

Opioid-Dependent Sickle Cell Disease and Emergency Department Utilization at IBHOH

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Abstract

Background: Sickle cell disease (SCD) is an inherited condition affecting hemoglobin, marked by recurrent painful episodes known as vaso-occlusive crises (VOCs), which frequently necessitate acute intervention in the emergency department (ED). While intravenous opioids are the primary treatment for VOCs, some patients may develop a dependency, resulting in regular, non-urgent visits to the ED even when they are not experiencing clinical crises. This trend significantly strains acute care resources, skews performance metrics, and pressures conventional emergency care delivery models.

Aim:

1. To analyze the trend of recurrent emergency department (ED) utilization by opioid-dependent sickle cell disease (SCD) patients over time.
2. To evaluate the operational burden associated with high-frequency ED visits and assess the impact of implementing an 8-hour intravenous morphine administration policy.
3. To explore the implications for developing sustainable multidisciplinary outpatient care strategies to reduce ED dependency and improve patient outcomes.

Methods: This retrospective observational study reviewed the ER utilization patterns of opioid-dependent adult SCD patients at Ibrahim Bin Hamad Obaidullah Hospital (IBHOH), Ras Al Khaimah, over 15 months from January 2024 to March 2025. Inclusion criteria were daily or near-daily visits for intravenous morphine without documented crises or significant pain, and non-attendance of outpatient psychiatry or pain management services. Patients younger than 13 years, those requiring inpatient admission for acute complications, or those receiving non-opioid-based pain management were excluded. **All data were validated and verified through official emergency department logs and hospital medical records.** Monthly visit counts and 48-hour return rates were analyzed per patient. A policy implemented in October 2024 limiting opioid access to every 8 hours was used as a temporal intervention point.

Results: Over 15 months, **10 opioid-dependent SCD patients generated 9,108 ED visits**, representing **10.8%–14.8% of total ED attendance**. The 8-hour morphine restriction policy did not reduce visit volume (**622 vs. 629 visits/month pre- and post-policy**) but improved temporal distribution of visits. All visits met criteria for 48-hour revisits, limiting the usefulness of this quality indicator. Peak utilization resulted in approximately **292 hours of clinical staff time** and **234 hours of bed occupancy** per month.

Conclusion: Opioid-dependent sickle cell disease patients generated substantial recurrent emergency department utilization despite implementation of an 8-hour morphine restriction policy. Multidisciplinary outpatient management may help reduce emergency department reliance, while conventional quality indicators such as 48-hour revisit rates should be interpreted cautiously in this population.

Keywords: Sickle cell anemia, opioid-seeking behavior, emergency department management, alternative pain management, healthcare resource utilization, protocol enforcement.

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Introduction

Sickle cell disease (SCD) is an inherited

hemoglobin disorder caused by a mutation in the β -globin gene that results in the production of hemoglobin S. Under conditions of hypoxia or physiological stress, hemoglobin S polymerizes, causing red blood cells to become rigid and assume a sickled shape. These abnormal cells contribute to microvascular occlusion, tissue ischemia, and progressive organ damage. Acute painful episodes,

known as vaso-occlusive crises (VOCs), are the most common clinical manifestation of SCD and represent a major cause of emergency department (ED) visits and hospital admissions.^{1,2}

Management of VOCs is multimodal and may include hydration, non-opioid analgesics such as nonsteroidal anti-inflammatory drugs (NSAIDs), and opioid therapy according to pain severity. Opioids, particularly intravenous morphine, remain a cornerstone of treatment for moderate to severe VOCs, and international guidelines recommend their prompt administration to achieve adequate pain control and reduce complications and complications related to hospital admissions.³

However, chronic opioid use in some adults with SCD presents an important healthcare challenge. Repeated exposure to opioids and frequent healthcare utilization may contribute to opioid dependence, persistent healthcare-seeking behavior, and recurrent ED attendance beyond acute vaso-occlusive events. A subset of patients becomes reliant on the ED as a primary source of opioid therapy despite the absence of objective evidence of an acute crisis.⁴ In many healthcare settings, this pattern places considerable strain on emergency services and highlights the need for integrated multidisciplinary outpatient care involving hematology, pain management, psychiatry, and addiction medicine.⁴

