A Qualitative Study to Explore the Experience of Parents of Newborns Admitted to Neonatal Care Unit in Rural Rwanda

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Abstract

ABSTRACT (310/350 words) **Background:** Neonatal Care Units (NCUs) provide special care for sick and small newborns and can help reduce neonatal mortality. For parents, the experience of having a hospitalized newborn can be traumatic. In LMIC, especially sub-Saharan Africa, there is limited information about the parents' experience of care in NCUs. **Objective:** Our study aimed to explore the experience of parents in the NCU of a rural district hospital in Rwanda. **Methods:** A qualitative study was conducted with parents whose newborns were hospitalized in the Ruli District Hospital NCU from September 2018 to January 2019. In-depth interviews were conducted using a semi-structured guide in the participants homes by trained data collectors. Data were transcribed, translated, and then coded using a structured code book. All data analyses were conducted using Dedoose software. **Results:** Twenty-one interviews were conducted primarily with mothers (90.5%, n=19) among newborns who were most often discharged home alive (90.5%, n=19). Parents reported stressful and emotional responses to having their newborns admitted particularly when they lacked clear understanding of their newborn's condition, generally positive communication and interactions with healthcare providers and other parents, policies and procedures in the NCU that contributed to stress and limited access to newborns by fathers and other family members, and stress due to the high financial burden of NCU care. **Conclusion:** The admission of a newborn into the NCU alone was a source of stress for parents and caregivers in rural Rwanda. However, there were several positive factors of the NCU including involvement of mothers and support from healthcare providers. The experience in the NCU can be improved when healthcare providers communicate and explain the newborn's status to the parents and actively involve them in the care of their newborn. Expanding the NCU access for families, encouraging peer support, and ensuring financial accessibility for neonatal care services could contribute to improved experiences for families. **KEYWORDS:** prematurity, neonatology, family-centered care, neonatal care unit, nurses, patient satisfaction, patient experience

Background

Neonatal mortality makes up nearly half of all deaths among children under five years of age [1]. It is estimated that nearly 1.9 million newborn deaths can be averted by 2025 if quality maternal and newborn care interventions were implemented [2]. Expansion of access to specialized neonatal care units (NCUs) for sick and small newborns is one of the global priorities to reduce neonatal mortality [1]. Despite the tremendous benefits of NCUs in achieving better neonatal health outcomes, studies exploring experience of parents in NCUs have shown it to be a stressful experience for families [3–8].

While there is a large body of literature regarding parental experience in NCUs in western countries, very little is known in Sub-Saharan Africa [9, 10]. A small number of studies in South Africa showed that parents often experience negative emotional feelings and various challenges in NCUs [8, 11]. Many parents expressed depressive symptoms and inability to bond with their newborns [12–16]. Some newborns were abandoned in the NCU, and this disruption of parental care can contribute to inferior early child development outcomes, lower educational attainment, and poorer lifetime economic earnings [17]. However the findings and recommendations from South Africa - a high middle-income country, are difficult to transfer to other Sub-Saharan African nations - predominantly low income countries [18].

Between 2005 and 2015, Rwanda has documented a rapid decline in under-five child mortality from 152 to 50 deaths per 1,000 live births and neonatal mortality from 37 to 20 deaths per 1,000 live births [19]. Despite such tremendous progress, neonatal deaths still contribute to 40% of all under-five deaths in Rwanda [19]. In order to accelerate the reduction in neonatal mortality, the Rwandan Ministry of Health launched the National Neonatal Care Protocol in 2012 addressing the gaps directly related to clinical neonatal care [20] and scaled-up hospital level neonatal care countrywide. However, other than for skin to skin care, the protocol does not integrate parents into the NCU environment

[21, 22]. One quantitative study found high stress score among parents of newborns admitted to NCU in an urban tertiary hospital [23].

Quality healthcare requires both the provision of evidence-based clinical care to newborns and also ensuring a positive experience of the newborn and their families [24]. High quality care cannot be fully achieved unless the experience of care meets the needs of families, which requires knowing their experiences, and designing appropriate interventions are designed [24–26]. Accordingly, this study explored the experience of parents whose neonates were hospitalized and discharged from the NCU in a district hospital in rural Rwanda. The results of this study can add to the existing literature on the experience of parents with newborn children in the NCU in low-and middle-income countries in the sub-Saharan Africa region.

