employed for this study. The target population consisted of caregivers of children diagnosed with sickle cell anemia, healthcare professionals working in pediatric and hematology units, and children aged 0–17 years diagnosed with the condition. The population was drawn from major public and private health facilities and community health centers within Emohua LGA, Rivers State that offer care and support to sickle cell patients. The sample size was 316 determined using Cochran's formula: $n_0 = Z^2pq/ e^2$. Where: Z = 1.96 (for 95% confidence level); p = estimated prevalence of SCA in Nigeria ≈ 0.25 (25%) according to WHO & Nwogoh et al. (2012); e = 0.05 (margin of error); q = 1- p = 0.75. Adding 10% non-response, the calculated sample size was 316. The purposive sampling technique was used to select the respondents. The instrument for data collection was a structured questionnaire titled "Prevalence and Management of Sickle Cell Anemia Questionnaire (PMSCAQ)", with a reliability coefficient of 0.81. Face and content validity of the instrument was ascertained by experts. Data was collected by administering the hard copies of the questionnaire to the respondents and retrieving same. Collected data were coded and analyzed with the aid of Statistical Products for Service Solution (SPSS) version 27.0). The result was obtained using percentage and Pearson correlation at 0.05 level of significance.

Results

The results of the study are shown below:

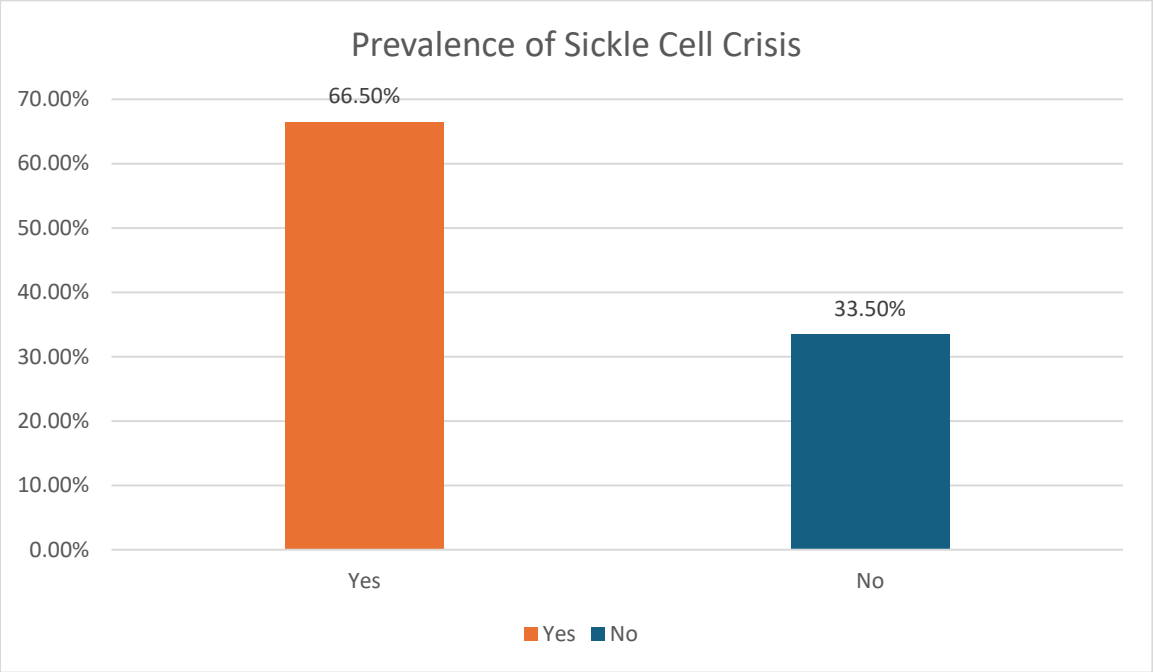

Fig 1: Percentage distribution showing prevalence of sickle cell crisis

The Fig above showed the prevalence of sickle cell crisis. The result showed that more of the respondents 198(66.5%) had sickle cell crisis often while 101(33.5%) had it rarely. Thus, the prevalence of sickle cell crisis among children in rural communities of Rivers State was high.

Table 1: Percentage distribution showing level of knowledge of sickle cell anemia among caregivers in rural communities of Rivers State

Level of knowledge	Frequency	Percentage
Average	30	10.0
good	199	66.6
poor	70	23.4
Total	299	100.0

Table 1 presents the percentage distribution showing level of knowledge of sickle cell anemia among caregivers. The result showed that more than half 199(66.6%) had good knowledge, 30(10.0%) had average knowledge while 70(23.4%) had poor knowledge of sickle cell anemia.

