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Social Determinants of Health Among Children and Adolescents with Sick Cell Disease Attending Two Tertiary Hospitals in Southwest Nigeria

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Abstract

Background: Sick cell disease (SCD) is influenced by the biopsychosocial model of health, which recognises the combined effects of biological, social, and behavioural factors on health outcomes. Social determinants of health are the non-medical factors that influence health and well-being.

Objective: To assess the social determinants of health among children and adolescents with SCD attending paediatric SCD clinics in two tertiary healthcare facilities in a semi-urban area of Nigeria, with emphasis on demographic characteristics, housing and environmental conditions, healthcare access, and pattern of healthcare utilisation.

Methods: Eligible consenting caregivers and adolescents were consecutively recruited into this cross-sectional study. The data were collected using a structured interviewer-administered questionnaire and analysed using appropriate statistical methods.

Results: A total of 99 caregivers of children and adolescents with sickle cell disease participated in the study. More than half of the respondents (51; 51.5%) lived in individual apartments, although only 53 (53.5%) of the children and adolescents had separate sleeping spaces. Most households had access to clean water (93; 93.9%) and sanitation facilities (74; 74.7%). Only 20 (20.2%) of respondents had access to any form of Health Insurance, while more than half (60; 60.6%) travelled over 30 minutes to access healthcare during illness episodes. Housing type and the type of health facility commonly visited during illness were significantly associated with hospitalisation ($p < 0.001$ and $p = 0.030$, respectively).

Conclusion: Improving living conditions, reducing barriers to timely healthcare access, and expanding health insurance coverage may help reduce disease burden and improve health outcomes in this population.

Keywords: *Haemoglobinopathy, Health Insurance Scheme, Healthcare-seeking behaviours, Hospitalisation, Housing, Sanitation facilities.*

Introduction

Sickle cell disease (SCD) is the commonest inherited blood disorder worldwide, affecting an estimated 7.7 million people, with the highest burden occurring in sub-Saharan Africa.¹ The disease has a profound impact on child survival and was the 12th leading cause of death among children under five years in 2021, accounting for an estimated 81,100 deaths globally.¹ Nigeria bears the highest global burden of sickle cell disease, with approximately 150,000 children born with the condition annually.²

The phenotypic expression of diseases, including SCD, is influenced by the biopsychosocial model, which recognises the combined effects of biological, social, and behavioural factors on health outcomes.³ Within this framework, social determinants of health (SDOH) refer to the non-medical conditions in which people are born, grow, work, live, and age, together with the broader social, economic, and political forces that shape these conditions.^{4,5} These include access to quality education and healthcare, safe housing and neighbourhoods, economic stability, and transportation, and have been estimated by the World Health Organisation (WHO) to account for 30–55% of health outcomes, often exerting a greater influence than healthcare services or individual lifestyle choices.^{4–6}

In SCD, several social and structural factors have been shown to influence disease severity, healthcare utilisation, and overall health outcomes.^{6,7} For example, access to specialised sickle cell care centres plays a crucial role in disease management, as longer travel distances and the absence of consistent primary care have been associated with higher hospitalisation rates and an increased risk of 30-day readmission.^{6,8} Similarly, children from low-income families and children of caregivers with limited health literacy or disease-specific knowledge experience greater acute care service utilisation and incur higher

healthcare-related costs.^{7,9}

Living conditions and housing environments reportedly influence the health experiences of children with SCD.⁶ Housing quality, overcrowding, sanitation, and neighbourhood infrastructure form part of the “neighbourhood and built environment” domain of social determinants of health.⁴ Poor housing conditions may increase exposure to infections and other environmental stressors that can precipitate complications in children with sickle cell disease.⁸ Therefore, in many low- and middle-income countries, where variations in housing quality and access to basic amenities are common, these factors may substantially influence disease outcomes and healthcare utilisation.

Despite the substantial burden of sickle cell disease in Nigeria, there is limited evidence on how social determinants of health influence the experiences, healthcare utilisation, and outcomes of affected children and adolescents, particularly in semi-urban communities. A better understanding of the influence of socioeconomic conditions, housing and environmental conditions, and healthcare access is essential for improving disease management, reducing hospitalisation, and informing targeted interventions to improve the quality of life and health outcomes of children and adolescents living with SCD. This study, therefore, assessed the social determinants of health among children and adolescents with SCD in southwest Nigeria, with a focus on demographic characteristics, housing and environmental conditions, and healthcare access and utilisation.

