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Health Systems Determinants of Occurrence of Postpartum Hemorrhage Among Women of Reproductive Age 15-49 Years - Kenya

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Abstract

Postpartum hemorrhage constitutes 73% of all the obstetric hemorrhage globally. Thirty-four percent of maternal deaths occurring in Kenya are due to postpartum hemorrhage. In Homa Bay County, postpartum hemorrhage is the leading cause of maternal mortality contributing 38% of all maternal deaths despite several strategies by the ministry of health to reduce occurrence. Previous studies attribute this to poor provision and utilization of essential health services. The possible contextual contribution of health systems determinants of occurrence

of postpartum hemorrhage has not been explored in the County. The objective of this study was to establish the health systems determinants of occurrence of postpartum hemorrhage among women of reproductive age 15–49 years in Homa Bay County. The specific objectives were: to identify the quality of health service delivery determinants, and: to describe the human resource for health determinants. This was a cross-sectional study design in which qualitative and quantitative methods were used. The quality health service delivery determinants found statistically significant was level of attention with Pearson chi-square = 5.2872 (P-value = 0.021), while the human resource for health determinants were: change of work stations with Pearson chi-square 6.929 (P-value = 0.008), and increased number of health workers with Pearson chi2(1) = 4.1205 (P-value = 0.042) and skills. The findings have significant importance in constructing and reviewing programs for women of reproductive age focusing on quality service delivery on level of attention, human resource for health change of station, increased number, and skills.

Keywords: postpartum hemorrhage, health systems, occurrence, determinants, postnatal women

1. Introduction

1.1 Problem Introduction

Postpartum hemorrhage is a worldwide problem (Maswime & Buchmann, 2017). Postpartum hemorrhage (PPH) is the number one direct cause of maternal mortality and morbidity (WHO, 2014). Globally, 13 million postnatal women experience postpartum hemorrhage, 1.56 million who survive develop severe anemia and 500,000 (34%) (WHO & UNICEF, 2012). In Chinese provinces, postpartum hemorrhage accounts for nearly 50% of all maternal deaths (Kwast, 1991). Postpartum hemorrhage is one of the most serious challenges faced by the international community and that inequality still exists within and between countries in relation to progress in reducing postpartum hemorrhage maternal mortalities and morbidities (Weidert et al., 2013). Low-income countries contribute 99% of all the maternal deaths caused by postpartum hemorrhage (Mousa et al., 2014). Eighty-eight percent of maternal deaths due to postpartum hemorrhage occur within 4 hours of delivery (Kane, 1992). Co-morbidities of postpartum hemorrhage include hypertension pregnancy disorders, unsafe abortions, septic infections, obstructed labor, cervical cancer, breast cancer, diabetes, AIDS, road carnage, anemia, and other causes. In Kenya, postpartum hemorrhage accounts for 34% of all maternal deaths (CGHBC report, 2017).

Maternal deaths are noted to occur more in the rural areas, in poor households or to mothers with no basic awareness of postpartum hemorrhage (WHO, 2015). Many efforts are targeting reducing maternal mortality in Kenya with the main focus on postpartum hemorrhage as the main direct cause of morbidity and mortality among expectant mothers.

In Homa Bay County, postpartum hemorrhage is the leading cause of maternal mortality. Maternal mortality in Homa Bay County is twice the national rate: 583/100,000 versus 362/100,000 live births (KDHS, 2015). Postpartum hemorrhage contributes 38% of all the maternal deaths in Homa Bay County (CGHB Report, 2018) which a 10% increase from 2015. The effect of postpartum hemorrhage in Homa Bay County is high (Felarmine et al., 2016). HIV/AIDS causes immunodeficiency hence severe underlying infections, which exacerbates postpartum hemorrhage. Homa Bay County is also within the malaria-endemic region (58,820 per 100,000 population), which causes a lot of anemia (PIMA, 2017). High poverty level in this county also worsens the situation. According to Economic Survey 2014, Homa Bay County poverty rate was 48.4 percent against the national 36.1 percent (KNBS, 2016).