METHODS

Setting

This study was conducted in the catchment area of Ruli District Hospital – a rural public hospital located in Rwanda's Northern Province. With 10 beds and 5 incubators, Ruli District Hospital's NCU also serves as a referral site for hydrocephalus treatment. In 2017, there were 459 NCU admissions [27]. From 2017–2019, Ruli District Hospital received support to improve the quality of care for newborns through the All Babies Count (ABC) program implemented by Partners In Health/Inshuti Mu Buzima and the Ministry of Health.

Design

We used phenomenological approach in this qualitative study of parent's lived experiences [28]. Semi- structured interviews were conducted to understand the experiences of parents having a newborn hospitalized and discharged from the NCU.

Study Participants

Parents or primary caregivers of neonates discharged from the NCU within three months prior to data collection were included in the study. They had to be at least 18 years of age and with newborns admitted to the NCU for at least three days. We purposively stratified the samples by distance (living within and more than 1-hour walking distance from the facility), by admitting diagnosis (prematurity and other reasons), and outcome (died or alive at discharge).

Data collection tool and procedure

Interviews were conducted using a semi-structured interview guide that included questions related to the parents' and caregivers' feelings on neonatal admission and their experience in the NCU, the quality of communication with healthcare providers, their involvement in the newborn's care, and the support received from the hospital staff, relatives, or others during the stay. The interview guide was translated to Kinyarwanda - the local language used for conducting the interviews.

The interview guide was pre-tested and piloted before data collection. Participants who fulfilled the selection criteria were identified via the NCU register and were contacted through their respective Community Health Workers and were invited to participate in the interviews. Interviews were conducted at the participants' homes on the appointment dates by two trained female data collectors until saturation was reached. Husbands and wives were interviewed separately. Written consents were obtained before the interviews.

Data Analysis

Interviews were transcribed and translated, then coded by two independent investigators. The codebook was created based on the literature, and the pilot interviews. The transcripts were coded then grouped into themes. The data analysis was conducted using Dedoose Software.

Ethics

The study was approved by the Rwanda National Ethics Committee (No. 107/RNEC/2019) and the Institutional Review Board for the University of Global Health Equity.

Results

A total of 21 interviews were conducted (Table 1), 19 (90.5%) were female and age between 20 and 65 years. Seventeen (80.9%) of the participants were married and 4 (19.0%) were single. Nineteen (90.5%) had children who were alive, while 2 (9.5%) died prior to discharge from NCU. Eight (31.0%) lived within an hour walking distance to the hospital while 13 (61.9%) had to either take the bus or a motorcycle, or walk for more than an hour to the hospital from their homes. Prematurity (42.8%) and infection risk or fever (14.2%) were the most common reasons for admission. All participants had health insurance.

Table 1
Demographic characteristics of participants

Characteristics		N (%)
Total Participants		21
Age (n = 19)	20–29	8 (38%)
	30–39	8 (38%)
	>=40	3 (15%)
	Undeclared	2 (9%)
Gender	Male	2 (9.5%)
	Female	19 (90.5%)
Newborn's outcome at discharge	Alive	19 (90.5%)
	Dead	2 (9.5%)
Marital status	Married	17 (80.9%)
	Single	4 (19.0%)
Distance to hospital	< 1 hour	8 (38.0%)
	> 1 hour	13 (61.9%)
Reason for admission	Prematurity	9 (42.8%)
	Low Birth Weight	2 (9.5%)
	Infection risk/Fever	3 (14.2%)
	Other*	7 (33.3%)
Health Insurance	Yes	21 (100%)

*Other: asphyxia, congenital malformation, jaundice, not sucking on breast, respiratory distress, cord bleeding

Participants shared four overarching themes about their experience of having their newborn hospitalized in NCU at Ruli DH. Theme one consists of parental experience, perception, and adaption to the NCU environment. The second theme describes the parental interactions and experiences with healthcare providers and other mothers in the NCU. The third theme covers the parental experience and perceptions of the regulations, policies and procedures of NCU. And the fourth and last theme covers the financial challenges of affording NCU care and the support received from the hospital.

Theme 1. Adapting to the NCU Environment

Parents shared fear and many emotions while they were adapting to an unfamiliar care environment in the NCU. They shared challenges with the cold temperature of the NCU, but also reported the NCU to be clean and calming.