Methods

Study locations and settings

The study was conducted at the Paediatric Sickle Cell Clinics of Bowen University Teaching Hospital (BUTH) and LAUTECH Teaching Hospital. Both institutions are tertiary healthcare centres that serve as major referral facilities for primary and secondary health institutions in Ogbomoso and surrounding communities in southwest Nigeria. The Departments of Paediatrics in both hospitals provide care for children and adolescents up to 18 years of age through specialised units including the Children's Emergency Unit, neonatal services, paediatric outpatient clinics, and paediatric wards. The sickle cell clinics run weekly at the paediatric outpatient departments with an average clinic attendance of approximately seven and twelve patients per clinic at BUTH and LTH, respectively. The clinics are managed by consultant paediatricians with support from resident doctors, nurses, and allied health professionals.

Study design

This study was a descriptive, cross-sectional study conducted to assess the social determinants of health among children and adolescents living with sickle cell disease (SCD).

Ethical considerations

Ethical approval was obtained from the Health Research Ethics Committee of Bowen University Teaching Hospital (approval number BUTH/REC-27100) before the commencement of the study.

Written informed consent was obtained from all parents or caregivers before participation in the study. For adolescents aged 10–18 years, assent was also obtained in addition to parental consent. Participation was voluntary, and respondents were assured that refusal or withdrawal would not

affect the child's medical care. Confidentiality of all information obtained was strictly maintained.

Study population, including inclusion and exclusion criteria

The study population comprised children and adolescents aged 1–18 years with confirmed sickle cell disease attending the paediatric sickle cell clinics of the two hospitals during the study period. Parents or primary caregivers and /or adolescents served as respondents for the study questionnaire.

Eligible children and adolescents with SCD attending the clinics during the study period whose caregivers provided consent were included in the study. Children whose caregivers were unavailable to complete the questionnaire, those whose caregivers or adolescents declined consent/assent, and those who were too ill to participate at the time of recruitment were excluded from the study.

Sample size determination and sampling technique

The minimum sample size required for the study was calculated using the formula for estimating a single population proportion: $n = (Z^2 pq)/d^2$, where n = minimum sample size, Z = standard normal deviate at 95% confidence level (1.96), p = prevalence of sickle cell disease in Nigeria (3% or 0.03), $q = 1 - p = 0.97$, and d = margin of error set at 5% (0.05).

Substituting into the formula gave a minimum sample size of 44.7 (≈ 45).

The combined weekly clinic attendance at the two centres is approximately 19 patients. Over a six-month study period (approximately 24 weeks),

the estimated total number of clinic attendees was 456 patients. Given this relatively small sampling frame, the finite population correction formula was applied, yielding a corrected sample size of 41 participants. Allowing for a 10% non-response rate, the minimum required sample size was 46 participants. The estimated minimum sample size was multiplied by a factor of 2 to correct for a possible cluster effect and arrive at 92. However, 99 respondents participated in the study.

A consecutive sampling technique was employed, whereby all eligible participants presenting at the paediatric sickle cell clinics during the study period were recruited until the desired sample size was attained.

Data collection methods

Data were collected using a structured interviewer-administered questionnaire completed by parents or caregivers of children and adolescents with SCD. The questionnaire was developed from relevant literature, and it consisted of three sections: demographic characteristics, housing and environmental conditions, and healthcare access and utilisation. Eligible caregivers were approached during routine clinic visits and informed about the study. After obtaining consent, trained research assistants (paediatric medical officers or resident doctors) administered the questionnaire in a confidential setting. Socioeconomic status was determined using the Oyediji model of socioeconomic classification,¹⁰ which is based on the educational attainment and occupation of both parents. Scores assigned to parental education and occupation were averaged and rounded to the nearest whole number to determine the child's social class.

Data management

The data were entered into and analysed using the Statistical Package for the Social Sciences (SPSS) version 26. Descriptive statistics such as

frequencies, percentages, means, and standard deviations were used to summarise the data. Associations between selected social determinants and healthcare utilisation variables were assessed using the Chi-Square test, with statistical significance set at $p < 0.05$.

