Assessing facility readiness to offer basic emergency obstetrics and neonatal care (BEmONC) services in health care facilities of west Pokot county, Kenya

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Background: Globally, more than 1,000 women die each day with 358,000 dying in a given year during pregnancy and child birth mainly due to poor access to effective interventions (WHO, UNICEF, UNFPA, and World Bank, 2012). Most maternal and neonatal deaths in low-income countries, including Kenya, are attributable to a handful of preventable causes. Emergency obstetric and newborn care (EmONC) is an integrated strategy that aims to equip health workers with skills, life-saving medicines, and equipment to manage the leading causes of maternal and newborn death. It is on this basis that this study was conducted to find out how the BEmONC training impacted on the reproductive health services that the people of West Pokot are receiving.

Objectives: The broad objective of the study was to assess the facility readiness to offer Basic Emergency Obstetrics and Neonatal Care services in west Pokot County, Kenya following the training program that was rolled out in the year 2014, in West Pokot County, Kenya.

Methods: A methodological triangulation design was used as it incorporated elements of both quantitative and qualitative approaches. Informing this decision was the Pragmatic worldview. Quantitative approach adopted a descriptive cross sectional ex post facto design of 49 randomly selected health facilities. The customized Averting Maternal Death and Disability (AMDD) tool adopted from Columbia University was used to collect quantitative data. Data was analyzed using STATA V.13. The BEmONC observation checklist, guided and in-depth interviews were used to collect qualitative data and the sample size was purposively determined when saturation of the data was attained. Data was analyzed thematically.

Results: Findings indicated that facility readiness varied significantly by designation and facility type. All facilities in the urban setting were ready to offer BEmONC services compared to only 15.8% in the rural set-up. The challenges that affected BEmONC service delivery included understaffing (92.6%), lack of supplies and equipment (63%), poor infrastructure (44.4%), ineffective transport and communication (69%), insecurity (42.9%) and insufficient water supply.

Conclusion: Facilities in the urban setting were ready to offer BEmONC services unlike in the many facilities from the rural set-up. Key items lacked in many facilities and relatively few had all the required commodities and equipment to provide BEmONC.

Recommendations: This study recommends advocating for a complete BEmONC system by: Availing all the essential equipment, drugs and supplies; Improving strategies to sustain knowledge and competencies of the providers as well as maintain equipment and supplies for use to avoid wear and tear and improving supply chain management for essential commodities at the peripheral facilities.

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1. Background

Globally, more than 1,000 women die each day with 358,000 dying in a given year during pregnancy and childbirth mainly due to poor access to effective interventions (WHO, Monitoring the building blocks of health systems: A handbook of indicators and their measurement strategies, 2010). Since the landmark Safe Motherhood Conference was convened in Nairobi in 1987, maternal, newborn, and child health has gained increasing international recognition as a major global health priority. The commitment to end all preventable maternal and child deaths was most recently expressed during the launch of a financing facility by global partners, who committed more than US$4 billion to scale up and sustain essential services for women and children (WBG, 2015). In spite of these efforts, recent data indicate that progress toward reducing maternal and neonatal mortality is likely to fall short of the targets set by Millennium Development Goals (MDGs) 4 and 5, particularly in sub-Saharan Africa, where two-thirds of the world’s maternal deaths and half of the world’s child deaths are estimated to occur (Echoke, Kombe, Dubourg, Evjen-Olsen, & Mwangi, 2013). Postpartum hemorrhage (PPH), hypertension, infections, obstructed labor, and complications of abortion are the leading causes of maternal death, representing more than two-thirds of the estimated 289,000 global annual mortalities related to pregnancy and childbirth (UNICEF U. N., 2009). Up to three-quarters of neonatal deaths are attributable to infections, pre-term birth, and intrapartum complications (GoK, 2014). These top causes of maternal and newborn mortality are all largely preventable through the effective use of highly cost-effective interventions that should be available at the primary care level.

Providers skilled in emergency obstetric and newborn care (EmONC) services are essential, particularly in countries with a high burden of maternal and newborn mortality (WHO, UNICEF, UNFPA, & World Bank, 2014). Improving provision of emergency obstetric care remains the cornerstone of Kenya’s maternal health strategy as well as global safe motherhood strategies. Although most obstetric complications (defined as acute conditions such as Postpartum Hemorrhage, Sepsis, Eclampsia, and Obstructed Labor that can cause maternal death cannot be predicted, the majority can be treated with timely provision of a package of evidence-based interventions known as emergency obstetric care (EmONC) (WHO, Monitoring the building blocks of health systems, 2010). The availability of EmOC is considered to be an indicator of how well a health system is prepared to manage conditions leading to acute maternal/Neonatal morbidity and mortality (Travis, Bennett, Haines, Pang, Bhutta, & Hyder, 2004).

