






Diverging pathways: exploring the interplay between hospital readmission and postdischarge mortality in paediatric sepsis in low-income settings

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ABSTRACT

Background Mortality and readmission rates are high in low-income countries following hospital discharge; however, few studies have studied the relationship between these outcomes. Hospital readmission is a complex outcome as it reflects illness severity and health-seeking behaviour. This study aims to better understand the heterogeneous nature of hospital readmission, especially as it pertains to mortality.

Methods Secondary analysis of a prospective, multisite, observational cohort study included children aged 0–60 months old admitted to hospital with suspected sepsis. We used Fine-Gray models and Cox proportional hazards regression to identify and contrast risk factors for readmission and postdischarge mortality. We also compared the risk ratio of the two outcomes across several domains, including diagnosis, postdischarge time period and study site.

Results Of 6074 children discharged, 376 (6.2%) died, while 1106 (18.2%) were readmitted shortly after discharge. The median time to death and readmission was 28 (IQR: 9–74) and 79.5 (IQR: 30–130) days, respectively. A few patient characteristics, such as prior care seeking and hypoxaemia, were associated with both mortality and readmission. However, other characteristics, such as malnutrition (adjusted HR (aHR): 5.58 (95% CI: 4.20 to 7.43)), HIV (aHR: 1.89 (95% CI: 1.20 to 2.98)) and unplanned discharge (aHR: 3.31 (95% CI: 2.61 to 4.21)), were strongly predictive of postdischarge mortality but not readmission (aSHR: 0.67 (95% CI: 0.56 to 0.81), 0.64 (95% CI: 0.40 to 1.00) and 0.81 (95% CI: 0.67 to 0.98), respectively). The overall rate ratio of readmission to postdischarge mortality was 3.12 (95% CI: 2.77 to 3.50) and increased over time, mostly due to decreasing mortality.

Conclusions Readmission as an outcome measure reflects perceived illness severity, health system capacity and complex healthcare-seeking behaviour. Unlike mortality, readmission is not a reliable surrogate for recurrent illness and should not be used as a primary measure of impact for programmes aiming to improve postdischarge outcomes.

WHAT IS ALREADY KNOWN ON THIS TOPIC

⇒ Hospital readmission of children with acute illness found malnutrition, younger age and previous history of poor health to be the predominant risk factors, and only one multicountry analysis has been conducted thus far.

WHAT THIS STUDY ADDS

⇒ This multisite observational cohort study is the largest prospective study to date to evaluate mortality and readmission after hospital discharge in a low-income country in both rural and urban settings using a wide range of demographic, clinical, social and maternal factors.

HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY

⇒ Findings from this study provide evidence for a need to find other reliable metrics, besides readmission, to reflect postdischarge morbidity, and will also guide clinicians and healthcare workers on ways to provide a smooth transition of care from the hospital to the community.

INTRODUCTION

Childhood deaths globally are disproportionately concentrated in low- and middle-income countries (LMICs), particularly in sub-Saharan Africa and South Asia.¹ In 2020, five million children under 5 years old died due to infectious diseases.¹ Postdischarge mortality is increasingly understood to be a major contributor to overall child mortality, with recent epidemiologic research pointing towards the critical role of malnutrition, disease severity and lower socioeconomic vulnerability in these deaths.^{2–4} While postdischarge readmission may be an important surrogate of ongoing vulnerability, it is also a positive marker of health seeking, suggesting its dual role during the postdischarge period.

A better understanding of the nature of readmissions is essential to both research and policy which aims to improve the hospital-to-home transition and outcomes for children in LMICs.

The causal events leading to hospital readmissions are complex and depend not only on a caregiver's perceived severity of illness, but also on a variety of other factors, including those related to socioeconomic status, geography and the responsiveness of the health system. On one hand, hospital readmission is undesirable as it may indicate poor discharge planning or recurrent illness; alternatively, it can be desirable because it may reflect better health-seeking behaviour. Recent evidence clearly shows that most postdischarge deaths occur in the absence of readmission, implying a substantial number of recurrent illnesses leading to death do not result in readmission.^{3 5 6} This tension between readmission as recurrent illness and better health seeking has important implications for research and policy. Readmission is often considered an appropriate component of a composite outcome alongside mortality to improve the statistical power of clinical trials.⁷ If readmission is used as the common outcome to drive interventional impact, especially in the context of clinical trials conducted in countries where health seeking is poor, then an observed reduction in readmission may actually reflect a reduction in desirable care-seeking behaviour. From a policy and quality of care perspective, hospital readmission metrics, which often are quality of care benchmarks in high-income countries, may be misleading, or even harmful.⁸ Indeed, a recent analysis of the The Childhood Acute Illness & Nutrition Network (CHAIN) study suggested that postdischarge mortality may be decreased by readmissions, whereby facilities with higher readmission rates also observe fewer postdischarge deaths.⁹

The aim of this study is to explore the heterogeneous nature of hospital readmission as it relates to postdischarge mortality by comparing the directionality and effect size of clinical, social and demographic risk factors. A thorough understanding of the nature of postdischarge readmissions is important to inform optimisation of the discharge and postdischarge care processes for children following acute illness.