Results

The largest proportion (34; 34.4%) of the participants were in the adolescent age group, with a mean age of 11.0 ± 5.03 years. Less than half (34; 34.4%) of the participants belonged to the high socioeconomic class. Most of the accompanying caregivers were mothers (67; 67.7%). The majority (91; 92.0%) of the caregivers were married, and most (86; 86.9%) were living together with their spouses. Regarding monthly family income, the largest proportion of families (31; 31.3%) earned between ₦50,000 and ₦100,000 (approximately 33–66 USD) per month. Other socioeconomic details are shown in Table I.

More than half of the participants (51; 51.5%) lived in individual apartments (flats, self-contained apartments), while 31.3% resided in detached houses (i.e., stand-alone buildings within the compound such as bungalows and duplexes). More than half of the households (59; 59.6%) had 3–5 occupants, and 53 (53.5%) of the children and adolescents had a separate sleeping space to themselves as individuals. The majority of households had access to clean water (93; 93.9%), with boreholes being the most common source of water (70; 70.6%). Access to sanitation facilities was reported by 74 (74.7%) households. Among these households, 71 (95.9%) used water-closet toilets as their primary sanitation facility. Other details are as shown in Table II.

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Table III shows that most caregivers (92; 92.9%) reported taking their children to healthcare facilities when sick, with teaching hospitals being the most utilised health facilities (77; 77.8%). Forty (40.4%) caregivers identified paediatricians as the most frequent healthcare provider who attended to their sick children, whereas 51 (51.6%)

reported other cadres of medical doctors. Only 20 (20.2%) of the respondents had access to the National Health Insurance Scheme (NHIS) or any other form of health insurance. Furthermore, more than half (60; 60.6%) often travelled over 30 minutes to access healthcare during their children's illness, and nearly half of caregivers (45; 45.5%) perceived the cost of care as expensive.

Table I: Sociodemographic characteristics of children/adolescents living with SCD and their caregivers

Variable		Frequency	Percentage
Child's age (years)	≤ 5	14	14.1
	6 – 10	30	30.3
	11 – 15	34	34.4
	> 15	21	21.2
Child's Body Weight (kg)	≤ 20	23	23.2
	21 – 40	47	47.5
	> 40	29	29.3
Child's place of residence	Ogbomoso	76	76.8
	Other places (neighbouring villages)	23	23.2
Socioeconomic classes	High	34	34.4
	Middle	41	41.4
	Low	24	24.2
Caregiver's relationship to the child?	Mother	67	67.7
	Father	23	23.2
	Others (Grandmother/Both parents)	9	9.1
Parent/caregiver religion	Christianity	57	57.6
	Islam	42	42.4
Parent/caregiver marital status	Single	4	4
	Married	91	92
	Widowed	4	4
Spouses living together	Yes	86	86.9
	No	13	13.1
Monthly family income (Naira)	< 50,000	13	13.1
	50,000 -100,000	31	31.3
	> 100,000 – 200,000	27	27.3
	> 200,000 – 500,000	18	18.2
	> 500,000	10	10.1

Forty-four (44.4%) attended routine SCD clinics monthly, while 58 (58.6%) had been hospitalised due to SCD in the preceding year. Among the 58 children who required hospitalisation, 33 (56.9%) experienced two to five pain crises requiring hospitalisation during the preceding year, and almost all 94 (94.9%) were on routine

medications for SCD. High medication cost was the commonest barrier to regular medication use (49; 49.5%); some other reasons were forgetfulness (12; 12.1%), long distance to the pharmacy (8; 8.1%) and drug unavailability (6; 6.1%). Nearly half of the caregivers (48; 48.5%) rated healthcare services for children with SCD in

Nigeria as very good. Out-of-pocket spending was the main source of healthcare expenditure (68; 86.1%), while 11 (13.9%) financed healthcare through assistance from relatives and friends. Also, Figure 1 shows that the main barriers to seeking healthcare for sick children with SCD included financial constraints (45; 37.8%), long distances to healthcare facilities (30; 25.2%), and long wait times at the healthcare facilities (25; 21.0%).

