

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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