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ORIGINAL ARTICLE

DO CARETAKERS OF SICK YOUNG INFANTS WITH POSSIBLE SERIOUS BACTERIAL INFECTION ADHERE TO REFERRALS FROM HEALTH POSTS TO HEALTH CENTERS?

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ABSTRACT

Introduction: *A well-functioning, responsive referral system relies on patient compliance in order to address newborn health problems that cannot be managed by lower level health facilities. Given that early identification and management of young infants with possible serious bacterial infection is fundamental to community-based newborn care.*

Objective: *Thispaper presents the findings of an assessment of adherence to referral.*

Methods: *Using a cross-sectional design with mixed qualitative and quantitative methods in five zones in two regions this study looked at sick young infants (0-2 months) whose caretakers sought care for them from a health post and who were classified with* possible serious bacterial infection *in the 12 months prior to the study. We reviewed clinical records of* possible serious bacterial infection *cases at health posts and health centers and conducted interviews with caretakers of referred* possible serious bacterial infection *cases and health workers.*

Results: *The study involved 33 health centers, 46 health posts, and 20 Woreda Health Offices. A total of 209young infants were identified as having* possible serious bacterial infection *and referred to higher facilities. A total of 145 mothers/caretakers of sick young infants with* possible serious bacterial infection *were interviewed. Registers from the health posts showed that 27% of cases were referred to a higher health facility. Health posts most commonly referred to government health centers (71%) while health centers referred most frequently to public hospitals (38%).According to health post records, only 52% of the* possible serious bacterial infection *cases were given a referral slip. The referral adherence rate from health posts to higher level health facilities was 88%according to caretakers; whereas health center registers reported the adherence rate as 23%. Significant factors associated with referral adherence included providing information on the severity of illness (p=0.037) and spouse's occupation (non-farmers 3 times more likely adhering to referral) (p=0.004).Communication between health posts and health centers was perceived as poor, despite formal meetings. Informal means of communication are more common than the formal ones.*

Conclusion: *This study identified major gaps around necessary health system element for the success of Community-Based Newborn Care, referral linkage between health posts and health centers and beyond. The referral practice including universal offer of referral, use of referral slips, and providing pre-referral treatment according to the national guideline is an area that needs a lot of work.*

Key Words*: Referral, Possible serious bacterial infection, referral adherence, health extension workers, Community-Based Newborn Care*

INTRODUCTION

According to the national Community-Based Newborn Care (CBNC) implementation guideline (1), all cases of possible serious bacterial infection (PSBI) must be referred, but will be managed at health post (HP) level when referral is not accepted and/or possible. The referral pathway for neonates with suspected PSBI considers identification at the household level and care at HP, health center (HC), and hospital levels (Figure 1).

It is estimated that currently about 80-90% of caretakers of newborns with PSBI will refuse to be referred to higher facilities and will be managed by health extension workers (HEWs), while the other 10-20% are assumed to agree with the referral (2).This makes referrals and their adherence critical, life-saving actions. A well-functioning and responsive referral system, therefore, is essential to treat PSBI cases appropriately. However, there is lack of literature about how the existing referral system for PSBI is functioning in Ethiopia and whether families are completing referrals.

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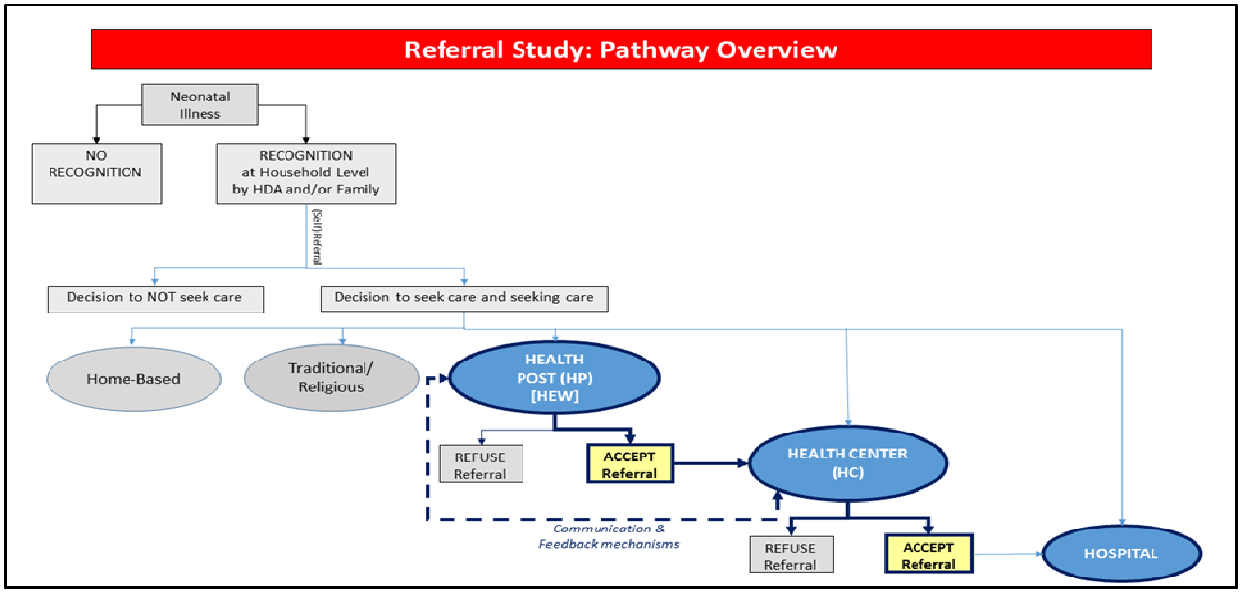