The main causes of postpartum hemorrhage have been linked to the three delays. First delay is caused by low status, lack of awareness of obstetric complications, nearest healthcare facility is more than 1 km away, uneventful previous home delivery, the family has insufficient money, poor experience of previous health care received at a healthcare facility, perceived poor quality of care at a healthcare facility, avoiding admission and long stay at a healthcare facility (Beck & Grande, 2010). The second delay is caused by inaccessibility of health facility for more than one hour due to long travel time from home to a health facility, cost of transportation, poor road condition or terrain, and visited a traditional healer or

traditional birth attendant first. The third delay is caused by long waiting time before treatment is received; more than 30 min from the time of arrival to time of being assessed or receiving treatment, shortage of equipment and supplies, wrong assessment of risk, wrong diagnosis, wrong treatment, shortage of healthcare providers, lack of competence or skills among the available healthcare providers, healthcare provider unavailable, inadequate referral system, ambulances not available, no fuel, breakdown and use of public transport, and lack of treatment guidelines e.g., Pre-eclampsia, postpartum hemorrhage, manual removal of placenta.

Other causes of postpartum hemorrhage include lack of proper equipment, distance, bad roads, indecision, professional negligence, lack of blood and blood products, age, parity, literacy, poverty, abortion, history of stillbirths, anemia and infections (Opon, 2017).

1.2 Importance of the Problem

Maternal Postpartum hemorrhage is the leading direct cause of maternal mortality in Homa-Bay County, contributing 38% of all maternal deaths (CGH, 2018). Maternal mortality in Homa Bay County due postpartum hemorrhage moved from 34% to 38% from 2015 to 2017 (DHIS, 2017). In Homa Bay County, maternal mortality is about double the national rate of 583/100,000 compared to 362/100,000 National live births (Agina et al., 2016). Postpartum hemorrhage remains the leading cause of maternal morbidity and mortality despite interventions such as; training of health care workers on basic obstetric care and comprehensive obstetric care, rolling out of universal health coverage, free maternal care, increased health financing through NHIF (Gok, 2011). Integration of health services for the postnatal mothers at community and the health facility levels is also an intervention that is intensified (CHS, 2011). Another intervention that is identified is increasing the number of human resources for health, buying necessary equipment, capacity building and training staff on management postpartum hemorrhage (HSSP, 2017/2022).

1.3 Relevant Scholarship

Postpartum hemorrhage is quite an invisible killer and huge menace for the lives of women and families in Homa Bay County common anemia cases, serious underlying conditions and poverty rate (50.6%) due to high prevalence of malaria (27%) and HIV/AIDS (18.6%) (CGHB, 2020). It is a big worry to the health systems and the community as the maternal morbidity and mortality due to postpartum hemorrhage remain high. This study therefore envisions to establish the influences of health system management and give appropriate recommendations informing corrective measures to curb postpartum hemorrhage.

1.4 Hypothesis

1) There are no quality health service delivery determinants of occurrence of postpartum hemorrhage among women of reproductive age15–49 years in Homa-Bay County?

2) There are no human resource for health determinants of occurrence of postpartum hemorrhage among women of reproductive age 15–49 years in Homa-Bay County?

2. Method

It is composed of the following sub sections.

2.1 Identification of Sub Sections

This chapter consists of a study area, research design, study population, target population, sample size, sampling procedure, data collection procedure, data collection instruments, data management and analysis, and ethical consideration.

2.2 Participants Characteristics

The study population comprised women of reproductive age 15–49 years in Homa Bay County. The total study population for this study was 46,473 who were women of reproductive age 15–49 years in Homa Bay County. The study target population were the 400 women who delivered at the 12 level 4 public hospitals in Homa Bay County during the months of December, 2019 and January 2020.