Many parents reported feeling fearful when they were informed that their newborn required admission to the NCU. The fear that their children may die caused them sadness, uneasiness, hopelessness, disturbance and anxiety.

"There was no other way I could understand it... I didn't even feel hopeful because the baby was too premature. I was just waiting for what God was to give me. My baby only weighed 1.2 kg. I felt hopeless and feel the healthcare providers were struggling for nothing." (Mother, age 36).

Several mothers reported a very emotional response to their newborn's admission:

"I felt very sad and I am telling you that I would suddenly burst into tears. I was alone with the baby always expecting to be discharged the following day. I felt disturbed, wept repeatedly, then breastfeed the baby but suddenly find myself crying." (Mother, age 28).

"I cried. Other mothers used to say that no other person enters in there [NCU]. I felt like it was over for me when I saw myself referred there. I thought that I would not leave soon and I imagined that my baby would eventually die. The place [NCU] is strange. Before this time, we used to bring food to mothers whose babies would be hospitalized in the NCU. We would not get in contact with them [other mothers]. We would see them from a distance, and you could not see their babies. When I realized that it was my turn to go there, I felt very sad, and it was hard for me to accept the situation" (Mother, age 25).

Many reported negative feelings caused by the look at the different tubes and wires attached to the newborns inside the incubators, the sound of the equipment and sometimes the care provided to the newborns. A father managed to trespass into the NCU and described how he felt when he saw his fifth newborn in the NCU for prematurity:

"I felt scared to see the machines. You say, look at these machines, and the baby is lying in them naked. I was not sure that my baby would survive." (Father, age unknown).

Another mother shared:

"I was stressed because I was thinking that she (my baby) would not survive. I saw that my baby was on oxygen, and another noisy machine, I lost hope because the baby spent the whole week in the incubator. When I arrived at the hospital, I was so worried that my baby would not make it." (Mother, age 35).

In addition to the emotions parents felt in the NCU, parents reported the NCU to be cold and crowded. Additionally, the nature of the NCU care makes mothers unable to rest as many of them had to watch over their newborns day and night. The death of a fellow mother's newborn was also another source of stress for the rest of the mothers in the NCU.

"Cold... ohhhh, it was too cold. Our babies were freezing and were losing weight. The room was freezing." (mother, age 44).

Additionally, parents feared that their newborn may be hurt by the care provided in the NCU.

"He [a nursing student] held it [a needle] and pierced without first looking for where the vein was, and he attempted three times. The third time, I told him to stop paining my baby." (Mother, 32).

Some mothers felt stressed by not being able to care for their newborns, or provide sufficient breastmilk. They also lacked means to follow up on their own health because they were usually still sick when the newborns were transferred to the NCUs.

"What stressed me is when they told me to express breastmilk for my baby. The baby stayed in the machines on oxygen, and when it was time to start pumping breast milk for the baby, I could not get it." (mother, age 36).

"Because of taking care of the baby while I was still sick, I became sicker and felt as if I was dead. I did not know what I was sick of but when I went to seek care I had high fever and was shivering." (mother, age 33).

Despite the many stressful aspects of the NCU, other mothers reported the environment to be safe, clean and quiet which provides a sense of comfort and positive feelings.

"I thought the place would be smelling bad. I, however, found it different. They [healthcare providers] teach them [mothers] morning and evening to have hygiene so that even newcomers can be informed about hygiene." (mother, age 43).

"I was very happy with the hygiene of the NCU. I was happy with the way they restrict the access into the Unit where there are babies born with problems. You see, allowing many people inside would cause the room of sick babies to be stuffy. They avoided that. The way they prohibit the entry of shoes from outside is good." (mother, age 27)

"You enter and you can even make a prayer silently in your mind to avoid making noise. You make sure there is no noise in the NCU, no one is allowed to scream, the people inside are so quiet. It is not authorized to make phone calls or other devices that may produce noise." (mother, 35).

Theme 2: Experiences with Other People in NCU

Caregivers reported having both positive and negative interactions with healthcare providers, and an overall strong sense of trust for healthcare providers. Other mothers in the NCU were reported to be a consistent source of support for each other.

A mix of healthcare provider attitudes, some positive and others negative, were reported by parents. They were appreciative of the healthcare providers who explained the care their newborns received, provided guidance and updates on the newborn's condition, and encouraged them to ask questions.