In the year 2014, AMPATH PLUS and its consortia partners embarked on a scale up of EmONC services across the Western region of the country, Kenya that carries a population of about 4.3 million people. The program is the USAID Implementing Partner [IP] for eight counties namely: Busia, Bungoma, Elgeyo Marakwet, West Pokot, Kisumu, Nandi, Trans-Nzoia and Uasin Gishu. It sought to implement global programs to build provider capacity in providing Basic and comprehensive EmONC services to women and newborns in poor-resource settings. The primary objective of this intervention was to make sure that at least half of the target group of facilities had capacity to offer all the signal functions for BEmONC. BEmONC training program was rolled out for the health care providers in West Pokot County with the overall aim of capacity building the health care facilities and help reduce the ever-increasing maternal and neonatal deaths. Basic training and equipment at the dispensaries and health centers were provided to enable providers to perform normal vaginal deliveries, neonatal resuscitation, and initiate referrals in the event of a complication.

The West Pokot County of Western Kenya borders the former North Frontier District in North Eastern Province with recurrent secessionist conflicts that deteriorated into disorganized banditry resulting into a large scale disruption to the way of life, huge loss of lives and thousands of casualties. It is a rural, marginalized county whose primarily ethnic minority population has limited access to health services and development infrastructure, and faces a heavy burden of health problems including high maternal and neonatal mortality, frequent malaria outbreaks, and a growing HIV/AIDS prevalence. It is estimated that 53% of the County’s population is poor and that 35% live in...
1.0. Problem Statement

The Turkana-Pokot cross border conflicts is widespread and of increasing concern. Studies indicate that conflicts are often characterized by the collapse of basic health services as well as local and national infrastructure, resulting in significant excess mortality (Toole & Waldman, 1997). A combination of difficult terrain and climate, poor infrastructure, and scant public resources has left the West Pokot County trailing in health and development, with grave consequences for the health of women and children. For nearly all health indicators related to maternal and child survival, the County lags far behind Kenya as a whole. It is estimated that 565 deaths per 100,000 births occur in West Pokot County alone annually (Kavita, Rebekah, & Rozalinetal, 2014). This is a sharp contrast to the reported national rate of 362 deaths per 100,000 live births (KDHS, 2014). However, County MMR is likely to be an underestimation, considering that there is inadequate community-based maternal mortality data in the area. Report from Clinical Audit and Research Unit (MTRH, 2013) indicated that majority (67%) of Maternal and Neonatal Mortalities were referral cases from West Pokot County. NCAPD, 2010 confirms that despite the Government of Kenya (GoK) and other stakeholders’ efforts to curb pregnancy related deaths and disabilities, maternal mortality rates (MMRs) have remained soaring high in the country. It further illustrates that pregnancy and childbirth related complications contribute to a significant number of pregnancy and childbirth related deaths and disabilities in West Pokot region. The major causes of these deaths are prolonged/obstructed labour, complications from unsafe abortion, hemorrhage, malaria during pregnancy, anaemia, and sepsis. Notably, most of these deaths and disabilities are preventable if women make good use of the available maternal health services.

The high MMR in West Pokot is mainly exacerbated by the extremely high prevalence of the most extreme form of female genital mutilation (infibulations type III), and attributed to obstructed labour and cephalopelvic disproportion (CPD) due to early marriages. It is estimated that 74% of women in West Pokot County give birth at home with traditional birth attendants (TBAs) attending most of these deliveries (GoK V., 2007). Only 10% of these women receive postpartum care within 2 days. Since most maternal deaths occur in the first week after birth, this means missed opportunity in terms of recognition and responding to danger signs after delivery. Safe motherhood interventions are thus crucial in reducing maternal deaths and pregnancy associated morbidity in the County. One important intervention was the AMPATH PLUS sponsored BEmONC training program conducted in 2014. This organization and its development partners made substantial investments in training and in increasing the supply of commodities and equipment for maternal and newborn care. However, these efforts have been largely fragmented. The capacity of health facilities across the county to provide the BEmONC signal functions is largely unknown. Remarkably, the extent to which available data are used to set priorities for the allocation of resources is unclear, as well.

Moreover, studies to evaluate the outcomes of the training have not been conducted. It is also important to evaluate the use of equipment and supplies provided during the training in the health care facilities of West Pokot County.