In Table IV, the housing type was significantly associated with hospitalisation ($p < 0.001$), with

children living in shared-facility houses (locally referred to as “face-me-I-face-you”) having the highest proportion of hospitalisation (11; 64.7%). The type of health facility commonly visited was also significantly associated with hospitalisation ($p = 0.030$), with a higher proportion (10; 66.7%) observed among children attending private clinics or hospitals. Table V shows that children living in shared-facility houses had significantly higher odds of hospitalisation compared with those living in detached houses or individual apartments (OR = 3.18, 95% CI: 1.07–9.47).

Table II: Housing and environmental conditions of children and adolescents living with SCD

Variable		Frequency	Percentage
Housing type	Detached House**	31	31.3
	Individual apartment (flat, self-contained) †	51	51.5
	Shared facilities‡	17	17.2
	Informal Settlement	0	0
Number of people living in the house	2	1	1
	3 – 5	59	59.6
	> 5	39	39.4
Number of rooms in the house	2	15	15.1
	3 – 5	68	68.7
	> 5	16	16.2
Number of bedrooms	1	16	16.2
	2 – 5	81	81.8
	> 5	2	2
Does the child have a separate Bedroom	Yes	53	53.5
	No	46	46.5
Family’s access to clean water	Yes	93	93.9
	No	6	6.1
Family’s source of clean water*	Deep well	21	21.2
	Shallow well	2	2
	Borehole	70	70.6
	Stream/spring/river	5	5
	Pipe-borne water	3	3
	Sachet	21	21.2
	Bottled water	6	6
	Other sources	0	0
Access to sanitation facilities	Yes	74	74.7
	No	25	25.3
Types of sanitation facilities	Water closet	87	87.9
	Pit Latrine	8	8.1
	None	4	4
	Others	0	0

*Multiple responses. **Detached house: household occupies a standalone building within the compound;

†Individual apartment (flat, self-contained): household occupies a separate apartment with private living facilities;

‡shared facilities: household shares essential facilities such as kitchen, bathroom, and/or toilet with other households within the same building or compound.

Discussion

This study explored the social determinants influencing health outcomes among children and adolescents living with sickle cell disease (SCD) in a semi-urban Nigerian setting. The sociodemographic profile observed in this study, with a significant proportion of participants belonging to the middle and low socioeconomic classes, is consistent with findings from other African studies.^{6, 7} Although sickle cell disease

occurs across all socioeconomic groups, socioeconomic disadvantages may adversely influence access to quality healthcare and disease outcomes. Previous studies have shown that children from lower socioeconomic backgrounds are more likely to experience worse disease severity and higher healthcare utilisation due to factors such as poor nutrition, environmental exposures, and limited access to healthcare services.^{6, 7}

Table IIIa: Healthcare access and utilisation by children and adolescents living with SCD in the study setting

Variable		Frequency	Percentage
Mode of care for the child when sick*	I give herbal medications	8	8.0
	I pray over the child	19	19.1
	I take the child to a traditional healer in my community	3	3.0
	I take the child to a healthcare facility/hospital	92	92.9
	I buy medications from nearby chemist shops	15	15.1
	Others	5	5.1
Type of facility visited when child is ill	Primary healthcare centre	2	2.0
	Private Clinic/hospital	15	15.2
	Secondary healthcare, such as a General Hospital	5	5.0
	Teaching Hospital such as BUTH or LAUTECH	77	77.8
Healthcare provider frequently attending to the child during illnesses	Other cadres of medical doctors	51	51.6
	Nurses	0	0.0
	Paediatrician	40	40.4
	Haematologist	3	3.0
	Cannot say	2	2.0
	Other health workers in the community	3	3.0
Access to NHIS**	Yes	20	20.2
	No	79	79.8
Distance to the health facility	≤ 30 min walking distance	39	39.4
	> 30min walking distance	60	60.6
Perceived cost of care	Expensive	45	45.5
	Affordable	52	52.5
	Cheap	2	2.0
Frequency of attendance at routine SCD Clinic	Monthly	44	44.4
	Quarterly	27	27.3
	Only when sick	16	16.2
	Rarely	6	6.1
	Others	4	4.0

*Multiple responses

**NHIS - National Health Insurance Scheme

In the present study, although socioeconomic class was not significantly associated with the

outcomes assessed, children from the lower socioeconomic backgrounds had higher rates of

hospitalisation. Similar findings have been reported by Goel *et al.*,¹¹ who observed higher hospital readmission rates among individuals from lower socioeconomic backgrounds. Likewise, Asnani *et al.*,¹² reported that socioeconomic deprivation remains an important predictor of increased morbidity among individuals living with SCD across different

settings. Although most caregivers were married and predominantly mothers, suggesting the presence of family support systems and better treatment supervision,³ the variability in family income underscores persistent economic constraints that may affect long-term disease management.