Table 2: Pearson Correlation showing relationship between prevalence and knowledge of sickle cell anemia among caregivers in rural communities of Rivers State

Variables		Knowledge	Prevalence	Remark
Knowledge	Correlation coefficient	1	0.13	Very low relationship
	n	299	299	
Prevalence	Correlation coefficient	0.13	1	
	n	299	299	

Guide: 0.00-0.19 = very low, 0.20-0.39 = low, 0.40-0.59 = moderate, 0.60-0.79 = high and 0.80 above is very high relationship

Table 2 showed the Pearson Correlation between prevalence and knowledge of sickle cell anemia among caregivers in rural communities of Rivers State. The result revealed a correlation coefficient, r = 0.13 indicating a very low relationship. Thus, the relationship between prevalence and knowledge of sickle cell anemia among caregivers in rural communities of Rivers State was very low.

Table 3: Cross tabulation showing level of knowledge of sickle cell anemia among caregivers in Emohua based on age

Age in years	Level of knowledge			Total
	Good F(%)	Average F(%)	Poor F(%)	
20-29	40(66.7)	0(0.0)	20(33.3)	60(100)
30-39	70(100)	0(0.0)	0(0.0)	70(100)
40-49	50(55.6)	10(11.1)	30(33.3)	90(100)
≥50	39(49.4)	20(25.3)	20(25.3)	79(100)
Total	199(66.6)	30(10.0)	70(23.4)	299(100)

Table 3 presents the level of knowledge of sickle cell anemia among caregivers in Emohua based on age. The result showed that good knowledge of sickle cell anemia was found more among those aged 30-39 years 70(100%) and 20-29 years 40(66.7%). Thus, good level of knowledge of sickle cell anemia among caregivers in Emohua LGA of Rivers State was more among the younger caregivers.

Table 4: Cross tabulation showing level of knowledge of sickle cell anemia among caregivers in Emohua based on education

Education	Level of knowledge			Total
	Good F(%)	Average F(%)	Poor F(%)	
None	0(0.0)	10(100)	0(0.0)	10(100)
Primary	10(25.0)	30(75.0)	0(0.0)	40(100)
Secondary	0(0.0)	79(79.8)	20(20.2)	99(100)
Tertiary	20(13.3)	80(53.3)	50(33.4)	150(100)
Total	199(66.6)	30(10.0)	70(23.4)	299(100)

Table 4 presents the level of knowledge of sickle cell anemia among caregivers in Emohua based on education. The result showed that good knowledge of sickle cell anemia was found more among those with secondary education (79.8%) and tertiary (53.3%). Thus, good level of knowledge of sickle cell anemia among caregivers in Emohua LGA of Rivers State was more among those with higher level of education.

Table 5: Pearson Correlation showing relationship between prevalence and knowledge of sickle cell anemia among caregivers in rural communities of Rivers State

Variables		Knowledge	Prevalence	Decision
Knowledge	Correlation coefficient	1	0.13	H_o rejected
	Sig.		0.02*	
	n	299	299	
Prevalence	Correlation coefficient	0.13	1	
	Sig.	0.02*		
	n	299	299	

*Significant; p<0.05.

Table 5 showed the Pearson Correlation between prevalence and knowledge of sickle cell anemia among caregivers in rural communities of Rivers State. The result revealed that there was a significant relationship prevalence and knowledge of sickle cell as $p<0.05$ ($n = 299$, $r = 0.13$, $p = 0.02$). Thus, the null hypothesis which stated that there is no significant relationship between prevalence and knowledge of sickle cell anemia among caregivers in rural communities of Rivers State was rejected.

Table 6: Pearson Correlation showing relationship between age and knowledge of sickle cell anemia among caregivers in rural communities of Rivers State

Variables		Age	Prevalence	Decision
Knowledge	Correlation coefficient	1	0.23	H_o rejected
	Sig.		0.01*	
	n	299	299	
Age	Correlation coefficient	0.23	1	
	Sig.	0.01*		
	n	299	299	

*Significant; $p<0.05$.

Table 6 showed the Pearson Correlation between age and knowledge of sickle cell anemia among caregivers in rural communities of Rivers State. The result revealed that there was a significant relationship age and knowledge of sickle cell as $p<0.05$ ($n = 299$, $r = 0.23$, $p = 0.01$). Thus, the null hypothesis which stated that there is no significant relationship between age and knowledge of sickle cell anemia among caregivers in rural communities of Rivers State was rejected.

Table 7: Pearson Correlation showing relationship between education and knowledge of sickle cell anemia among caregivers in rural communities of Rivers State

Variables		Education	Prevalence	Decision
Knowledge	Correlation coefficient	1	0.20	H_o rejected
	Sig.		0.00*	
	n	299	299	
Education	Correlation coefficient	0.20	1	
	Sig.	0.00*		
	n	299	299	

*Significant; $p<0.05$.

