

Assessment of the Causes and Outcomes of Hospitalization in Children with Sickle Cell Disease at Jaramogi Oginga Odinga Teaching and Referral Hospital

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Background

Context:

- Sickle cell disease (SCD) is a major cause of childhood morbidity and mortality in sub-Saharan Africa, with 75% of global cases.

Why the study was done:

- High hospitalization rates in Kenya, particularly in western regions, but limited data on causes and outcomes of hospitalization in children with SCD at JOOTRH.

Aim:

- To assess the causes and outcomes of hospitalization in children with SCD at JOOTRH and explore associations between causes and outcomes.

Methods

Study design:

- Descriptive cross-sectional study that made use of secondary data obtained from electronic databases, diagnostic test results, and notes from health service providers.

Study setting:

- JOOTRH, a major referral hospital in western Kenya.

Participants:

- Medical records of children with SCD admitted into the pediatric ward of JOOTRH from January to December 2021.
- Inclusion criteria: Children with SCD admitted to JOOTRH pediatric ward during the study period.
- Exclusion criteria: Children without SCD, incomplete medical records, or admissions outside the study period.

Sample size:

- 139 patient files from a population of 217 as determined by the Cochran formula for finite populations.

Analysis:

- Primary outcomes: Causes of hospitalization, length of stay, and clinical outcomes (discharge or death).
- Statistical tests: Descriptive statistics, Chi-square test for associations ($p < 0.05$).

Ethical considerations:

- Ethical approval was obtained from Maseno University Scientific and Ethics Review Committee (MSU/DRPI/MUSERC/01108/22).
- Parents or guardians consent to the use of their children's medical records for research on admission in the JOOTRH pediatric ward. Therefore, no new consent was sought.

Table 1: sociodemographic characteristics of children hospitalized with SCD	
Characteristic	n = 139 n (%)
Age	
Mean (SD)	4.2 (3.2)
<5 years	88 (63.3%)
5-12 years	51 (36.7%)
Gender	
Male	69 (49.6%)
Female	70 (50.4%)

Results

Participants:

- During the study period, a total of 2201 children were hospitalized in the pediatric ward at JOOTRH out of which 217 had SCD. This represents 9.9% of the total admissions.
- The medical files of 161 children hospitalized with SCD during the study period were reviewed. Of these, 22 were excluded due to incomplete data.

Descriptive data:

- Of the 139 patients whose medical files were included in the study, 69 (49.6%) were male, and 70 (50.4%) were female.
- Their ages ranged from 1 month to 12 years, with a mean age (\pm SD) of 4.2 \pm 3.2 years. The majority of them 88 (63.3%) were <5 years.
- Of the 139 patients whose medical files were included in the study, 7 of them were hospitalized twice during the study period resulting in 146 hospitalization events.
- VOC was the most common cause of hospitalization with 57 (39%) hospitalization events, followed by infections with 46 (31.5%) hospitalization events, and acute anemia with 18 (12.3%) hospitalization events.
- Malaria was the most common infection causing hospitalization with 18 (12.3%) hospitalization events, followed by sepsis with 14 (9.6%) hospitalization events.

Outcome data:

- Majority of the respondents (66.4%) were discharged whereas a few of them (33.6%) died in the course of hospitalization.
- The length of hospitalization ranged from 1 to 35 days, with a median length of hospitalization of 5 days.
- The majority of the respondents (63.7%) were hospitalized for less than 7 days while the remainder (36.3%) were hospitalized for 7 days or more.

Associations

- Causes of hospitalization were significantly associated with length of stay ($p = 0.009$) and clinical outcomes ($p < 0.001$).

Table 2: association between causes and outcomes of hospitalization in children with SCD								
Hospitalization Outcomes	Causes of Hospitalization n = 146					Total	Chi square value	p<0.05
	Vaso-occlusive crisis n (%)	Infections n (%)	Acute anemia n (%)	Acute chest syndrome n (%)	Others n (%)			
Length of hospitalization								
<7 days	44 (47.3%)	30 (32.3%)	9 (9.7%)	8 (8.6%)	2 (2.2%)	93 (100%)	14.950	0.005
7-35 days	13 (24.5%)	16 (30.2%)	9 (17.0%)	7 (13.2%)	8 (15.1%)	53 (100%)		
Total	57 (39.0%)	46 (31.5%)	18 (12.3%)	15 (10.3%)	10 (6.8%)	146 (100%)		
Clinical outcomes								
Discharge	49 (50.5%)	29 (29.9%)	12 (12.4%)	4 (4.1%)	3 (3.1%)	97 (100%)	26.581	<0.001
Death	8 (16.3%)	17 (34.7%)	6 (12.2%)	11 (22.4%)	7 (14.3%)	49 (100%)		
Total	57 (39.0%)	46 (31.5%)	18 (12.3%)	15 (10.3%)	10 (6.8%)	146 (100%)		

Table 3: outcomes of hospitalization in children with SCD	
Characteristic	n = 146 n (%)
Clinical outcome	
Discharge	97 (66.4%)
Death	49 (33.6%)
Length of hospitalization	
Median	5
<7 days	93 (63.7%)
7-35 days	53 (36.3%)

Interpretation

General interpretation:

- The results indicate that SCD is a prevalent condition among children hospitalized at JOOTRH.
- VOC, infections, and acute anemia are the most common causes of hospitalization in children with SCD at JOOTRH.
- Most children hospitalized with SCD at JOOTRH have a short length of hospitalization but the fatality rate is high.
- The length of hospitalization and clinical outcomes of children hospitalized with SCD at JOOTRH are dependent on the causes of hospitalization.

Strengths:

- First study looking into the causes and outcomes of hospitalization in children with SCD at JOOTRH.
- It provides empirical data on the prevalence of SCD among hospitalized children at JOOTRH, which contributes to the body of evidence on the burden of SCD in the Western region.
- It adds to the theoretical framework on the clinical manifestations and complications of SCD by identifying the most common causes of hospitalization in children hospitalized with SCD.
- The association between the causes and outcomes of hospitalization provides theoretical insights into the prognostic factors for children with SCD.

Limitations

- Reliance on secondary data (potential recall bias).
- Single-center study limits generalizability.
- No follow-up data on long-term outcomes.

Global health implications:

- Findings underscore the need for targeted interventions (e.g., pain management, infection prevention, hydroxyurea therapy) in resource-limited settings.
- Policy recommendations: increase funding for SCD-specific treatments and diagnostic facilities in resource-limited settings.

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