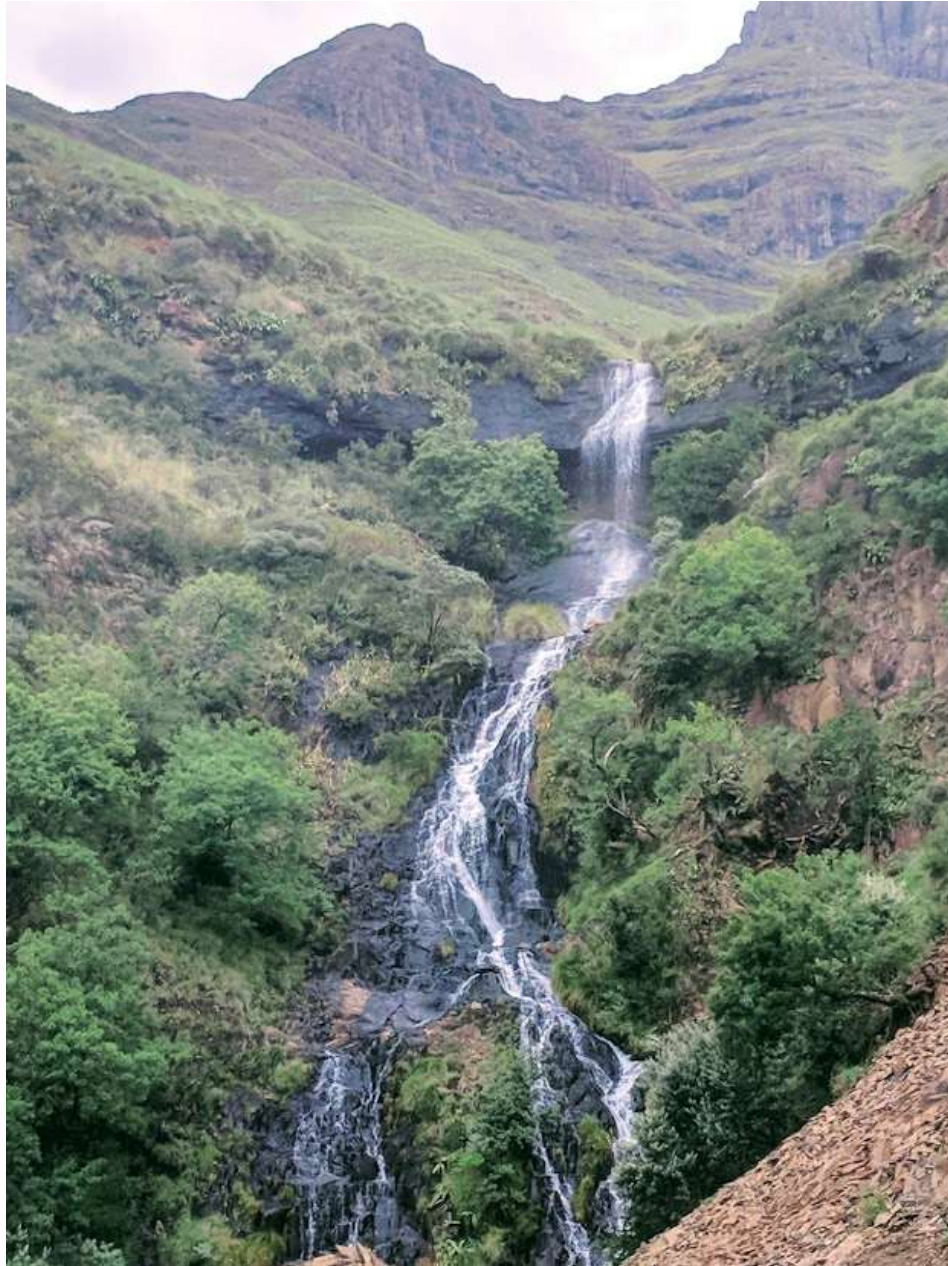


Lesotho Medical Journal



Cover photo: Courtesy of Saikrishna Kugabalasooriar MD, family medicine resident, Boston University School of Medicine

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Remembrance of an Honorable Physician and Former Editor



It is with hope for the future that we remember Dr. Musi Mokete, the former Editor of the *Lesotho Medical Association Journal (LMAJ)*. Dr. Mokete was past President of the *Lesotho Medical Association* where he worked tirelessly to support the physicians of the Mountain Kingdom and to provide continuing education in the health sector.

Under Dr. Mokete's stewardship, beginning 2007, the *Lesotho Medical Association* and the *Lesotho-Boston Health Alliance (LeBoHA)* partnered to publish a new version of the *LMAJ*. The fourteen editions of the *LMAJ* published since 2007 are shown on this page and are archived on the LeBoHA website <https://www.leboha.org.ls/>. This fifteenth edition is dedicated in memory of Dr. Mokete.

It was Dr. Mokete's hope that someday the *Journal* would organize an Editorial Board, institute a peer-review system for all manuscripts and be searchable using online search engines allowing its articles to be accessible to health professionals all over the world. With the publication of this edition, the Editorial Board commits to pursuing these dreams and instituting these changes as quickly as possible. We will keep you informed of our progress in these pages.

A personal remembrance: Dr Mokete was a hero in the true sense. He proudly believed in his own people and in the mission which he had instilled into all of us. He was our inspiration. He was my personal encouragement whenever I was getting impatient and wherever I started to doubt. Ntate Musi was our great mentor. A selfless colleague, a constant teacher, a good doctor. A real friend. I am deeply humbled and thankful for the privilege of crossing ways on several occasions, starting from my time as a District Medical Officer of Mokhotlong during the 1980's to eventually going miles together, fighting for recognition and support of under-and postgraduate training of young Basotho medical doctors in the Mountain Kingdom.

ROBALA KA KHOTSO MOTAUNG

Dr. Rudolf Schumacher
Family Medicine Speciality Training Program



From the New Editor: Changes to the *Lesotho Medical Journal*

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With this edition, we announce some changes to the *Lesotho Medical Association Journal*. Over the past few months, there have been discussions about the future of the *Journal*. I am happy to announce that the *Journal* will continue to be published as a cooperative effort between the Lesotho-Boston Health Alliance (LeBoHA) and the Lesotho Medical Association (LMA).



In order to give the journal a broader scope, wider appeal and ultimately an increased impact factor, the name has been changed to the *Lesotho Medical Journal (LMJ)*. An editorial board has been named.

The new editorial board members are, Dr. Radiance Ogundipe, Dr. Sebaka Malope, Dr. Jill Sanders, Olivia Killilea, Dr. Chelsea McGuire, Mrs. Elizabeth Nkabane-Nkholongo, Dr. Rudolf Schumacher, Professor Brian Jack and members from the Lesotho Medical Association to be named. In the coming months we will publish the governance structure for the new *LMJ* Board providing others an opportunity to join the Board.

In its first meeting, I am honored to report that the Editorial Board offered me the position as the next Editor of the *Journal* which I proudly accepted.

The purpose of the *Journal* will remain the same, that is, to provide a place that members of the health sector (physicians, nurses, dentists, all other allied health workers, and those with an interest in the health issues facing Lesotho) can publish articles relevant to Lesotho, and to improve communication among local colleagues – and interested parties around the world – about the issues facing us and of the discoveries we have made.

Over the next months, our agenda will include creating a plan for peer review of submitted articles, a website to facilitate peer review and to prepare the *Journal* to be eligible to be included in online search engines. We also have begun discussions about distributing the *LMJ* within the Lesotho Diaspora Association. In these pages, we will keep you informed of our progress.

In this edition we have instituted a new section called “Information for Authors.” It contains the information needed to prepare an article for submission to the *LMJ*. The next edition is planned for March 2022. Please **submit a manuscript**, as the *LMJ* will only be as good as the articles submitted. For now, please submit manuscripts directly to me.

I look forward to working with you all to make the *LMJ* something we can all be proud of.

Sincerely,

Radiance Ogundipe

Instructions for Future Authors of the *Lesotho Medical Journal*

How should I submit an article for the Next Edition? The next edition of the *Lesotho Medical Journal* (LMJ) is scheduled to be released in March 2022. For consideration and to allow time for peer review and printing, please submit your article by January 15, 2022 by email to Dr. Radiance Ogundipe - rogundipe@leboha.org.ls. Please include a cover letter, the manuscript and any figures/tables (maximum 5) as separate documents.

What kind of articles do we publish? The *LMJ* publishes the following types of articles:

1. Commentaries – Discussion of current topics in health - maximum 500 words
2. Clinical Case reports – reports of clinical cases that we can learn from - maximum 1,000 words
3. Original research – maximum 3,500 words (with exemptions for qualitative research that could be more)
4. Letter to the editor – to make a concise comment on previous publications - maximum 400 words
5. Community Oriented Care Field Reports – maximum 3,000 words
6. Systematic Reviews – critical synthesis of research related to a clinical topic – maximum 3,500 words
7. Essays – Reflections from clinicians, patients, families, communities and policymakers
8. New innovations in Medical Education or Clinical Care– Succinct stories of on-the-ground innovations
9. Photographs – Each edition will include a few photographs. Photos related to the Mountain Kingdom are most welcome.

How will the submission be reviewed? The editor and two members of the Editorial Board will review each submitted manuscript. Articles will be accepted, rejected or the authors will be provided specific feedback and asked to revise and resubmit the manuscript. In the future, we are planning a more formal peer review process. The details will be published in future editions of the *Journal*.

How should the manuscript be prepared? In general, manuscripts should be prepared according to guidelines described in the ICMJE's "[Recommendations for the Conduct, Reporting, Editing and Publication of Scholarly Work in Medical Journals](http://www.icmje.org/recommendations/)" <http://www.icmje.org/recommendations/>

Is there a fee for publishing in the *LMJ*? No, and the authors will retain copyright to their submitted article.

Is advertising accepted by the *LMJ*? Yes, we now are accepting advertising in order to partially cover the cost of publication. Current advertising costs are:

- a. Full page M5,588
- b. Half page M2,759
- c. Quarter page M1,379

Is there a Conflict of Interest Policy? Yes, all authors of accepted manuscripts will be required to declare relevant conflicts of interest.

EDITORIAL

Lesotho's Epidemic Preparedness: Steps in the Right Direction

Radiance Ogundipe, MD

As Lesotho and other African countries grapple with waves of the Covid-19 pandemic, primary care health practitioners should be at the forefront of the nation's epidemic preparedness. Interconnectedness among the nations of the world afforded by air travel has made possible the global spread of epidemics within hours of onset in one country. Covid-19 pandemic has brought to fore the multi-sectoral impact of epidemics of such magnitude. Not only has this pandemic resulted in considerable morbidity and mortality, stretching the limits of the health sector in the containment, it has also impacted on the economy through the series of lockdowns, border closures and attendant loss of productivity. Therefore, a multi-sectoral response to this pandemic and preparedness for future epidemics is necessary.

The Ministry of Health is taking steps in the right direction. With the support of the World Health Organization (WHO) and the World Bank, a multi-sectoral Strategic Tool for Assessment of Risk (STAR) and a Multi-hazard Preparedness Plan are being developed. This is aimed at planning for a timely, strategic, and coordinated response in event of a future outbreak. It is hoped that the plans would be widely disseminated and cascaded to all stakeholders in the near future.