METHODS

Study design and setting

This study was a secondary analysis of a prospective, multisite, observational cohort study, consisting of two cohorts of children admitted to hospitals in Uganda with suspected sepsis.⁵ The study enrolled participants aged 0 to <6 months and 6–60 months at four hospitals in Uganda: Mbarara Regional Referral Hospital (Mbarara RRH), Holy Innocents Children's Hospital (HICH), Masaka Regional Referral Hospital (Masaka RRH) and Jinja Regional Referral Hospital (JRRH). There were two additional sites for children under 6 months at Villa Maria Hospital (VMH) and Uganda Martyrs Hospital

(UMH). These facilities are a mix of both public (free facility care) and private not-for-profit (subsidised care associated with fees) serving catchments of 30 districts with a population of approximately 8.2 million individuals, including approximately 1.4 million children under 5 years. Enrolment of participants at all four hospitals began in July–November 2017 and ended in April–July 2019 for 6–60 months, and from January–March 2018 to March–April 2020 for 0–6 months. The enrolment periods for VMH and UMH were from November 2018 to February 2020 and from March 2019 to March 2020, respectively. Participants were followed up for 6 months after index discharge. The primary outcome of this analysis was the first readmission to any type of health-care facility during follow-up. This article adheres to the guidelines for Strengthening the Reporting of Observational Studies in Epidemiology.¹⁰

Participants

Children under the age of 5 admitted to the hospital with confirmed or suspected infection were enrolled into the study. Those who resided outside the hospital catchment area or who were admitted for a short-term observation period (<24 hours), trauma or immediately after birth (ie, without first being discharged home) were excluded. A full list of inclusion and exclusion criteria is outlined in online supplemental table S1. Written informed consent was obtained from the parent or legal guardian of all study participants. Scheduled study follow-up was at 2, 4 and 6 months after discharge.

Data collection and measurement

All data collection tools are available through the Smart Discharges study dataverse.^{11 12} All data were collected at the point of care with encrypted study tablets and subsequently uploaded to a Research Electronic Data Capture database hosted at the BC Children's Hospital Research Institute (Vancouver, BC, Canada).¹³ Studies of both cohorts were conducted by the same investigative team and research staff, following the same protocol, such as frequency and duration of follow-up.

At index admission, trained study nurses systematically collected data on clinical variables, sociodemographic variables and baseline characteristics. Clinical data included anthropometry (to establish malnutrition status), vital signs, simple laboratory variables (eg, glucose, malaria rapid diagnostic test (RDT), HIV RDT, haematocrit and lactate), clinical signs and symptoms, comorbidities and healthcare history, including previous hospital admissions. Sociodemographic variables and baseline characteristics included maternal and household details, such as maternal age, education, HIV status, distance of home from facility, household size, use of bed-nets and the availability of clean drinking water. Information on sex was extracted from medical records. At discharge, study nurses also obtained feeding status (subjectively defined as feeding well or feeding poorly) and discharge status. Discharge status was categorised as