It is also unclear if there are any strategies put in place to sustain the program and if there are any mechanisms installed to sustain the supplied equipment. Arrangements on follow-up of mastery of skills and competencies on BEmONC, following the training is not known. Where trainings have occurred, no standardized practice of evaluating provider performance has been established. It is on this basis that this study was conducted to find out if the training has positively impacted on the Reproductive Health Services that people of West Pokot are receiving despite the several challenges the county is facing for example intensified cattle rustling, proliferation of illicit arms, inadequate policing and state security arrangements, diminishing role of traditional governance systems, competition over control and access to natural resources such as pasture and water, land issues, political incitements, ethnocentrism, increasing levels of poverty and idleness amongst the youth.
1.1. Justification

While global, regional and national policies and strategies to improve maternal, newborn and child health (MNCH) exists and interventions to prevent maternal, neonatal and child deaths are available, MNCH indicators remain unacceptably poor. Both the under-five and maternal mortality is increasingly concentrated (WHO, Monitoring the building blocks of health systems: A handbook of indicators and their measurement strategies, 2010). According to (Jennifer & Moss, 2012), maternal and neonatal mortality rates are highest in areas affected by humanitarian emergencies.

This study is designed to identify the outcomes of the BEmONC training program carried out in 2014 and establish existing gaps. It further seeks to inform programmatic efforts for increasing quality, coverage, and utilization of BEmONC services as well as critical support systems at all referral levels.

Increasing our understanding of the provision of BEmONC in low resource settings will provide useful information to guide future service delivery and allocation of resources. This research is important because its findings will help contribute in policy development on maternal and child health. The results from the study will further guide the government to better understand current policies and practices for Basic Emergency Obstetrics and Neonatal care (BEmONC) at the primary care level in low resource settings and identify factors that affect the implementation and maintenance of BEmONC interventions to reduce maternal/neonatal morbidity and mortality.

The study findings will further contribute in building scientific knowledge that informs recommendations to improve the provision of Emergency Obstetrics and Neonatal Care at the facilities where most women access services in the County. In addition, the aspects of geographic and financial access to services among these facilities and key constraints to BEmONC provision will also inform service improvement recommendations.

The data generated may be informative for West Pokot County planning to improve health service delivery for emergency obstetrics and Neonatal care. In addition, these recommendations may inform Kenya’s maternal health strategy and safe motherhood strategies, which are focused on reducing maternal and neonatal deaths through improved utilization and access to emergency obstetrics and Neonatal care.

2. Objectives

2.0 Broad objective

The broad objective of the study was to assess the effectiveness of Basic Emergency Obstetric and Neonatal Care (BEmONC) training program in West Pokot County, Kenya.

2.1. Specific Objectives

The specific objective of the study was to assess the facility readiness to offer Basic Emergency Obstetrics and Neonatal Care services in West Pokot County.

2.2. Research Questions

Were the facilities in West Pokot ready to offer Basic Emergency Obstetrics and Neonatal Care services?

3. Methods

The study adopted a triangulation method. The design was employed because it incorporated elements of both quantitative and qualitative approaches whereby the combination aimed to produce complementary strengths with no overlapping weaknesses (Johnson & Onwuegenbuzie, 2007). The method was also found suitable because it sought convergence and corroboration of the results from questionnaire, guided interviews and guided observations. Informing this decision was the Pragmatic worldview because the study arose out of actions (BEmONC) training, situations (resource constrained settings), and consequences (maternal and neonatal outcomes in challenging environments) rather than antecedent conditions.

Quantitative approach adopted a descriptive cross sectional ex post facto design of 49 randomly selected health facilities. The customized Averting Maternal Death and Disability (AMDD) tool adopted from Columbia University was used to collect quantitative data. Completed questionnaires were coded and data entry was done in Microsoft Excel dashboards (Spreadsheet). It was later exported to STATA V.13 for analysis. Descriptive statistics (frequencies, means
Table 1. Components addressed in Modules 1 to 9

<table>
<thead>
<tr>
<th>Module</th>
<th>Component addressed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Identification of Facility and Infrastructure</td>
</tr>
<tr>
<td>2</td>
<td>Human Resources</td>
</tr>
<tr>
<td>3</td>
<td>Essential Drugs, Equipment, and Supplies</td>
</tr>
<tr>
<td>4</td>
<td>Facility Case Summary</td>
</tr>
<tr>
<td>5</td>
<td>BEmOC Signal Functions and Other Essential Services</td>
</tr>
<tr>
<td>6</td>
<td>Partograph Review</td>
</tr>
<tr>
<td>7</td>
<td>Provider Knowledge and Competency for Maternal and Newborn Care</td>
</tr>
<tr>
<td>8</td>
<td>Maternal Death Review</td>
</tr>
</tbody>
</table>

and standard deviation) were used to summarize the data. The BEmONC observation checklist, guided and in-depth interviews were used to collect qualitative data. The sample size was purposively determined when saturation of the data was reached and data was analyzed thematically. An Ethical approval was sought from Institutional Research and Ethics Committee (IREC) of Moi University was obtained prior to the commencement of the research to ensure that the risks faced by human participants in this research were minimal. Clearance letter to conduct the study was obtained from the Minister of Health, and Medical Officer of Health (MOH), West Pokot County. The respondents’ privacy was respected. Anonymity and confidentiality was assured in that under no circumstances would the researcher identify the informants or make it public. In the study pseudonyms were used to describe respondents thus avoid chances of respondent identification.