In the interim, frontline health workers need to be fastidious about measures to avoid getting infected as they continue the care of their patients. The preventive protocols should be maintained during the care of patients both presenting with conditions requiring critical care as well as with the more stable patients. More relaxed situations such as break times and informal group discussions are times of possible infections and as such, protective guards should not be lowered. There have been lots of spurious claims of efficacy of various remedies, both pharmaceutical and herbal, in preventing or treating the Covid-19 infection. It is the duty of health workers to respectfully explain to patients or their relatives that these claims are not supported by acceptable scientific evidence. Such misconception may have led to some individuals relying on such remedies, believing that they are safe without the face masks and other proven methods of preventing infection.

Evidence suggests that our factories have been hotspots of Covid-19 transmission. It is important to review the infection control measures provided at these factories. It should be mandatory that appropriate preventive measures are put in place to reduce the risk of spread of the virus at the workplace. Continuous education on the nature of the pandemic, and the necessity of unrelenting compliance with the preventive protocol may help to stem the tide of further waves of the pandemic.

THANK YOU TO ALL THE HEALTH WORKERS IN LESOTHO WHO HAVE SO BRAVELY ASSISTED IN THE EFFORTS TO FIGHT THE PANDEMIC!

The *Lesotho Medical Journal* wishes to appreciate all the health workers in Lesotho who have bravely assisted in the fight against the pandemic, through their continued patient care, and other health services rendered despite various challenges. We are hopeful that the efforts to increase the vaccination coverage in the Mountain Kingdom would yield dividends and help to cut down on morbidity and mortality from the epidemic. This desirable silver lining should not be too far from the horizon.

We pray for the repose of the souls of those who have paid the supreme price in the fight against this pandemic and pray that the almighty will comfort the bereaved relatives and friends.

Barriers and Facilitators of Prevention of Mother-to-Child Transmission Adherence among Postpartum Women in Qacha's Nek, Lesotho

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Submitted to the LeBoHA Family Medicine Specialty Training Program as a partial requirement to complete the training in the research component of the program. No authors report any relevant conflicts of interest.

Abstract

Background: Sub-Saharan Africa accounts for 69% of new HIV infections globally, of which vertical transmission contributes approximately 390,000 new cases each year. Although prevention of mother-to-child transmission (PMTCT) programs have had significant impact, decreasing the number of new child infections from 4,400 in 2009 to 1,300 in 2015, additional research is needed. Low antiretroviral treatment (ART) coverage in postpartum women for the PMTCT has limited the effectiveness of PMTCT programs. In Qachas Nek, a semi-rural district of Lesotho, a chart review at a children's HIV clinic showed that from 2008-2017 about 20% of children tested HIV positive, despite their mothers being enrolled in PMTCT care. This is in stark contrast to the transmission rate of 5.7% found recently in a country-wide Lesotho PMTCT study. There is a need to understand barriers and motivators to postpartum PMTCT adherence.

Methods: Semi-structured qualitative interviews were conducted with fifteen postpartum women receiving PMTCT care at selected health facilities in Qachas Nek. Additionally, three focus groups were

held with healthcare workers providing PMTCT care. Thematic analysis was used to analyze data.

Results: This study revealed a number of barriers to postpartum PMTCT adherence such as difficulty in transport, lack of knowledge of PMTCT within families especially among mothers-in-law, community stigma and poor integration of services and recurrent stock outs of medicine. We found individual acceptance of HIV diagnosis, disclosure to partners and family, concern for the babies and their own wellbeing, as well as infant testing are major motivators for PMTCT adherence.

Conclusion: There is a need to tackle social stigma, lack of knowledge, transportation challenges by enhancing targeted community activity. This study has policy implications designed to improve supply chains, integration of services, transportation services and health education and support.

BACKGROUND

Approximately 69% of the world's population living with HIV/AIDS (34 million people), reside in Sub-Saharan Africa.¹ Women account for about 56% of the population living with HIV/AIDS in this region.² Globally, there are about 2.7 million new HIV infections each year; of which about 14% is acquired through mother-to-child transmission.¹ Prevention of mother to child transmission (PMTCT) of HIV programs provide a set of services to women of reproductive age who infected or at risk of HIV in order to keep them healthy and stop their babies from being infected with HIV. There is a need to start treatment early as HIV progresses rapidly in children; within a few weeks for those not on treatment.²⁰ Despite PMTCT interventions, vertical transmission is currently estimated at 1.4-5.9% globally, with an average of 3.5%.⁴ The mother-to-child-transmission rate is slightly higher in Lesotho with a reported rate of 5.7%.⁵ Low antiretroviral therapy (ART) coverage in postpartum women is a key barrier to the effectiveness of PMTCT programs.²⁴

According to UNAIDS estimates in countries with high rate and increased duration of breastfeeding, up to eight of 10 children may become infected with HIV.²⁰ Given the estimated number of HIV positive pregnant women per year (approximately 15,000), in the absence of PMTCT interventions there would be an estimated 5,900 new pediatric HIV infections in Lesotho each year. In 2016, Lesotho adapted a test and treat strategy and PMTCT guidelines were updated. Care of exposed infants now depends on timing of HIV diagnosis, maternal initiation on treatment, virology status, and type of infant feeding.¹¹ A significant proportion of HIV-positive infants die in the first year of life, approximately 61 per every 1000.¹⁰ According to the WHO, the risk of mother-to-child-transmission is high during early postnatal period.¹² In Lesotho, HIV prevalence was estimated to be 28% among women attending antenatal care services in 2011 and 32% in 2017.^{6,7} In 2016, approximately 25-50% of women on ART at delivery were lost from care during the postpartum period.¹⁶ High incidence of HIV in postpartum women has led to sustained vertical transmission.¹¹

There has been a great deal of research aimed at understanding the barriers of PMTCT uptake. Health behaviour theories, based on research in western Kenya, cite cultural and environmental factors, including social norms and attitudes, as motivators or barriers to uptake of health services.¹⁴ At the household level, it has been shown that male partners have significant influence over women's utilisation of health services, acceptance of HIV counselling and testing results, and ability to adhere to antiretroviral drugs and infant feeding decisions.^{2,17} Due to lack of information, men are often ill-equipped to help their families access HIV prevention, testing, and treatment services or to promote safe pregnancies and delivery to prevent HIV vertical transmission. Women who are able to disclose their HIV statuses to their male partner are more likely to adhere to antiretroviral treatment and infant feeding recommendations.¹⁷ Weak commodity procurement and distribution mechanisms, limited laboratory infrastructure, poor integration of services, limited human resources, and lack of community or patient centeredness are barriers that limit the health sectors ability to provide the needed services.¹⁶

Several interventions have been developed to address these barriers, but only a few have proved to be successful. In high income nations such as Japan, they have implemented a strong social security system which addresses a large number of these challenges related to socio-economic status of PMTCT clients.¹⁰ According to Geldstzer et al, there is some evidence that phone-based interventions can improve retention in PMTCT in the first one to three months postpartum.¹⁵ The International Association of Physicians in AIDS Care convened an expert panel to develop evidence-based recommendations to optimise entry into and retention in care and ART adherence and to monitor these processes.⁹ An integrated approach (combining PMTCT, antenatal care, and immunisation) has been advocated by experts.^{2,15,18} Lesotho adapted this integrated approach in 2015. Clinics are supplied with "mother/baby packages", which are colour-coded rectangular boxes containing smaller packages with PMTCT medications inside representing the antenatal,

intrapartum, and postpartum periods of pregnancy.
5,19

PMTCT programs have had a significant impact in reducing new HIV infections, from 4,400 new child infections in 2009 dropped to 1,300 in 2015.⁸ However, there are still about 20% of children whose mothers were enrolled in PMTCT care in Qacha's Nek clinic, who have tested positive for HIV.⁹ The barriers to effective PMTCT that are most important in rural districts such as Qacha's Nek in Lesotho are not known. Little is known about the specific barriers and motivators to maternal adherence to PMTCT care during the postpartum period, and few published studies to-date have explored this in Lesotho. We therefore designed a study to determine the primary motivators and barriers to adherence to PMTCT care among women during the postpartum period in Qacha's Nek, Lesotho.

METHODS

We conducted an exploratory qualitative study using individual interviews and focus groups to determine the motivators and barriers to adherence to PMTCT care among women during the postpartum period in Qacha's Nek, Lesotho.

Setting. Qachas Nek is a rural, southern district, mountainous, and the majority of its areas are hard to reach. According to 2016 census report, it has a population of about 74 000 people.

Inclusion criteria. Individual interviews included Sesotho-speaking postpartum women above age 18 who were receiving postpartum PMTCT care at Machabeng hospital, Hermitage and Sekake health centers in Qacha's Nek. These included women currently presenting for care at these facilities during one of the seven postpartum visits within the PMTCT package (either at 6 weeks, 10 weeks, 14 weeks, 6 months, 9 months, 12 months or 18 months postpartum.) The focus groups included health care workers working at mother and child health clinic and labour ward at Tebellong Hospital, Sacred Heart and St Francis Health Centres in the same district.

Sampling and Recruitment. The study utilized convenience sampling. For the individual interviews, we invited participants who were present at the clinic and available for interview on the day the

interviewers visited the sites. The focus groups were conducted with all health workers meeting inclusion criteria who were available on the day of the focus group, invited by the nurse-in-charge.

Tool development. One semi-structured interview guide was developed for individual interviews and another for focus groups. The individual interview guide was adapted from a published tool used in a study by Iroezi et al. on barriers and facilitators to receiving care in PMTCT program in Malawi.²¹ The guide was adjusted to Basotho culture and the specific context of Lesotho. Of note, the guide included a number of questions that were closed-ended or short answer, in addition to other open-ended exploratory questions. The focus group guide was developed by the authors based on reviewed literature and the research questions.

Data collection and management. The individual interviews lasted for approximately 10-15 minutes and were conducted by authors NL and/or MM. The focus group discussions lasted for approximately 60 minutes and were facilitated by NL and/or MM. The focus group discussions were audio recorded with audio recorder and the investigator took field notes to accompany the recordings. The individual interviews were not audio recorded, rather the interviewer took notes as to the participant responses to each question. Audio recordings of focus groups were translated and transcribed into a Microsoft Word file by MM. Hand written interview notes were typed up as Word files and demographic and closed-ended responses to interview questions were entered into a Microsoft Excel sheet.

Analysis. Qualitative data was analyzed via a mixed inductive-deductive thematic analysis approach.²¹ An *a priori* codebook was developed using the socioeconomic framework²⁸ and interview guides. MM and KR then conducted open coding of all focus group transcripts and one of the individual interview note-based data to identify additional codes and refine definitions. This process continued until no new codes were added and the codebook was finalized after inputs by CM. MM used the final codebook to re-code all transcribed focus group data and all written interview note-based data by entering coded segments into a coding grid in Microsoft Excel. The finalized coded segments were then reviewed by MM, KR and CM to identify

preliminary themes and then consolidate into final core themes through an iterative, collaborative process. Demographic data from both individual interviews and focus groups, and closed-ended data from individual interviews were analysed descriptively using counts and frequencies in Microsoft Excel.