This trend is growing at IBHOH in Ras Al Khaimah among adults aged 26–43 years. These patients often visit the ED as frequently as three times daily, requesting 10 mg of intravenous morphine per visit. Although opioid therapy was initially administered in accordance with standard management protocols for documented vaso-occlusive crises, many subsequent presentations lacked objective clinical evidence of an acute VOC. Most of these visits were classified as ESI level 4 or 5, indicating low-acuity presentations. Even when offered inpatient admission, these individuals typically declined hospitalization. To address this issue, IBHOH arranged repeated referrals to psychiatry and pain management services for assessment of opioid use disorder and long-term pain management; however, none of the patients attended these appointments and instead continued to rely on the ED for opioid administration.⁵

Before October 2024, these patients arrived unexpectedly throughout the day, causing workflow interruptions and excessive emergency department resource utilization. In October 2024, a new hospital policy was implemented, restricting morphine

administration to once every 8 hours unless a clinically documented crisis or significant pain was present. This initiative aimed to improve care efficiency, reduce staff burden, and preserve emergency capacity. A particularly troubling consequence of this pattern is the elevated rate of return visits within 48 hours. Worldwide, 48-hour ED returns are a vital quality metric to assess the effectiveness of initial management and discharge decisions 6,7.

In numerous emergency department quality frameworks, the 48-hour revisit rate serves as a crucial performance indicator (KPI) for assessing diagnostic precision, treatment effectiveness, and service quality. Elevated 48-hour return rates often indicate possible shortcomings in initial clinical evaluations, inappropriate management decisions, or poor discharge planning. However, among certain high-frequency patient groups, such as those with opioid-dependent SCD, higher revisit rates might not signify actual service failures but could instead reflect behavioral trends associated with opioid dependency and unmet outpatient care needs. Recognizing this difference is vital for a precise assessment of ED performance, ensuring that institutional metrics genuinely represent service quality instead of being distorted by frequent, non-urgent visits 8.

When recurrent ED revisits occur without clear clinical justification, they can significantly distort the perceived quality of care, even when protocols are followed appropriately and referrals to outpatient services are made according to best practice guidelines. Frequent low-acuity revisits artificially inflate performance metrics, trigger unnecessary

audits, consume valuable staff time, strain limited resources, and displace urgent cases, cumulatively contributing to staff fatigue and burnout 9. Despite the operational significance of this issue, Focused research evaluating the specific effects of opioid-dependent SCD patients on IBHOH ED operations is still lacking, as it is the primary ED handling these cases. Addressing this gap, the present study investigates trends in recurrent ED utilization among opioid-dependent SCD patients over 15 months, examines the operational burden associated with high-frequency attendance, assesses the influence of an intravenous morphine policy intervention that limits administration to once every eight hours, and considers strategic recommendations to support the development of multidisciplinary outpatient pathways aimed at reducing ED dependency and improving long-term patient outcomes.

1. Methodology:

This retrospective observational study was conducted at IBHOH, a 200-bed public care facility in Ras Al Khaimah, United Arab Emirates. IBHOH's high-volume emergency department operates 24/7 and receives significant visits from adult SCD patients. The study reviewed emergency department utilization patterns over 15 months, from January 2024 to March 2025.

2.1 Inclusion Criteria

- Age ≥ 13 years.
- Confirmed diagnosis of sickle cell disease.
- Daily or near-daily ED visits for intravenous morphine 10 mg IV per visit.
- No documented clinical or laboratory signs of an acute VOC.
- Refusal of inpatient admission.

- Documented non-attendance of outpatient psychiatric or pain management services.

2.2 Exclusion Criteria

- Patients under 13 years of age
- SCD patients with acute medical complications requiring inpatient admission
- Patients receiving non-opioid analgesia only
- Records with incomplete or unverified data

2.3 Data Collection and Validation

Patient data were extracted from official emergency department logs and the hospital's electronic medical records system. For each patient included in the study, we documented and validated monthly visit counts, morphine administrations, and 48-hour return visits. Additionally, we reviewed the Emergency Severity Index (ESI) triage levels and documentation related to pain or clinical crises. A hospital policy implemented in October 2024 that restricted morphine administration to once every 8 hours—unless a clinical crisis was confirmed—served as a temporal intervention point for comparative analysis.

2.4 Data analysis

Quantitative data collected on ED utilization, including monthly visit counts and associated time metrics, were compiled using Microsoft Excel and subsequently analyzed using Python (version 3.10). The pandas library was employed for data cleaning, aggregation, and tabular structuring, while matplotlib was used to generate descriptive visualizations, including monthly visit trends and estimated clinical resource burden.

