

Knowledge, attitudes, and practices of Kenyan healthcare workers
regarding pediatric discharge from hospital

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Abstract

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The objective of this study was to assess attitudes, perceptions, and practices of healthcare workers regarding hospital discharge and follow-up care for children under age five in Nyanza Province, Kenya. From November 2017 to December 2018, we conducted a cross-sectional mixed methods study, involving online surveys of healthcare workers who deliver inpatient care to children at eight hospitals, followed by semi-structured telephone interviews to explore key areas in greater depth. Eighty percent (111) of eligible healthcare workers completed the survey. 104 (94%) felt that discharge care is “very important” to patient outcomes, but only 33% and 21% perceived that their hospital delivers discharge care and provides resources to deliver adequate discharge care “very well”, respectively. Of the international guidelines assessed in this study, the *WHO Pocketbook of Hospital Care for Children* was reportedly used the least (76%; 84). Participants reported various barriers to adequate use of the international and national guidelines, such as lack of availability and standardization of the guidelines. Respondents acknowledged the importance of follow-up care, however they reported that supportive mechanisms were either lacking or entirely non-existent at most participants' hospitals. Ninety-seven percent of survey participants underestimated the risk of post-discharge mortality. The post-discharge period is increasingly being understood by researchers as a very high-risk time for children. If improved discharge and follow-up care is to be achieved, our findings suggest that continuing education (i.e., pre-

service and in-service training) should be enhanced to include best practices for discharge and follow-up care. Routine mortality reports in hospitals could be expanded to review adverse outcomes during hospitalization and in the post-discharge period. In addition, national and international guidelines for care require updating to expand sections on discharge and follow-up care. Finally, intervention trials are needed to assess the efficacy, effectiveness, and cost-effectiveness of packages to improve discharge and follow-up care.

INTRODUCTION

Globally, the under-five mortality rate has fallen by 58 per cent, from 93 deaths per 1,000 live births in 1990 to 39 deaths per 1,000 live births in 2017.¹ In Kenya, the under-five mortality rate is 46 deaths per 1,000 live births, the 46th highest globally.¹ Despite national priorities to improve access to essential health services through Kenya Vision 2030 and other efforts, child mortality declines in Kenya were insufficient to meet Millennium Development Goal 4 to reduce child mortality by two-thirds between 1990 and 2015. Accelerated progress and attention to vulnerable populations will be needed to meet Sustainable Development Goal target 3.2 (<25 deaths per 1000 live births by 2030).²

Recent evidence suggests that the period following discharge from the hospital represents a particularly vulnerable time for children. In 2000, Snow et al. found that children in Kenya hospitalized with infectious diseases, such as malaria, were often readmitted.³ A 2011 study from Kenya found that mortality in the 12 months following discharge from hospital was more than eightfold higher compared to similarly-aged children in the community, and that 4.5% of discharged children die within the subsequent year.⁴ A 2017 study by Vierum et al. found a marked increase in mortality after hospitalization compared to in the community, with a particularly strong effect for children who discharged from the hospital against medical advice.⁵ In a 2014 study, Chisti et al. found that post-discharge mortality in Bangladesh was most common for children under-5 following inpatient care for specific illnesses, such as severe malnutrition and pneumonia.⁶ An enhanced understanding of pediatric discharge and follow-up care practices is vital if we are to decrease child mortality in Kenya and other low-resource settings.

Despite the increasing evidence that the post-discharge period is a highly vulnerable timeframe, very little is known about how care is implemented during discharge and follow-up or about the barriers and facilitating factors to adequate care. The World Health Organization (WHO) issues evidence-based guidelines, including those related to the care of hospitalized children in low-resource settings.^{7,8} These resources are intended to be adapted at the country-level to address local epidemiology; multiple inpatient resources have been developed for use in Kenya.^{9,10,11,12,13} These international and national recommendations include identification and management of common illnesses at presentation to and during the hospital stay, as well as at discharge and follow-up although the content regarding discharge and follow-up is generally more limited in these publications. Little is known about how healthcare

workers use guidelines and related resources to deliver discharge and follow-up care and what new or additions to these resources might be useful.

We sought to assess knowledge, attitudes, and reported practices regarding pediatric discharge and follow-up care among healthcare workers (HCW) who provide inpatient and discharge care to inpatient children aged 1-59 months across eight hospitals in Nyanza Province, western Kenya. We sought to determine how HCWs: understand post-discharge vulnerability; prioritize discharge care tasks relative to inpatient care tasks; perceive the importance of discharge and follow-up care; report guideline use and perceive their adequacy and utility; perceive how well discharge and follow-up care is delivered; and, perceive the barriers and facilitating factors to adequate discharge and follow-up care.

METHODS

In this study, discharge care is defined as medical care provided to a patient and the support provided to primary caregivers (e.g., parents, guardians) after healthcare workers determine the patient is well enough to go home and before the patient leaves the hospital. This could include counseling on home management of illnesses, providing missing immunizations, and referrals to follow-up health services. Follow-up care is defined as care and support that is provided once a patient has left the hospital. This could include checking for continued resolution of symptoms, recurrence of illness or adequate weight gain, and identifying the need for further treatments.

Study Population

Eligible HCWs were defined as doctors, clinical officers, clinical officer interns, nurses, nursing students, nutritionists, and other allied health professionals who deliver inpatient care to children aged 1 to 59 months. HCWs who do not provide pediatric inpatient care in the study site hospitals and those who do not consent to participation were excluded from the study. Almost all hospitals in Migori and Homa Bay counties were included in the study, including one county hospital (Migori County Referral Hospital) and seven sub-county hospitals (in Migori: Migori, St. Josephs, Rongo, Isebania, and in Homa Bay: Mbita, Ndhiwa, Rachuonyo, and Kendu Bay) (Figure 1). These counties were chosen due to particularly high child mortality rates in western Kenya. Homa Bay County Hospital was excluded from due concerns that

this study might contaminate results of another ongoing research study. This area was selected for this study due to high child mortality rates relative to national averages.¹⁴

Study Design

We used a mixed methods, cross-sectional study design. After approval was granted from hospital administrators, we used a structured tool to enumerate all eligible HCWs at each site. Eligible HCWs were invited to complete an online, 12-item survey requiring approximately 15-20 minutes to complete. The survey assessed which HCW cadres are involved making decisions to discharge; how HCWs prioritize discharge care tasks relative to inpatient care tasks; resources used when discharging patients and recommending follow-up (e.g. international and national guidelines, algorithms, wall charts, and apps); understanding of mortality risk in the post-discharge period; perceptions of discharge and follow-up care on post-discharge outcomes; and, perceived barriers and facilitating factors to quality discharge and follow-up care. At sites with initial low participation rates, a study facilitator distributed hard copies of the survey or invited participants to use a tablet to complete the survey. Participants completing the survey were given 300KHS via M-Pesa as reimbursement.