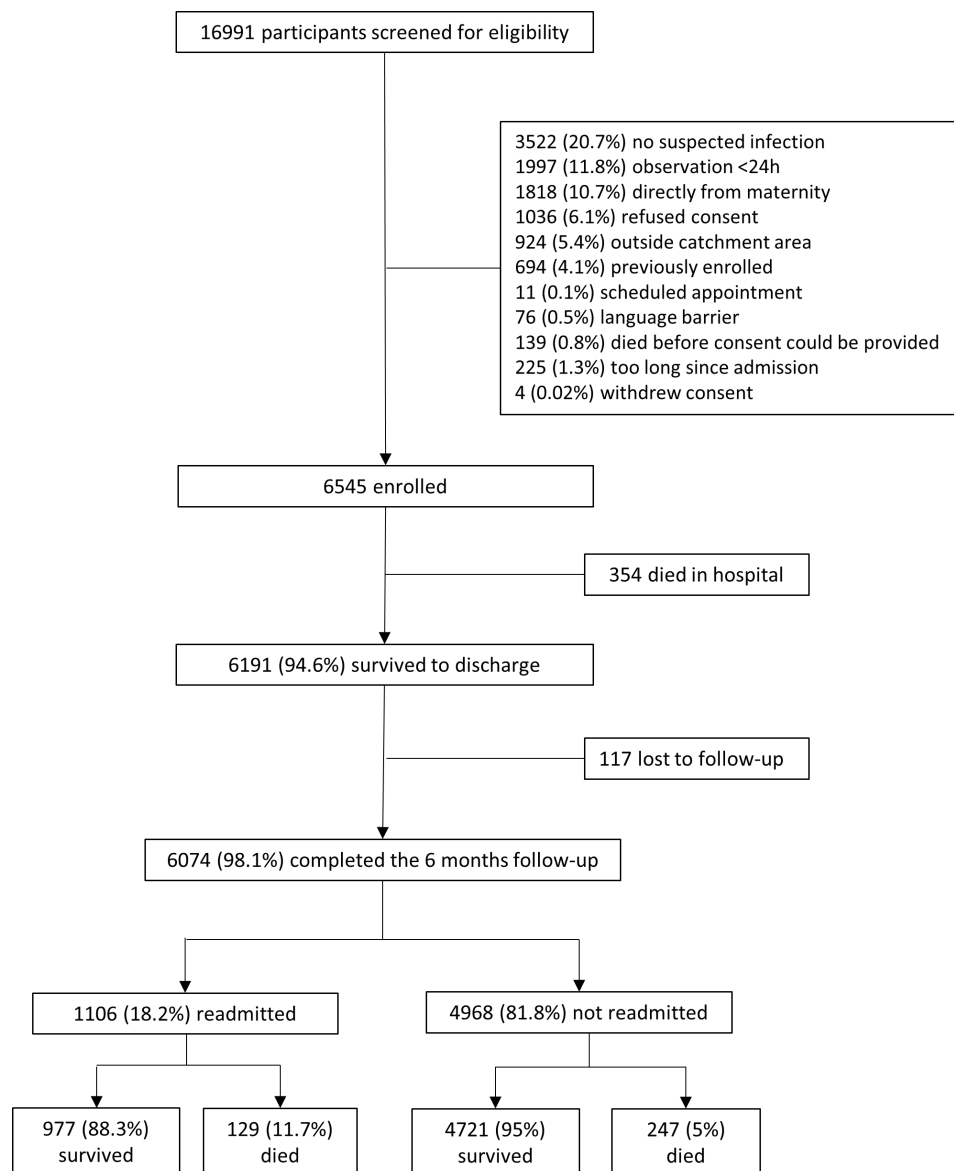


Figure 1 Participant flowchart.

(1) routine discharge, (2) referral to a higher level of care and (3) unplanned discharge (discharge against medical advice). The discharge diagnosis was abstracted from the medical record. As the primary outcome of this analysis is readmission after index discharge, field officers collected data on readmission at 2 and 4 months after discharge by telephone and at 6 months after discharge in person. Date and location of readmission were obtained for up to two episodes of readmission along with any health-care seeking after discharge and postdischarge mortality details.

Statistical analysis

The sample size was previously determined based on the primary goal of developing prediction models for postdischarge mortality.¹⁴ Descriptive statistics were conducted to summarise baseline characteristics and clinical, social/maternal and discharge variables, stratified by readmission status using median with IQRs for

continuous variables and counts with percentages for categorical variables. χ^2 and Mann-Whitney U tests were done for continuous and categorical variables, respectively, to compare the aforementioned variables between the two groups. To examine the relationship between postdischarge mortality and readmission, the ratio of the two outcome rates was calculated by health conditions, postdischarge time period and sites with rates based on events per 1000 child-months from date of index discharge.

To assess clinical and sociodemographic factors associated with hospital readmission, we used the Fine-Gray competing risk regression model to calculate sub-distribution HRs while adjusting for age, sex and site. A separate Cox proportional hazards regression model using the same set of covariates was conducted for post-discharge mortality to compare adjusted (sub) HRs (a(S) HRs) between the two outcomes.

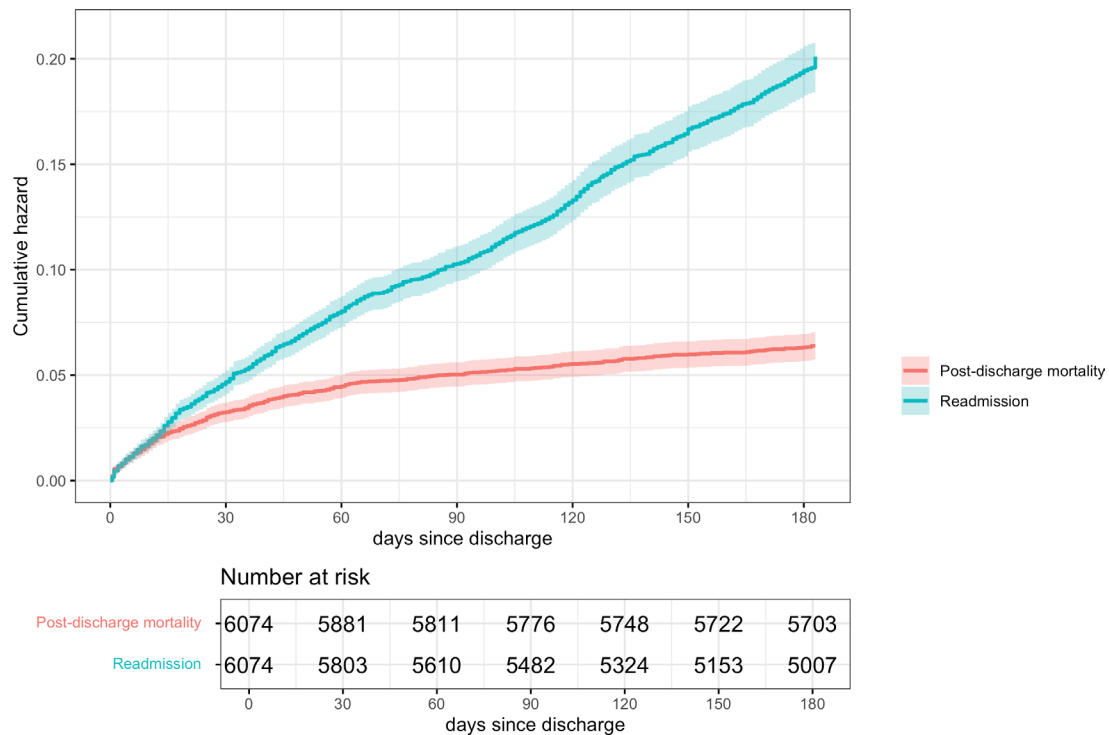


Figure 2 Hazard curves for cumulative incidents of hospital readmission and postdischarge mortality.