2.3 Sampling Procedure

The sample size of 400 postnatal women was proportionately allocated per level 4 public hospital in Homa Bay County. Table 1 indicates the way sample respondents were distributed throughout the Homa Bay County. The respondents were identified for a response using random sampling method where postnatal women were considered on first come, first enrolled basis. Only postnatal women who did not consent were skipped for the next postnatal woman. Every consented postnatal woman filled the postnatal woman questionnaire. The other questionnaire was filled by maternity In-Charge, and Matron. Key Informant Interviews (KII) were also conducted involving the 12 Sub County Medical Officers of Health and, the one County Gynecologist for qualitative data.

Table 1. *Sampling proportionate to the size of postnatal women*

Sub-County Level 4 Health Facilities (12)		Average Number of Deliveries per Month per Facility	The proportion of Postnatal Women to be Sampled	Number of Postnatal Women to be sampled per Level 4 hospital
1	Homa Bay County Teaching and Referral Hospital (CRH)	257	26.5%	106
2	Kabondo Sub County Hospital (REH)	35	3.6%	15
3	Kandiege Sub-District Hospital (KSC)	41	4.2%	17
4	Kendu Sub-District Hospital (RNH)	82	8.4%	31
5	Kisegi Sub-District Hospital (KDH)	14	1.4%	6
6	Mbita District Hospital (SNH)	74	7.6%	32
7	Ndhiwa District Hospital (NDH)	131	13.5%	54
8	Nyangiela Sub District Hospital (NSC)	24	2.5%	10
9	Ogongo Sub-District Hospital (OSC)	31	3.2%	13
10	Rachuonyo District Hospital (RSH)	175	18%	72
11	Rangwe Sub-District Hospital (RCH)	45	4.6%	18
12	Suba District Hospital (SSH)	63	6.5%	26
TOTAL		971	100%	400

2.3.1 Sample Size, Power and Precision

The sample size for this study was calculated based on the formula adopted from Cochran's formula (1977) which allows calculation of an ideal sample size for a desired level of precision, confidence level, and estimated proportion of the attribute present in the population. It is considered for large and small populations. The formula is:

$$n = \frac{(Z\alpha/2)^2(PQ)}{d^2} \quad (1)$$

Where:

n = the sample size (respondents who were interviewed)

d = 0.05 (the sampling margin error (5%) that was accepted in this study

Z α/2 = 1.96 (Z score corresponding to a 95% confidence interval)

P = 0.38 (estimated proportion of postpartum hemorrhage in Homa Bay for categorical data).

Q = 0.62 (1-P)

Substitution;

$$n = \frac{(1.96)^2(0.38x0.62)}{0.05^2}$$

$$= 362.3$$

$$= 363$$

According to (UNFPA, 2014), 10% of n was added for non-response. 10% of 363 equals 37. The final sample size, taking into account the non-response is 400 postnatal women.

Other participants were the 12 Nursing Officers in-charges, 12 Maternity Officers, 8 Sub County Medical Officers of Health, and One gynecologist.

2.3.2 Measures and Covariates

There were four data collection questionnaires employed: the structured closed-ended questionnaires: Postnatal woman questionnaire, Maternity In-Charge questionnaire, and Matron's questionnaire for collection of quantitative data, and the semi-structured Key Informants Interview questionnaire for collection of qualitative data. Other instruments used were phone recorder, lap top, note book, and a pen.

There were three structured closed-ended questionnaires: Postnatal woman questionnaire, Maternity In-Charge questionnaire, and Matron's questionnaire.