Figure 1: Referral pathway for Community Based Newborn Care

The objective of this study is to assess the referral adherence rate of caretakers of sick young infants and the barriers and facilitators to adherence. Specifically, the study looked at current referral practices from HPs to HCs, acceptance and adherence of referrals, and communication and feedback mechanisms between HPs and HCs.

MATERIALS AND METHODS

We used an observational, cross-sectional study with qualitative and quantitative methods. Data collection took place across five zones in two regions: Sidama and Gurage zones, Southern Nations and Nationalities' People Region (SNNPR) and East Shoa, West Arsi, and South West Shoa zones, Oromia region. We used retrospective register reviews to assess the volume of referrals made and the proportion of referrals completed.

Additional case reviews allowed us to explore the quality of care. Cases identified from the previous 12 months were traced to communities, where surveys of caretakers took place; in-depth interviews were conducted with a subset of caretakers. Qualitative interviews were also carried out with healthcare providers (HEWs) at referring HPs and at referred HCs. Table 1 summarize data-collection methods and sources.

Sample size

A single population proportion formula with the following assumptions was used to determine the required sample size of referred PSBI cases for the survey:

- 50% of cases that accepted referral will reach the designated facility (since the referral adherence rate was unknown, this was the most conservative assumption);
- ± 10% absolute precision;
- Design effect =1.5 (to account for correlation of observations among HPs);
- 95% confidence level

$$n = \frac{1.96^2\, p(1-p)(DEFF)}{d^2}$$

The sample size required for the survey was 145 referred PSBI cases. It was estimated that that at least 215 cases would need to be identified in order to survey 145 mothers/caretakers of infants with PSBI cases.

Sampling procedure – health facilities and PSBI cases: A multistage sampling procedure was used to select caretakers who visited HPs and were referred to HCs. In each HC, HP, and Woreda Health Office (WoHO), one HEW, HW, and WoHO staffer, respectively, was interviewed as a key informant. In-depth interviews with seven purposively selected caretakers were also conducted (four in SNNPR and three in Oromia).A sampling frame of woredas, HPs, and HCs was populated using Save the Children's routine programmatic database. Eighteen woredas (three to five per zone) and two HCs were selected based on level of PSBI case load (supervising HPs with relatively high referral case load, except in three woredas, where we only visited one HC).

[1]Referral adherence: after getting advice to go to a higher facility, having sought care from any qualified, facility-based provider. Whether the referral was completed was based on self-report and/or facility records.

Table 1: Methods overview

Method	Tool	Level	Purpose	Primary Data source	Inclusion Criteria
Quantitative	Module 1: Data extraction sheet	Health post	Document number of PSBI cases and referral practice	iCCM at HP	Child 0 to 2 months old during the onset of illness Child diagnosed with or classified as having PSBI Event occurred in the 12 months prior to HP visit Accepted referral to HC or higher facility
	Module 3: Data extraction sheet	Health center	Describe referral information from caretaker that complied with referral from HPs	IMNCIat HC	
	Module 2: Questionnaire	Community	Describe referral adherence, treatment adherence and the status of the newborn after treatment.	Mother/ caretakers whose newborns were referred for PSBI in the past year at household.	Caretaker identified during data extraction from HP 0-2 months' register, diagnosed with PSBI, event in the past 12 months, accepted referral. Caretaker accompanied sick young infant to HP during the child's illness; should be present at home.
	In-depth interview guides	Community	health-seeking behavior and adherence of referral	Caretakers who had a referral history in the three months before the study	Newborn illness occurred within the three months before the survey. Status of newborn has to be alive to avoid any grievance. Newborn illness occurred within the three months before the survey.
Qualitative		Health post	Explore information on the magnitude of PSBI	HEWs	HEWs who work in an HP where a young infant with PSBI was referred to an HC in the past 12 months.
		Health center	treatment adherenceand the status of the newborn after treatment; enablers and barriers to referral and treatment adherence	HWs	HWs who work in an HC where a young infant with PSBI was treated in the past 12 months.