Table IIIb: Healthcare access and utilisation by children and adolescents living with SCD in the study setting

Variable		Frequency	Percentage
Any hospitalisation of the child due to SCD in the past 1 year	Yes	58	58.6
	No	41	41.4
Frequency of hospitalisation in the past one year	Once	27	46.6
	Two-three times	26	44.8
	More than three times	5	8.6
Frequency of visits to the emergency room due to SCD	Never	25	25.3
	Once or twice a year	53	53.5
	Every few months	17	17.2
	Monthly	4	4
Number of pain crises needing hospitalisation in the past 1 year	1	21	36.2
	2 – 5	33	56.9
	> 5	4	6.9
Child on regular medications for SCD	Yes	94	94.9
	No	5	5.1
Perceived barriers to regular use of SCD medications	High cost	49	49.5
	Long distance to the pharmacy	8	8.1
	Drug not available	6	6.1
	Forgot	12	12.1
	Other reasons (None, fed up)	24	24.2
Rating of healthcare services for SCD children in Nigeria	Excellent	17	17.2
	Very good	48	48.5
	Good	28	28.3
	Poor	6	6
	Very poor	0	0
Average wait time in the clinic	Less than 1 hour	38	38.4
	1-2 hours	43	43.4
	More than 2 hours	18	18.2

Housing types within the built environment domain of the SDoH were strongly associated with health outcomes in this study, particularly regarding the significant relationship between housing structures and hospitalisation rates. Specifically, children living in shared or overcrowded housing facilities, often lacking separate sleeping spaces, had the highest rates of

hospitalisation. This underscores the role of residential overcrowding and environmental stressors in sickle cell disease. This finding is consistent with previous literature linking poor housing conditions to an increased susceptibility to infections, severe vaso-occlusive crises and therefore, acute care utilisation.^{13, 14} This is well reported, even in high-income settings, to reinforce the fact that the impact of housing

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quality on chronic disease management goes beyond geographical and economic boundaries. Notably, a US national study by Tan *et al.*¹⁵ reported that people with SCD living in areas with the highest social vulnerability faced 4.9 times higher mortality risk than those in low-vulnerability areas. Beyond structural housing, gaps in sanitation and household infrastructure persist in this study despite relatively high access

to clean water, reflecting the complex interplay between environmental health and disease outcomes. While access to water is important, inadequate sanitation may still predispose children to infections, which can subsequently exacerbate SCD complications. This highlights the need for integrated public health interventions that address broader environmental determinants, rather than isolated factors.

Table IVa: Social Determinants of the health status of children living with SCD

Variable		Hospitalisation on account of SCD in the past year		Total	χ^2	p-value
		Yes n (%)	No n (%)			
Child's age (years)	≤ 5	5 (35.7)	9 (64.3)	14	4.689	0.196
	6 – 10	14 (46.7)	16 (53.3)	30		
	11 – 15	10 (29.4)	24 (70.6)	34		
	> 15	12 (57.1)	9 (42.9)	21		
Child's socioeconomic class	High	12 (35.3)	22 (64.7)	34	5.815	0.055
	Middle	14 (34.1)	27 (65.9)	41		
	Low	15 (62.5)	9 (37.5)	24		
Caregiver's relationship to the child	Mother	29 (43.3)	38 (56.7)	67	1.732	0.63
	Father	10 (43.5)	13 (56.5)	23		
	Guardian	1 (33.3)	2 (66.7)	3		
	Other (Grandmother/Both parents)	1 (16.7)	5 (83.3)	6		
Parent/Caregiver's religion	Christianity	29 (50.9)	28 (49.1)	57	5.665	0.059
	Islam	12 (30.0)	30 (70.0)	42		
	Traditional	0 (0.0)	0 (0.0)	0		
Parent/caregiver's marital status	Married	37 (40.7)	54 (59.3)	91	0.264	0.607
	Others	4 (50.0)	4 (50.0)	8		
Monthly family income (Naira)	< 50,000	8 (61.5)	5 (38.5)	13	7.003	0.136
	50,000 -100,000	14 (45.2)	17 (54.8)	31		
	> 100,000 – 200,000	12 (44.4)	15 (55.6)	27		
	> 200,000 – 500,000	6 (33.3)	12 (66.7)	18		
	> 500,000	1 (10.0)	9 (90.0)	10		