The postnatal woman questionnaire was divided into three main sections as follows: section one targeted the socio-demographic characteristics, section two looked at the health systems. Maternity In-Charge questionnaire looked at the administration of the labor and postnatal

Wards administration while Matron's questionnaire was concerned with the availability of essential elements for quality obstetrics and gynecological healthcare. Key Informant Interview questionnaire also looked at the socio-demographic determinants, personal health determinants, and health systems determinants of postpartum hemorrhage. The structured questionnaires were administered by the research assistant while Key Informant Interview was carried out by myself. Each of the 12 level 4 public hospitals had one Research Assistant who administered the questionnaire to the postnatal women assigned to each of the hospitals as they were admitted at the postnatal Ward. The process of administration started with the checking of the records at the facility's postnatal Ward register to understand the condition of delivery in reference to occurrence of postpartum hemorrhage. The Research Assistant then follows-up the woman at the postnatal Ward, introduce self, and the purpose of the data collection, seek consent of the woman to administer the tool, and if granted consent, the respondent signs and research assistant moves on and administer the tool. The questionnaires that were correctly completed were analyzed.

This was composed of the Key Informant Interview (KII) questionnaire. The interview guide was used to collect data from healthcare providers through face-to-face interviews. The method was used to explore the health systems determinants of occurrence of postpartum hemorrhage. They were then invited in turns into a prepared interview room set with all the data collection instruments. The Researcher introduced himself, and the purpose for the interview and sought consent of the respondents. All of them consented and each was taken through the questionnaire at own separate time. The Gynecologist was however interviewed virtually since he was on leave in Nairobi at the time of data collection. The Researcher conducted the interview and recorded the proceedings as Research Assistant took notes.

2.3.3 Research Design

The study applied descriptive cross-sectional study design. Qualitative and quantitative methods were used for data collection and analysis. The descriptive study provided information concerning health systems determinants of occurrence of postpartum hemorrhage; quality health service delivery determinants, and human resource for health determinants of occurrence of postpartum hemorrhage among women of reproductive age.

2.3.4 Experimental Manipulations or Interventions

There were two sets of data collected: Quantitative and qualitative data sets. After the recruitment of Research Assistant, the researcher convened a one-day training meeting for the 12 Research Assistants at the Homa Bay County Health Management Team (CHMT) Boardroom on 2nd of December, 2019 from 10.00 am to 3.00 pm. The purpose of this meeting was to install the Comcare application into the phones of the Research Assistants. The second deliverable for meeting was to orientate the Research Assistant on the three questionnaires that they were to administer by going through all the questions. Lastly, each of the 12 Research Assistants was assigned specific level 4 public hospital to collect data from depending on the preference of the Research Assistant. The Research Assistants reported to the various respective health facilities on 3rd December, 2019, paying courtesy call at the Hospital Medical Superintendents, before proceeding to the postnatal Ward where again they

reported to the Ward In-Charge for permission to conduct the data collection and access to the records of the women delivering at the health facilities.

The first respondent was the first woman who arrived immediately in the postnatal ward immediately the Research Assistant arrived at the postnatal ward. The Research Assistant did the exercise every day until the last respondent as per the proportion assigned the health facility. The Research Assistants were able to interview 400 postnatal women by 28th December, 2019. During the data collection period, the Researcher, convened virtual meeting with the Research Assistants for updates and review of the progress and resolution of any matters arising from the field.

In between the days, the Research Assistants interviewed the facility Matron's and the Maternity In-charge.

3. Results

This chapter deals with data analysis of the of the frequency and percentage distribution of the respondents and study results which were to establish the influences of health system management on occurrence of postpartum hemorrhage among women of reproductive age in Homa Bay County, Kenya. The analysis was done based on the research objectives which were to identify the quality health service delivery determinants of occurrence of postpartum hemorrhage among women of reproductive age; and to describe the human resource for health determinants of occurrence of postpartum hemorrhage among women of reproductive age. Quantitative data was collected using structured questionnaire administered on the postnatal women, and maternity in-charges, while qualitative data was collected using key informant interview of the Sub County Medical Officers of Health and the County Gynecologist as key informants and finally, the facility assessment checklist was done. Determinants are quality health service delivery, and human resource for health.