Human subjects' protection. Prior to starting the interview or focus group, written consent was obtained from all participants. Approval for this study was obtained by Research Ethics Committee, Ministry of Health, Lesotho (Protocol Number: ID121-2018). The informed consent form is available from the primary author.

RESULTS

Demographic and Professional Characteristics. A total of 14 HCWs participated in the focus groups, four from Sacred Heart Health Centre, five from Tebellow Hospital, and five from St. Francis Health Centre. We interviewed five women each from Machabeng hospital, Hermitage, and Sekake health centers, for a total sample of 15 women enrolled in PMTCT services. Table 1 shows the characteristics of the focus group and interview participants. Among focus group participants, the majority of HCW were female, employed as midwives, and between the ages of 28 and 37 years. Among interview participants, most were between the ages of 28 and 37 years, married, and had three or more children.

Closed-Ended Question Results from Individual Interviews. Analysis of individual interview closed-ended question data about medication usage, travel to health facilities, support, and stigma is presented below, with selected findings highlighted in Table 2.

Medication Usage. In our sample, all women reported to be actively taking HIV medications and none reported side effects that cause them to stop taking the medications. Table 2 shows that three of the 15 women reported missing one dose of the medications per week, while the rest reported missing no doses. All but one had been pregnant before. However, only 9 of the 15 women had used PMTCT services before.

Travel to Health Facility. Table 2 shows that slightly more than a quarter of women in our sample find it hard to travel to the facility where they get PMTCT services, and a third report they have to spend too

much to get there. Ten of the 15 women have to pay for a taxi bus or taxi car to get to their PMTCT facility.

Stigma. Just one woman reported embarrassment when seeking care; this same respondent reported concern over people finding out about her HIV status. In our sample, all women had disclosed their HIV status to at least one person. Among these, 10 had shared their status with their husband and family, while five had only shared with friends and not with their family. Just one person reported an experience of being stigmatised or not supported by a health care worker.

Table 1. Characteristics of Interview and Focus Group Participants		
Characteristic	Focus Groups (n=14)	Interviews (n=15)
Gender, n (%)		
Male	4 (28.6%)	0 (0.0%)
Female	10 (71.4%)	15 (100.0%)
Age, n (%)		
18 - 27 years	3 (21.4%)	2 (20.0%)
28 - 37 years	9 (64.3%)	12 (80.0%)
38 - 47 years	1 (7.1%)	0 (0.0%)
> 47 + years	1 (7.1%)	0 (0.0%)
Facility Role, n (%)		
Midwife	5 (35.7%)	-
Nurse Assistant	2 (14.3%)	-
Lay counsellor	6 (42.9%)	-
Counselor	1 (7.1%)	-
Years at Facility, n (%)		
< 1 year	3 (21.4%)	-
1 - 5 years	4 (28.6%)	-
6 -10 years	7 (50.0%)	-
Marital Status, n (%)		
Married	-	9 (60.0%)
With Partner	-	1 (6.7%)
Sep/Divorced	-	5 (33.3%)
Single	-	0 (0.0%)
# Children ≤17, (%)		
1	-	1 (6.7%)
2	-	5 (33.3%)
3 or more	-	9 (60.0%)

Possible Facilitators. We asked about family planning services, which is a possible facilitator of PMTCT engagement. All but one woman knew where to access family planning services. As seen below, only 10 women in the 15-person sample had

used these services before. Women also were questioned about the usefulness of having someone help with their PMTCT medications, such as someone to accompany them to the clinic, pick up medications for them, or remind them to take the medications. All but two reported this would be helpful to their PMTCT adherence.

Qualitative Results from Focus Groups and Interviews:

The following section organizes the key themes that emerged from the combined interview and focus groups data by each level of the socio-ecologic model. The results are presented at each level with discussion of facilitators reported first, followed by barriers. Table 3 summarizes the core themes that were identified at each level.

Individual Level. The first theme at the individual level was that mothers' concern for their infant's health and wellbeing is an important facilitator of adhering to PMTCT services.

I will come back because I am concerned about HIV status of my child (MII 3)

Most often mothers who adhere to PMTCT accepted their HIV status during pregnancy. They understand the need to protect the baby from being infected with HIV (THFGP2).

It was reported that living near a facility providing good services was seen as a facilitator by some. However a number of others reported difficulty with transport to PMTCT facilities as a major barrier. Travel to and from South Africa provides an additional barrier to some women.

I came here because the place is near and the hospital provides good quality services (MII 5)

It is hard to travel to the clinic (HII 1)

Patients at maternal child health clinic do not have a problem of being initiated on treatment. The challenge is usually patients who work in South Africa and Matatiele. They usually request for long return dates as a result we fail to do tests and end up getting lost to follow up. Sometimes they represent with babies infected since they have not been taking medications (THFGP3)

One woman expressed concern over the PMTCT services she received, and "poor attitudes" by

Table 2. Closed-ended Questions and Responses of Women Participants during Interviews	
<i>How often do you miss HIV medication doses?</i>	
0 doses / week	12 (80.0%)
1 dose / week	3 (20.0%)
>1 dose / week	0 (0.0%)
<i>Have you been pregnant before this pregnancy?</i>	
Yes	14 (93.3%)
No	1 (6.7%)
<i>If yes, did you use PMTCT or infant HIV testing when you were pregnant before?</i>	
Yes	9 (64.3%)
No	5 (35.7%)
<i>How do you get to your PMTCT health facility?</i>	
Walking	5 (33.3%)
Taxi bus or taxi car	10 (66.7%)
<i>Is it hard to travel to get your PMTCT health facility?</i>	
Yes	4 (26.7%)
No	11 (73.3%)
<i>Does it cost too much to get to PMTCT facility?</i>	
Yes	5 (33.3%)
No	10 (66.7%)
<i>Would having PMTCT services in another location closer to your home/village be helpful?</i>	
Yes	14 (93.3%)
No	1 (6.7%)
<i>Do you feel ever embarrassed to seek PMTCT care?</i>	
Yes	1 (6.7%)
No	14 (93.3%)
<i>Are you afraid others will know about your HIV status?</i>	
Yes	1 (6.7%)
No	14 (93.3%)
<i>Who knows your status?</i>	
Husband and family know	10 (66.7%)
Friend(s) only know	5 (33.3%)
No one knows	0 (0.0%)
<i>Has a health care worker stigmatized you?</i>	
Yes	1 (6.7%)
No	14 (93.3%)
<i>Do you know how to get family planning services?</i>	
Yes	14 (93.3%)
No	1 (6.7%)
<i>Have you ever used family planning services?</i>	
Yes	10 (66.7%)
No	5 (33.3%)
<i>Would you like help you with your PMTCT medications?</i>	
Yes	13 (86.7%)
No	2 (13.3%)
<i>Would you fear this person knowing your HIV status?</i>	
Yes	1 (6.7%)
No	12 (93.3%)

HCWs was noted in one focus group as a barrier to accessing and adhering to PMTCT services

I will not come back anytime because I will not be given good services (MII 5)

The other reason for poor adherence is poor attitude by healthcare workers to the patients (THFGP4)

Community / Interpersonal Level. At the community level, the most prominent theme was woman's disclosure of her HIV status to family and/or husband and their acceptance and provision of support around her diagnosis and care was a major facilitator.

My parents and husband asked me come here for care (SII 3)

Mothers who adhere to PMTCT are people who have disclosed their statuses to their husbands and families and have their support. (SHFGP1)

It was also noted that HIV-related stigma in the community is a barrier for some women.

I want my illness to be confidential because I fear discrimination (HII 1)

Most young mother leave babies behind when they go to work or get married. It is usually difficult to disclose their status to new partners. As a result there is an increase in new paediatric infections (SHFGP4).

Additionally, lack of knowledge about PMTCT and safe infant feeding practices among mothers-in-law or other care givers were reported to increase risk of loss to follow up and MTCT.

The old people are usually not well informed about the babies' status. They are usually only told to take babies for tests. Most often such babies are lost to follow up (SFFGP1).

New breastfeeding mothers often return back home to stay with their mothers-in-law so they are often faced with the challenge that the mother in-laws instruct them to give their grandchildren water since they are believed to be thirsty. Sometimes the breastfeeding mothers leave babies behind with old people who usually do mixed feeding (SHFGP4).

Facility and System Level. At the facility level, a leading theme was that coordination of care, tracking, and support services are important facilitators of access and retention.

We have managed to reduce loss to follow up patients after the decision was made to transfer postpartum women and their babies from the health post to the health centre. (SHFGP2)

We now have a tracking tool. "Let's say I'm referring a patient to Sehlaba thebe. I will call Sehlaba thebe and tell them about the patient and the expected return date." We even give Sehlaba thebe the physical address of the patient. (SFFGP1)

In addition, integrating infant testing at health centres helps facilitate retention into post-partum PMTCT programs.

What would make it easier for you to come back again?

Bringing the baby for testing and for refill of medication and also integration of services (MII 1).

We also have the machine that produces DNA PCR results within a shorter period of time and we have been able to share results with their mothers. (SHFGP2).

However, poor integration of services and frequent drug stock-outs were also identified as facility level barriers for PMTCT services.

The other challenge is with a lot of vertical programs. Most patients decide not to return back to the facility if they could not access all services in a day (SFFGP4).

We have frequent out of stock of nevirapine from National drug supply organisation (SFFGP1).

Solutions. There were other findings outside of the socio-ecological model that were significant and important to highlight. A main theme was the discussion of solutions among participants. These included having improved work space for the HCW's to use for education.

We can't improve health education which is currently a big problem because we don't have

a space. Let's first get a space and the rest will follow (THFGP1).

We need to conduct community gatherings to educate people about the importance of PMTCT (SHFGP1).

In addition, solutions such as removing potentially stigmatizing coordination systems, providing additional financial support, hiring staff, and transportation systems were advocated to help increase postpartum PMTCT adherence.

Table 3. Key Themes Regarding PMTCT Adherence from Focus Groups of Healthcare workers and Interviews with Women engaged in PMTCT Services in Qachas Nek
<p>Individual level</p> <p><i>Facilitators</i></p> <ul style="list-style-type: none"> An individual's acceptance of their HIV diagnosis and concern for both their own and their child's health and wellbeing is an important facilitator. <p><i>Barriers</i></p> <ul style="list-style-type: none"> Difficulty with transport to PMTCT facilities was noted as major barrier.
<p>Community/Interpersonal level</p> <p><i>Facilitators</i></p> <ul style="list-style-type: none"> A woman's disclosure of her HIV status to family and/or husband and their acceptance and provision of support around her care was a major facilitator. <p><i>Barriers</i></p> <ul style="list-style-type: none"> HIV-related stigma in the community a barrier for some women Lack of knowledge about PMTCT among families especially mothers-in-law can increase risk of loss to follow up and/or infant feeding practices risky for MTCT.
<p>Facility and System level</p> <p><i>Facilitators</i></p> <ul style="list-style-type: none"> Coordination of care, tracking and support services are facilitators of access and retention Infant testing is a motivation to facilitate retention of women into post-partum PMTCT. <p><i>Barriers</i></p> <ul style="list-style-type: none"> Poor integration of services and frequent drug stock outs are a facility level barriers for PMTCT services.