Missing data were low and imputed using k-nearest neighbours. Analyses were conducted in Stata/MP V.15.0, R V.4.5.1 and RStudio V.2023.6 (RStudio, Boston, Massachusetts, USA).

RESULTS

Over the study period, 16991 children were screened for eligibility, of whom 6545 were enrolled (figure 1). Of these, 354 (5.4%) died in hospital, and a further 117 (1.9%) were lost to follow-up after discharge, leaving 6074 discharged children with 6 months of follow-up available for analysis. Among the 6074 discharged children included in this analysis, 376 (6.2%) died, 1106 (18.2%) were readmitted at least once and 1353 (22.3%) experienced either death and/or readmission during the 6-month follow-up period (figure 2, online supplemental table S2). The median time to hospital readmission and mortality was 79.5 (IQR: 30–130) days and 28 (IQR: 9–74) days, respectively. The cohort enrolled more males than females (55.8%), two-thirds (66.3%) had sought care for their illness previously, approximately 13.5% of enrolled children were severely underweight (weight-for-age Z-score <-3), 17.8% were in respiratory distress at admission and 8.3% had an abnormal Blantyre Coma Scale score (table 1). The most common discharge diagnoses were pneumonia (31.2%), sepsis (28.6%), malaria (21.4%) and gastroenteritis (15.5%) (online supplemental table S3).

There was a substantial difference in prediction performance between risk of readmission compared with mortality, with risk factors for readmission generally being closer to the null than risk factors

for mortality (figure 3, online supplemental table S4 and figures S1–S4). Several clinical features, such as hypoxemia (aSHR 1.16 (95% CI: 0.98 to 1.37) vs aHR 1.83 (95% CI: 1.43 to 2.35)), respiratory distress (aSHR 1.12 (95% CI: 0.96 to 1.30) vs aHR 1.43 (95% CI: 1.13 to 1.82)) and delayed capillary refill time (aSHR 1.12 (95% CI: 0.93 to 1.35) vs aHR 1.51 (95% CI: 1.13 to 2.03)), showed weak association with readmission while being strongly associated with mortality. Rather than merely blunted risk estimates, several risk factors had opposing effect estimates, each being statistically significant in its own direction. A very low mid-upper arm circumference (MUAC) strongly predicted mortality (aHR 5.58 (95% CI: 4.20 to 7.43)) but was also strongly associated with not being readmitted (aSHR 0.67 (95% CI: 0.56 to 0.81)). Similarly, both maternal HIV and a positive HIV RDT were highly predictive of mortality (aHR 1.46 (95% CI: 1.04 to 2.05) and aHR 1.89 (95% CI: 1.20 to 2.98), respectively) while also being ‘protective’ against readmission, with aSHR of 0.73 (95% CI: 0.56 to 0.95) and 0.64 (95% CI: 0.40 to 1.00), respectively. Compared with the youngest cohort of less than 2 months, those older than 6 months were less likely to die postdischarge (aHR range: 0.64–0.72) but more likely to be readmitted (aSHR range: 1.80–1.82).

Both mortality and readmission rates were highest during the first month, declining thereafter. However, the magnitude of the decline in mortality was much more rapid compared with readmissions. The readmission mortality rate ratio increased from 1.46 (95% CI: 1.22 to 1.75) readmissions per death in the first