All HCWs who completed the survey were eligible for a subsequent semi-structured, in-depth telephone interview. We aimed to interview 15 nurses and 15 clinicians (clinical officers, clinical officer interns and doctors) in order to ensure adequate representation of both groups for a comparative analysis. Other HCW (nutritionists, clinical officers, trainees) were also interviewed in order to provide contextualization. The interview lasted approximately 60 minutes and included questions that were informed by the survey results such as, "What do you think could improve discharge care at your hospital," "What do you think is missing from the international/national guidelines to help you deliver quality discharge and follow-up care?" and "When analyzing the survey results, we found that over 75% of respondents not only underestimated post-discharge mortality, but also thought that recently discharged children had a lower risk of dying. Why do you think healthcare workers who took the survey underestimated post-discharge mortality?". All interviews were conducted in English. Upon completion of the interview, participants were provided 300KHS via M-Pesa as reimbursement for mobile data usage.

Data Analysis

All interviews were recorded after receiving verbal consent from each participant. Interviews were transcribed independently, then coded using R and Dedoose software packages. We included a second coder to reach intercoder agreement to mitigate bias.

Ethics

Ethical clearance for this study was received from the Scientific and Ethical Review Board of the Kenya Medical Research Institute (KEMRI/SERU/CCR/077/3534). An exemption was received from the University of Washington Institutional Review Board.

RESULTS

Survey and interview data were collected from November 2017 to December 2018. Table 1 summarizes characteristics of the 111 survey participants (seven doctors- four medical officers and three medical officer interns, 30 clinical officers, 15 clinical officer interns, 43 nurses, five nursing students, five nutritionists, and six HIV counselors). We interviewed 39 HCWs (18 clinicians, 15 nurses, and 6 others) resulting in 14 (36%) interviews from the county hospital and 25 (64%) from sub-county hospitals (Table 2). Eighty percent of eligible HCWs participated in the survey; 39% of those completed an interview (Table 1).

Delivery of Care

The vast majority (104; 94%) of survey participants indicated that discharge care tasks are “very important” to health outcomes of pediatric patients, however only 33% of survey participants reported that discharge care goes “very well”. Responses stratified by cadre showed some variability with no doctors, 4 (13%) clinical officers, 9 (60%) clinical officer interns, and 18 (42%) nurses responding “very well” to this question; however, results did not statistically differ between providers as a whole compared to nurses nor did any one provider group statistically differ compared to nurses (Table 3). Overall, only 15 (14%) indicated that their facility provides resources to deliver adequate pediatric discharge care “very well”. Variation in response by cadre was less marked: no doctors, and only 2 (7%) clinical officers and 2 (13%)

clinical officer interns and 14 (33%) nurses reported that their hospital does “very well”. Responses to these questions were similar when comparing county to sub-county hospital respondents.

At county and sub-county hospitals, discharge care tasks were perceived as being “very prioritized” during the working day. Discharge care tasks are prioritized based on HCW time constraints, available staffing for patient management, and HCW perception of readiness to discharge. In the interviews, all HCWs at all hospital levels perceived patient education as an important component of the discharge process. Patient education (e.g. counseling) is reportedly typically done as part of the discharge care process and was felt to influence re-admissions after discharge and post-discharge mortality. Interview participants mentioned that counseling is an opportunity to educate caregivers about take home medications, home care of illnesses, and follow-up care.

“We have to make sure that the patient is well enough to go home. After that...our first priority [is to] explain to the caregiver how the medication is to be given at home. In case of any danger signs the patient should come back. We also educate the patient on what to do and what not to do, and tell them to come back for review in case there’s any change in the patient’s condition.” Clinical Officer #4, County hospital

Discharge care guidelines recommend that missed doses of vaccines, vitamin A, and deworming be assessed from the child’s immunization card and delivered prior to discharge home.⁷ Interview participants indicated that deworming tablets, vitamin A, and immunizations are typically given as part of routine discharge care and there are rarely stock-outs of immunizations, vitamin A, or deworming tablets, respectively. Interviewees noted that the occasional missed provision of immunizations occur due to HCW strikes or when the pharmacy is closed.

“When the patient is being discharged, we usually take the mother clinic book and see if the patient needs immunizations. We usually have deworming or vitamin A [on the ward]. For those who are still in the age bracket for getting immunizations, after getting vitamin A and deworming we accompany them to the maternal and child health clinic to get missed immunizations.” -Clinical Officer #4, County hospital

All HCWs reported, through the surveys and interviews, that discharge care involves a multi-cadre team that includes doctors, clinical officers, nurses, nutritionists (Fig. 3). However, the final discharge decision, usually based on the child’s condition, is made by a medical officer or, if s/he is not available, a clinical officer.

“During the ward round, we have the doctor, the clinical officer, the nurse, the nutrition officer. Altogether we see the client, how they have been progressing, if they are free to

go home, and we make a unanimous decision to see if the client has improved. It is not for one person to decide. The doctor in charge-- the medical officer-- makes the final decision. That is standard protocol.” -Nurse #2, Sub-county hospital

Discharge Care: Barriers & Facilitators to Adequate Discharge Care

Survey respondents identified several barriers to adequate discharge care (Figure 3). Here results will be divided by county and sub-county, and results will be presented in two categories: 1) caregiver barriers, and 2) health system/individual HCW barriers. At the county hospital, HCWs perceived caregiver neglect as an important barrier to adequate discharge care. Thirty-seven (88%) HCWs identified families not having the Mother and Child Health book (which contains immunization, vitamin A, and deworming status), lack of family fidelity to instructions (86%; 36), and lack of family financial resources for purchase of take-home therapeutics (81%; 34) to be “very important” barriers to adequate discharge care. Key perceived health system failures to adequate discharge care included stock-outs of medications and immunizations, and overstretched clinical staff.

These findings were corroborated in the interview responses. For example, in relation to stock-outs, one clinical officer noted:

“Another challenge is the supply of medication that is being provided in the facility. You’ll find that the medication [is] not being provided here or that they are out of stock. The participant or the primary caregiver is forced to go into their pocket to buy and sometimes we’ll find that the affordability is a problem when it comes to that.” -Clinical Officer #3, County hospital

Cost to families emerged as another key barrier during interviews, especially influencing premature discharge.

“Sometimes you have patients who...fear the cost. They feel that when they stay longer on the ward, they will pay a lot so they maybe ask for early discharge. They ask for early discharge when you are not ready to give discharge and you don’t offer good discharge care” -Clinical Officer #1, County hospital

At the sub-county hospitals, HCWs reported similar health system failures as the county hospitals. Seventy-five percent (52) of survey participants reported that stock-outs of take-home medications was a “very important” barrier. However, communication emerged as a common barrier at the sub-county hospitals. Seventy-four percent (51) of HCWs reported that ineffective communication with caregivers by healthcare providers was a “very important” barrier to adequate discharge care. Of these, the highest

proportion of survey participants that identified communication as a “very important” barrier was nursing students (100%; 5) and clinical officer interns (95%; 14). Similar findings emerged in the interviews.