Table 7 showed the Pearson Correlation between education and knowledge of sickle cell anemia among caregivers in rural communities of Rivers State. The result revealed that there was a significant relationship education and knowledge of sickle cell as $p<0.05$ ($n = 299$, $r = 0.20$, $p = 0.00$). Thus, the null hypothesis which stated that there is no significant relationship between education and knowledge of sickle cell anemia among caregivers in rural communities of Rivers State was rejected.

Discussion of findings

The findings of the study are discussed below:

The result showed that more of the respondents 198(66.5%) had sickle cell crisis often while 101(33.5%) had it rarely. The findings of this study are in line with that of Chetan et al. (2023) whose study showed similar result. The findings of this study are in line with that of Trivedi et al. (2025) on sickle cell trait and Sickle cell anemia in the Saurashtra Region whose study

showed similar result. The findings of this study are in line with that of Jiya et al. (2024) on Sickle Cell Anemia in a Tertiary Health Facility in North-western Nigeria whose study showed similar result. The findings of this study are in line with that of Wudil et al. (2023) study on assessment of the risk of stroke in children with sickle cell anemia using transcranial doppler ultrasound with imaging in Northwestern Nigeria whose study showed similar result. The similarity between the previous studies and the present study could be due to the homogeneity of the study population. The result showed that more than half 199(66.6%) had good knowledge, 30(10.0%) had average knowledge while 70(23.4%) had poor knowledge of sickle cell anemia. The finding of this study is in line with that of Ezenwosu et al. (2021) study on knowledge and awareness of individual sickle cell genotype among adolescents in a unity school in Southeast, Nigeria which showed average knowledge of sickle cell anaemia. The finding of this study is in line with that of Adeyemo et al. (2021) study on knowledge, attitude and control practices of sickle cell diseases among senior secondary students in Osun State, Nigeria which showed average knowledge of sickle cell anaemia. The similarity between the previous studies and the present study could be due to the homogeneity of the study population. The result revealed a correlation coefficient, r = 0.13 indicating a very low relationship. The finding of the study is similar to that of Haemato et al. (2018) whose study in Martini hospital Margodishu of Somali Regional State in Ethiopia showed relationship between prevalence and knowledge of sickle cell anemia. The finding of this study is in line with that of Welkon et al. (2012) whose study on sickle cell Anaemia linga community, Cameroon showed relationship between prevalence and knowledge of sickle cell anemia. The finding of this study is in line with that of Clikiz et al. (2016) whose study on the perception of Patient with sickle cell Anaemia in a rural Community in Delta State, Niger Delta Region of Nigeria whose study showed relationship between prevalence and knowledge of sickle cell anemia. The similarity between the previous studies and the present study could be due to the homogeneity of the study population. The finding of this study is in line with that of Ezenwosu et al. (2021) study on knowledge and awareness of individual sickle cell genotype among adolescents in a unity school in Southeast, Nigeria which showed average knowledge of sickle cell anaemia both male and female. The finding of this study is in line with that of Adeyemo et al. (2021) study on knowledge, attitude and control practices of sickle cell diseases among senior secondary students in Osun State, Nigeria which showed relationship between age and knowledge of sickle cell anaemia more among. The similarity between the previous studies and the present study could be due to the homogeneity of the study population.

The result showed that there was a relationship between education and knowledge of sickle cell anemia. The finding of this study is in line with that of Adeyemo et al. (2021) study on knowledge, attitude and control practices of sickle cell diseases among senior secondary students in Osun State, Nigeria which showed relationship between education and knowledge of sickle cell anemia. The finding of this study is in line with that of Ezenwosu et al. (2021) study on the effect of health education on knowledge and awareness of sickle cell disease among adolescents which showed relationship between education and knowledge of sickle cell anemia. The similarity between the previous studies and the present study could be due to the homogeneity of the study population.

Conclusion

Based on the findings of the study, it was concluded that caregivers of children with sickle cell anemia in Emohua local government area of Rivers State had good knowledge of sickle cell.

Recommendations

The following recommendations were made based on the findings of the study:

1. Public health practitioners should focus on sickle cell anaemia during their campaign among students to influence their knowledge by organizing programmes for them where they can be counselled appropriately.
2. Psychologists should be invited by the principal to speak to the sickle cell anaemia students to help influence their perception.
3. Community stakeholders should make effort to enforce laws that prohibit discrimination and stigmatization of sickle cell anaemia patients.
4. The principal should strategize on how to influence students' perception towards sickle cell anaemia.

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