Among these, HPs with *at least two cases of* PSBI in the previous year were considered and sorted in descending order by case load size. Cases were extracted until the required woreda-level sample size was obtained. Attempts were made to trace all PSBI referral cases from selected HPs to administratively assigned, destination HCs.

Data extraction tools were developed to capture PSBI cases seen and referred in the year prior to the assessment.

Data sources for extraction included ICCM registers (birth to two months) at HPs and the *IMNCI registers* at HCs. Modules for quantitative and quantitative data collection were prepared in English and translated into Amharic and Oromiffa. All were pre-tested and necessary adjustments were made prior to data collection. Data collection was done between July and August 2016 by two teams composed of a research associate with a note taker for the qualitative part and a supervisor and four data collectors for the quantitative part.

The research associates had at least MPH qualification and previous experience in such work, and the data collectors had a health background with least a BSc and previous experience. Extensive training on the tools and the study was done prior to the data collection.

For the quantitative data, SPSS version 21 was used for data entry and analysis. Statistical significance was tested using chi-square and *F*-test statistics. For qualitative data, interviews were transcribed and translated. Transcripts were coded both inductively and deductively and analyzed thematically.

Ethical clearance was granted by the Ethiopian Science and Technology Ministry's Institutional Review Board (IRB). The survey team was trained on ethical issues during orientation. Oral and written consent were obtained from study participants.

RESULTS

Overview of study participants

The study involved 33 HCs, 46 HPs, and 20 WoHOs in the five study zones of the two regions. Using ICCM registers, a total of 209young infants were identified as having PSBI and referred to higher facilities. A total of 145 (69%) mothers/caretakers of sick young infants with PSBI were tracked to their home and all consented to follow-up interviews. The majority of those surveyed (94%) were mothers who took their infants to the HP ;the remaining were fathers and other family members (Table 2).

Referral practice and care for very sick young infants at health posts: Registers from the study's HPs indicated that 778 young infants with PSBI were seen in the year prior to the study, of which 209(27%) were referred to a nearby higher health facility (Figure 2). S.W. Shoa and Gurage zones referred nearly 80% of cases, while the referral in the Sidama is about 50% of those cases seen. Differences among the zones may be explained by the fact that some zones like W. Arsi, which reported a 10% referral rate, has the Zonal health department directing the HPs to treat all newborn sepsis cases, even though the national CBNC protocols have provided clear guidelines on referral.

Of the 209 cases reviewed in HP registers, 71% were sent to HCs and 18% were sent to hospitals; the remaining 7% returned back to the HP. This contrast with caretaker interviews who reported that 82% were referred to HCs, 12 % were referred to hospitals and 6% were referred to non-governmental health facilities.

Table 2: Socio-demographic characteristics of caretakers (n=145)

Characteristics	N (%)
Zone/Region:	
Gurage	46(32%)
Sidama	23 (16%)
SNNP	70 (48%)
W. Arsi	23 (16)
E. Shoa	46 (32)
S.W. Shoa	6(4)
Oromia	75 (52%)
Relationship to infant:	
Mother	136(94)
Father	5(3)
Grandmother	4(3)
Age of the caretaker (mean ±SD)	28.3(±6.4)
Age category:	
Up to 24 years	37(26)
25 -30 years	66(46)
31-35 years	25(17)
Above 35	17(11)
Attended formal education	90(63)
Level of formal education (N=90):	
Primary (1-6) school	63(70)
Secondary (7-12) school	27(30)
Marital status of caretakers:	
Single & never married	6(4)
Married & living together	131(91)
Married but not livening together	1(1)
Divorced/separated	3(2)
Widowed	2(1)
Occupation:	
Housewife	108(75)
Farmer	29(20)
Daily Labourer	1(1)
Trader/merchant	6(3)
Employee (Government/private/ NGO)	1(1)
Spouse/partner occupation:	
Daily Labourer	78(54)
Farmer	49(34)
Trader/merchant	2(1)
Civil servant	7(5)
Other/DK	9 (6)
Average monthly income of the HH (mean ±SD) range	709±672 (20-4400)
Average monthly income of the HH by category	
Below 600 birr/month	68(47)
600 birr/month& above	62(43)
DK	15(10)