“Sometimes it is hard to explain to them this is what is happening to your child. So, you tell them it is a name, and they don't know what the name is so you have to break it down for them to understand. This is a challenge. They might go home assuming they really don't know what is happening to their child. You really can't explain it for them to get it.” - Nurse #2, Sub-county hospital

In addition, seasonality was a theme at the county and sub-county hospitals that emerged during the interviews. Cold and rainy seasons were described as times with higher numbers of malaria, diarrhea, and asthma admissions. As a result, participants across HCWs and hospital levels reported increasing strain on hospital resources such as beds and available medications during these periods, which leads to suboptimal discharge care.

“Asthma and malaria they occur during rainy season... so we find the number will increase together with pneumonia and diarrheal diseases and then we have sickle cell so they come in crises...At the same time those with malaria it comes with the season so if there's a cold season you'll find malaria, rainy season malaria, and sometimes it happens during change of weather.” -Clinical Officer #3, Sub-county hospital

Insufficient staffing was reported by numerous interview participants as an important barrier for adequate discharge care at sub-county hospitals.

“Sometimes discharge gets delayed...due to competing tasks. Sometimes a patient will want to go home, but...there are some patients whose condition has not improved or who may need attendance. This means we have to attend to those in poor condition, then we come back to the patient who is going home. Again, due to a shortage of staff, sometimes accomplishing tasks becomes a real challenge.” -Nurse #1, Sub-county hospital

At both county and sub-county hospitals, interviewees indicated there are times when patients do not receive the standard of discharge care when families discharge against medical advice or abscond.

“The discharge decision can occur not according to standard clinical practice...when the patient's caretaker demands to be discharged against medical advice, we will discharge them. But we give them a medical form to sign saying that they are taking the patient against medical protocol.” -Nurse #1, Sub-county hospital

Participants identified counseling caregivers on danger signs (89%; 99), prescribing or providing missing immunizations, vitamin A and deworming doses (86%; 95), effective communication with caregivers (86%; 95), and determining which patients need follow-up care and when follow-up care

should be scheduled (86%; 95) as skillsets that were covered “very well” during their professional training. However, training on other aspects of care such as post-discharge mortality risk was reported as lacking.

“I think the information on post discharge mortality is not there. We need training, we need to be quick with the information, and the resources about the post discharge mortality rates so that we don’t assume, and we don’t ignore them.” -Nurse #1, Sub-county hospital

Commonly reported facilitators to adequate discharge care at county hospitals were positive HCW attitude and proficiency in the caregiver’s language.

“You can call someone who is more familiar with the local language to explain to the caretaker, to explain to the parent what is supposed to be done in the best way possible.” -Clinical Officer #1, County hospital

Reported facilitators at sub-county hospitals were services to support payment of hospital bills, counseling and health education, and effective care management.

“We [make] sure that the discharge is done timely and that the patient goes home and also ensure that there is no recurrence of the same illness and to make sure after discharge there is no admission again. Also, for the counseling, it will make the patient or the caretaker aware and also give them knowledge and skills to be able to know what the patient is handling or what the illness is all about.” Clinical Officer #1, Sub-county hospital

Follow-up Care: Barriers and Facilitators to Adequate Follow-up Care

Survey participants at both county and sub-county hospitals reported being “very well” trained on follow-up care (86%; 96). Participants report that follow-up care is typically done by clinical officers, nurses, and nutritionists in partnership with the community health workers, however the caregiver is ultimately responsible for adhering to follow-up care instructions.

“We give them a return date for them to come back for review and apart from that we have the community health workers who are linked with the community...but mainly we rely on the patient returning for a check-up.” -Clinical Officer #2, Sub-county hospital

Reported barriers to follow-up care at the county hospital were lack of staff and caregiver lack of adherence to follow-up care instructions (Table 4).

“We rarely do that [track patients] ...For general hospital patients we rarely do that at their homes or in the facility. For caregivers, they believe that once they are discharged they don’t need to come back to the hospital unless the illness recurs.” -Clinical Officer #4, County hospital

At sub-county hospitals, perceived barriers to follow-up care include poverty, lack of staff, and lack of transportation to a health facility to attain follow-up care.

“You find sometimes those who are capable of doing follow up are not so many. More employment should be done for these people so they can treat patients and also do follow up for the patients at home. You’ll find that...the skilled staff that are doing the follow up are very few in the facility. In our training institutions, some of these issues are not being handled. There is a need for adding more healthcare providers who are more technical and able to provide treatment.” -Nurses #1, Sub-county hospital

Tracking mechanisms and thorough documentation were facilitators for adequate follow-up care, which includes gathering contact information from the caregiver to facilitate follow-up care.

“We normally put a locator when we admit them-- a physical locator as well as [documenting] the area where they come from [and their] phone numbers. So if there’s a patient that has been discharged [we] follow them up to see if what is given if the right thing. We’ll call or go and see how the child is performing.” -Clinical Officer #3, Sub-county hospital

Utilization of International & National Guidelines

Survey participants identified a variety of international guidelines used in the discharge care process (Figure 4), including some that are specific to inpatient management and others that are specific to first level/clinic-based practice. Of the international guidelines, the WHO Pocketbook of Hospital Care—widely recognized as an important tool for hospital care—was reported as least available to HCWs at both county and sub-county hospitals, 10% (11).

“[WHO Pocketbook] We don’t have it currently but it’s something that we can look into so we can have it in the facility.” -Clinical Officer #2, Sub-county hospital

When prompted, interview participants offered detailed descriptions of what is missing from the international guidelines and which existing protocols should be expanded.

“We should highlight the point at which we make the decision to discharge the patient. Sometimes we discharge the patient without them completely recovering in the ward. Maybe they could just [include] some of the signs and symptoms.” -Doctor #1, County hospital

Within Kenya, the guideline most frequently reported as used at the county and sub-county hospital was the Integrated Management of Acute Malnutrition (IMAM), 93% (39) and 87% (60), respectively.

Interview participants at both county and sub-county hospitals reported that the Pediatric Protocol was a

commonly used tool. Respondents at all hospitals reported that enhanced guidelines would improve standardization and improve care management.

“The pediatric protocol is something we use normally during everyday care of the patient and we use it up to the time when we are supposed to discharge the patient because it gives the guidelines.” -Clinical Officer #2, Sub-county hospital

Post-discharge Outcomes: Readmission & Mortality

Although many HCWs reported that re-admission is rare, all nurses and most doctors believed that >90% of readmissions could be prevented by better discharge and follow-up care. Interview respondents in both county and sub-county hospitals reported that re-admission was caused by various health system and socioeconomic factors such as treatment failure, inadequate discharge care, insufficient education on home care, chronic illnesses, and poverty.