The modules assessed in this study addressed the following components in Table 1.

4. Results

4.1. Demographics

There was a total of 33(78.6%) facilities that had conducted deliveries within the last 12 months with 9 (21.4%) facilities having not attended to any delivery. Figure 1 illustrates the above information.

4.1.0. Facility Region

Accessing majority of these facilities was the most challenging and very risky task. Plate 1 is one swinging bridge in Tamkal District, Central Pokot, Where patients have to cross as they are carried using a human stretcher to arrive at the nearest Health facility.

4.1.1. Designation of Facilities

Majority 37(88.1%) of the facilities are situated in the rural set up while only 4 (9.5%) care found in the urban environment. It was however not known where the designation of 1 (2.4%) facility belonged to.

4.1.2. Level of Facilities

Dispensaries carried the larger 29 (69.1%) representation of the health facilities in West Pokot County followed by the health centers 7(16.7%), the Sub-county facilities comprised 4(9.5%) and the least 1(2.4%) made up the County/District hospital (Figure 2).

4.2. Facility Readiness

Adequate availability of infrastructure is a crucial prerequisite for effective Maternal and Neonatal Health services delivery. It is extremely difficult for health care provider to offer quality services without physical space (rooms), beds for patients and source of electricity and...
running water. Similarly, functional mode of transport and communication systems is essential for timely and quick referral of emergency patients to a next higher level of health care facility.

Among the readiness categories, county and sub county hospitals scored higher in drugs, equipment and supplies (69%; 50%; 63%) \((p = 0.04; p = 0.03; p= 0.04)\). Only 10(23.8%) were ready to offer Basic Emergency obstetrics and neonatal care services while majority (76.2%) of the facilities did not have adequate capacity to offer BEmONC services (Figure 3).

Facility readiness varied significantly by designation and facility type \((p<0.05)\). All facilities in the urban setting were ready to offer Basic Emergency obstetrics and neonatal care services compared to only 15.8% of those in the rural set-up. Similarly majority of the county hospitals (83.3%) were ready to offer Basic Emergency obstetrics and neonatal care services compared only 3.6% of the dispensaries (Table 2).

4.2.1. Availability of designated rooms and beds for maternity care

69.1% of the MCH did not have designated physical space available to carry out delivery services (Figure 4). The building was too small for BEmONC facility. In majority (85%) of the facilities, the delivery services, ANC clinic and general OPD were all housed in one room. The referral level hospitals (Kapenguria County, Sigor Subcounty, Kacheliba sub county, Chebareria, Kabichbich and Orutm Mission Hospitals have different picture for maternity services. Plate 2 shows a typical delivery bed in a heath centre. Only Kapenguria County Referral Hospital, Orutm Mission Hospital and Kacheliba Sub-county Hospital have separate room for labour and delivery whereas in Keringet Health Centre, Chebareria, Kabichbich and Lomut Health Center, it is combined together in one room. Most (82.8%) dispensaries did not have labour room at all. The rooms were quite small, very congested and untidy without hand washing facilities. Some of the dispensaries (60%) were completely without beds and delivery tables at all.

The number of maternity beds and delivery tables are below the WHO standards (1991) for prenatal and postnatal care (30-32 beds for every 1,000 deliveries). Kapenguria County Hospital had only 3 delivery beds out of 250 total beds while based on their average 4,440 deliveries a year it should have at least 143 maternity beds.
beds. The Ortum Mission Hospital had only 4 out of 120 total beds while based on their average 1,800 deliveries a year it should have at least 56 maternity beds.

The basic services provided by the facilities were assessed and focused antenatal care took the lead overall at 93%. Family planning was also found to be the most common MNH service provided in majority (85.7%) facilities. Obstetric surgery and General anaesthesia ranked the least at 9.5% and 7.5% respectively. Figure 5 gives summarized description of the basic services provided in West Pokot region. Table 3 further illustrates how each service was provided in each and every of the four sub counties.

4.2.2. Availability of electricity and water

The availability of running water and access to a continuous and reliable supply of electricity is a crucial prerequisite for quality Maternal and Neonatal Health services delivery. It is extremely difficult for service provider to maintain standard infection prevention measures and provide effective medical care without having source of running water and electricity supply. Figure 6 illustrates the primary sources of water used in the surveyed facilities.