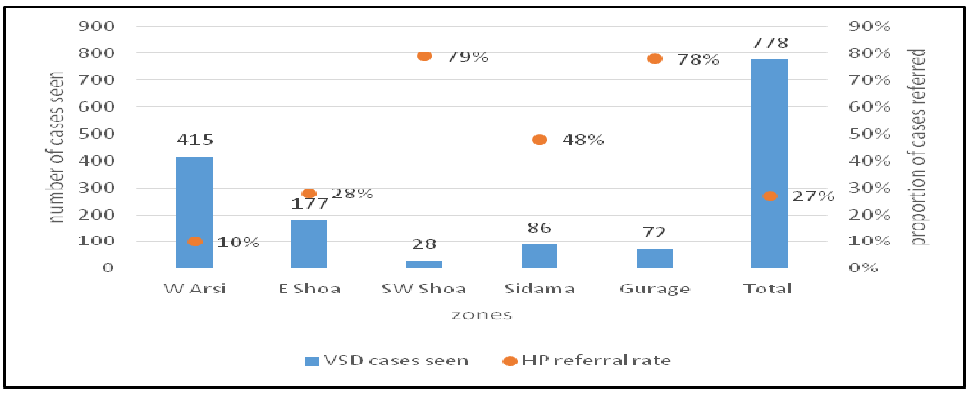

Figure 2: Number of possible serious bacterial infection cases and

Referral practices at HPs

Decision to offer referral

Interviews of health providers revealed that referrals were not universally offered for all PSBI cases. Issues such as the perceived severity of illness, availability of essential drugs at HPs and at destination HCs, awareness and understanding of the protocol, acceptance of the national protocol, and pre-referral treatment outcome were the frequently cited reasons that influence whether referral is made or not.

> *Although the chart booklet states that all neonates with PSBI should be referred to HCs, taking our preparedness and caretakers' suffering (time and cost) into consideration, I always treat them at HP unless we run out of medication, the danger signs worsen, and/or the mother requests to be referred. Furthermore, I do not see the difference in the management of PSBI between HPsb and HCs.*
>
> HEW at S.W. Shoa zone

Pre-referral treatment

Based on ICCM registers, only 64% of sick young infants were provided pre-referral gentamycin at the HP; 13% of records had no information recorded while the rest (23%) did not get the pre-referral gentamycin. This is higher than the 3% not receiving pre-referral gentamycin that was reported by the COMBINE study(3).HEWs cited various reasons for not administering pre-referral gentamycin, primarily a lack of supply, wanting to avoid double injection, and less severe signs of illness.

Fifty-five percent of caretakers surveyed confirmed that an injection was given to their sick infants as a pre-referral medication. Sixty-five percent of the caretakers also reported that their sick infants were given oral medication. Only 47% of PSBI cases reported receiving both the injection and oral medication at

Provision of referral slip

ICCM registers reported provision of referral slip in 52% of referred cases, whereas 72% of caregivers receiving referral reported being given a referral slip. Most HEWs and HWs noted that referral slips to and from HC sare very important because they improve case management and support follow-up to ensure that an infant is completing treatment. Specific referral practices varied. According to some HWs, HEWs call HWs (at HCs) to notify them of PSBI referrals whereas others just send a short note on a small piece of paper. Most caretakers reported that HEWs just told the mother to go to a HC.

> *…I think one PSBI case has been seen in the past three months at the HC. HEWs are not sending referral slips, but at times, they make a phone call, and the register does not have a column to enter referral cases. We also do not have the practice of sending written feedback to HPs.*
>
> Health Worker. Shoa zone

Referral adherence

Of the 145 caretakers who accepted referral, 88% adhered to the referral, of whom 89 (70%) went to the health facility specified by the HEW while 38 (30%) went to other health facilities. By contrast, HC registers show only 23% referral adherence from those who reported that they went to the recommended facility (Figure 3).There were many problems related to the completeness of HC registers, including incomplete registration, a lack of revised CBNC registers, and confusion about the sending facility. The interviews with the health worker revealed that the common perception was that only IMNCI-trained HWs are supposed to

According to the caretakers, nearly 90% of completed referrals arrived at the referral facility within 24hours of referral.