“One, the diagnosis was not made right. Two, during discharge they didn’t counsel. Three, probably [the healthcare worker] counselled but [the caregiver] did not understand what they talked about and didn’t do the right thing. Four, the patient who was discharged didn’t continue medication at home probably because of financial reasons.” -Clinical Officer #1, Sub-county hospital

Pediatric patients are eight-fold more likely to die in the 12 months following discharge from hospital compared to age-matched community peers.⁴ When asked to select a multiple choice survey response about post-discharge risk of mortality, HCWs at all hospitals underestimated the likelihood of post-discharge mortality— only 3 (3%) accurately selected the eight-fold option while 12 (11%) and 86 (77%) thought there was an equal and lower risk, respectively (Figure 5). Specifically, all doctors underestimated post-discharge mortality with 57% reporting post-discharge mortality was less likely. Ninety-five percent of nurses underestimated post-discharge mortality with 77% reporting that post-discharge mortality was less likely.

When asked about why survey participants underestimated the risk of post-discharge mortality, interview participants offered the following thoughts: lack of HCW attention to monitor rates of post-discharge mortality, clinician overconfidence in care management and the stability of the patient, and HCW attempts to cover their own inadequacies causes HCWs to underestimate post-discharge mortality.

“I think the overconfidence that they have done their part on the ward and [they think] follow up is not that important. And I think also that clinicians are not putting a lot of effort in counseling they need to be so they don’t see, maybe post discharge mortality has not

come out in the open, has not been highlighted; they have not seen the consequences of post discharge mortality. I think not giving enough attention to post discharge mortality. I think discharges should be highlighted so they put more effort in discharge, in counseling, and good care of the patient.” -Clinical Officer #1, County hospital

DISCUSSION

Barriers to adequate discharge care identified in this study such as financial constraints, medication stock-outs, caregiver preferences for traditional medicine resulting in discharge against medical advice corroborated with previous research in this area.^{15,16,17} However the extent that these barriers were reported differ based by hospital level. Similar to findings by Bigogo et al. in Kenya, we found seasonality was a factor that influences quality of discharge and follow-up care. In addition, time constraint was a barrier to providing counseling, a finding that is supported in the literature.^{16,18}

Research on facilitators for improved discharge care such as effective care management and involving patients and families in the preparations for discharge is consistent with our findings at all hospitals included in this study.¹⁹ The majority of participants at sub-county hospitals stated that services to support payment of hospital bills would assist with adequate discharge care. Evidence from other settings show that subsidizing or abolishing user fees increases health seeking behavior.^{20,21} Across all hospitals in our study, the discharge decision was reported to typically be a collaborative process across cadres including doctors, nurses, clinical officers, and nutritionists. This is encouraging as Roy et al. found that including a nutritionist in the discharge process is helpful to provide guidance on nutritional rehabilitation. In addition, homecare can be beneficial for malnutrition cases.²²

When HCWs have limited time and resources, standard of care and discharge care prioritization is based on HCW perception of their workload. Research has shown that subjective workload influences prioritization of discharge tasks and is a determinant of whether discharge care falls off of the list.²⁴

Despite resources such as the WHO Pocketbook of Hospital Care and Kenyan national guidelines, HCWs at both county and sub-county hospitals reported that available resources are often unavailable and, even when available, are insufficient to support their discharge practices and follow-up care recommendation needs. Participants further emphasized that while these and other such resources

have well developed guidelines for care during hospital stay, recommendations for care during the discharge and follow-up process are very limited, vague, and lack standardization.

Research shows re-admission risk is significantly higher for children admitted with major infectious diseases, such as malaria, within 3, 6 and 12 months.³ Many HCWs not only reported lacking accurate data on re-admissions at their facility, but also emphasized the influence of caregivers on re-admission risk. The caregiver's responsibility to purchase take-home medication, adhere to medical advice, monitor the child at home, and pursue medical care if complications occur was identified as being key determinants for re-admission.

Multiple studies have shown that pediatric patients experience increased risk of post-discharge mortality, particularly when they were admitted for illnesses such as pneumonia, malnutrition, and malaria.^{4,24,25,26,27,28,29,30,31} This is even more pronounced in discharge against medical advice or absconding scenarios.⁵ However, 97% of HCWs in this study underestimated post-discharge mortality and most thought that there was a reduced risk, revealing a critical knowledge gap about the post-discharge period.

The findings in our study yield multiple recommendations for immediate implementation to improve discharge and follow-up care. Hospital staff could do more to provide continued care after discharge from the hospital by understanding household-level healthcare seeking behaviors and establishing better communication with caregivers on home care of illnesses.^{32,33} Site-specific quality assurance programs could be implemented and should emphasize assessment and resolution of barriers to optimal delivery of discharge and follow-up care.

Successful interventions for strengthening standard of care include the creation of standardized workflow expectations, a discharge checklist, and daily interdisciplinary discharge planning huddles to improve the order entry time and the median time of discharge.³⁴ Additionally, impactful interventions could include recommendations to standardize discharge planning processes and identifying discharge barriers earlier.³⁵ Needs assessment tools to outline and track tasks over time have also been proven to be successful interventions.³⁵

Our findings show that HCWs acknowledge the importance of follow-up care, but follow-up care guidelines, practices, and follow-up care tracking is lacking at all hospitals. Establishing follow-up for early detection of medical problems could enable appropriate patient management and prevent death.³⁶ Community follow-up to resolve the problem of non-compliance with follow-up could also be effective.³⁷ Follow-up care interventions should be staffed by an interdisciplinary clinical support team that engages with community health workers and dedicated data management systems at all levels of hospitals to improve quality of care, and improve decision-making, promote collaborative healthcare approaches.^{37,38}

International and national guidelines could include an expanded section on standard discharge and follow-up care protocols. Effects of these updated guidelines on child health outcomes should be evaluated. Additionally, initiatives to inform best practices in discharge and follow-up care and a strategy for implementing clinical practice guidelines should be developed.³⁸

Additionally, increased awareness of post-discharge mortality and the potential role of adequate discharge and follow-up care through pre-service training and in-service venues such as mortality meetings, which are common forums for review of inpatient deaths, could be helpful.^{39,40} Existing mortality meetings could be expanded to include post-discharge deaths.

While these recommendations provide strategies to improve pediatric discharge and follow-up care, they must be considered within the broader context of the health system in Kenya. Implementing interventions to improve discharge and follow-up care would require trade-offs in time, money, staffing, and resources. Trade-offs within the health system would involve giving up some benefits to get other benefits to replace low-value care with higher-value care.⁴¹ For example, a financial investment to implement these recommendations could help to improve discharge and follow-up care, but would undoubtedly add additional financial strain to an already strained health system. Multi-criteria decision analysis and program budgeting and marginal analysis would be necessary to effectively assess any, and all, trade-offs associated with implementing these recommendations.⁴¹ Additionally, less resource-intensive intervention strategies, such as task shifting, could be used to expand the health workforce by redistributing tasks and leverage existing resources.⁴²

This study has several limitations. Eighty percent of HCWs who care for children during inpatient and discharge processes completed the survey however, only 37% of survey participants participated in the interviews suggesting potential selection bias. Interviewees could have provided socially acceptable responses. This bias could have resulted in under-reporting of unfavorable discharge and follow-up care practices such as senior clinicians delegating discharge care tasks to junior clinicians, or over-reporting of favorable responses such as how much discharge care is prioritized by their facility.