"There was one woman [healthcare provider] who used to talk to us. She would say, 'Do you have any questions?', and we often responded, 'no'. She would then ask us what she would have taught us. We were more comfortable with that healthcare provider." (Mother, age 28).

"We would joke with healthcare providers and occasionally forget that our babies are hospitalized. They would come and comfort us telling us that our babies would get cured. You could notice that they were doing whatever possible to converse with us." (Mother, age 33)

The provision of information about the findings of assessments contributed to the parent's understanding of the newborn's condition and was one key factor to the positive feelings and comfort to the mothers in the otherwise hopeless conditions.

"It was my first time to see such kind of disease [jaundice], my first time to hear of it. I had a hope that he will get well soon. After they [healthcare providers] explained the condition to me, I felt ensured that the child shall get cured and I had no problem. In fact, because the healthcare provider explained the baby's condition to me, I did not ask again. However, before explaining to me, I was very curious to know what caused the disease but they gave me explanations." (Mother, age 22).

"When I arrived, they [healthcare providers] examined the baby, looked at her vomiting and the problem in her eyes and they comforted me saying it would go away little by little. They advised me how to position my baby while breastfeeding and it decreased gradually. Gradually as they talked to me and comforted me, I regained the mood." (Mother, age 28).

However, some healthcare providers were reported to have a bad attitude which made the NCU stay stressful and challenging for some mothers.

"Whenever healthcare providers entered, I felt fear because they entered speaking roughly, except that you ought to get used to it. Once, when the baby was inside a machine, they wore only pampers because they were naked inside the machines. I went outside immediately after breastfeeding. A few minutes after, when I came back the baby had passed stools. The healthcare provider immediately talked to me in a rude voice. I tried to explain that I was there with my baby a few seconds ago. She refused to understand and roughly said I should look after my baby at every moment." (Mother, age 22).

"They yelled at me asking me why I had not yet bought clothes for my baby. I begged and told them that I could not afford to buy the clothes because I am poor. She rudely replied that poor people do not go to seek care at Ruli hospital." (Mother, age 36).

Blaming parents for the newborn's condition was another attitude repeatedly reported by parents.

"My baby had a fever and was vomiting. I called the healthcare provider who was on day duty and she said that it was because of me that I was not holding my baby well." (Mother, age 22).

"They [healthcare providers] kept telling me that I had refused to go to seek care in Kigali when I was referred. I told them that I had no means." (Mother, age 36).

Most of the parents interviewed expressed high levels of trust in healthcare providers, including those whose newborns died prior to discharge. Parents reported that they trusted that providers were doing their best to save the newborns.

"I wished to be involved, but I did not decline any treatment because I could see them coming to treat my baby and I felt that because they are healthcare providers my baby would be cured." (Mother, age 33).

"I felt that because my baby is in the hands of healthcare providers, she would be fine. They would comfort us saying that no baby would die anymore, and we felt hopeful. After that, they took an exam and the result was good and I was very happy that my baby was fine. They took care of my baby. They tried whatever possible." (Mother, age 25).

In addition to turning to their partners, family and relatives for support at the time of admission and during the stay, fellow mothers in NCU provided emotional and material (food, clothes, and other consumables) support which was a

great comfort for many.

"Other mothers are the ones who helped me feel better. When I looked at their babies and they told me that their babies were sicker when they arrived than [at] that time, I felt better." (mother, age 27).

"There was another woman next to me, who had also given birth to twins and whose care attendant was her mother. They used to lend me materials and because she also came from far, when they would have brought them food they cooked and shared with me. I did not have people who could bring me food, so, I survived because there were people of goodwill at the hospital." (mother, age 25).

Other mothers also helped explain the situation of the NCU to others when healthcare providers did not:

"We had to transmit the information to the mothers who were new and did not know these instructions because healthcare providers were not always in [a] good mood of communicating." (Mother, age 25).

"There were mothers without care attendants. They go into the eating hall to see if someone can give them food. We do share food with them because one cannot finish it. I have noticed that people help each other because of the service that takes place at the hospital. When you see how healthcare providers try to support us, and you wonder how we cannot support each other's mothers as well." (Mother, age 28).

Theme 3. Experience of the strict regulations, policies, and procedures of NCU

Caregivers reported some regulations that were positive – such as uninterrupted access to their newborn but other regulations of no visitors, no care attendants, and no eating inside the ward stressed mothers. The procedures of always cleaning hands, changing shoes, putting on different clothing (aprons) are a source of stress to some mothers even though some mothers appreciated them due to the resulting calmness in NCU. Caregivers stress was worsened by insufficient induction contributing to a lack of understanding of NCU rules and procedures.