Plate 3 depicts one of the health facility that was using a tanker to harvest rain water.

At the time of assessment only [14(33%)] of facilities had both electricity and water supply. This comprised

### Table 3. Basic MNH services in the four sub counties

<table>
<thead>
<tr>
<th>Services provided by health facilities</th>
<th>Central Pokot</th>
<th>North Pokot</th>
<th>West Pokot</th>
<th>South Pokot</th>
</tr>
</thead>
<tbody>
<tr>
<td>Focused antenatal care</td>
<td>8(100)</td>
<td>8(80)</td>
<td>17(100)</td>
<td>6(85.7)</td>
</tr>
<tr>
<td>Postnatal care</td>
<td>1(12.5)</td>
<td>2(20)</td>
<td>7(41.2)</td>
<td>1(14.3)</td>
</tr>
<tr>
<td>Obstetric Surgery</td>
<td>0(0.0)</td>
<td>0(0.0)</td>
<td>3(17.7)</td>
<td>1(14.3)</td>
</tr>
<tr>
<td>General anaesthesia</td>
<td>0(0.0)</td>
<td>0(0.0)</td>
<td>2(11.8)</td>
<td>1(14.3)</td>
</tr>
<tr>
<td>Treatment or repair of obstetric fistula</td>
<td>6(75)</td>
<td>5(50)</td>
<td>3(17.6)</td>
<td>5(71.4)</td>
</tr>
<tr>
<td>Cervical screening(pap smear)</td>
<td>7(87.5)</td>
<td>7(70)</td>
<td>8(47.1)</td>
<td>6(85.7)</td>
</tr>
<tr>
<td>Diagnosis and treatment for STI</td>
<td>8(10)</td>
<td>8(80)</td>
<td>15(88.2)</td>
<td>5(71.4)</td>
</tr>
<tr>
<td>Family planning</td>
<td>1(12.5)</td>
<td>3(30)</td>
<td>15(88.2)</td>
<td>0(0.0)</td>
</tr>
<tr>
<td>PMTCT</td>
<td>1(12.5)</td>
<td>2(20)</td>
<td>14(82.4)</td>
<td>0(0.0)</td>
</tr>
</tbody>
</table>
of all the sub-county hospitals, county hospital and two health centers in the county. Kapenguria County hospital, Ortum mission, Kacheliba and chebareria had 24 hrs electricity and running water supply. Back-up generator support is also available.

26(85.7%) dispensaries in the entire county had neither electricity nor water supply. Staff had to fetch water from the following sources for hand washing and cleaning:

1. Wells
2. Rivers
3. Harvest from rain water
4. Donkey cart supply
5. Hand pump

These dispensaries had to use sunlight as source of light during the day, therefore it only would operate for eight (8) hours.

Lomut, Keringet and Chebareria were quite busy MCH but did not have running water or hand washing facilities. Staff used main tap outside for hand washing, however electricity was available 24 hrs(Table4).

### 4.2.3. Availability of communication and transport for referral services

Virtually majority of the health facilities did not have sufficient means of transport facility for referral cases. Kapenguria County hospital and Ortum Mission Hospital each had one functional ambulance funded by the government following devolution. Five more ambulances were distributed in strategic regions in the county which were only used in extreme emergency situations. Patients' families were responsible to make transport arrangements on their own. The distances varied from 2 to 15 kilometers and the time required to reach referral hospital (by motorized vehicle) ranged from 1 hour to 5 hours respectively. It costs around 1,000 to 2,000 Kenyan Shillings.

Figure 7 illustrates the most common mode of transportation

All (100%) of the facilities visited had at least one
functioning mode of communication on site, most often a cell phone owned by staff (100%). However, none of the facility had a policy in place to reimburse the staff that used their cell phones for work purposes. No other mode of communication was available such as two way radio, public telephone or landline telephone.

4.2.4. User fees for services and cost-sharing and cost recovery

User fees and cost for various services varied across facilities. Overall, 90% of the facilities at the time of assessment were providing all the services free of cost, the main reason being the maternity services was borne by the government following the free maternity bill passed by the Kenyan Government in 2013. Other revenue generated was utilized to meet recurring expenditure of MCH (cost-recovery and cost-sharing phenomenon) to buy cleaning products, pay water tanker charges and honorarium to volunteers working in the facility. However, in the county and sub-county hospitals, the fee was deposited in to the hospital accounts.