Despite these limitations, our findings shed new light on discharge and follow-up care practices in western Kenya. Additional research could include direct observation to catalogue discharge care practices. Further, research to assess the causes of lack of availability of the international and national guidelines and root causes of barriers to quality discharge and follow-up care could be bene. More research is needed to assess the efficacy, effectiveness, and cost-effectiveness of packages to improve discharge and follow-up care. Such packages could include community-based follow-up of hospitalized children and enhanced tracking systems that incorporate cell phone technology for outreach and health education with families.

This study assessed clinician perceptions, attitudes, and practices related to discharge care practices. The post-discharge period is increasingly being understood as a very high-risk time for children. This information needs to be more widely disseminated to frontline health care workers, hospital administrators, and policy makers. Improved quality of discharge and follow-up care has the potential to reduce preventable child deaths and improve child health in Kenya and many other low-and-middle income countries.

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Table 1. Characteristics of study participants

	HCWs eligible for study (n = 138)	HCWs surveyed (n = 111)	HCWs interviewed (n = 39)
Sex, % (n)			
Women		56% (62)	54% (21)
Men		44% (49)	46% (18)
Age, % (n)			
<25		14% (16)	10% (4)
25-40		77% (85)	80% (31)
>40		9% (10)	10% (4)
Hospitals, % (n)			
County Hospital			
Migori County Referral Hospital	29% (40)	28% (31)	36% (14)
Subcounty Hospitals			
Rachuonyo Hospital	12% (16)	17% (19)	13% (5)
Isebania Hospital	9% (13)	16% (18)	10% (4)
St. Joseph's Mission Hospital	10% (14)	10% (11)	0% (0)
Kendu Bay Hospital	13% (18)	10% (11)	18% (7)
Mbita Hospital	13% (18)	10% (11)	13% (5)
Rongo Hospital	9% (12)	6% (7)	7% (3)
Ndhiwa Hospital	5% (7)	3% (3)	3% (1)
Occupation, % (n)			
Nurse		39% (43)	38% (15)
Nursing Student		5% (5)	3% (1)
Clinical Officer		27% (30)	41% (16)
Clinical Officer Intern		14% (15)	10% (4)
Medical Officer		4% (4)	3% (1)
Medical Intern		3 (3)	0% (0)
Other*		10% (11)	5% (2)
Years of Experience, % (n)			
In training		13% (14)	7% (3)
<1		11% (12)	3% (1)
<5		45% (50)	54% (21)
5-10		22% (24)	23% (9)
11-20		5% (6)	7% (3)
>20		5% (5)	5% (2)

*Other includes nutritionists (8 surveyed and 2 interviewed) and HIV counselors (2 surveyed and 0 interviewed).

Table 2. Study participants, by hospital

Hospitals	Total Eligible (n = 138)	Survey Participants (n = 111, 80%)	Interview Participants (n = 39, 35%)
County Hospital,% (n)			
Migori County Referral Hospital	29% (40)	28% (31)	36% (14)
Sub-county Hospitals, % (n)			
Kendu Bay Hospital	13% (18)	10% (11)	18% (7)
Mbita Hospital	13% (18)	10% (11)	13% (5)
Rachuonyo Hospital	12% (16)	16% (18)	13% (5)
St. Joseph's Hospital	10% (14)	10% (11)	0% (0)
Rongo Hospital	9% (12)	6% (7)	8% (3)
Isebania Hospital	9% (13)	17% (19)	10% (4)
Ndhiwa Hospital	5% (7)	3% (3)	2% (1)

Figure 1. Geographical map of sampled counties

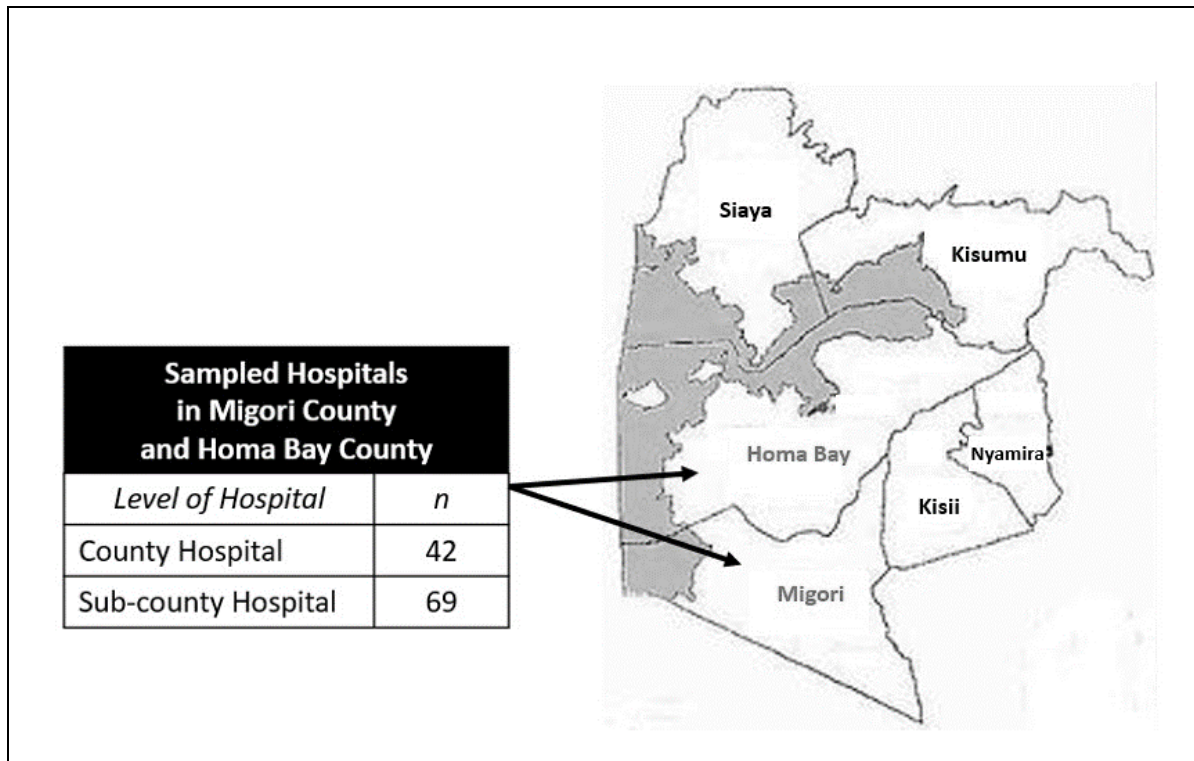


Photo source: Wikipedia. Nyanza Province du Kenya. 2019. Available from: [https://fr.wikipedia.org/wiki/Nyanza_\(province_du_Kenya](https://fr.wikipedia.org/wiki/Nyanza_(province_du_Kenya)