Table 1 Comparison of clinical risk factors by 6-month readmission status

	All participants (N=6074)	No readmission (n=4968)	At least one readmission (n=1106)
Baseline characteristics			
Male sex	3387 (55.8)	2783 (56.0)	604 (54.6)
Age (years)*	0.8 (0.2–1.6)	0.7 (0.2–1.6)	0.9 (0.4–1.8)
<2 months	1382 (22.8)	1219 (24.5)	163 (14.7)
2–6 months	1097 (18.1)	887 (17.9)	210 (19.0)
>6–24 months	2426 (39.9)	1932 (38.9)	494 (44.7)
>24 months	1169 (19.2)	930 (18.7)	239 (21.6)
Admission clinical assessment variables			
MUAC*†	130 (115–144)	130 (113–143)	133 (120–145)
<110/<115	1195 (19.7)	1031 (20.8)	164 (14.8)
110–120/115–125	1110 (18.3)	919 (18.5)	191 (17.3)
>120/>125	3769 (62.1)	3018 (60.8)	751 (67.9)
Weight for age Z-scores	–1.0 (–2.1 to –0.02)	–1.0 (–2.1 to –0.01)	–1.0 (–2.1 to –0.1)
<–3	818 (13.5)	668 (13.5)	150 (13.6)
–3 to –2	836 (13.8)	679 (13.7)	157 (14.2)
>–2	4420 (72.8)	3621 (72.9)	799 (72.2)
How long since last admission*			
Never	4078 (67.2)	3472 (69.9)	606 (54.8)
<1 month	679 (11.2)	494 (9.9)	185 (16.7)
1 month to 1 year	1043 (17.2)	775 (15.6)	268 (24.2)
>1 year	274 (4.5)	227 (4.6)	47 (4.3)
Care sought for current illness prior to admission*			
Referral	4026 (66.3)	3248 (65.4)	778 (70.3)
SpO ₂ ‡	1853 (30.5)	1516 (30.5)	337 (30.5)
<90%	97 (93–99)	97 (93–99)	97 (92–99)
90%–95%	929 (15.3)	735 (14.8)	194 (17.5)
95%–99%	1423 (23.4)	1197 (24.1)	226 (20.4)
>99%	3722 (61.3)	3036 (61.1)	686 (62.0)
Heart rate	146 (132–161)	146 (131–161)	146 (132–163)
Respiratory rate	49 (38–61)	49 (38–61)	48 (39–60)
Temperature (°C)			
<36.5	734 (12.1)	589 (11.9)	145 (13.1)
36.5–37.5	2906 (47.8)	2361 (47.5)	545 (49.3)
37.6–39	1932 (31.8)	1608 (32.4)	324 (29.3)
>39	502 (8.3)	410 (8.3)	92 (8.3)
Respiratory distress	1079 (17.8)	867 (17.5)	212 (19.2)
Capillary refill ≥3s	733 (12.1)	585 (11.8)	148 (13.4)
Abnormal Blantyre Coma Scale*	431 (7.1)	371 (7.5)	60 (5.4)
Malaria test positive*	505 (8.3)	431 (8.7)	74 (6.7)
HIV RDT test positive*	1304 (21.5)	1040 (20.9)	264 (23.9)
HIV RDT test positive*	173 (2.9)	154 (3.1)	19 (1.7)
Haemoglobin status*			
Not anaemic (≥11 g/dL)	12 (10–13.3)	12 (10.3–14)	11.3 (9.3–13.3)
Mild anaemia (7–10 g/dL)	3961 (65.2)	3318 (66.8)	643 (58.2)
Mild anaemia (7–10 g/dL)	1606 (26.4)	1281 (25.8)	325 (29.4)
Severe anaemia (<7 g/dL)	506 (8.3)	371 (7.5)	136 (12.3)
Lactate (mmol/L)*	2.1 (1.4–3.1)	2.1 (1.4–3.1)	2.1 (1.5–3.4)

Continued

Table 1 Continued

	All participants (N=6074)	No readmission (n=4968)	At least one readmission (n=1106)
Maternal and social characteristics			
Time to reach hospital*			
<30 min	1299 (21.4)	1102 (22.2)	197 (17.8)
30 min to 1 hour	2138 (35.2)	1773 (35.7)	365 (33.0)
1–2 hours	1581 (26.0)	1287 (25.9)	294 (26.6)
2–3 hours	720 (11.9)	553 (11.1)	167 (15.1)
>3 hours	336 (5.5)	253 (5.1)	83 (7.5)
Maternal age (years)			
<18	26 (23–30)	26 (23–30)	26 (23–30.5)
18–30	75 (1.2)	62 (1.3)	13 (1.2)
18–30	4541 (74.8)	3733 (75.1)	808 (73.1)
>30	1458 (24)	1173 (23.6)	285 (25.8)
Maternal education			
No school/≤P3	616 (10.1)	498 (10.0)	118 (10.7)
P4–P7	2524 (41.6)	2085 (42.0)	439 (39.7)
S1–S6	2088 (34.4)	1709 (34.4)	379 (34.3)
Post-secondary	788 (13.0)	628 (12.6)	160 (14.5)
Maternal HIV status*			
Negative	5281 (86.9)	4288 (86.3)	993 (89.8)
Positive	476 (7.8)	416 (8.4)	60 (5.4)
Unknown	317 (5.2)	264 (5.3)	53 (4.8)
Bed net use*			
Never	580 (9.6)	498 (10.0)	82 (7.4)
Sometimes	466 (7.7)	388 (7.8)	78 (7.1)
Always	5028 (82.8)	4082 (82.2)	946 (85.5)
Boil/disinfect/filter water*			
	4409 (72.6)	3674 (74.0)	735 (66.5)
Discharge characteristics			
Discharge status*			
Routine discharge	5123 (84.3)	4194 (84.4)	929 (84.0)
Referred to higher level of care	189 (3.1)	131 (2.6)	58 (5.2)
Unplanned discharge	762 (12.6)	643 (12.9)	119 (10.8)
Feeding poorly	467 (7.7)	355 (7.2)	112 (10.1)

Numbers are represented by n (%) for categorical variables and median (interquartile range) for continuous variables.

*Statistically significant between the two groups.