Facility preference and preferential adherence

According to the caretaker interviews (*n*=145), the majority of cases were referred to government HCs as compared to hospital and non-governmental health facilities, with 73% of caretakers reporting they adhered to the referral by going to the recommended facility. Caretakers reported adhering to referral for non-governmental facilities at 100%; 71% for government hospitals; and 57% for government HCs.

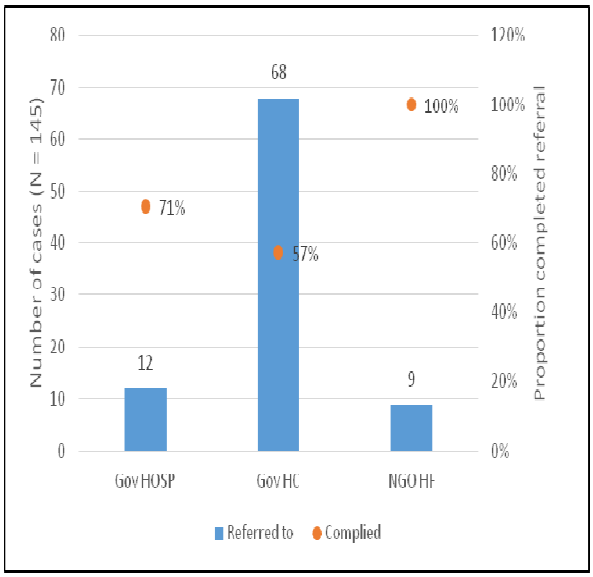

Figure 3: Referral acceptance and completion by destination health facility as reported by caretakers

While most care takers reportedly took their sick young infants to their assigned referral facility, some reported going to other facilities because of cost, distance, confidence, and trust. Most, (57%) of caretakers required to pay for their transport while 80% for medical service they received, an average of 40 birr. Of those who paid for medical care, 82%paid for medication and 21% for consultation/card.

It should also be noted that the current IMNCI guideline directs Health Centers to provide Gentamycin and Ampicillin injections for seven days at OPD level, which requires for the family to come twice daily making it more difficult (4)There were also cases where caretakers and HEWs jointly decided on the destination facility. Some HEWs reported tailoring the referred facilities to the severity level of each PSBI case.

> *If I believe that the illness is severe, I send the baby to nearby hospital and to a nearby HC if I feel the condition is mild or moderate. In fact, direct referral of cases from HPs to hospital is also well accepted and encouraged by HCs, as they believe that there is no difference in the management of VSD between HPs and HCs.*
>
> HEW in Sidama zone

Factors influencing referral

After controlling for possible confounders in a multivariate model, providing information on the severity of illness (p=0.037) and spouse's occupation (where non farmers are 3 times more likely than farmers to adhere to referral) (p=0.004) were associated with referral adherence. These findings should be treated cautiously, as the sample size of this study is relatively small.

Referral non-adherence

In the qualitative inquiry, health workers mentioned time and financial constraints as a major factor for refusing referral, especially to hospitals due to the possibility of being admitted. Other reasons mentioned by HEWs included a less friendly and cold reception at HCs and hospitals. Factors noted by caretakers that hindered referral acceptance included long waiting times for care providers, hassle in drawing patient cards, going to different sections of the facilities for services (e.g., laboratory, injection room) and sometimes referrals to other hospitals.

> *Most families do not like going to the hospital when referred, mainly for fear of admission and the following challenges:(1) maternal exposure to cold/wind and fear of evil eye upon the sick child; (2)expense related to hospital service and to transport food from home; (3) parents with many children [who are] less educated and from poorer households usually resist referral.*
>
> A HEW in Sidama

Caretakers also prefer to go to heath facilities where they are near to their family/relatives for social support rather than to going to the HEW's specified facility.

> *A mother in Adami Tulu Jido Komolcha Woreda with a sick infant with PSBI was advised to take the baby to a nearby HC. In order to avoid confrontation with the HEW, the mother took the referral slip with pre-referral injection, but went to a nearby hospital because the hospital is much closer to her relatives to get support.*

[7]Referral non-adherence: after getting advice to go to a higher facility, not having sought care from any qualified, facility-based provider.