Visit volumes were assessed monthly and daily adjusted. Operational burden was calculated per visit using standardized time allocations: 2 minutes for registration, 20 minutes for nursing care, 15 minutes

for physician assessment and documentation, and 30 minutes for bed occupancy. These values were extrapolated across the total monthly visits to estimate the cumulative workload in hours.

2.5 Ethical Considerations

All data underwent anonymization before analysis to ensure patient confidentiality. The research adhered to international research standards and Emirates Health Services (EHS) ethical guidelines. Ethical approval was secured from the IBHOH Clinical Governance and Ethics Committee.

2. Results:

3.1. Emergency Department Utilization Volume

Over the 15 months from January 2024 to March 2025, a total of 9,108 emergency department (ED) visits were recorded among 10 adult patients with confirmed sickle cell disease (SCD) and documented opioid dependence. The cohort consisted of young adults aged 26–43 years with no major non-SCD comorbidities. However, several patients had chronic SCD-related complications, particularly avascular necrosis, and three had previously undergone multiple joint replacement surgeries. Although many patients reported follow-up at tertiary hematology centers outside our healthcare system, details on disease-modifying therapies, including hydroxyurea use and treatment adherence, were unavailable for verification. These visits were overwhelmingly non-urgent, classified as Emergency Severity Index (ESI) levels 4 or 5, and were primarily motivated by repeated requests for intravenous morphine (10 mg

per visit) in the absence of clinically documented vaso-occlusive crises (VOC).

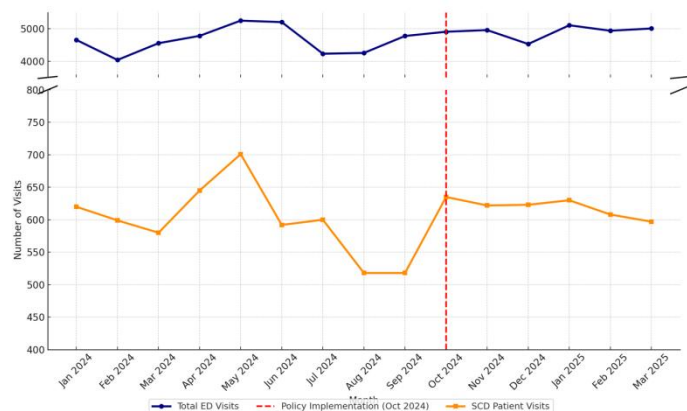
Monthly visit frequencies for the cohort ranged from 518 to 701, with a mean (arithmetic average) of 607.2 visits per month. The highest monthly count was observed in May 2024 (701 visits), while the lowest occurred in August and September 2024 (518 visits each). The total ED census ranged between 4,039 and 5,250 monthly visits during the same period. Accordingly, this small cohort accounted for 10.84% to 14.83% of monthly ED visits, representing a significant operational burden disproportionate to their number. Morphine administration policy in October 2024, indicated by the vertical dashed line in Figure 1, did not substantially alter the overall visit volume.

Table 1. Monthly Emergency Department Visits, Sickle Cell Disease (SCD) Patient Visits, and Percentage of Total ED Visits (January 2024 – March 2025)

Month	Total ED Visits	SCD Visits	Percentage of Total ED Visits (%)
Jan 2024	4656	620	13.32%
Feb 2024	4039	599	14.83%
Mar 2024	4555	580	12.73%
Apr 2024	4781	645	13.49%
May 2024	5250	701	13.35%
Jun 2024	5204	592	11.38%
Jul 2024	4231	600	14.18%
Aug 2024	4255	518	12.18%
Sep 2024	4777	518	10.84%
Oct 2024	4908	635	12.94%
Nov 2024	4959	622	12.54%
Dec 2024	4530	623	13.75%
Jan 2025	5107	630	12.34%

Feb 2025	4939	608	12.31%
Mar 2025	5008	597	11.92%

Figure 1. Monthly Total ED Visits and SCD Patient Visits with Corrected Scales (January 2024 – March 2025)



was characterized by frequent daily visits, often occurring closely together (e.g., visits in the morning, afternoon, and evening). This created significant time-sensitive congestion in the ED, particularly during shift changes and busy service hours. Since the policy change, staff have observed better spacing between visits, although the overall daily volumes have remained unchanged.

3.3. Return Visits Within 48 Hours

All 10 patients showed a consistent pattern of high-frequency emergency department (ED) usage, qualifying every visit as a return visit within 48 hours of their last visit. As a result, the 48-hour revisit metric proved non-discriminatory and ineffective as a key performance indicator (KPI) for this patient subgroup, leading to a misrepresentation in institutional performance reporting.