4.3. Human Resources

4.3.1. Health workers currently working

The human resources category in the health care facilities at West Pokot County included Medical doctors, Family physicians, Paediatrician, Gynecologist, Nurses, clinical officers, laboratory technicians, and clinical officer anesthesiologist. The overall staffing position in terms of professional classification in hospitals was not at satisfactory level to carry out full-fledged BEmONC functions. Only one hospital had one pediatrician and one general surgeon during the time of study. None of the other hospitals had a paediatrician or a neonatologist to manage neonatal emergencies. Only two hospitals had qualified medical officers to carry out CEmONC and BEmONC services. None of the county and sub county hospitals had any anaesthetist, qualified general surgeon, OT technicians or Nurse -anaesthetist. The OT and anaesthesia work is managed by trained (clinical officers). This caused the limitations for adult and neonatal resuscitation requiring intubation.

All the MCH assessed, had at least one or more nurse midwife or general nurse in position. Table 5 shows the snapshots of the technical staff available in all the four sub counties of West Pokot. However, for 24/7BEmONC, more skilled birth attendants (SBA) would be needed to fill in the gaps in these facilities especially at the dispensaries.

4.3.2. 24-Hours availability

Round-the-clock services are necessary to provide pregnant women with skilled care during labour and delivery, including the management of obstetric complications. The survey asked which health workers were onsite and on call overnight and on weekends. The findings show that midwives and nurses form the backbone of 24/7 service provision at both dispensaries and hospitals.

The county and sub county hospital provided 24/7

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**Table 5. Basic MNH services in the four sub counties**

<table>
<thead>
<tr>
<th>HR Professional Classification</th>
<th>Central Pokot</th>
<th>North Pokot</th>
<th>West Pokot</th>
<th>South Pokot</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>General practitioners</td>
<td>0</td>
<td>0</td>
<td>14</td>
<td>1</td>
<td>15</td>
</tr>
<tr>
<td>Family Physician</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Gynecologist</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>General surgeon</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Pediatric</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Neonatologist</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Clinical Officer</td>
<td>13</td>
<td>1</td>
<td>10</td>
<td>2</td>
<td>26</td>
</tr>
<tr>
<td>Midwife</td>
<td>0</td>
<td>22</td>
<td>10</td>
<td>32</td>
<td>64</td>
</tr>
<tr>
<td>Nurse</td>
<td>22</td>
<td>23</td>
<td>63</td>
<td>28</td>
<td>136</td>
</tr>
<tr>
<td>Anesthesiologist</td>
<td>0</td>
<td>0</td>
<td>1 (CO)</td>
<td>1 (CO)</td>
<td>2</td>
</tr>
<tr>
<td>Nurse anesthetist</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Laboratory technician</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td><strong>Total Human Resource</strong></td>
<td><strong>38</strong></td>
<td><strong>48</strong></td>
<td><strong>105</strong></td>
<td><strong>65</strong></td>
<td><strong>256</strong></td>
</tr>
</tbody>
</table>

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**Figure 8. 24 Hour Availability of Staff**

![Figure 8. 24 Hour Availability of Staff](image-url)
services with a full-time presence of a nurse/nurse midwife present overnight and over the weekends. The medical officers remained on call to attend emergency cases. Figure 8 indicates the 24-hour availability of staff in the health facilities.

4.4. Availability of Drugs, Equipment, and Supplies

The availability of essential drugs, equipment, and supplies plays a major role in delivering high-quality BEmONC and other MNH-related services. Figure 9 illustrates its 24-hour availability.

4.4.1. Source of Supply of medicines, drugs, and other supplies

Government-funded and Non-Governmental Organizations were the primary source of supply of medicine, medical supplies, and other supplies including gloves, syringes, and infection prevention products for all MCH and partially for hospitals. AMREF supplied the medicines as kit to the dispensaries and health centers.

Every health facility assessed had either a pharmacy or a supply of medicine. Over 76% of each facility type had drug inventory registers, but they were not always up to date. Assessment observed that the mechanism to discard expired medicine and first-in-first-out was also lacking in 50% of all health facilities. Ordering of drugs in most facilities (29 (69.05%), was mostly done during the same time each week/month/quarter. This posed a risk of overstocking many drugs in the store which would not be of use especially in the dispensaries where few patients sought medical care. The table below illustrates how ordering of drugs was done.

4.4.2. Availability of essential BEmONC drugs

Drugs related to BEmONC signal functions and emergencies require several different types of drugs that include antibiotics, anticonvulsants, antihypertensive, uterotonics, prostaglandins, and drugs for use in emergencies. Gaps were present in availability of several essential BEmONC drugs at the time of assessment.