Figure 2. Healthcare workers involved in making decision to discharge, as reported by survey participants

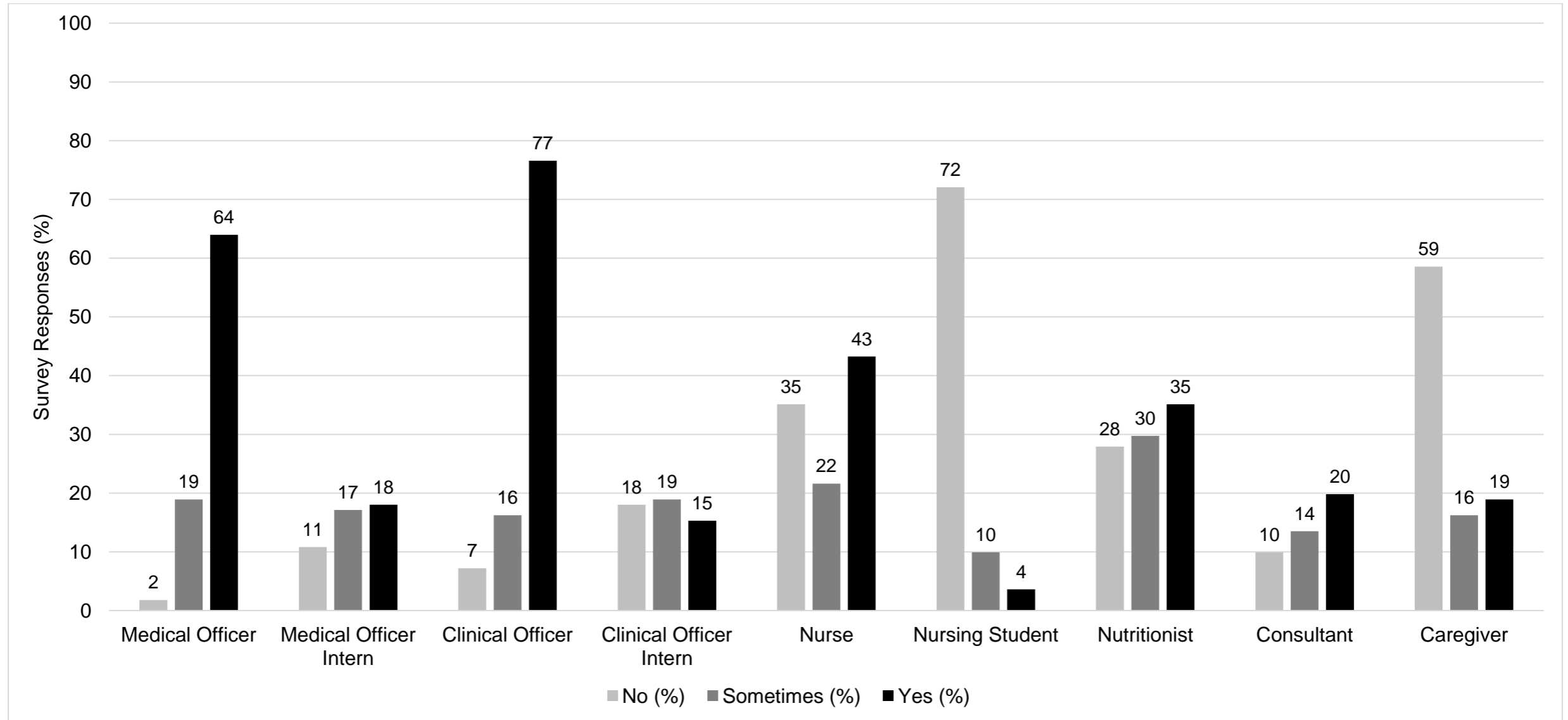


Figure 3. Perception of barriers to providing adequate discharge care, as reported by survey participants

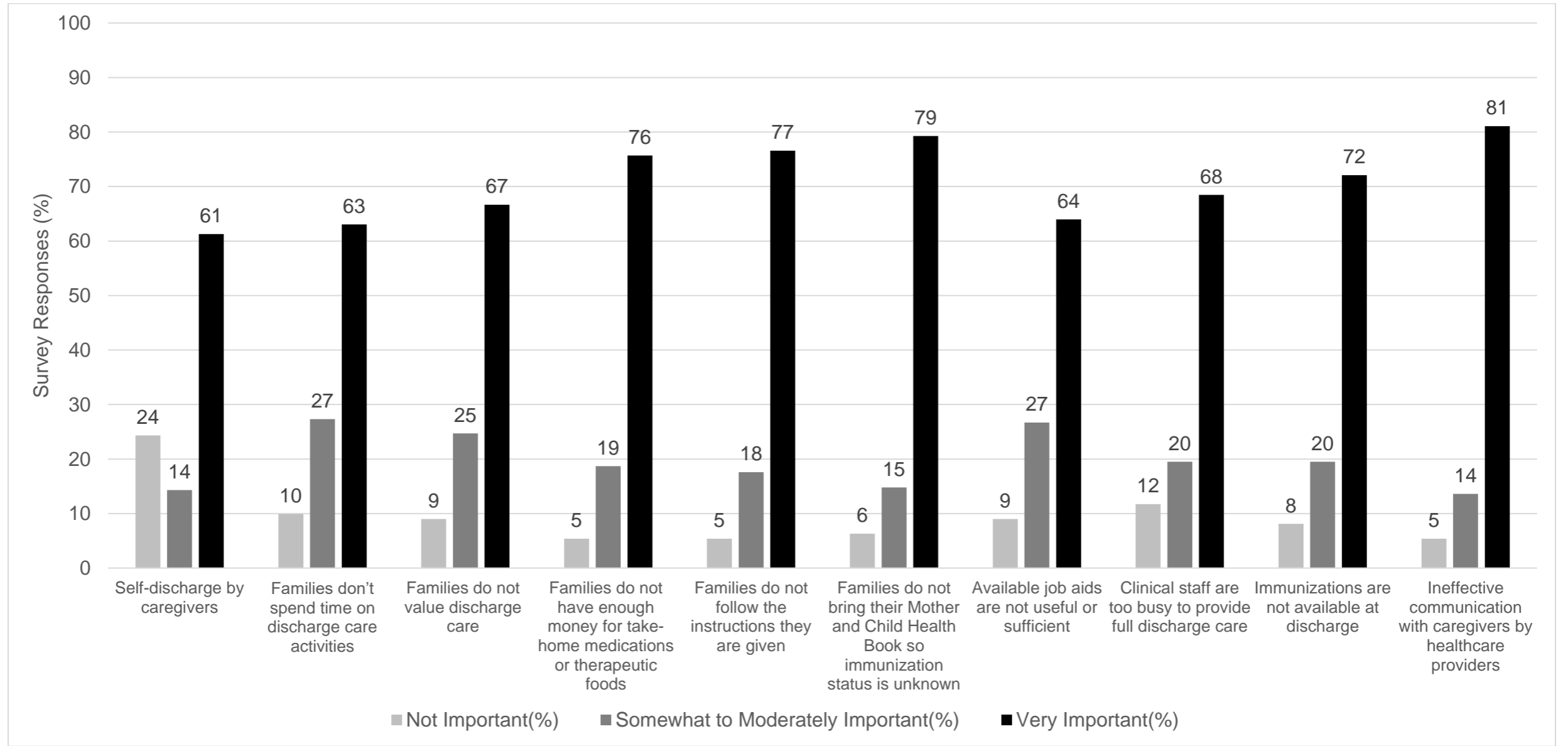


Figure 4. Guidelines used when discharging pediatric patients, as reported by survey participants