3.4. Impact of the October 2024 Policy

In October 2024, a new hospital policy restricted intravenous morphine administration to every 8 hours, unless clear documentation of acute VOC was provided. An analysis conducted after implementing the policy indicated a slight rise in average monthly visits, with 629 visits per month post-policy compared to 622 pre-policy. However, qualitative feedback from ED staff pointed out that the policy successfully balanced patient visits throughout the day, reducing visit clustering and improving operational efficiency. While overall visit counts did not decrease, the intervention facilitated a better temporal distribution and enhanced management of clinical workloads.

3.5. Operational and Time Burden

Each ED visit of SCD patients in the study approximately required the allocation of:

3.2. Visit Frequency and Temporal Clustering

After considering the varying number of days each month, the average daily visit rate fluctuated between 16.7 and 22.6 visits per day, with May 2024 marking the peak. Before the intervention, patient behavior

2 minutes for registration, 15 minutes of nursing time, 10 minutes of physician time, and 20 minutes of bed occupancy

This amounts to 0.25 hours of nursing time, 0.166 hours of physician time, and 0.3 hours of bed occupancy on a per-visit basis. The overall impact of recurrent, non-urgent opioid-seeking visits was significant. In May 2024, the month with the highest volume, the cumulative service burden totaled:

- 175.25 hours of nursing time
- 116.83 hours of physician time
- 292.08 hours of total clinical staff time
- 233.67 hours of bed occupancy

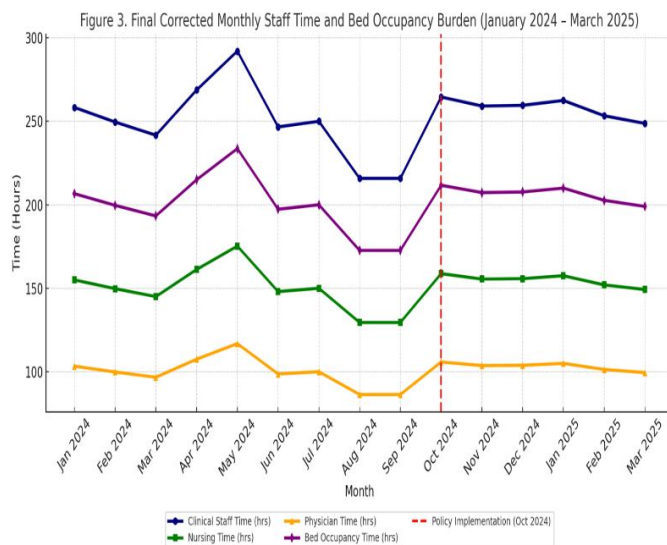


Table 1. Monthly ED Visit and Staff Time Burden for 10 Opioid-Dependent SCD Patients

Month	Visits	Physician Time (hrs)	Nursing Time (hrs)	Clinical Staff Time	Bed Occupancy (hrs)
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				(hrs)	
Jan 2024	620	103.33	155.0	258.33	206.67
Feb 2024	599	99.83	149.75	249.58	199.67
Mar 2024	580	96.67	145.0	241.67	193.33
Apr 2024	645	107.5	161.25	268.75	215.0
May 2024	701	116.83	175.25	292.08	233.67
Jun 2024	592	98.67	148.0	246.67	197.33
Jul 2024	600	100.0	150.0	250.0	200.0
Aug 2024	518	86.33	129.5	215.83	172.67
Sep 2024	518	86.33	129.5	215.83	172.67
Oct 2024	635	105.83	158.75	264.58	211.67
Nov 2024	622	103.67	155.5	259.17	207.33
Dec 2024	623	103.83	155.75	259.58	207.67
Jan 2025	630	105.0	157.5	262.5	210.0
Feb 2025	608	101.33	152.0	253.33	202.67
Mar 2025	597	99.5	149.25	248.75	199.0

Figure 3. Estimated Monthly Staff Time and Bed Occupancy Burden (January 2024 – March 2025)

3. Discussion:

This study highlights the significant operational and clinical burden imposed by a small cohort of opioid-dependent patients with sickle cell disease (SCD) on emergency department services. During the 15-month study period, 10 adult patients generated 9,108 emergency department visits, accounting for

approximately 10.8%–14.8% of all monthly ED visits at IBHOH. Most presentations were classified as low acuity (ESI 4 or 5) and involved requests for intravenous morphine in the absence of documented vaso-occlusive crises or other objective indications for emergency care. Despite their small number, these patients consumed a substantial proportion of emergency department resources, including physician time, nursing care, and bed occupancy.