Mothers reported that having full access to the newborn any time throughout hospitalization, even when the newborns were inside incubators or on phototherapy, brought them comfort. Having some responsibility for the care of their newborns, ranging from paying the bills, to bringing required materials, to feeding or bathing their newborn, improved their feelings about the situation.

"Of course, we, as mothers, feel very stressed. However, the healthcare providers told us, there was no problem, we could go at any time to have a look at our babies. They told us to be close to our babies. We hence used to come look at our babies and [go] back whenever." (mother, age 35).

"They [nurses] told me to go and breastfeed my baby anytime I wanted. I felt no problem because I was free to go and see the baby anytime." (mother, age 22).

The fathers were the only caregivers other than the mothers reported to have some access into the NCU, though they had limited visiting hours and were not allowed to touch or hold the newborns. Other visitors were not allowed into the NCU. Mothers expressed the challenges and stress related to not having their husbands be able to see their newborn, especially if they had no hope that the newborn would survive.

A mother reported that the father did not see their newborn before she died:

"I told one of the other mothers in the NCU that I was very sad because my baby was going to die before her father could at least see her. The mother told me that I should have requested it before and I told her that nobody advised me to ask a healthcare provider the permission so that my husband could visit my baby." (mother, age 35)

Parents did not appreciate the way they were not provided initial orientation so that they can consciously abide on the NCU regulations. They would find themselves frustrated from the things which they should have been informed about at admission.

"She [healthcare provider] asked me why I had violated the rules [allowing the father of the baby to visit]. I responded that I had read that fathers are allowed to come and see the baby. She replied that I should not allow him in without telling her first. I told her that I had read the regulation but did not know that I should get approval from her before bringing him inside." (Mother, age unknown).

"They [healthcare providers] should explain to the mother where they were taking the baby and explain the life there. For instance, after I arrived, nobody explained the rules and regulations of the place except reading it for myself. None told me the procedure of things in the unit. They should improve that. There are people who made mistakes because they were not told before." (Mother, age 25).

Theme 4. Financial aspects of the care in NCU and support received

Many mothers and fathers said the financial burden due to NCU admission was challenging and was a stress for them. They had difficulty in paying many of the NCU requirements such as specific clothing, basins, flasks as well as the hospital fee. Despite all participants having health insurance, many could not afford the co-payment. Two interviewees reported they had to sell a portion of their land to pay for the NCU costs.

"I was wondering how I would get money to pay the invoice that was 99 times more than my salary. People told me that I must sell the land to pay medical invoices. I was scared. I was wondering how I will survive when I go home because I had already sold my land in order to buy clothes [for the baby]. I was speechless and there were times when I did not have breast milk because of problems." (mother, age 44).

"I was stressed because of the 30,000 RWF medical bill for spending a week and three days in the hospital. I was wondering where I would get the money if I had to spend one more week in the hospital. I was confused but I was also ready to sell my house to be able to pay the medical bill." (Mother, age 34). She eventually sold her land to pay the bills.

Even sometimes when the NCU was not as expensive as expected, the thought of the potential cost caused a lot of stress.

"When we went to the hospital, we wondered how we could pay the bill. We ask ourselves so many questions. I was afraid that I would not get enough money to pay the medical bills and would be held in custody at the hospital. But, luckily, I was not charged a lot of money because I had health insurance. I did not have to sell any of my goods." (mother, age 35).

The cost of hospitalization was a major source of stress, and any forms of intermittent support they had received from others, like porridge and food received from the Catholic sisters or university students supporting the hospital were very much appreciated by the parents.

"Every morning they [healthcare providers] bring the porridge and bread. I cannot blame them for anything. The healthcare providers bring the hungry people food from the Sisters. They do whatever possible." (mother, age 36).

"The most important thing that they helped us with was the free porridge in the morning. It was very impactful because a mother cannot breastfeed the baby without eating the porridge. It is the best help they gave us. We ate the porridge happily with the peace of mind." (mother, age 25).

Discussion

Parents shared both positive and negative aspects of their experience at the NCU in rural Rwanda, highlighting common experiences seen among other parents such as stress, sadness, and financial barriers but also unique features of the NCU in Rwanda that were a positive such as high levels of trust for the healthcare providers and uninterrupted access of mothers to their newborns.