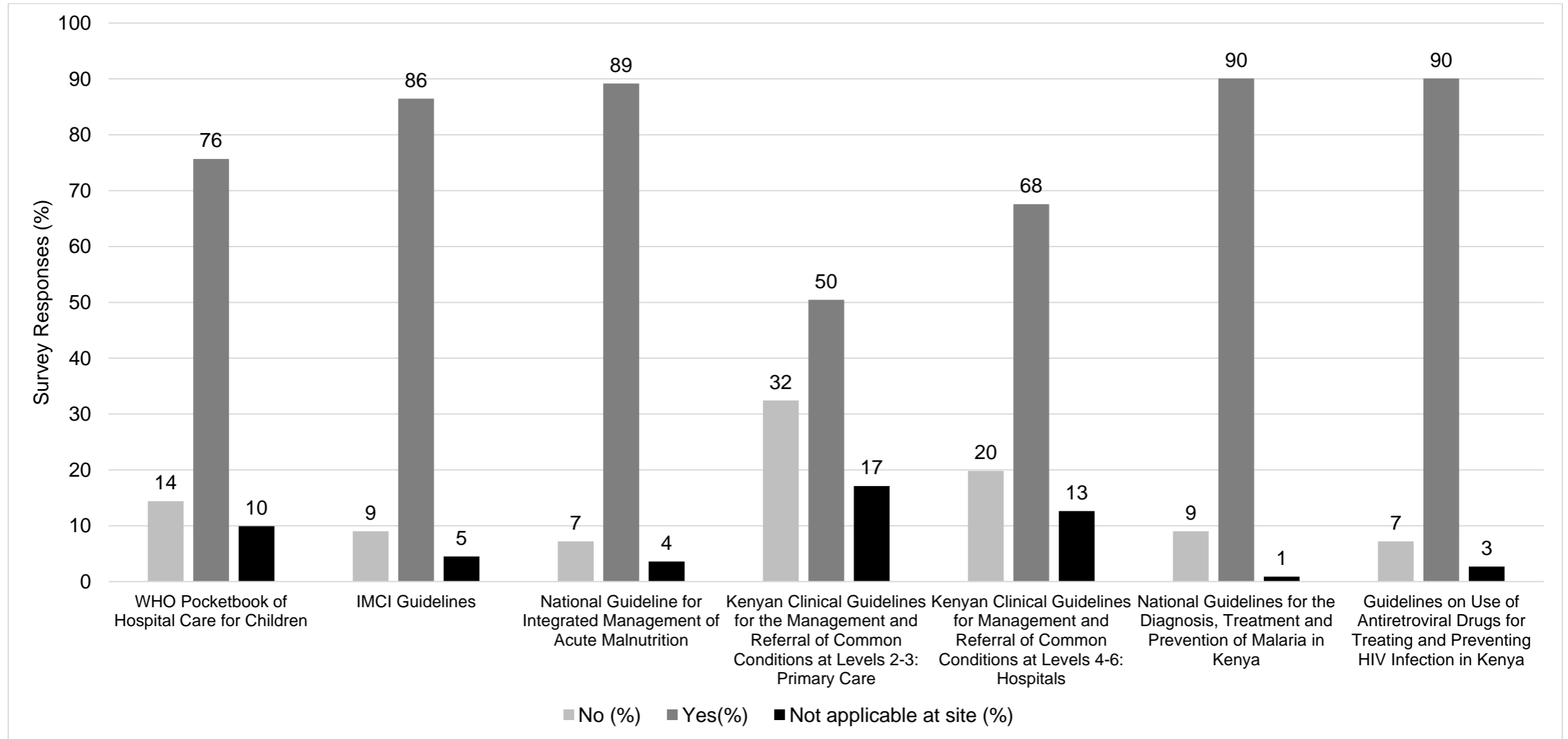
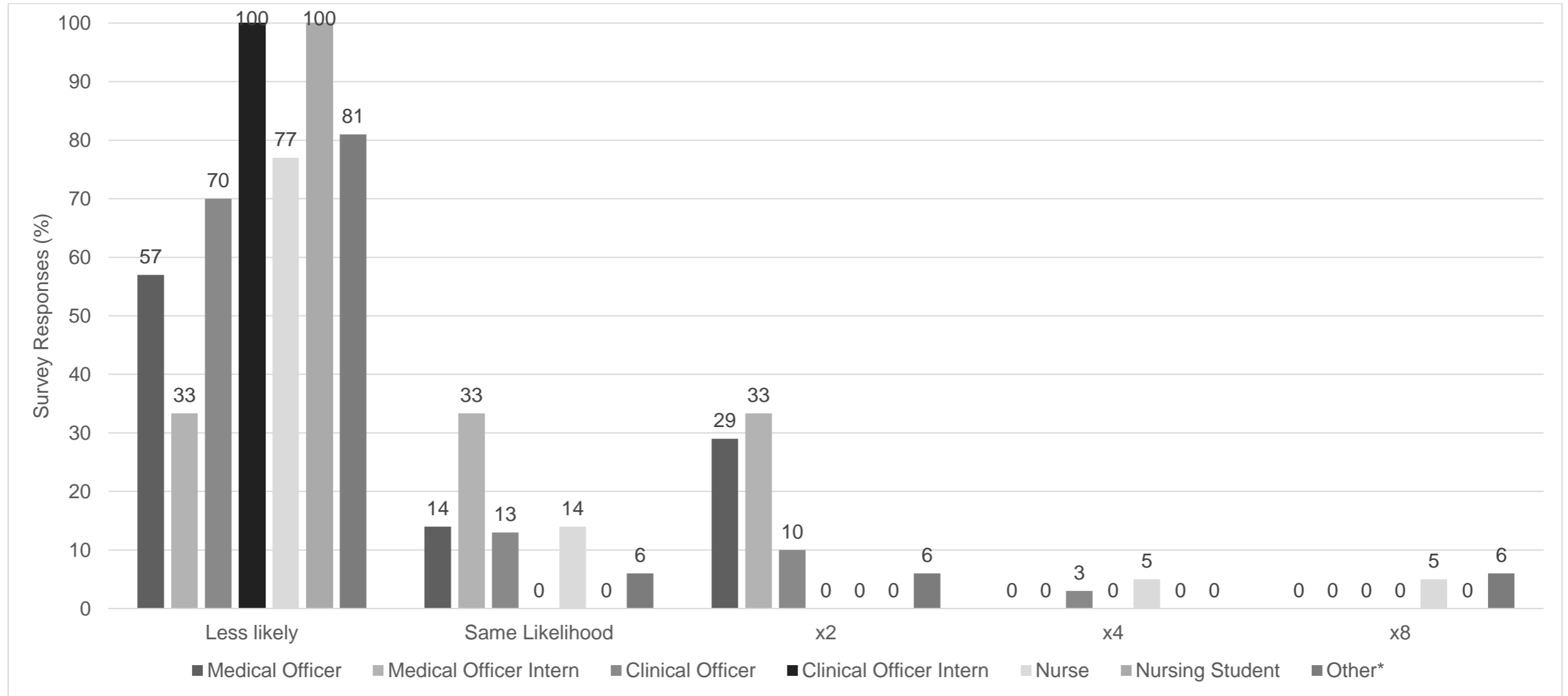