The pattern of healthcare utilisation observed in this study demonstrates generally appropriate health-seeking behaviour among caregivers, although some practices that may delay timely medical care persist. The high proportion of caregivers seeking care at formal health facilities, particularly tertiary centres, is encouraging and consistent with reports from other tertiary-based studies in Nigeria and other LMICs.^{16, 17} This

finding suggests good health-seeking behaviour among most caregivers of children with SCD and highlights the central role of specialist physicians in the management of children with SCD.

Nevertheless, a small proportion of caregivers in this study still take their children for over-the-counter medications at patent medicine stores when sick, potentially delaying timely evaluation and effective treatment.

Table IVb: Social Determinants of the health status of children living with SCD

Variable		Hospitalisation on account of SCD in the past year		Total	χ^2	p-value
		Yes n (%)	No n (%)			
Housing type	Detached House	4 (12.9)	27 (87.1)	31	16.111	< 0.001
	Individual apartment	26 (51.0)	25 (49.0)	51		
	Shared facilities	11 (64.7)	6 (35.3)	17		
	Informal Settlement	0 (0.0)	0 (0.0)	0		
Family access to clean water	Yes	38 (40.9)	55 (59.1)	93	0.194	0.66
	No	3 (50.0)	3 (50.0)	6		
Access to sanitation facilities	Yes	30 (40.5)	44 (59.5)	74	0.092	0.761
	No	11 (44.0)	14 (56.0)	25		
Type of health facility constantly visited when the child is sick	Primary Health Centre	0 (0.0)	2 (100.0)	2	8.933	0.030
	Private Clinic/Hospital	10 (66.7)	5 (33.3)	15		
	Secondary facility such as a General Hospital	0 (0.0)	5 (100.0)	5		
	Teaching Hospital such as BUTH or LAUTECH	31 (40.3)	46 (59.7)	77		
Healthcare provider	Other cadres of medical doctors	23 (45.1)	28 (54.9)	51	2.821	0.588
frequently attending to the child's illness	Nurses	0 (0.0)	0 (0.0)	0		
	Paediatrician	15 (37.5)	25 (62.5)	40		
	Haematologist	1 (33.3)	2 (66.7)	3		
	Can't say					
	Other health workers in the community	2 (66.7)	1 (33.3)	3		

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This underscores the need for continued caregiver education and counselling on the importance of seeking prompt medical care whenever children with SCD become ill. In addition, a few caregivers reported relying solely on prayer rather than seeking immediate clinical care. While spiritual beliefs and prayer form an important component of coping and healthcare-seeking across many African communities, exclusive reliance on faith-based interventions without timely medical care is a well-documented driver of delayed hospital presentation and consequent poorer outcomes among children with SCD.^{19, 20}

The low enrolment in the National Health Insurance Scheme (NHIS) and the high perceived healthcare costs observed in this study may reflect persistent financial barriers to accessing quality SCD care in Nigeria. Previous studies have similarly reported limited health insurance coverage, poor affordability of essential medications, and concerns regarding the inadequacy of NHIS coverage for individuals living with SCD.^{21, 22} These financial constraints contribute to delayed healthcare seeking and increased disease complications. Catastrophic health expenditure has also been reported among households caring for individuals with sickle cell disease.^{23, 24}

Table V: Predictors of hospitalisation on account of SCD in respondents

Variable		B	p-value	Odd Ratio	95% CI
Housing type	Detached House/ Individual apartment	RC			
	Shared facilities	1.156	0.038	3.178	1.067 – 9.466
Type of health facility frequently visited during an illness	Primary healthcare centre	20.808	0.999	Indeterminate	
	Private Clinic/hospital	-1.088	0.068	0.337	0.105 – 1.081
	Secondary healthcare, such as General Hospital	20.808	0.999	Indeterminate	
	Teaching Hospital, such as BUTH or LAUTECH	RC			

RC - Reference Category; CI - Confidence Interval; B – Regression Coefficient.