Communication between PHCUs

Written feedback from HCs to HPs was very low (19%); only 12% of cases were referred back to HPs for follow up from referral higher facilities. In interviews with HC and HP health workers, most admitted poor communication between them in general and for PSBI management, in particular; however, the reasons were not explored during the interviews. Informal ways of communication such as telephone calls, use of simple pieces of paper, verbal messages through caretakers and others were reported as more common than the formal referral mechanisms, such as use of referral slips and feedback written notes.

DISCUSSION

We believe our study is the first to examine the referral system for newborns with signs of PSBI under Ethiopia's CBNC program. The study focused on referrals by HEWs to HCs as currently recommended by the Ministry of Health. We specifically examined the quality of pre-referral care by HEWs and referral adherence by caregivers among those who agreed to accept the HEWs' referrals. Using qualitative methods, we further identified enablers and barriers for HEWs to provide pre-referral antibiotics, as well as for caregivers to adhere to referral recommendations.

The study identified factors associated with adherence to referral. These are perceived severity of illness of infants, age of the sick infant, education level of the caretaker, support from caretaker's spouse, prior experience of referral, and access to referral facilities. The importance of social support to make onsite consultative decisions among close family members is indicated by the better adherence rates of those with support from spouses.

On the healthcare providers' side, facilitators included provision of information about the seriousness of illness and the available quality of care at referral facilities to caretakers, psychosocial and physical support for mothers, and provision of a referral slip. Some of these were also mentioned as factors that affect referral as in a couple of other Ethiopian studies where perceived availability of services, commodities, medicines and human resources in the referral facilities limits the completion of referrals (5,6).

CBNC guidelines (3) recommend that HEWs provide pre-referral antibiotics at the health posts for all PSBI cases accepting referral. This is a critical and life-saving because any delays in starting antibiotics put the sick child at risk. During supervision visits and clinical mentoring, pre-referral treatment should be emphasized.

Optimal functioning of the CBNC referral system requires consistent provision of referral slips by HEWs and receipt and appropriate use of referral slips by HCs. Our data on provision and use of referral slips indicates that this component of the referral system is weak. Referral slips serve multiple purposes including helping the family to understand and adhere to the referral, ensuring the health worker at the higher-level facility has information needed to make clinical judgments about illness classification and appropriate decisions about treatment such as timing of administration of Gentamicin.

A key element of primary health care is its referral system in which patients are able to access care at community-based health posts or health centers before accessing higher-levels of care such as secondary and tertiary hospitals. The referral system among health facilities in Ethiopia is used by a minority of patients, suggesting that intended connections between health posts, health centers, and hospitals may need strengthening to increase the efficiency of primary care nationally. (5) The referral of PSBI cases to an admitting higher facility has been the mainstay of management according to global and national guides (3,7). Despite national guidelines requiring universal offer of referral, use of referral slips, and pre-referral treatment, our study identifies major gaps in this service delivery.

In this study, the communication across the various levels of the PHCU with regard to referral and counter referral system was suboptimal. Written feedback from HCs to HP appear to be generally low. This may undermine the necessary follow up home care that need to be provided for at risk vulnerable newborns (particularly for premature or low birth weight babies) once they are back at home (8).

The limitations of this study included that the cases examined had already been classified as PSBI by HEWs, and they were not validated. The study did not classify different levels of illness severity, but instead, analyzed all PSBI cases based on national guidelines. Other limitations include poor documentation in registers of cases and referrals, the lack of a "gold standard" source of information, and a small sample size.

Conclusion and recommendation

This study focuses on major health system element upon which the success of CBNC depends, referral linkage between HPs and HCs. The management of PSBI at the HPs, especially with regards to pre-referral treatment, and irregular communication between HC and HP levels, are major gaps. The institutional capacity of the HPs for managing PSBI cases must be maintained. The study recommends that there needs to be stronger support from the PHCUs in ensuring HPs strictly follow the national PSBI management protocol – pre-referral treatment, counseling of caretakers on the importance of referral adherence, what to expect at a higher facility, and follow up of referred cases. Using mobile phones and other innovative ways can improve two-way communication and feedback loops. There is a need to strengthen the linkages (clinical and social) between HCs and HPs such that they see themselves as one unit; encourage HC staff to facilitate and participate in PRCMMs with WoHO and ensure the focus during these reviews and supportive supervision include issues related to referral.

We also recommend to encourage the use of ambulance for transport of newborns with complications. There is a need to realign the various guidelines that govern management of severe infections in newborns at different levels so that the outpatient treatment is similar. There should also be further study to address the way health facilities handle referrals like process mapping of what happens when families arrive until they are treated.

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Conflict of interest

Authors have no conflicts of interest to declare.

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