Figure 5. Child recently discharged from hospital likelihood of mortality compared to a similarly aged child in the community, as reported by survey participants



*Other includes nutritionists (5 surveyed) and HIV counselors (6 surveyed).

Table 3. Perceptions of hospital discharge care and how well respondent's hospital provides resources to deliver adequate discharge care, by healthcare worker and level of hospital

	How well do you think your hospital <u>delivers</u> pediatric discharge care?			How well does your hospital <u>provide the resources</u> to deliver adequate pediatric discharge care?		
	Very well	Somewhat to Moderately Well	Not well	Very well	Somewhat to Moderately Well	Not well
Medical Officers* <i>n = 7</i>	0 (0%)	7 (100%)	0 (0%)	0 (0%)	86 (100%)	14 (0%)
Clinical Officer Interns <i>n = 15</i>	9 (60%)	6 (40%)	0 (0%)	2 (13%)	13 (87%)	0 (0%)
Clinical Officers <i>n = 30</i>	4 (13%)	25 (84%)	1 (3%)	2 (7%)	23 (76%)	5 (17%)
Nurses <i>n = 43</i>	18 (42%)	25 (58%)	0 (0%)	14 (33%)	26 (60%)	3 (7%)
Other** <i>n = 16</i>	0 (0%)	10 (62%)	6 (38%)	1 (6%)	10 (63%)	5 (31%)
County <i>n = 42</i>	14 (33%)	28 (67%)	0 (0%)	8 (19%)	31 (74%)	3 (7%)
Sub-County <i>n = 69</i>	23 (33%)	45 (65%)	1 (2%)	7 (10%)	47 (68%)	15 (22%)
TOTAL <i>n = 111</i>	37 (33%)	73 (66%)	1 (1%)	15 (14%)	78 (70%)	18 (16%)

*Medical Officers includes Medical Officer Interns

**Other healthcare workers include nutritionists (5 surveyed), nursing students (5 surveyed), and HIV counselors (6 surveyed).

Table 4. Additional quotes from interviews with healthcare workers, by theme

Theme	County Hospital Responses	Sub-county Hospital Responses
Guidelines	<p>“We are not in possession of the blue book; [we] mostly use the IMCI guidelines, nutritional guidelines, and national guidelines.” -Clinical Officer#2</p> <p>“Not every health service provider is acquainted with the WHO guidelines...because they have narrowed themselves to the IMCI books and the national guidelines that are readily available to them. Not everyone is using [the WHO guidelines] in terms of serviced provision in terms of service provision we are seeing on the ground.” -Clinical Officer#3</p> <p>“Enhanced guidelines would improve pediatric discharge care because they would be more comprehensive and help healthcare workers make an informed decision. I think they should look at the disease burden in the country and develop a protocol...that covers everything. The national pediatric TB guidelines [and] the HIV guidelines, should be monitored or even discharged. Those should be handled to compliment the national pediatric protocol.” -Clinical Officer#3</p>	<p>“I think enhanced guidelines would improve discharge care. If everyone has access to the guidelines, then a standard of care will be provided. If everyone knows that the guidelines are... standard [and] should be followed, then there will be a standard of care at hospitals at every level.” -Nurse#1</p> <p>“We commonly use the WHO guidelines in cases of diarrhea and pneumonia. Those are the guidelines we normally use, or the IMCI guidelines. WHO guidelines considers diarrhea. During discharge of patients we group them where they belong according to the guidelines.” -Clinical Officer#2</p> <p>“From the discharge guidelines, I’d suggest that it should be standard everywhere such that wherever we are, if we go to another facility, the standard remains the same.” -Clinical Officer#3</p>
Underestimation of Post-discharge Mortality	<p>“To cover up for the inadequacies, that’s why...the clinicians that were interviewed could have said that to cover for their inadequacies and the government as a whole.” -Clinical Officer#4</p>	<p>“Because there is no follow-up on post-discharge mortality. They only do a mortality review in the ward, but a post mortality has never been done. They don’t have the data to inform their response.” -Clinical Officer#1</p>
Follow-up care	<p>“No, we do not track patients...usually the government hasn’t given enough personnel. Clinicians don’t have enough time to...follow up at home. Also the money...[caregivers of pediatric patients] might need to come back for review but they don’t.” -Clinical Officer#4</p> <p>“Follow up care does not go well because of inadequate number of staff.” -Nurse#1</p>	<p>“We are not doing very well right now...we have not been able to track patients [and] we have not had someone allocated to following up with patients...there are clinical knowledge gaps for...clinicians on what should be done and when.” -Clinical Officer#1</p> <p>“If a patient is needed to return back at the clinic and the patient has not returned, we will make sure that the patient is followed up.” -Nurse#1</p>

Re-admission	<p>“When you are doing the discharge and the counseling is not done properly. When they go home the [caregiver] is likely to repeat the same so this will lead to readmission. When discharge is done properly, that is to do counseling, that will avoid readmission.” -Nutritionist#1</p> <p>“The readmissions is not a barrier unless they fail to comply with the health instruction and education and medication they are given, unless there is a post infection apart from the one that was being managed. As far as I know, if the parent complies with what you were saying...re-admission] always very rare.” -Clinical Officer#1</p> <p>“If we can have good discharge and follow-up care we are going to avoid a lot of readmissions. We are going to manage our patients well and maybe manage conditions well.” -Clinical Officer#1</p>	<p>“Poor [home] care which can lead to severe acute malnutrition, exposure to HIV, and [poor] hygiene. These are the three cases that cause children to be readmitted to the ward.” -Nurse#1</p> <p>“They are readmitted because, one, they fail to come back when you give them follow up, and two, when the patient goes home things complicates again and the patient is brought back. Patient will come back with fever or malaria and after the course of treatment you discharge them and again they come back with the same fever.” -Clinical Officer#1</p> <p>“When you discharge the patient correctly and follow up, you avoid readmission because if there is a problem with a patient you make the diagnosis and treat the condition before they are readmitted.” -Clinical Officer#2</p>
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