3.1 Recruitment

Data collection was done at the level four hospitals. The twelve Research Assistants who were required to have smart phone compatible with Comcare application, at least Diploma in Health-related course, and be ready to be engaged full time during the month of December, 2019. The Researcher oriented the Research Assistants, and installed them the Comcare application, and assigned the Research Assistants the hospitals to collect the data. Every day, the researcher held meeting with the Research Assistants for updates and progress assessment. After the structured questionnaires were done, the Researcher conducted Key Informant Interview which took place during the month of January, 2020. One research Assistant helped with notetaking during the Key Informant Interview.

3.2 Statistics and Data analysis

Quantitative data were collected, stored in password-protected laptops, processed through data editing and coding. Qualitative data was collected through recording and notetaking. This was stored in a password protected laptop as audio recording. The notes taken were also filed. After that, the audio recording was replayed and discussion captured according to the

objectives. Thematic approach was employed in analysis of the qualitative data.

3.3 Ancillary Analyses

This was conducted in order to test whether the questionnaire was valid. It was carried out at Kisumu County Hospital which is a level 4 public hospital. The pilot study achieved 4 respondents from the facility each filling one questionnaire. The researcher analyzed the data and determined whether the research tools used would lead to the achievement of the research objectives. The pre-test findings were used to modify the content, question structure, and sequencing of the questionnaire for example, it was realized that Key Informant Interview questionnaire needed restructuring for the interviewees to give appropriate response. On postnatal woman questionnaire, it was also realized that there was different interpretation on the question on "when was your last birth" where some understood it to mean, the current birth. The pre-test findings however were not included in the statistics of the main study.

3.4 Baseline Data (Frequency and Percentage Distribution of the Respondents)

This section looks at the distribution of respondents per facility, age distribution, education level, marital status, place of residence, type of house, house ownership and monthly income, employment status, partner occupation.

3.4.1 *Statistics and Data Analysis*

The four hundred respondents were all female and were distributed in the percentage proportion of the monthly skilled deliveries. Homa Bay County level 4 had the majority of respondents 106(26.5%) followed by Rachuonyo South level 4 hospitals with 72 (18%). Kisegi level 4 hospital, and Nyang'iela level 4 hospital were the least with 6 (1.4%) and 10 (2.5%) respectively.

Table 2. *Distribution of the respondents per level four hospital*

Health Facility	**No. respondents**	**Proportion %**
Homa Bay County Level 4 Hospital	106	26.5%
Kabondo Level 4 Hospital	15	3.6%
Kandiege Level 4 Hospital	17	4.2%
Kendu Level 4 Hospital	31	8.4%
Kisegi Level 4 Hospital	6	1.4%
Mbita Level 4 Hospital	32	7.6%
Ndhiwa Level 4 Hospital	54	13.5%
Nyang'iela Level 4 Hospital	10	2.5%
Ogongo Level 4 Hospital	13	3.2%
Rachuonyo South Level 4 Hospital	72	18%
Rangwe Level 4 Hospital	18	4.6%
Suba Level 4 Hospital	26	6.5%
TOTAL	**400**	**100%**

The respondents were grouped into years with an interval of 5 according to the common WHO grouping in monitoring and evaluation of health systems on health outcomes. Majority of the respondents 197 (46.4%) were between ages 15–24 years. Those participants who were above 35 years old were a paltry 35 (8.3%). The age 40–44 years were the least 6 (1.5%). The respondents who were between ages 15–19 years were 79 (18.6%). This is an indication of high teenage pregnancy in the County.

Table 3. *Age distribution of respondents*

Age	No. respondents	Percentage
15–19	74	18.5
20–24	111	27.7
25–29	118	29.5
30–34	63	15.8
35–39	28	7.0
40–44	6	1.5
TOTAL	**400**	**100%**

The study found out that college and university school leavers were only 51 (12.7%). This implies that most of the women in Homa Bay County drop out of school before attaining tertiary education.

Table 4. *Education level of the respondents*

Education	No. respondents	Percentage
Primary	187	46.7
Secondary	162	40.6
College/University	51	12.7
TOTAL	**400**	**100%**

There were 89 (22.2%) respondents who had no spouses. These were either single, widowed, or separated. Majority 311 (77.8%) of the respondents had spouses.