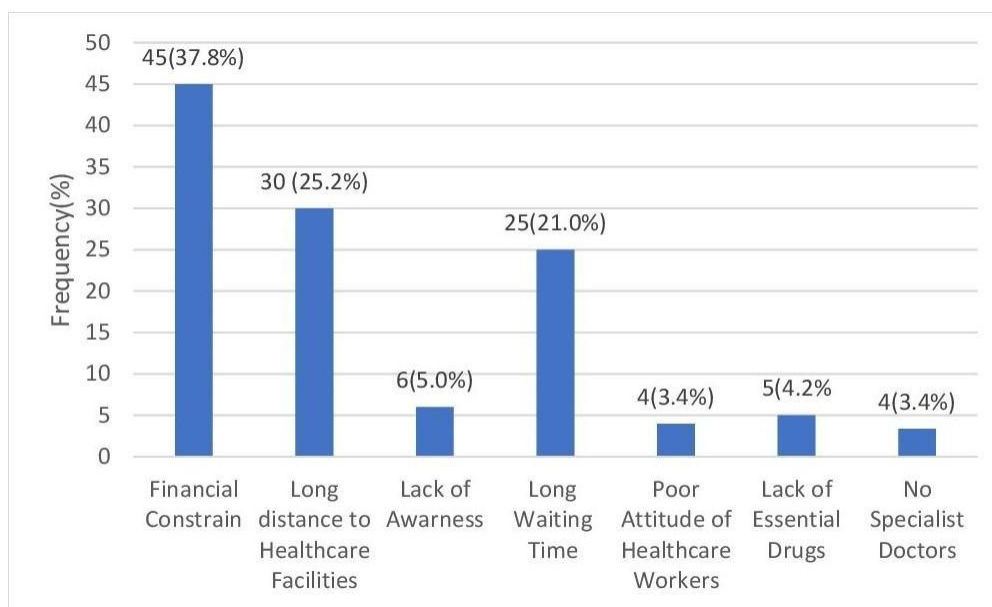


Figure 1: Challenges faced with caring for the child (multiple responses)

Additionally, more than half of the children and adolescents lived more than 30 minutes away from a healthcare facility. Extended distance and travel times are well-documented barriers to effective chronic disease management. Khan *et al.*⁷ demonstrated that even in the presence of comprehensive medical care, SDoH factors such as prolonged travel distance to specialised clinics significantly increase acute care utilisation and hospitalisation rates among young children with SCD. This underscores that proximity to care is a critical determinant of health outcomes; excessive geographical distance frequently delays care-seeking behaviour during acute vaso-occlusive or infectious episodes, subsequently worsening clinical outcomes.

Furthermore, challenges experienced by caregivers in this study included financial constraints, long distances, and lengthy clinic wait times, with most reporting waiting 1 to 2 hours to see a doctor. This delay is likely exacerbated by the high rate of emigration among medical and health workers, otherwise known as the "Japa" phenomenon. This severe 'brain drain' of Nigerian healthcare professionals migrating abroad leaves health facilities understaffed.^{25, 26} High medication costs also restrict routine drug adherence, reflecting the extensive financial and logistical challenges previously documented among informal caregivers in African hospital settings.^{17, 27}

Paradoxically, despite these institutional hurdles, many caregivers still rated the healthcare system as "good" or "excellent," likely reflecting an appreciation for the clinical expertise rather than the infrastructure. Overall, the findings of this study are largely consistent with existing literature, reinforcing the critical role of social determinants, especially housing, socioeconomic status, and healthcare access, in shaping outcomes among children with SCD. However, the study also contributes context-specific

insights, particularly regarding the interplay between environmental conditions and healthcare utilisation in a semi-urban Nigerian setting. These findings underscore the need for integrated interventions that go beyond clinical care to address the broader social context in which children with SCD live.

Conclusion

Housing conditions and healthcare access were significant social determinants associated with hospitalisation among children and adolescents with SCD in this study. Improving living conditions, expanding health insurance coverage, and strengthening access to timely, affordable healthcare may help reduce disease burden and improve outcomes in this population.

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