The parents in our study shared similar experiences as reported in other previous studies: when their newborns were hospitalized, parents were understandably stressed and worried about their newborn's condition [7]. Consistent to other studies, inclusion in the provision of care could contribute to parents' comfort, hope and confidence to keep caring for the newborns even after discharge [7, 26, 29]. According to other studies, parents not only should be involved in the care, but also in the decision making about the newborn's care [30, 31]. However, in our study, parents did not complain about not being involved in the decision-making for their newborns' care. On the contrary, many placed high trust in their healthcare providers. This could be due to many reasons. The parents may not feel they were sufficiently informed to make decision, or they trusted the healthcare providers were providing the best possible treatment, or the local culture does not normally encourage such practice. Further research on the parents' involvement in decision making should be conducted.

Having non-restrictive access to their newborns was one of the positive experiences for mothers. Such access, however, is not always allowed in many NCUs [23] and even other NCUs in Rwanda have restricted access [32]. Limited access to the NCUs by fathers and other family members or caregivers was a source of concern for the parents in our study. Restricted NCU access is usually justified as necessary for infection control. However, studies have conflicting results. One study in UK found that restricted access was associated with a significant decline in respiratory infections [33], while another study in India showed allowing parents in the NCU to directly participate in their newborn's care did not increase in hospital acquired infections [34]. In all cases, education on hygiene practices are essential for all parents, visitors and providers.

The exclusion of fathers in particular was a common negative experience shared by our study participants. Such exclusion could reduce father's role to merely providing financial support. Studies have shown this could leave the fathers feeling scared of their preterm newborns, affect early bonding and father-child relationships [3, 35]. Recognizing the importance of parental access to newborns, some healthcare providers break the rules and allowed occasional visitations – leading to some reports of “good nurses” and “bad nurses” [36]. Hospitals should reconsider the NCU visitation policy, and aim to deliver family-centered care to promote the best experience for the families and their newborns.

The quality of communication between caregivers and providers greatly impacted the experience of parents in the NCU. When NCU staff provided information about the newborn's condition and showed caring attitude, parents tend to feel more hope, understanding, confident and will trust the providers more. It was obvious in our study as well as other literature that when the poor communication and blame from healthcare providers were a source of stress for parents [37].

The interactions with other parents provided peer support and should be encouraged. A systematic review has shown that informal or formalized peer support could improve the experiences and well-being of parents [38]. Such findings further reinforced the importance of clear communication from healthcare providers. When healthcare providers gave parents proper and clear orientation and instructions, such messages will be passed along among other parents.

Almost all respondents in our study mentioned the cost was a great source of stress. Similar to other studies, the cost of the NCU care, materials needed for the care, transportation, and food are serious challenges [39]. Studies to assess

the cost related to NCU admission, and potential catastrophic out of pocket expenditures, should be investigated in order to inform policy makers if advocacy for expanding insurance coverage is needed.

This study has some limitations. Most respondents in our study were women, and insights from fathers were relatively limited. The current study was conducted in a district hospital that receives support from a few non-government organizations. Not all Rwandan hospitals receive such support, thus the findings may not be generalizable to other Rwandan health facilities.

Conclusion

The admission of a newborn into the NCU is a source of stress for parents. Their stress is exacerbated by the environment including barriers to access by fathers and other family members, high-cost of neonatal care, and negative interactions with healthcare providers. However, the experience of care is improved by unrestricted access to the newborns by mothers as well as good communication with and trust of healthcare providers. Health facilities should also consider expanding the NCU access, encouraging peer support and actively involving parents in the care of their newborns. Further work is needed to understand the financial barriers for accessing NCU care.

List Of Abbreviations

ABC: All Babies Count

LMIC: Low- and Middle-Income Countries

NCU: Neonatal Care Unit

RNEC: Rwanda National Ethics Committee

Declarations

Ethics approval and consent to participate

The study was approved by the Rwanda National Ethics Committee (No. 107/RNEC/2019), University of Global Health Equity and Ruli District Hospital. Signed written consents were obtained from all participants.

Consent for publication

All co-authors read and approved the final manuscript.

Availability of data and materials

Not applicable

Competing interests

The authors declare that they have no competing interests.

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Authors' contributions

SB contributed to the study design, data collection, analysis, and writing the manuscript.

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