The trend of frequent, non-urgent ED visits is not exclusive to IBHOH. Comparable patterns have been observed globally, where patients with SCD and opioid dependence or opioid use disorder (OUD) show disproportionately high rates of ED utilization and hospital admissions ^{1,10}. The operational strain is considerable; during peak months, these 10 patients required over 290 hours of clinical staff time and more than 230 hours of bed occupancy. This scenario redirects resources from more acutely ill patients, exacerbates staff fatigue, and causes workflow disruptions. Despite multiple referrals to psychiatry and pain management clinics, none of the patients in this study utilized outpatient services, instead relying on the ED for their primary opioid therapy ¹¹. This pattern underscores a significant gap in the care continuum for SCD patients with OUD, highlighting not only the insufficiency of outpatient pain management systems but also the complex psychosocial challenges, including stigma and mistrust, that this population often encounters ¹².

Following implementation of the October 2024 policy restricting intravenous morphine administration to once every eight hours unless a vaso-occlusive crisis was documented, the overall volume of emergency department visits remained largely unchanged. However, staff observed a more even temporal distribution of visits, with less

clustering during peak periods and improved workload distribution across shifts. These findings suggest that the policy influenced the timing of presentations rather than reducing overall emergency department utilization. Similar operational benefits have been described following interventions aimed at improving patient flow and workload distribution in emergency departments.¹³ The persistence of high visit volumes despite the intervention highlights the challenges of managing opioid dependence in patients with sickle cell disease and underscores the need for multidisciplinary approaches beyond policy restrictions alone.^{4,14}

The consistently elevated 48-hour revisit rates in this group underscore the shortcomings of employing return visits as a quality measure for opioid-dependent SCD patients. These rates indicate behavioral trends and unmet outpatient requirements, rather than deficiencies in acute care delivery. Similar findings have emerged in other research, illustrating that frequent, non-urgent ED use by SCD patients with OUD skews institutional performance metrics and prompts unwarranted audits ¹⁵.

These findings emphasize the necessity for multidisciplinary, outpatient-focused care models for SCD patients with OUD. Successful pathways must combine the expertise of hematology, psychiatry, addiction medicine, and pain specialists while also considering social determinants of health. Additionally, institutional safeguards for frontline emergency providers and the enhancement of quality indicators to reflect unavoidable ED usage are needed.

Limitations

This study has several limitations that need recognition. Firstly, its retrospective design depends on the accuracy and completeness of electronic medical records, which could introduce information bias. Secondly, it was conducted at a single center, potentially restricting the generalizability of the results to other healthcare environments with diverse patient populations, resource levels, or care models. Thirdly, the research focused exclusively on adult sickle cell disease patients with documented opioid dependence and recurrent emergency department utilization at our institution. Although this cohort represented all eligible patients meeting the study criteria during the study period, the findings may not be generalizable to other sickle cell disease populations or healthcare settings. Lastly, although operational metrics such as staff time and bed occupancy were evaluated, the study did not investigate patient-reported outcomes, satisfaction levels, reasons for declining engagement with outpatient services, or treatment received at external healthcare facilities. Future multicenter, prospective research should seek to address these gaps and validate the findings across different healthcare systems.

4. Conclusion and Recommendations

This study analyzes the recurring patterns of emergency department use among patients with opioid-dependent sickle cell disease. It evaluates the operational strain on the healthcare system, assesses the effects of a focused morphine administration policy, and thoroughly examines the reliability of conventional quality measures like 48-hour revisit

rates. The findings underscore the significant clinical, operational, and systemic hurdles in overseeing a small cohort of high-frequency, low-acuity patients within the emergency environment. Although there was a brief enhancement in workload distribution after the policy was implemented, the overall emergency department utilization stayed elevated, highlighting the intricate and deeply rooted nature of opioid dependency behaviors in this group.

Recommendations:

1. Establish multidisciplinary outpatient care for opioid-dependent SCD patients.
2. Review ED performance indicators for high-frequency users.
3. Strengthen outpatient follow-up and patient engagement.
4. Conduct multicenter research to validate these findings.
5. Reduce reliance on emergency departments through outpatient care pathways.

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