The facility should do away with card system since this makes other clients to fear coming for services (SII 4).

Services should be taken closer to the people (...) we should also get financial support (MII 3).

We advocate for transport support from Non-governmental organizations [...] to pick our patients or conduct outreaches.(SFFGP3).

We need just one more nurse to reinforce the importance of PMTCT. The nurse will encourage men to come with their partners even if it's just once in four antenatal visits (SFFGP3).

DISCUSSION

We conducted the first known exploratory study of postpartum PMTCT in a semi-rural district of Lesotho. Our qualitative study utilized the socioecological framework to organize our findings. Major findings at the individual level included that a woman's disclosure of her HIV status to family and/or husband and their acceptance and provision of support around her diagnosis and care was a major facilitator of PMTCT, while difficulty with transport to PMTCT facilities was noted as major barrier by many. This is supported by 67% of postpartum women whose status was known by partners and family and also supported them in taking antiretroviral medications. As a result, 12 women, or 80% reported no missed doses of their medication. Early disclosure with partner and family support is thought to improve adherence.²¹ Approximately 27% and 35% of the women said it was difficult and expensive to travel to PMTCT facility respectively. This finding is supported by studies done by Iroezi et al which also found a majority of women who struggle with transportation to get to PMTCT facilities.²¹ In our sample all but one of the women said it would be helpful if the PMTCT services could be taken closer to their home or near village.

Another key finding was an individual's acceptance of their HIV diagnosis and concern for both their own and their child's health and wellbeing is an important facilitator to PMTCT adherence. This is further supported by the fact that the postpartum women felt integration of infant testing will be a motivation to facilitate their retention.

Poor integration of services and frequent drug stock-outs are facility level barriers for PMTCT services. Health care workers reported that some women said they could not afford coming multiple times for checkup of their babies or their appointments as that caused them a lot of inconveniences (e.g. having to go to one place for counselling before being seen at PMTCT clinic). Frequent stock outs of medication also demotivated them from coming to the facilities.

Social or community stigma was still perceived by some women to the extent that 5 women felt comfortable disclosing their HIV status to only their friends and not to family members. Social stigma was also one of the major barriers in the Nkhoma et al study in Malawi.²¹

Lastly, there is need for education among family members especially mothers-in-law by capacitating their peers and village health workers²⁶ if ever MTCT is to be eliminated. The mothers-in-law play a major role as they are left behind with babies when their mothers seek jobs in South Africa. The initiative will also address major challenge of transportation of postpartum women to PMTCT facilities.

Limitations to this study include a small overall study size, selection bias, study location limited to one district, small study budget, and a paucity of prior literature on the postpartum PMTCT in Lesotho. These participants have characteristics that may be different from that of the larger community and introduce bias, especially around health-seeking behaviours. For this reason, we interpret our data with caution. Additionally, language translation from Sesotho to English can affect the true meaning of the participants' views and may be a limitation to our work. Individual interviews were also not audio recorded and all the transcriptions were single coded, which could also introduce bias to the study. Finally, MM and NL, who conducted interviews and focus groups, are healthcare workers and participants may have not felt comfortable fully expressing negative views.

Conclusion. Our study found that individual acceptance of HIV diagnosis, disclosure to partners and family, concern for the babies and their own wellbeing, as well as infant testing are major motivators for PMTCT adherence. These motivators

can be capitalized on by system-wide efforts to continue to decrease HIV stigma, educate communities, and support integration of PMTCT services into primary care. Transportation barriers in this semi-rural district of Lesotho may be a high yield focus for resources to support PMTCT adherence among postpartum women.

Appendices Available from the first Author. Focus Group Guide, Individual Interview Semi-Structured Question Guide and Informed Consent form area available from the first author.

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A Report of the First Year of Dialysis Treatment Availability in the Mountain Kingdom of Lesotho

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ABSTRACT

Background: Africa has the lowest dialysis uptake rates in the world despite chronic kidney disease being three to four times more common than in the developed world. Factors responsible for low rate of dialysis uptake include inadequacy of dialysis infrastructure, lack of reimbursement or government subsidies for dialysis, and severe shortage of trained nephrology personnel. In October 2017, Lesotho initiated its first government-run dialysis unit.

Purpose: The purpose of the study is to explore patient's clinical and demographic characteristics, adherence to treatment, common barriers to dialysis, and outcomes experienced by patients within the first year of dialysis treatment availability in Lesotho

Methods: We conducted a retrospective chart review of all patients receiving haemodialysis at Motebang Hospital's Renal Unit from October 2017 to September 2018. Charts were reviewed to identify demographic data, vital signs at the first visit, initial laboratory data, the number of visits that were scheduled, the number of missed visits, and clinical status at one year.

Results: The charts of 48 patients receiving dialysis at Motebang's Renal Unit within its first year of operation were reviewed. The mean age of patients on dialysis was 42 years. The primary renal diagnoses were: 35 (75%) hypertension, 19

(40%) antiretroviral therapy, and 10 (21%) diabetes mellitus. Of the 182 total missed visits, 71 (39%) were due to transportation challenges, 24 (44%) were because the patient was traveling away from home, while 50 (27.9) missed dialysis treatment due to the clinic lacking consumables, water, electricity, or equipment malfunction. There was a significant difference when comparing the creatinine level on presentation among those who died (mean 1894 $\mu\text{mol/L}$) versus those who survived (mean 1343 $\mu\text{mol/L}$, $p=0.037$). Among the 10 patients presenting on the first visit with a creatinine value greater than 1338.6 $\mu\text{mol/L}$, all but one died within 8 weeks. At the end of the year, 21 patients died and 23 patients were alive (14 active dialysis, 6 recovered, and 3 transplanted).

Conclusion: Although it is promising that Lesotho has its first government-run dialysis unit, significant barriers to treatment remain. After 1 year, 21 patients died and 23 were alive. Patients referred for dialysis were young and associated with hypertension, anti-retroviral medications, and diabetes. Treatments were missed because of transportation, and supply chain issue regarding dialysis equipment and supplies. Those with high creatinine levels when referred had worse outcomes. Initiating educational programs for clinicians about timely referral of patients with renal failure could result in improved outcomes.

INTRODUCTION

Chronic Kidney Disease (CKD) is still unrecognized by many low-resource countries as a potentially significant cause of morbidity and mortality.¹ Chronic kidney disease was ranked 27th as cause of the total number of deaths worldwide in 1990, but rose to 18th in 2010.² Approximately 10% of the population is affected by CKD worldwide and millions die each year because they do not have access to affordable treatment.²⁻³ CKD has an indirect impact on global health by increasing the risk associated with at least five major causes of death: cardiovascular disease, diabetes, hypertension, HIV, and malaria.⁴ Although it is generally considered a comorbidity of diabetes and hypertension, kidney disease has numerous complex etiologies.⁴⁻⁵

In October 2017 a new renal dialysis unit was opened in Motebang District hospital in Lesotho. Motebang's Renal Unit is located in Leribe regional hospital, which is the northern part of the country. The funding for the dialysis unit was provided by the government of Japan who donated ten haemodialysis machines. The unit serves patients with both acute and chronic kidney disease. Currently it is the only government unit in the country of Lesotho and serves patients from all ten districts in the country. There has been no research on the characteristics of the patients served by this unit or their ability to adhere to treatment recommendations.

Based on our review of the literature and on the clinical experience of the principle investigator, we hypothesized that: (a) hypertension, diabetes, and HIV positive patients on tenofovir account for the most common causes of CKD in Lesotho; (b) there are many patients who experienced challenges to adherence to management recommendations; and (c) common barriers that result in non-adherence to management recommendations include: lack of funds for transport, lack of medical consumables like dialyzer, and lack of electricity and water shortages at the treatment facility.

To explore these hypotheses, we carried out this research to explore the questions: What are the

demographic, socioeconomic, and clinical characteristics of the patients served by the Renal Unit during its first year of operation? Are patients who were initiated on haemodialysis able to adhere to appointments for haemodialysis sessions? What are the most common barriers to keeping haemodialysis appointments? What are the outcomes and predictors of poor outcomes in this first cohort of dialysis patients in Lesotho.

METHODS

Study design: A retrospective chart review was conducted of all patients who accessed dialysis at the Motebang Hospital in Leribe renal unit within its first year of operation.

Study location: The study was conducted at Motebang Government Hospital renal unit which is located in Hlotse in the district of Leribe.

Inclusion Criteria: We reviewed all charts of patients who accessed dialysis at Motebang Renal Unit. To identify subjects we reviewed the dialysis unit registry and recorded data on all patients who received at least 1 dialysis treatment and had a treatment plan documented between the openings of the unit in October 1, 2017 through September 30, 2018.

Data collection and management: A data extraction form was used to extract and document each patient's information. A master code linked names and the data collected from the chart. All data, with the study ID only linking the case to the original paper chart, was entered into Microsoft Excel spreadsheet. All entered data was verified for accuracy.

Data analysis: The patient characteristics and degree of adherence were analysed using descriptive statistics using standard software. Simple frequency tools and graphs were used for analysis. Distances between Motebang Hospital and the village in Lesotho were estimated from maps of the country. Primary diagnoses and comorbidities were determined by patient self-report on intake. The percentage of missed visits was determined by calculating the number of weeks the patient was alive during the first six months and multiplying this value by three, as each patient was scheduled for three treatments

Table 1: Demographic Information of Patients Presenting to Dialysis in Lesotho from October 2017 through September 2018, N= 48

Variable	N = (%)
Age	
<20	2 (4.17)
21-40	23 (47.9)
41-60	13 (27.1)
>60	8 (16.67)
Gender	
Male	30 (62.5)
Female	18 (37.5)
Marital Status	
Single	12 (25.0)
Married	32 (66.7)
Divorced/ Widowed	1 (2.1)
Occupation	
<u>Unemployed</u>	10 (20.8)
<u>Student</u>	3 (6.3)
Miner, farmer, factory worker, domestic worker	13 (27)
Teacher, banker, business, police officer	10 (20.8)
Pastor, traditional healer	2 (4.2)
District	
Maseru	17 (35.42)
Berea	12 (25.0)
Thaba-Tseka	1 (2.1)
Matefang	3 (6.3)
Leribe	10 (20.8)
Qachas Nek	1 (2.1)
Botha-Bothe	3 (6.3)
Distance (km) to patient's village	
0-50	14 (29.2)
50-100	24 (50)
100-150	3 (6.3)
150-200	4 (8.3)
>200	3 (6.3)
Number of intakes per month	
Oct-Dec 2017	10 (20.8)
January- March	9 (18.8)
April- June	16 (33.3)
July- September 2018	13 (27.1)

per week. This was then divided by the number of visits each patient missed, converted into a percentage and presented within the brackets shown. Comparisons between demographic and clinical characteristics and the clinical outcomes of adherence to HD appointments and death were conducted. An independent sample t-test was conducted to determine the relationship

between the creatinine level on presentation and death by the end of the year. A significance level of 0.05 considered significant.

Ethical considerations: The information that was obtained from the charts is the minimum necessary to conduct the study. The confidentiality of the data was protected by assigning a code to each subject and only recording the code on the data collection form. This retrospective chart review study did not require informed consent. Approval for this study was obtained by Research Ethics Committee, Ministry of Health, Lesotho (Protocol ID 233-2019).