Table 5. *Marital status of the respondents*

Education	No. respondents	Percentage
No spouse	89	22.2
Spoused	311	77.8
TOTAL	**400**	**100%**

The study showed that 308 (76.9%) respondents live in the rural. This implies that most the population in Homa Bay County are living in the rural areas.

Table 6. *Place of residence of the respondents*

Residence	No. respondents	Percentage
Urban	92	23.1
Rural	308	76.9
TOTAL	**400**	**100%**

There were 287 (71.8%) of the respondents who lived in a semi-permanent house. Only 113 (28.2%) respondents lived in a permanent house. This implied that majority of the respondents had low economic status.

Table 7. *Type of house of the respondents*

Type of House	No. respondents	Percentage
Permanent	113	28.2
Semi-permanent	287	71.8
TOTAL	**400**	**100%**

The research shows that majority 268 (67.1%) of the respondents owned houses. However, 20 (5%) were either in the parents' house or relatives' house.

Table 8. *House ownership of the respondent*

Education	No. respondents	Percentage
Own home	268	67.1
Rental	112	27.9
Parents House	18	4.5
Relative House	2	0.5
TOTAL	**400**	**100%**

According to this research, 83 (20.5%) of the respondents had below Ksh.1,000 monthly income while only 90 (22.6%) had monthly income of above Ksh.10,000. More than half of the respondents 227 (56.8%) had between Ksh.1,000 to Ksh.10,000 as monthly income. This means that most women are not empowered and came from poor families.

Table 9. *Monthly income of the respondent*

Monthly income	No. respondents	Percentage
Less than 1000 KSh	83	20.5
1000–5000 Ksh	114	28.5
5000–10000 Ksh	113	28.3
Above 10000 Ksh	90	22.6
TOTAL	**400**	**100**

There were 289 (72.2%) of the respondents who were self-employed. Casuals were 79 (19.8) while only 32 (8%) had salaried jobs. This means that there is a great unemployment in Homa Bay County.

Table 10. *Employment status of the respondent*

Employment status	No. respondents	Percentage
Casual job	79	19.8
Salaried	32	8
Self Employed	289	72.2
TOTAL	**400**	**100%**

The study revealed that most of the partners of the respondents 172 (43.1%) were self-employed. Those working as casuals were 91 (22.9%) while unemployed partners were 69 (17.3%). This confirms the high rate of unemployment as seen earlier in the table of employment status of the respondents.

Table 11. *Occupation of the partner of the respondent*

Partner occupation	No. respondents	Percentage
Casual job	91	22.9
Self-employed	172	43.1
Unemployed	69	17.3
Not Applicable	67	16.7
TOTAL	**400**	**100%**

3.4.2 Adverse Events: Health Systems Factors Influencing Occurrence of Postpartum Hemorrhage

According to the study, the women who were satisfied that personnel number and infrastructure level at the facility influenced occurrence of postpartum hemorrhage were 268 (63.2%) and 347 (81.9%) respectively. However, only 267 (63%) were satisfied that cost of services at the very facilities influenced postpartum hemorrhage while 287 (67.7%) were

satisfied that accessibility of the services was influencing postpartum hemorrhage. Those who were not satisfied with supervision by senior health officers as influencing occurrence of postpartum hemorrhage were 33 (7.7%) of the participants but 176 (41.5%) indicated that assessment frequency of service delivery in such facilities was most frequently (>80%) an influencer of occurrence of postpartum hemorrhage.

This section looked at the level of attention, change of work stations, and increased number of health workers. Skills is also looked into under KII.