Virtually, some essential BEmONC drugs were missing in majority of the facilities such as antihypertensives (14% available), Drugs used for emergency (31% available), anticonvulsants (60% available in dispensaries) and uterotonics (50% available in dispensaries). Oxytocin - an effective and WHO-recommended prophylactic uteronic to prevent atonic postpartum hemorrhage PPH was not available in 16 (19.1%) facilities. Some facilities having Oxytocin unfortunately, had kept the drug at room temperature due to non-availability of refrigerators to store the drug. Many facilities (12% did not have Magnesium sulphate - a WHO-recommended drug of choice to prevent pre-eclampsia becoming eclampsia. Instead diazepam or oral Phenobarbiton were being practiced.
Around 56% of all assessed health facilities did not have oxytocin. In one of the health center the oxytocin had been kept at room temperature and may have been used that way. In some of the facilities, the assessment observed considerable number of expired drugs. Table 6 describes how drugs were managed in various facilities.

4.4.4. Availability of newborn supplies and equipment in maternity unit

With regards to availability of basic and emergency newborn care supplies and equipment in the maternity area, none of the hospitals could provide special care for pre-term or low birth weight babies due to unavailability of equipment, skilled human resource and supply constraints. The largest and county Referral hospital in West Pokot County did not have incubator as well newborn resuscitation equipment. Instead, Kangaroo Mother Care (KMC) was practiced to keep the baby warm en-route to the national referral Hospital, MTRH. No evidence based guidelines were available on any technical aspect of MNH care.

The main deficiency noted in almost all the MCH and the hospitals except Kapenguria, Ortum, Kabichbich, Kacheliba and Sigor facilities was the non-availability of ambu bag and mask for immediate newborn resuscitation. Most staff despite BEmONC training was not able to mention steps of neonatal resuscitation sequentially (p-value of 0.32).

4.4.5. Equipment and supplies for delivery room.

MCH and hospitals were fairly equipped with items needed for delivery services. The major setback in most dispensaries was lack of electricity and sterilizing machine to sterilize the delivery packs after use. Most of the packs were cleaned with water and re-used until the next available period when the staff would be travelling to the county hospital, was when the next autoclaving would be done. The county and sub-county hospitals generally had fair stock of equipment and instruments to carry out almost all BEmONC services. AMREF and Beyond O programmes provided extra delivery kits to the MCH centers.

4.4.6. Infection prevention measures

Service providers and the patients both can be at great risk of acquiring and transmitting potentially life-threatening infections through accidental exposure to blood and body fluids or contaminated objects. The assessment while looking at the availability of materials needed to help prevent infection in the maternity unit found that most basic items (protective clothing, gloves, soap, trash bins etc.) were available.

Ethanol was only available in [7 (16.7%)] of the facilities while [38(90%)] of all facilities had a stock of either chlorhexidine or povidone iodine for use as a disinfectant and antiseptic.

Overall, the infection prevention measures were generally weaker everywhere especially hand washing and safe disposal of medical wastes. Lack of running water supply also contributed negatively in adopting proper infection prevention measures.

4.4.7. Protocols and evidence based guidelines in maternity ward

Evidence based technical and clinical guidelines can be an important tool and source of information for service provider and health managers to support high-quality service delivery. The assessment observed that the relevant guidelines and protocols on MNH and SRH care were available in most [29(69.1%)] of these facilities. It is essential for the BEmONC facilities to have updated guidance material and technical tools.
at least on Pregnancy, Childbirth, Postpartum and Newborn Care (PCPNC), Managing Complications of Pregnancy and Childbirth (MCPC), Managing Newborn Problems (MNP), immediate newborn care, Focused ANC, Family Planning and infection protection for HIV/AIDS etc.

5. Discussion

The availability of basic items required to address the major causes of maternal and newborn mortality was found to vary across health facilities in the forty two facilities assessed. Although overall capacity to provide the BEmONC signal functions was observed to be suboptimal in many facilities, the availability of specific items varied widely. It was further noted that health centers and dispensaries were generally less equipped than hospitals to provide the BEmONC signal functions. Antibiotics (essential for the management of puerperal sepsis) and oxytocin (necessary for managing PPH) were found to be present in most facilities both at 81.0% available. It did compliment what (Alemnesh, Mitike, & Mulu, 2014), discovered in Addis Ababa, Ethiopia. Together, these conditions account for one third of maternal deaths annually. These findings are positive indicators of the preparedness of health facilities to attend to the two emergencies. But the high burden of these conditions is affected by additional factors, including seeking appropriate and timely care. Indeed, previous work conducted in western Kenya (former Nyanza Province) has shown that socioeconomic and demographic factors play important roles in determining the use of maternal health care services (Wang, et al., 2014).

Assisted vaginal delivery through the use of forceps and vacuum extraction is a safe and valuable intervention that has been linked to improved maternal and fetal outcomes and reduced rates of Caesarean section delivery when appropriately applied to women experiencing obstructed labor. Performance of this signal function was generally poor across counties. This finding is a cause for concern, given the limited capacity of referral and performance of Caesarian delivery across the country. These findings also concurred with what Amlesh et al. 2014 & MEASURE EVALUATION PIMA, 2016, identified.