Table 2: Primary renal diagnosis and comorbidities, n=48

Primary Renal Diagnosis	n (%) *
ART related	19 (39.48)
DM related	10 (20.8)
HTN related	35 (72.91)
Rhabdomyolysis	1 (2.1)
Postpartum bleeding	1 (2.1)
DM and HTN	9 (18.75)
ART and HTN	8 (16.67)
ART and DM	1 (2.1)
Comorbidities	
HTN	36 (75)
DM	10 (20.8)
HIV/TDF	20 (41.67)
Hepatitis B	4 (8.33)
Lupus	2 (4.17)
Anemia	23 (47.92)
Thyroid dysfunction	2 (4.17)
Hemorrhage	1 (2.1)
Recent Trauma	1 (2.1)

RESULTS

The charts of 48 patients receiving dialysis at Motebang's Renal Unit within its first year of operation were reviewed. Most patients were between 41-60 years old and the mean age was 42. The majority of the cohort came from the capital of Lesotho, Maseru. We calculated that 88 km was the mean distance that patients travelled from their village to the clinic (table 1).

Table 2 shows that the primary renal diagnosis for 35 (75%) patients was HTN, 19 (40%) patients was from ART, and 10 (21%) was DM. We found that

36 (75%) patients had a comorbidity of HTN, 20 (42%) had HIV and 23 (48%) were anaemic.

Table 3: A Comparison of patient's who started dialysis in Lesotho with patients who had started in South Africa		
	Started in Motebang, n=42	Started in SA, transferred to Motebang, n=6
Pre-dialysis, Average (SD)		
Systolic BP (mmHg)	144 (32.0)	155.66 (26.7)
Diastolic BP(mmHg)	88.8 (25.9)	88.3 (9.6)
Pulse (bpm)	87.4 (19.7)	75.8 (8.7)
SpO2	97.8% (1.8)	96.5% (1.9)
Temp (Celsius)	35.1 (0.93)	35.4 (0.55)
RBS (mmol/L)	8.97 (3.2)	7.4 (2.7)
Creatinine (µmol/L)	1657.3 (882.7)	751.1 (422.1)
Urea (mmol/L)	54.1 (29.6)	29.5 (21.9)
Potassium (mmol/L)	5.4 (1.6)	*
Outcomes, N (%)		
Died	22 (52.4)	1 (16.7)
Recovered	6 (14.3)	-
Active	11 (26.2)	3 (50)
Transplant	2 (4.8)	1 (16.7)

The vital signs and lab values that were measured prior to each patient's first dialysis treatment during the intake exam (data not shown and available upon request). Many of the values are not listed due to missing equipment, the laboratory's lack of reagents, or other human error such as incomplete charting. Half of the patients presented with a systolic blood pressure greater than 140 mm Hg and 14 patients had a pulse greater than 100 bpm. Of note, every patient with a recorded result presented with a creatinine level of greater than 115 µmol/L on intake, and 13 (27%) presented with a creatinine greater than 2000 µmol/L. Additionally, 40 (83%) had high urea values, 11 (22%) had high potassium, and 13 (27%) had low sodium levels.

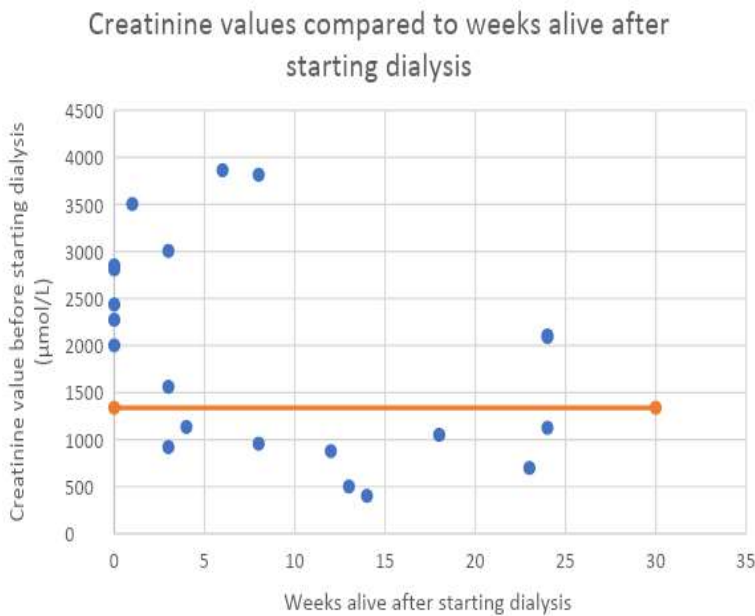
Table 3 compares the patients who started dialysis in Motebang with the patients who were already on dialysis and transferred from South Africa. Patients who had started dialysis in South Africa presented as more anaemic with a lower oxygen saturation, and their creatinine was lower than those who started in Motebang. These differences did not reach statistical significance due to the small sample size of the South Africa transfer patients.

Table 4 shows that 22 patients never missed a visit, 14 missed 1-10% of their visits, 13 missed 10-30% of their visits, and no one missed over 30% of visits. Of the 182 total missed visits, 71 (39.0%) were because of transportation challenges, and 44 (24.2%) missed because they were travelling and had left the Leribe area. The third most common reason for missing visits was that the clinic lacked consumables, with 28 patients (13.7%) missing dialysis for this reason. In total, there were 48 (26.4%) days when the patient arrived at the clinic but did not receive dialysis due to lack of consumables, water, electricity, or equipment malfunction.

Table 4: Missed Visits and Reason for Not Receiving Dialysis (n=48)	
% of visits missed	# of patients
0%	22
1-5%	7
5-10%	7
10-15%	4
15-20%	4
20-25%	1
25-30%	3
>30%	-
Reasons miss visits	182 visits
Patient did not arrive	
Transport	71 (39.0)
Defaulted	12 (6.6)
Travelled	44 (24.2)
Too Ill	4 (2.2)
Patient arrived, clinic unable to perform	
Consumables	28 (15.4)
Water	4 (2.2)
Electricity	5 (2.7)
Dialysis machine	1 (0.5)
Catheter related	5 (2.7)
Reverse Osmosis	8 (4.4)

Table 5 (shown below the references) compares the clinical outcomes at the end of the year by the initial diagnosis, co-morbidities, pre-dialysis clinical values, distance to the clinic, missed visits and having started dialysis in South Africa. At the end of the year, 21 patients died and 23 patients were still alive (14 still on active dialysis, 6 recovered, and 3 transplanted). Patients on ART account for 42% of all patients that died. Those that had HTN or DM combined with renal failure were more likely to have worse outcomes; of the

10 patients with DM and renal failure, 70% died and 30% are still on dialysis. HIV and HTN are comorbidities most associated with death.



The Figure illustrates that all patients but one who presented with a creatinine value greater than 1338 µmol/L, died within 8 weeks. Of the 19 creatinine measurements recorded for patients who died (mean = 1,904, SD=1,065) compared to the 20 creatinine measurements (mean = 1,343, SD=459) recorded for those who survived (a combination of recovered, active and transplant patients), there was a statistically significant difference ($p < 0.05$) between the two groups. The figure clearly shows that those who initiated dialysis in Lesotho with a high creatinine levels are more likely to die within a matter of weeks. The orange line is a reference value of the average creatinine value (mean = 1,338 µmol/L, SD= 480) of patients who either were in recovery, were continuing dialysis or had a transplant.

DISCUSSION

This study describes the first cohort of renal unit patient’s clinical characteristics, adherence and barriers to successful administration of dialysis, and death rates encountered at the regional government hospital in Lesotho within its first year of operation. We identified several important findings.

First, at the end of the year, nearly half the patients (21) had died while 23 patients were still alive (14 were still on active dialysis, 6 had recovered, and 3 underwent a renal

transplant). Our data show that many patients presented with very high blood pressure and pulse at the initial dialysis appointment, and many presented with a very high serum creatinine. Even with a small sample size, we found a statistically significant difference between the creatinine measurement at intake between those who passed away and with those who survived. It is likely that earlier referral and initiation of dialysis could benefit these patients.

Second, the factors contributing to patients not adhering to recommended sessions were divided into two. The first category was patients who were not able to arrive to the clinic due to lack of money for transport, patients who were travelling, those who defaulted and/or fell ill. The second category showed that over one-fourth of patients who missed visits did so after they arrived, but the clinic unable to perform dialysis due to lack of consumables, water, and/or electricity.

Third, the primary renal diagnoses of patients in our sample were hypertension and diabetes mellitus. It is possible that improved treatment of these chronic diseases could decrease the rates of end-stage renal disease as has been shown around the world. Hypertension affects approximately 25% of the adult population and is the cause of chronic kidney failure in 21% of patients on renal replacement therapy in the South African Registry. The hypertension and diabetes rates that we found are similar to studies done in South Africa and other sub-Saharan African countries.¹¹

Fourth, the average age of patients requiring dialysis in our study (42 years) is much lower than found in many parts of the world. This study is similar to retrospective study of a single haemodialysis centre in Nigeria where patients initiating dialysis averaged 47.5 years old, ranging

from 12 to 72 years. Although our study describes a single year of patients accessing dialysis at a single centre in Lesotho and not a population-wide study of ESRD in Lesotho, we note that this average age of 42 is young in comparison to studies of ESRD patients in the United States, which show that the highest prevalence in the 65-75 age groups.² The prevalence of diabetic nephropathy is estimated to be 14%–16% in South Africa, 23.8% in Zambia, 12.4% in Egypt, 9% in Sudan, and 6.1% in Ethiopia.¹¹ In most parts of sub-Saharan Africa, the focus of healthcare policy over the years has been on the control of communicable diseases (such as malaria and human immunodeficiency virus (HIV) infection) and maternal and child health. As a result, little or no attention is given to non-communicable diseases. However, there is a growing burden of non-communicable diseases in many countries that contribute to the burden of CKD.

Fifth, we found that the presence of dialysis in Lesotho was lifesaving for the four HIV positive patients on ART-TDF combination medication who were initiated on dialysis, and for the one patient with rhabdomyolysis whose renal function recovered after initiation of dialysis. All five of these patients survived and eventually were discharged. Of note, these patients did not have any other co-morbidities such as hypertension or diabetes. The individuals with HIV on TDF combinations represent a specific subset of the population in Lesotho for whom dialysis is needed for acute renal failure due to HIV medication-related renal failure.⁹

Sixth, patients are referred to the Motebang's Renal Unit from all over Lesotho which likely impacts their ability to keep appointments. The mean distance that patients live from the hospital is 88 km, and most patients travel from central Maseru, followed by Berea. Only one-fifth of patients were from Leribe. Approximately one quarter of patients in our sample are unemployed. It is likely that the long distances from patient's homes to the dialysis unit, combined with lack of financial resources resulted in 26 of the 48 patients missing at least one of their dialysis session. In South Africa, where there is also a limited availability of government-funded

dialysis, patients who are otherwise eligible for dialysis are frequently unable to access it because of their socioeconomic circumstances.¹²

For those who do access dialysis, the financial burden is exacerbated because they typically cannot work on days when they receive dialysis due to the time spent at the dialysis centre receiving treatment and on travelling to and from the provider. Poverty is associated with lack of social protection, lack of transportation, poor housing and unemployment. Lack of transportation restricts access to care even when treatment costs are not a major barrier. According to a study done in Nigeria only 6.8% of patients could afford haemodialysis beyond three months.¹⁰

Limitations of the study include that we only studied a single site and only for one year. We hope to continue data collection to increase our sample size in the future. Our tables shows a high frequency of missing data in the charts that were abstracted. Some of this is due to the lack of record keeping (e.g. vital signs) and some is due to lack of equipment and reagents in the laboratory. Finally, another weakness is that the major etiology and co-morbidity data come from patient self-report. A strength of our study is that data was collected for all patients initiating dialysis in the renal unit and information about the number of missed visits was accurately calculated.