†MUAC thresholds are given in mm with lower numbers representing cut-off for under 6 months old.

‡Statistically significant only as a continuous variable.

MUAC, mid-upper arm circumference; RDT, rapid diagnostic test; SpO₂, oxygen saturation.

month to 8.88 (95%CI: 5.84 to 14.01) readmissions per death in the last month of follow-up (online supplemental table S5). The readmission mortality rate ratio varied significantly across conditions, suggesting divergent health-seeking patterns based on mortality risk (figure 4, online supplemental table S6). Overall, the readmission to mortality rate ratio was 3.12 (95% CI: 2.77 to 3.50). However, children initially admitted secondary to severe malnutrition, HIV or tuberculosis typically experienced fewer readmissions' events

than mortality events (ratio range: 0.64–0.95), while those originally admitted with malaria, gastroenteritis or bronchiolitis experienced a much higher ratio, between 4.51 (gastroenteritis) and 7.31 (bronchiolitis). Across the six facilities, we saw no association between the readmission to mortality ratio and post-discharge mortality, as had been previously observed (online supplemental table S7). When comparing readmission rates across the six sites, JRRH had the highest readmission rate at 48.8 (95% CI: 44.7 to

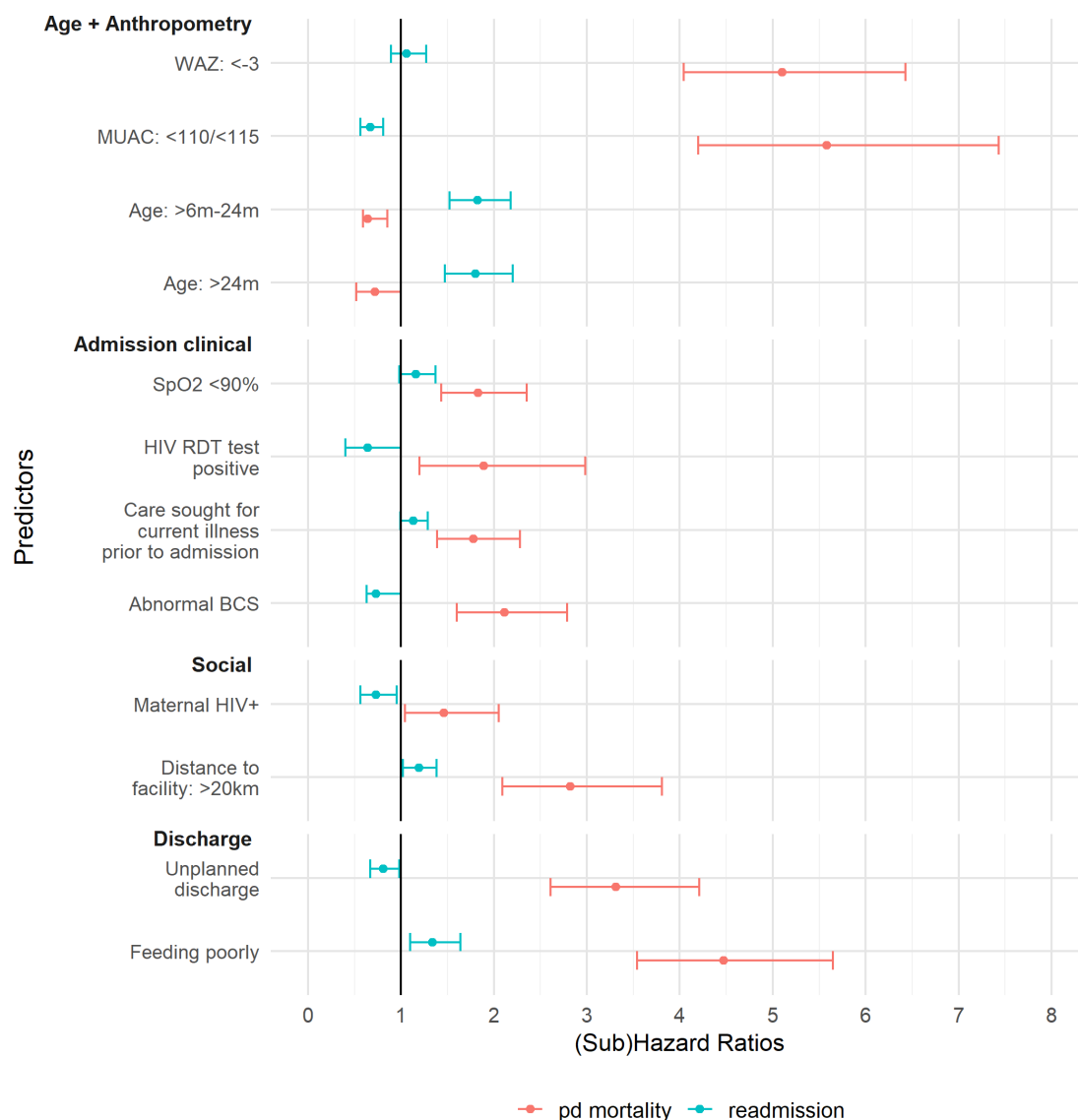


Figure 3 Comparing (sub)HRs between postdischarge mortality and hospital readmission. The reference category for the anthropometry measurements is those not malnourished and age is compared against <2 months old. The reference categories for SpO₂ and distance to facility are >95% and <5 km, respectively. BCS, Blantyre Coma Scale; MUAC, mid-upper arm circumference; pd, postdischarge; RDT, rapid diagnostic test; SpO₂, oxygen saturation; WAZ, weight-for-age Z-score.