Although many hospitals were equipped with manual vacuum aspiration kits for the removal of retained products of conception, health centers and dispensaries lacked this lifesaving equipment. For the ones that had, sterilization of the kits for reuse purpose was almost impossible because few [17(33.3%)] facilities had electricity supply and autoclaving machine. Making this equipment available at low-level facilities and conducting training on its use presents an immediate opportunity for reducing mortality due to abortion. Perinatal asphyxia is associated with high newborn mortality and serious long-term complications.

Newborn resuscitation is a critical skill required for the management of newborns who experience difficulty initiating breathing at birth. Pediatric Ambu bags, required for resuscitation, were found to be widely unavailable across the facilities assessed. Scaling up of this signal function should focus on increasing availability of this equipment at all health facilities, as well as appropriate training of staff on newborn resuscitation.

The results in this report contrast findings of previous local studies. The Kenya Service Provision Assessment survey found only 3 percent of health facilities with capacity to provide BEmONC (WBG, 2015). The Kenya Service Availability and Readiness Assessment Mapping—a recent, comprehensive, nationwide health facility survey—found essential medicines for maternal care, including antibiotics, anti-convulsants, and antihypertensive drugs, to be available in only 24 percent of primary healthcare facilities and 29 percent of hospitals.14 in a cross-sectional study conducted in 40 health facilities in Malindi County, none of the included facilities was prepared to provide the complete range of seven BEmONC signal functions, primarily for lack of equipment to perform assisted vaginal delivery (Echoke, Kombe, Dubourg, Evjen-Olsen, & Mwangi, 2013).

The wide variation observed in performance across counties suggests the need for individualized approaches to improving care based on identified gaps. The poor quality of health information is a major weakness of health systems in developing countries, including Kenya. Reliability of data on maternal and newborn indicators has been highlighted as a
specific challenge. Similar findings scenarios were encountered when collecting data on module 4: Facility case summaries within the last 12 months. Clinical documentation of the records was missing, incomplete or not documented appropriately.

Conclusions

Facilities in the urban setting were ready to offer BEmONC services unlike in the many facilities from the rural set-up. Key items lacked in many facilities and relatively few had all the required commodities and equipment to provide BEmONC. As the government and partners seek to address the high burden of maternal and newborn mortality through interventions, such as increasing coverage of BEmONC, there is a growing need for reliable and timely assessments to track progress. Data from such assessments can further be used to match the allocation of resources with existing needs.

Recommendations

Future research may focus on advocating for a complete BEmONC system by availing all the essential equipment, drugs and supplies and replenishing it with frequent BEmONC inductions, trainings or seminars to sustain knowledge and competencies. Understanding how to improve supply chain management for essential commodities at the peripheral facilities is useful and may require innovations such as the use of mobile phones to track and replenish the same. Research on the blood requirements at county, sub-county, health center and dispensary facilities could assist with planning of centralized blood transfusion and blood collection centers. At the policy level, research is needed on the impact of various non-financial incentive schemes on retention of specialists in rural areas as well as effective context-specific strategies for implementation.

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【背景・目的】ケニアを含む低所得国での妊産婦および新生児死亡の多くは、先進国においては予防可能な原因に起因する。緊急産科・新生児ケア（BEmONC）は、母親と新生児死を防ぐため医療従事者に技術、救命救急措置を提供整備することを目的とした統合戦略である。本研究は、ケニアのWest Pokot地方でのBEmONCの影響を評価した。

【方法】無作為に選定された49の保健医療施設についてBEmONCの評価を行なった。コロンビア大学でカスタマイズされた母体死と障害（AMDD）ツールを使用した定量的なデータと、BEmONC観察チェックリスト、詳細なインタビューを用いた定性的データを収集し解析した。

【結果】都市部ではすべての施設でBEmONCサービスを提供する体制が整っていたのに対し、農村部ではわずか15.8%で整備されていなかった。インタビューから得られたBEmONCサービス提供における課題としては、人員不足（92.6%）、供給設備の不足（63%）、インフラの不足（44.4%）、輸送と通信の非効率（69%）、不安（42.9%）が挙げられた。【結論】都市部の施設はBEmONCサービスを提供する準備が整っていたが、農村部では十分ではなかった。このことから、農村部の医療施設での持続可能な機器や消耗品等サプライチェーン管理の改善、プロバイダーの知識と医療従事者的能力を維持するためのトレーニングが必要である。

キーワード:緊急産科・新生児ケア, トレーニング, 医療設備, 地域医療

要 旨

ケニア West Pokot 地方の医療施設における緊急産科・新生児ケア（BEmONC）サービスの評価

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