CONCLUSION

This study suggests that in Lesotho the most common causes of renal failure include both non-communicable diseases and infectious diseases (hypertension, diabetes mellitus, HIV/ART), Inaccessibility of the single renal unit to majority of the population and lack of equipment and consumables leads to missed dialysis sessions. It appears that CKD/ ESRD is often diagnosed at very advanced stage and referrals for dialysis are made late in the course of disease and for patients who arrive to HD with high creatinine and unstable vital signs, mortality rates are high.

Prevention, early detection and referral could play major role in avoiding these outcomes. Policies must strengthen primary care in all

districts and equip laboratories so that renal function tests can be performed routinely for patients at risk and those with predisposing conditions.

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Table 5: Comparison of Clinical Outcomes of Dialysis Patients				
Variable	Died, n=21	Recovered, n=6	Active, n=14	Transplant, n=3
Age, mean in years (SD)	38.9 (13)	38 (13.98)	45.86 (13.8)	38.67 (12.5)
Diagnosis	n (%)	n (%)	n (%)	n (%)
ART	9 (42)	4 (66)	5	-
DM related	7 (33.3)	-	3	-
HTN related	15 (71.4)	-	14 (100)	3 (100)
DM + HTN	6 (28.6)	-	3 (21.4)	-
ART + DM	1 (4.7)	-	-	-
ART + HTN	3 (14.3)	-	5 (35.7)	-
PPH	-	1 (16.7)	-	-
Rhabdomyolysis	-	1(16.7)	-	-
Comorbidities	n (%)			
HTN	16 (76.2)	1 (16.7)	14 (100)	-
DM	7 (33.3)	-	3 (21.4)	-
HIV	9 (42.9)	4 (66.7)	5 (35.7)	1 (33.3)
Hep B	3 (14.3)	-	1 (7.1)	-
Lupus	2 (9.5)	-	-	-
Anemia	11 (5.2)	2 (33.3)	9 (64.3)	-
Trauma	-	1 (16.7)	-	-
Thyroid dysfunction	1 (4.7)	-	1 (7.1)	-
Pre-dialysis Clinical Values	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)
Systolic BP (mmHg)	134 (31)	145 (21)	155.78 (27.9)	137.67(15.89)
Diastolic BP (mmHg)	81 (20)	90 (22)	94.35 (22)	75.3 (3.5)
Pulse (bpm)	84 (20)	84 (16.7)	89.9 (16)	92.67 (18.14)
RBS (mmol/L)	8.5 (3)	8.26 (1.3)	8.5 (2.2)	7.2 (0)
Creatinine (μmol/L)*	1894 (1125)	1457 (495)	1293 (503)	1253 (67.89)
Urea (mmol/L)	70 (37.7)	38.3 (23)	46.5 (22)	44.85
Sodium (mmol/L)	129.6 (7.4)	133.5 (6)	135.5 (4.7)	**
Potassium (mmol/L)	5.9 (1.5)	4.8 (2.7)	5.2 (1.6)	**
Other Characteristics				
Distance to clinic in mean km (SD)	91.5 (64.9)	78 (65.3)	76.8 (51.4)	144.3 (50.29)
Mean %of missed visits (SD)	5.2 %(8.7)	4.7 %(6.9)	8.2 %(8.2)	5.3 %(9.2)
Started Dialysis in SA (%)	1 (4.8)	-	3 (21.4)	1 (33.3)

Retrospective Descriptive Study of a Neonatal Mortality in a Lesotho District Hospital

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ABSTRACT

BACKGROUND: In sub-Saharan Africa over a million babies a year die during the neonatal period, or during the first four weeks of life. In Lesotho the neonatal mortality rate is 33 deaths per 1000 live births. We conducted the first known study in Lesotho's Motebang Hospital to evaluate neonatal deaths.

METHODS: We conducted a 12-month retrospective chart review to assess clinical characteristics associated with early neonatal deaths at a large district hospital, Motebang Government Hospital, in Hlotse, Leribe. Data were analysed using descriptive statistics.

RESULTS: Among neonates who died in the first 28 days of life (n = 26), the largest proportion died within 24 hours of life (14 out of 26), and most died within the first week of life (23 out of 26). The most common diagnoses at admission for neonates who later died included asphyxia (nine out of 26) and sepsis (eight out of 26). A large amount of maternal data was not documented, especially in mothers who delivered outside Motebang Hospital (8 out of 26). Seven out of 18 mothers with recorded HIV status were HIV positive and all of the HIV

positive mothers were on antiretroviral therapies.

CONCLUSIONS: Our analysis on the cause of neonatal deaths at Motebang Hospital showed that largest proportion of neonates died within 24 hours of life, and most died within the first week of life. Birth asphyxia, HIE and sepsis were the most common causes of death. Better documentation of patients transferred from other care settings is needed. There is a need for improved peripartum care via assessment of foetal distress and prolonged labor, and improved availability of neonatal resuscitation and treatment of neonates in district hospitals.

BACKGROUND

Globally, the leading causes of neonatal death are reported to be preterm birth complications (35.7%), intrapartum complications (23.4%) and sepsis (15%).¹ In sub-Saharan Africa, the top three causes of neonatal deaths as identified by Afolabi were infections (39%), birth asphyxia (24%) and complications of preterm birth (25%).⁴ In this study it was estimated that 14% of babies were born with birth weight <2,500 grams due to restricted intrauterine growth, though the period of gestation was normal. Reasons for low birth weight were documented

as twinning or multiple pregnancy, hypertension (either chronic or pregnancy-induced), anaemia, infections (such as placental malaria, Human Immunodeficiency Virus (HIV), or other sexually transmitted infections), poor nutrition, or a combination of any of these factors.⁴

Some studies have also identified specific socioeconomic, environmental, and cultural characteristics that may be associated with neonatal death. The Afolabi study in sub-Saharan Africa classified the factors influencing neonatal death as remote and proximal. Remote factors included overlooked social determinants of neonatal health, the effect of certain cultural beliefs and traditions, weak health systems, poor living conditions, and ignorance of the “germ theory” (e.g., that germs or bacteria are the causes of infection).⁴ Proximal factors included lack of education, unplanned or unintended pregnancies, unmarried mothers, late attendance for antenatal care, women over 35 years giving birth, girls under 15 years giving birth, social deprivation/inequality, and inequity.⁶ A study in Zambia found that the factors significantly associated with neonatal mortality were lower socio-economic status and inadequate water or sanitation facilities. Additionally, a home delivery and absence of a trained delivery attendant predicted higher neonatal mortality in this study.⁵ The Lesotho Demographic and Health Survey sheds some light on the social factors that are associated with neonatal death. In Lesotho, maternal incomplete primary school was associated with a higher neonatal mortality of 44 per 1000 whereas more than secondary school completion had a reduced mortality rate of 23 per 1000. If maternal age was less than <20, neonatal mortality rate increased to 48 per 1000, while the rate was 26 per 1000 in mothers aged 30-39.⁶

These studies provide some insight into the factors influencing neonatal deaths globally and in sub-Saharan Africa but, to our knowledge, no research studies have evaluated these factors in Lesotho. To that end, we conducted a

retrospective chart review of neonatal deaths at Motebang Government Hospital in Lesotho between the dates of 1st January 2018 to 31st December 2018 to identify the main diagnostic classifications of early neonatal deaths, to establish the demographic, socioeconomic and clinical characteristics of mothers and neonates who die in the neonatal period and to determine the overall number and rate of in-hospital neonatal deaths occurring over this time period.

METHODS

Study sample: Study inclusion criteria were all neonates who died at Motebang Hospital from 1st January 2018 to 31st December 2018. Stillbirths, infants who died beyond the first 28 days of life, and neonates who died at home were excluded from the study.

Study design: We conducted a retrospective chart review of all neonates who died in the neonatal period during admission at Motebang Government Hospital, located in Leribe, a district of Lesotho.

Study Setting. Motebang Government Hospital, a district hospital, is the main referral hospital in the northern part of the country and has a catchment population of 28,006, total in-patient bed size of 195, and a total number of live births of 1,585 in 2018.^{22,23} The site serves a wide range of the Leribe population. Trained nurse midwives at Motebang Hospital conduct the majority of vaginal deliveries with support by physicians who help with complicated cases and perform all caesarean sections.

Data Collection: A data collection form developed *a priori* by literature review was used to extract each case's information. The charts of the mothers of neonates who died were identified by comparing the names of the infant and the mother on the respective admission charts. The data collection instrument was designed to collect data on the demographic, socioeconomic and clinical characteristics of mothers of neonates. We evaluated all charts of admission to the hospital during the study time period. Admission charts were obtained from

the hospital record room and included deaths in the maternity wards, neonatal wards, paediatric wards, and casualty.

Data analysis: We conducted descriptive analyses to evaluate the overall number of neonatal deaths and causes of death at Motebang Government Hospital within the study time period. We then calculated an in-hospital neonatal death rate (per thousand) defined as the neonates who were born at Motebang Government Hospital and subsequently died per the total number of live deliveries at Motebang Government Hospital over the same one-year time period. We also conducted descriptive statistics evaluating the demographic, socioeconomic, and clinical factors that have been associated with neonatal death in other studies. Further subgroup analysis was then conducted to compare differences between causes of neonatal deaths. These subgroups included term vs preterm, normal vaginal delivery vs c/section, HIV positive vs HIV negative maternal status, age of death, APGAR score at 5 minutes, and APGAR score at 10 minutes. All analysis were conducted in Microsoft Excel.

Ethical Considerations: Permission was sought from the Ministry Of Health, National Health Research Ethical Committee (NH-REC) of Lesotho, which reviewed and approved the research proposal (ID 38-2019). We also obtained permission from Motebang Hospital management to review patient files.

RESULTS

A total of 26 neonates died at Motebang Hospital within the first 28 days of life during the study period. The total births at Motebang hospital (1,585) and the neonates from our sample who were born in the hospital (16) were used to calculate the neonatal death rate. The neonatal death rate at Motebang Government Hospital is 10.1 per 1000 live births for the year of 2018. Sixteen maternal charts accompanied the 26 neonatal charts, with the rest absent from hospital records. The charts that were missing were all from neonates who were born

outside of the hospital and transferred to Motebang Hospital.