53.2)/1000 child-months, followed by HICH at 33.3 (95% CI: 29.2 to 38.9)/1000 child-months (online supplemental table S7).

DISCUSSION

The present study shows that readmission following discharge is common, occurring in nearly a fifth of children. While readmission is associated with mortality, we also observed that the rate ratio between readmission and mortality increases dramatically over the 6-month postdischarge period. Moreover, our analysis revealed that the risk estimates for predictors of readmission diverge significantly from those associated with mortality, often exhibiting opposing effects. These results highlight the complex nature of readmission as a proxy for recurrent illness and substantiate concerns of its use as an indicator of quality of care, or as an outcome for which a

reduction would be necessarily desirable. As efforts build in addressing paediatric postdischarge mortality, consideration should be given to the metrics beyond mortality most appropriate for measuring improvements for the hospital to home transition.

The use of readmissions as a proxy for a negative outcome is common in medical research.^{9 15 16} Our study showed that there was some degree of concordance between mortality and readmission for some variables, especially those measuring illness severity, such as hypoxemia, severe anaemia and those who were referred. This has also been shown in other studies in similar settings.¹⁷⁻²⁰ Furthermore, we found that those who were readmitted had more than two times the chance of dying postdischarge, signifying that the readmitted cohort is generally a higher risk cohort. However, this does not suggest that readmission is a reasonable surrogate for

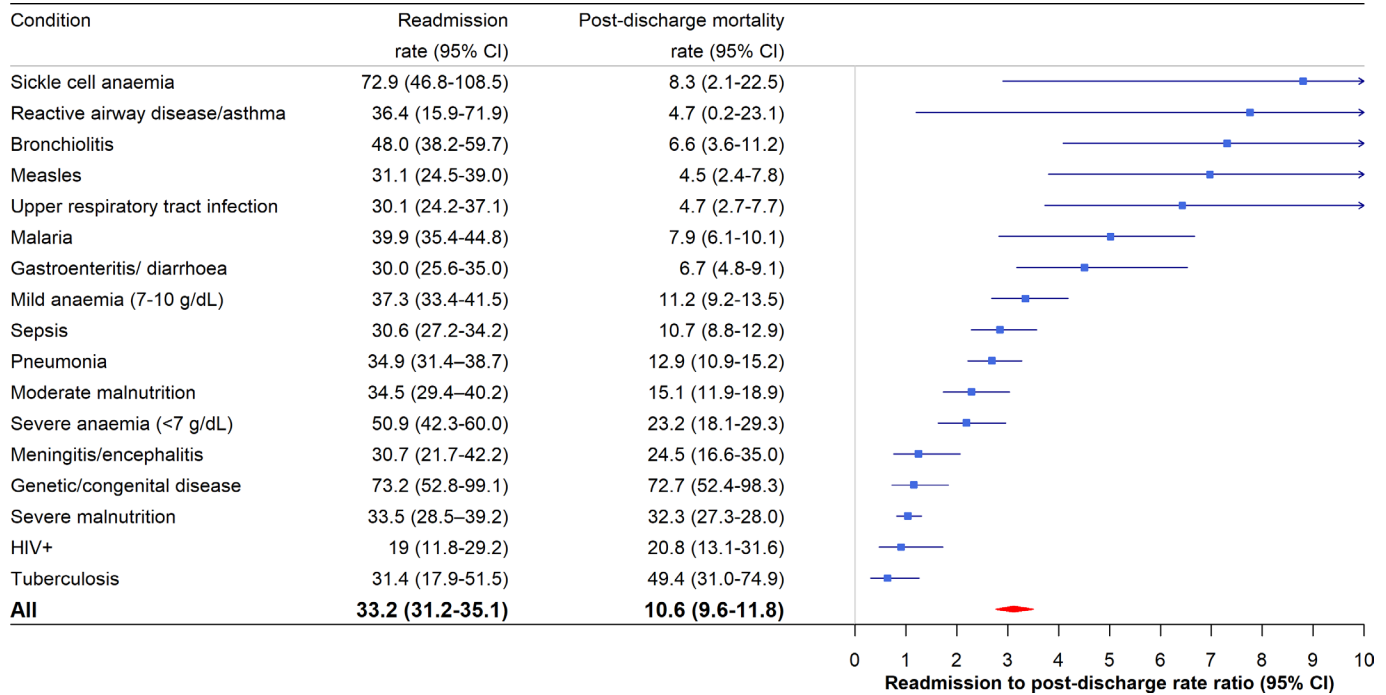


Figure 4 Comparing the rate of hospital readmission and postdischarge mortality based on health conditions. Rates are per 1000 child-months and arrows at the end of the line represent upper CI beyond the X-axis limit.