Table 1 (see end of article) describes data about the neonates who died. Among neonates who died (n=26), 16 (61.5%) were born at Motebang Hospital the rest were referred to the hospital from an outside clinic/hospital. Regarding seasons of death, most neonates, nine (34.6%), died in autumn, followed by 8 (30.8%) died in winter, then 5 (19.2%) died in summer and 4 (15.4%) died in the spring. Documented age of death showed that 14 (53.8%) died within the first 24 hours of life, 9 (34.6%) died between day 1 and day 7 of life, and 3 (11.5%) died between days 8 and 28 of life. Apgar scores in the first minute of life (n=22), were <8 for 17 neonates (77.3%) and Apgar scores in the 10th minute of life (n=22) were < 8 for 14 neonates (63.6%). Documented foetal distress (n=21) was present in 18 neonates (85.7%), meconium stained amniotic fluid (n=22) was present in 6 neonates (30%), and neonatal fever (n=26) was present in 11 neonates (42.3%). Resuscitation (n=22) was needed for 19 neonates (86.4%) and oxygen therapy (n=22) was given for 20 neonates (90.9%).

Table shows characteristics of mother showing that (n=12) were married and 17 of 18 (94.4%) lived outside Hlotse town. Among mothers who reported an occupation (n=8), 5 (62.5%) reported being a housewife and 3 (37.5%) reported being a factory worker and among those who reported education status (n=8), 2 (25%) completed some secondary school or less, 5 (62.5%) completed some high school, and 1 (12.5%) completed some tertiary school. Regarding clinical characteristics, among those with documented gestational age (n=15), there were 7 preterm (46.7%), 7 term (46.7%), and 1 post-term babies (6.7%). Of the documented maternal gravidities, 7 (46.7%) were primigravid. Maternal HIV status (n=18) was negative in 10 (55.6%), positive in 7 (38.9%), and unknown in 1 (5.6%) case. Among mothers who reported body weight (n=8), 4 were obese (50%), 2 were overweight (25%), and 2 were normal weight (25%). For maternal mode of

delivery (n=19), the mode was normal vaginal delivery (NVD) for 10 mothers (52.6%) and c/section for 8 mothers (42.1%). Foetal presentation at delivery (n=19 documented) was largely cephalic (n=9, 89.5%).

Table 3 (see end of article) depicts frequency of cause of deaths within different subgroups. Subgroup 1 compares preterm and term neonates. Birth asphyxia 4 (50%) was the major cause of neonatal death in term neonates, followed by sepsis 3(37.5%), hypoxic ischaemic encephalopathy (HIE) 3 (37.5%), and meconium aspiration 3 (37.5%) whereas respiratory distress syndrome in 4 (57.1%) is the major cause of neonatal death among preterm neonates. One preterm baby died from aspiration pneumonitis and one from anencephaly.

Subgroup 2 depicts frequency of cause of deaths within neonates delivered via NVD and C-section. Among those who were delivered via NVD 5 (45.4%) died from asphyxia, whereas 3 (37.5%) died of asphyxia amongst those who were delivered via cesarean section. Within the C-section subgroup 3 (37.5%) each died from RDS and Meconium Aspiration.

Subgroup 3 depicts frequency of cause of deaths of neonates with maternal HIV status subgroups. Birth asphyxia contributed to 5 (50%) deaths in maternal HIV positive subgroup and 2 (28.5%) in the maternal HIV negative subgroup.

Subgroup 4 depicts frequency of cause of deaths in neonates that died before or after 24 hours of age. Sepsis contributed to 7 (58.3%) of those who died after 24 hours of age and 1 (7.1%) in those who died within 24 hours of age. HIE and RDS each contributed to 5 (35.7%) of deaths within 24 hours, while both of these causes contributed to 1 (8.3%) each to deaths beyond 24 hours of age.

Subgroup 5 depicts frequency of cause of deaths within subgroups of birth weight less than and greater than 2,500g. Birth asphyxia contribute to 7 (58.3%) deaths in the >2500g birth weight subgroup and 2 (16.6%) of deaths

in <2500g subgroup. Sepsis contributed to 5 (41.6%) of deaths in >2500g birth weight subgroup and 2 (16.6%) in subgroup of birth weight less than 2500g.

Table 2. Characteristics of mothers of neonates who died in the first 28 days of life at Motebang Hospital	
Average age (years), n = 18	27.7 (SD = 6.46)
Age ≥35	3
Education	
Secondary or less	2 (25%)
Some High School	5 (62.5%)
Some Tertiary School	1 (12.5%)
No documentation	18
Marital Status	
Single	0
Divorced / separated	0
Married	12 (100%)
Widow	0
No documentation	13
Occupation	
House wife	5 (62.5%)
Factory worker	3 (37.5%)
No documentation	18
Gestational Age at delivery (weeks)	
< 28	1 (6.7%)
28 -33	4 (26.7%)
34 – 36	2 (13.3%)
37- 40	7 (46.7%)
>40	1 (6.7%)
Place Of Residence	
Within Hlotse Town	1 (5.6%)
Outside Hlotse Town	17 (94.4%)
No documentation	8
BMI (kg / m²)	
Obese (BMI > 30)	4 (50%)
Overweight (BMI 25-29.9)	2 (25%)
Normal (BMI= 18 – 24.9)	2 (25%)
Underweight (BMI <18)	0
No documentation	18
Number of Pregnancies	
Primigravida	7 (46.7%)
2- 4	6 (40%)
>4	2 (13.3%)
Maternal Mode of delivery	
NVD	10 (52.6%)
Caesarean Section	8 (42.1%)

Subgroup 6 depicts frequency of cause of deaths within defined subgroups given neonatal APGAR scores at 5 minutes: 0-3, 4-7, 8-10. Birth asphyxia contributed to 3 (60%) deaths in subgroup of 0-3 APGAR score, 6 (54.5%) in subgroup 4-7 score, and 0 (0%) in subgroup of 8-10 score. Sepsis contributed to 1 (20%) deaths in subgroup of 0-3 APGAR score, 1 (9.0%) in subgroup 4-7 score, and 3 (50%) in subgroup of 8-10 score.

Subgroup 7 depicts frequency of cause of deaths within defined subgroups given neonatal APGAR scores at 10 mins: <8, 8-10. Birth asphyxia contributed to 9 (64.2%) of deaths with an APGAR score less than 8 at 10 mins. HIE contributed to 6 (42.8%) of deaths in subgroup with APGAR less than 8 at 10 mins. Sepsis accounted for 3 (37.7%) of deaths in subgroup with APGAR score 8-10.

DISCUSSION

We conducted the first known retrospective chart review to evaluate early neonatal deaths at Motebang Hospital in Lesotho. Our findings are limited by significant missing documentation, with up to 69.2% of data missing for some of the variables that we evaluated. We noted a pattern of missing documentation, highlighting the need for system-wide interventions on proper and complete documentation of clinical data.

Documentation improvement changes could include: all health facilities referring their patients to Motebang Hospital could be asked to bring along their patients' Lesotho Obstetrics Records (LORs) for photocopying of important maternal information in the LOR. The LOR could also be reviewed and improved to include all the important missing information or Motebang Hospital Maternity ward admission form could be developed to include all important information. Assessment for quality of documentation of Maternity admission files (LORs and Neonatal admission files) could be done on regular basis (for example Monthly reviews) to improve quality of documentation by staff members. Improved access and update

of prenatal, antenatal, neonatal care, reduced unnecessary caesareans, treatment of newborn urgent conditions early may be next important steps for reducing neonatal mortality in Lesotho. Correct identification of fetuses at risk for IUGR / LBW, provision of maternal antenatal care early and delivery in the correct place if at risk may also be important next steps for reducing neonatal mortality in Lesotho.

However, despite this missing data, this chart review represents an important exploratory study that yielded some notable preliminary findings surrounding neonatal mortality in Lesotho. Overall, we noted that most of the mothers whose neonates died were between 15 and 34 years of age, were married, were either house wives or factory workers, and resided outside Hlotse town (some from very far distances from Motebang Hospital). Most mothers whose neonates died were in their first pregnancy. We noted that the majority of neonates died within 24 hours of life and all but 3 others died within the first week of life.

In our data, we noted that 46.7% of the mothers were primigravida. As the fertility rate in Lesotho is 3.17,⁷ our findings suggest that women in our sample who were in their first pregnancy were more likely to incur neonatal deaths at Motebang Hospital.

Distance from and difficulties surrounding transportation to Motebang Hospital may be contributing factors to neonatal mortality in our sample as 17 of the 18 women (94.4%) with documented residence data lived outside Hlotse town. Though one previous study in Sub-Saharan Africa noted no difference between early neonatal death and distance to the nearest healthcare facility,⁸ our data indicate that there might be some validity in correlating distance and neonatal mortality. Our data did not contain detailed information about whether these mothers intended to travel to Motebang for care or whether they were referred to Motebang due to issues with labour or after delivery. Further clarification of this with

improved documentation or a prospective study could help address the cause of this association.

In 2018, the prevalence of HIV in the Lesotho female population aged 15-49 was 28.8%. In our sample, the prevalence of HIV was 44% (7 out of 18 mothers with documented status were HIV positive), which is higher than the country's current prevalence rate. It is worth noting that all women in our sample who were HIV positive were documented to be on antiretroviral (ART) therapy. Rates of vertical HIV transmission can be reduced from 15-45% to under 5% in women who are on ART therapy adjunctive to appropriate care and delivery⁹. Data suggest that there are no differences in neonatal mortality between mothers who are HIV negative and HIV positive, with HIV status being relevant to outcomes in the post-neonatal period¹⁰. Although there were higher rates of HIV in our sample than in the general population, we do not suspect this was a major factor in neonatal death since all women were on ART.

Neonatal data also provided some insight about possible post-delivery shortcomings. Fourteen of the 26 (53.8%) deaths occurred within the first 24 hours. Per the WHO Global Health Observatory data, 2.6 million neonatal deaths occur worldwide each year.¹¹ One million (~38%) of these occur on the first day and another million within the next week.¹¹ In our data, we see a higher rate of death within the first day of life, underscoring the need for immediate, mortality-preventing protocols to care for infections, hypothermia, hyperbilirubinemia, respiratory distress, and asphyxia.¹² Early neonatal death also underscores the need proper peripartum care via comprehensive assessment of foetal distress, partograms, and appropriate C-sections.

The distribution of birth weight was also an important finding in our sample. Half (12/24) of all neonatal deaths had low birth weight (LBW) (defined as a birth weight <2,500g). By comparison, only 15% of all births in Lesotho

fall in this category.¹³ This difference is suggestive of LBW being a relevant factor in neonatal mortality in our sample. The most common reasons for LBW are IUGR (intrauterine growth restriction) and preterm births². Of the 7 documented preterm births in our data, 6 had LBW. Providing adequate prenatal care with an emphasis on maternal nutrition, treatment of genitourinary infections, smoking cessation, and malaria prophylaxis can help lower the incidence of LBW.¹² Once delivered, proper triaging of babies who are LBW can help to reduce neonatal mortality; for instance, protocols to ensure proper feeding may be necessary first-line interventions in this context.^{14,15}

APGAR scores are one component in evaluating birth asphyxia.¹⁶ Looking at the APGAR scores, we noted that 12 out of 22 neonates had a score of less than 5 at 1 minute. At the 5 minutes, 9 out of 22 neonates had a score less than 5 and at the 10 min mark, 6 of 22 neonates had a score less than 5. The low 5 and 10-min APGAR scores suggest that birth asphyxia may have been a factor in neonatal mortality within this sample. Appropriate training of midwives and physicians in neonatal resuscitations may be important next steps for ensuring that birth asphyxia is a focal point of neonatal intervention.¹⁷

We observed neonatal fever in 11 out of 26 (42%) neonates. Similarly, 8 out of 26 (30%) neonates had sepsis as an identified diagnosis on admission. Seven out of the 11 neonates who experienced neonatal fever were also diagnosed with sepsis on admission, underscoring a need for proper management with antibiotics, blood cultures (which are not performed at Motebang Hospital), and early infection interventions. Though the data in the charts were not clear if appropriate antibiotics and sepsis evaluation was completed for the neonates, it is routine for neonates with fever at Motebang to get a limited sepsis evaluation and receive broad spectrum antibiotics. Eight out of 11 of those who died of sepsis in our data were early neonatal deaths. Research states

that most septic deaths occur in the late neonatal period; however, we do not see that observation represented in our data, which raises questions about missed diagnoses, or missed deaths.¹⁴

LIMITATIONS

This study has some important limitations. A lack of proper documentation was the first limitation. Our work highlights the need for better documentation and communication between outside facilities and the referral hospital of Motebang. We excluded maternal characteristics from all women who were transferred to Motebang from an external site (e.g., born at clinics or other hospitals but died at Motebang Hospital) because of the lack of documentation of their characteristics since their obstetric record charts were missing (table 1). Second, this study is limited to only one year of data and a sample size of only 26 neonates.

Next, this study was based at only one district government hospital not covering the other nine districts of Lesotho, and thus not providing a complete depiction of neonatal deaths in the country.

We did not collect information about fathers and other family members, or of social characteristics outside of what was included in the medical record. Thus, given the lack of data, it is not possible to draw conclusions about

broader causative factors surrounding neonatal mortality in Lesotho.

Another limitation of our analysis pertains to age of viability. It could be presumed that the age of viability in Lesotho is when gestational age is more than 28 weeks. However in our analysis we have included the age of one neonate which died at the age of 26 weeks raising the concern that this might be a stillborn fetus rather than a neonatal death.

Finally, the diagnoses of sepsis and HIE are confirmed by blood cultures, and arterial blood gases and brain imaging, respectively. These studies are not available at Motebang Hospital and the above-mentioned diagnoses are presumed based on clinical presentation.

CONCLUSION

Our retrospective analysis on the cause of neonatal deaths at Motebang Hospital showed largest proportion of neonates died within 24 hours of life, and most died within the first week of life. Birth asphyxia, HIE and Sepsis were the most common causes of death. We propose better documentation of patients transferred from other care settings and a need for proper and improved peripartum care via comprehensive assessment of foetal distress and use of partogram and improved availability of diagnostic methods, resuscitation methods and treatments.

Table 1. Characteristics of Neonatal Deaths (≤28 days) at Motebang Hospital in 2018, n=26			
Age at Death (in days)		Presence Of Fever (≥38 C)	
< 1	14 (53.8%)	Yes	11 (42.3%)
1 – 7	9 (34.6%)	No	15 (57.7%)
8-28	3 (11.5%)	Any Resuscitation at Birth	
Sex		Yes	19 (86.4%)
Male	15 (60%)	No	3 (13.6%)
Female	10 (40%)	Oxygen Therapy	
Birth weight (in grams)		Yes	20 (90.9%)
<1000 (ELBW)	1 (4.2%)	No	2 (9.1%)
1001-1500 (VLBW)	3 (12.5%)	Diagnosis at Admission	
1501-2500 (LBW)	8 (33.3%)	Birth Asphyxia	9 (20%)
2501 – 3999 (Normal)	12 (50%)	HIE	6 (13.3%)
>4000 (High BW)	0	Neonatal Sepsis	8 (17.8%)
1 minute APGAR score		RDS	6 (13.3%)
0 – 3	10 (45.5%)	Preterm	4 (8.9%)
4-7	7 (31.8%)	Meconium Aspiration	4 (8.9%)
8 – 10	5 (22.7%)	Low Birth Weight (LBW)	3 (6.7%)
5 minute APGAR score		Aspiration Pneumonitis	2 (4.4%)
0 – 3	5 (22.7%)	Severe Hypothermia	1 (2.2%)
4-7	11 (50%)	Congenital Anomaly	2 (4.4%)
8 – 10	6 (27.3%)	Place Of Birth	
10 minute APGAR score		Motebang Hospital	16 (69.6%)
0 – 3	2 (9.1%)	Mamohau Hospital	1 (4.3%)
4 – 7	12 (54.5%)	Health Centre/Clinic	5 (21.7%)
8 – 10	8 (36.4%)	In transit	1 (4.3%)
Foetal Distress*		Season The Neonate Died	
Yes	18 (85.7%)	Summer (Nov, Dec, Jan)	5 (19.2%)
No	3 (14.3%)	Autumn (Feb, Mar, April)	9 (34.6%)
Meconium Stained Fluid		Winter (May, June, July)	8 (30.8%)
Yes	6 (30%)	Spring (August, Sept, Oct)	4 (15.4%)
No	14 (70%)		
Notes To Table 1.			
1. Percentages do not add to 100% due to missing data.			
2. RDS = Respiratory Distress Syndrome			
3. HIE = Hypoxic Ischaemic Encephalopathy			

Table 3: Causes of Death within Subgroups								
	Asphyxia N (%)	HIE N (%)	Sepsis N N(%)	RDS N (%)	Meconium N (%)	Aspiration N (%)	Hypothermia N (%)	Anencephaly N (%)
1. Preterm vs term delivery								
Preterm (n=7)	1 (14.2)	0 (0)	0 (0)	4 (57.1)	0 (0)	1 (14.2)	0 (0)	1 (14.2)
Term (n = 8)	4 (50)	3 (37.5)	3 (37.5)	1 (12.5)	3 (37.5)	1 (12.5)	0 (0)	0 (0)
2. NVD vs Cesarean-section delivery								
NVD (n=11)	5 (45.4)	3 (27.2)	2 (18.1)	2 (18.1)	1 (9.0)	1 (9.0)	0 (0)	1 (9.0)
C-Sect (n=8)	3 (37.5)	2 (25.0)	2 (25)	3 (37.5)	3 (37.5)	1 (12.5)	0 (0)	0 (0)
3. Maternal HIV Status								
HIV+ (n=10)	5 (50)	2 (20)	2 (20)	3 (30)	3 (30)	0 (0)	0 (0)	1 (10)
HIV(-) (n=7)	2 (28.5)	2 (28.5)	1 (14.2)	2 (28.5)	1 (14.2)	2 (28.5)	0 (0)	0 (0)
4. Neonatal age of death (hours)								
≤24 h (n=14)	6 (42.8)	5 (35.7)	1 (7.1)	5 (35.7)	2 (14.2)	1 (7.1)	1 (7.1)	1 (7.1)
≥24 h (n=12)	3 (25)	1 (8.3)	7 (58.3)	1 (8.3)	2 (16.6)	1 (8.3)	0 (0)	1 (8.3)
5. Neonatal birthweight (grams)								
≤2500 (n=12)	2 (16.6)	0 (0)	2 (16.6)	4 (33.3)	1 (8.3)	2 (16.6)	0 (0)	2 (16.6)
≥2500 (n=12)	7 (58.3)	6 (50)	5 (41.6)	2 (16.6)	3 (25)	0 (0)	0 (0)	0 (0)
6. APGAR scores at 5 minutes								
0-3 (n=5)	3 (60)	3 (60)	1 (20)	0 (0)	0 (0)	0 (0)	0 (0)	2 (40)
4-7 (n=11)	6 (54.5)	3 (27.2)	1 (9.0)	5 (45.4)	4 (36.3)	0 (0)	0 (0)	0 (0)
8-10 (n=6)	0 (0%)	0 (0%)	3 (50%)	1 (16.6)	0 (0)	2 (33.3)	0 (0)	0 (0)
7. APGAR scores at 10 minutes								
<8 (n=14)	9 (64.2)	6 (42.8)	2 (14.2)	3 (21.4)	3 (21.4)	0 (0)	0 (0)	2 (14.2)
8-10 (n=8)	0 (0)	0 (0)	3 (37.5)	3 (37.5)	1 (12.5)	2 (25)	0 (0)	0 (0)

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I would like to dedicate this paper to Kaitlyn Riffenburg and Chelsea McGuire whose words of encouragement were very helpful in the completion of this research. May the good Lord bless you. To families and friends of all heroes who succumbed to Covid-19 as well



Dr. Mamakhala Chitja

Ministry of Health / Lesotho Boston Health Alliance Family Medicine Specialty Training Program and Baylor College of Medicine, Children Foundation in Lesotho

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Dr. Tilo Namane, MBChB

Ministry of Health / Lesotho-Boston Health Alliance Family Medicine Specialty Training Program, Leribe, Lesotho

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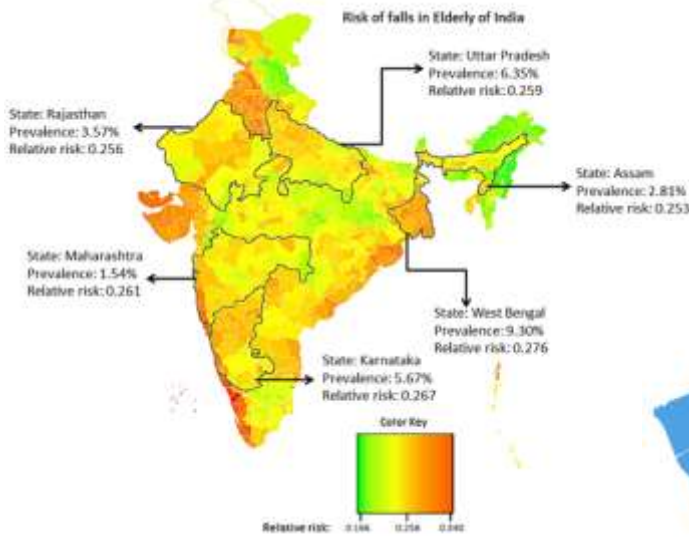
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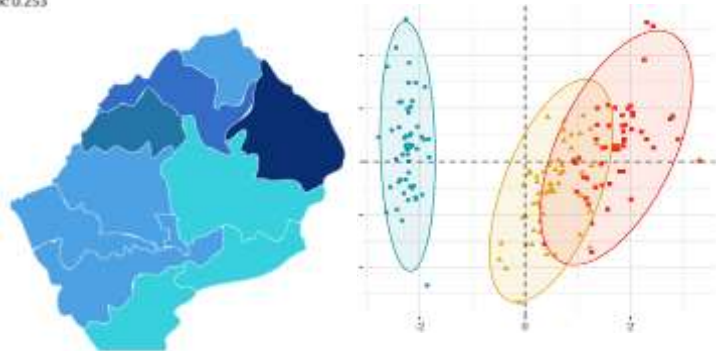
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- Dr. Ashish Sharma, PhD – Instructor at Emory University, specialist in HIV/AIDS research
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