recurrent illness to be used in epidemiologic research, prediction models or clinical trials, due to its divergence from mortality along key illness metrics, as we have shown in this study. Among those not readmitted, there are clearly many ‘false negatives’, children experiencing recurrent illness who remain in the community. This is also corroborated by clear evidence that most postdischarge deaths occur in the community.²¹ Furthermore, those readmissions that do occur are in part driven by appropriate health-seeking behaviours, which tend to be evenly distributed across populations. Economic and social stability are known predictors of appropriate health seeking.¹⁸ These complexities pose a problem for studies that have combined postdischarge mortality and readmission into a composite.⁷

The most starkly observed divergence in effect estimates between readmission and postdischarge death was related to anthropometry, most especially MUAC. Malnutrition has been repeatedly shown to be a key driver for postdischarge mortality, and thus it can be inferred that these children also experience high rates of recurrent illness. Likely, this is because children with malnutrition are also socially vulnerable, and thus their health-seeking patterns diverge compared with non-malnourished children. We have previously shown that low MUAC is also associated with at-home deaths, as compared with deaths during a subsequent readmission.⁵ It is also possible that among those most malnourished, the signs and symptoms of severe recurrent illness may be subtle, further reducing the probability of caregivers seeking care. Our study also showed the same divergence in HIV-positive cohort. As financial constraints such as affordability and modes of transportation were the most common barriers to seeking

care, being HIV positive can result in poverty, leading to less ability to pay for healthcare.²² Furthermore, malnutrition and HIV often serve as comorbidities resulting in high death rates in the community.²³ In addition to WHO’s recommended community-based nutritional rehabilitation for malnourished children, enhanced convalescent care is needed to improve outcomes and aid recovery in this vulnerable population.^{23 24}

In the CHAIN cohort study, it was noted that sites with the highest postdischarge mortality had the fewest readmissions, thus suggesting that increases in readmission rates may be an appropriate and necessary metric of better postdischarge care.⁹ Our study did not show this phenomenon by site, as the two sites with the lowest postdischarge deaths also had the lowest readmissions. Since readmission reflects both the positive behaviour of health seeking as well as the negative outcome of recurrent illness, the mix of these two pathways would suggest that the ratio could move in either direction depending on their relative weights, even while the mortality rate remains stable. Our analysis showed the interesting observation that the case-mix of conditions significantly impacts the readmission to mortality ratio, with chronic diseases such as HIV, tuberculosis and malnutrition being associated with relatively few readmissions per mortality event, while other conditions such as bronchiolitis, reactive airway diseases, measles and malaria being associated with relatively more frequent hospitalisations per mortality event. While as a metric, the readmission to mortality rate ratio may not be sufficient to define improved postdischarge care, it is increasingly acknowledged that improved health-seeking behaviours will be an important component to improve postdischarge outcomes, especially since

most postdischarge deaths occur within the community. Several key barriers exist that limit health seeking during the postdischarge period, such as illness recognition, costs of care seeking, the quality of care provided at facilities as well as cultural beliefs surrounding the causes of recurrent illness. Furthermore, even awareness of the high risk of the postdischarge period itself remains a barrier for both health workers and caretakers to ensure that a comprehensive postdischarge care plan is made and implemented at the time of discharge, especially in those at high risk of mortality.²⁵

We detected a statistically significant effect of age on postdischarge mortality and readmission rates with a contrasting phenomenon. While younger children were more likely to die postdischarge, they were less likely to be readmitted, and this aligns with findings from a previous study.²⁶ One possible explanation is that readmission is conditioned on initial admission, and younger children have not had the life span to experience recurrent adverse health events. Adherence to follow-up care and vigilance in symptoms monitoring and detection are vital for these very young children, as they are more likely to die postdischarge but less likely to seek care.

This study has several strengths. It is one of the first studies to provide insight into risk factors for hospital readmission across a wide range of demographic, clinical, social and discharge variables. Data were collected at multiple sites covering urban and rural areas. However, it has some important limitations. First, the study was exploratory in nature and included analytical comparisons of numerous variables, leading to overlapping association. As the analysis only adjusted for age, sex and site, additional studies involving other confounding variables are required to substantiate our results. Second, the study was conducted in a single country and may lack generalisability; however, our results do largely reflect studies conducted in other African countries. Lastly, this was an observational study using self-reported measures of outcomes. Self-reported measures can be inaccurate and unreliable, which was evident when collecting dates of readmission from parents. In addition, the cause of readmission was not collected due to self-report and further exploration is needed on the cause of death and readmission in order to inform policy and interventions.

Despite readmission being four times more common than postdischarge mortality, limited studies have been delved into factors associated with readmission. Readmission consists of diverging pathways, one that reflects illness severity and the other healthcare-seeking capabilities. A smoother transition of care from hospital discharge to the community is needed, and ongoing family support for postdischarge is vitally important, especially for those who are socially vulnerable.²⁷ Future research should focus on identifying appropriate responses to risk assessment, raising awareness among health providers of post-discharge mortality and readmission risks, improving communication, discharge processes and care continuity between hospitals and community providers.

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