3.4.2.1 Influence of Level of Attention on Occurrence of Postpartum Hemorrhage

In terms of quality of health care services, level of attention given to the postnatal woman was statistically significant with Pearson Chi-square 5.28 (P-value = 0.021). Satisfaction with personnel number was statistically insignificant. Other aspects of quality such as communication, attitude, efficiency, quality of treatment, and duration of time taken were found to be statistically insignificant. In this regard, it is important for health care workers to give quality time for an eye-to-eye contact with the patients while attending to them. This means that the issue of discharging the queues should be resolved.

Table 12. *Influence of level of attention on occurrence of postpartum hemorrhage*

Level of attention	No Number	No Percent	Yes Number	Yes Percent	Total Number	Total Percent
High Extent	161	42.1	10	23.8	171	40.3
Low Extent	221	57.9	32	76.2	253	59.7
Pearson chi-square = 5.2872 P-value = 0.021, Pearson chi-square = 4.1205 P-value = 0.042						

3.4.2.2 Influence of Change of Work Station on Occurrence of Postpartum Hemorrhage

Change of work station by human resource for health was found to be of great statistical significance in influencing occurrence of postpartum hemorrhage with Pearson chi-square 6.929 (p value = 0.008). This implies that frequent transfers should be avoided because every time the health worker is finding a bearing if the transfers are too frequent.

Table 13. *Influence of change of work station on occurrence of postpartum hemorrhage*

Change of work station	No Number	No Percent	Yes Number	Yes Percent	Total Number	Total Percent
High Extent	152	39.8	8	19	160	37.7
Low Extent	230	60.2	34	81	264	62.3
Pearson chi-square = 6.9294 P-value = 0.008						

3.4.2.3 Influence of Increased Number of Health Care Workers on Occurrence of Postpartum

Hemorrhage

Increasing number of health care workers was also found to be statistically significant with Pearson Chi-square 4.12 (P-Value = 0.042). As required by WHO, the leadership and governance of our health systems should optimize the number of health care workers. the study found out that the lower the satisfaction with personnel number, the more likely occurrence of postpartum hemorrhage. Personnel number dissatisfaction had 5.5 times likelihood of experiencing postpartum hemorrhage. Interestingly, indecision on satisfaction with number of personnel had a bearing on occurrence of postpartum hemorrhage contributing 50% reduction of occurrence of postpartum hemorrhage among unsatisfied postnatal women.

Table 14. *Influence of increased no. of health workers on occurrence of postpartum hemorrhage*

Increased no. of health workers	No Number	No Percent	Yes Number	Yes Percent	Total Number	Total Percent
High Extent	152	39.8	8	19	160	37.7
Low Extent	230	60.2	34	81	264	62.3
Pearson chi-square = 4.1205, P-value = 0.042						

Note. Dissatisfaction with personnel number odds ratio 5.5.

Skills of human resource for health was however statistically insignificant with Pearson Chi-square (P-Value = 0.364) however this factor was identified under the KIIs, participant KII01 observed,

> "Availability of Trained Personnel who can help in managing cases……is crucial and within the County, it will take us back to the availability of skills".

Skills of human resource for health in preventing the occurrence of postpartum hemorrhage among women of reproductive age in different facilities are captured in the following excerpts from KIIs:

> "In my facility, there is an improvement. Initially, we lacked skilled staffs but now we have 2 doctors."

Participant KII01 said that "*3rd delay involves finding someone with incompetency in diagnosis*".

And,

KII04 "*If you lack skilled personnel then PPH will be likely to occur. This results to bad outcomes in our facilities as compared to the well-stocked facilities. Instrument availability comes in handy*".

KII06 also indicated that "*Limited Skills of the health care provider can lead to PPH. Late referrals of mothers to facilities is also a major contributing factor*".

There are some health care providers who also had a diverse opinion on the human resource skills on preventing the occurrence of postpartum hemorrhage among women of reproductive age in different facilities. An example is a medical doctor who said,

> "The strength is still weak and we really need to do a lot".

Other aspects of quality such as communication, attitude, efficiency, quality of treatment, and duration of time taken were found to be statistically insignificant.

However, 66.7% of those who experience postpartum hemorrhage were satisfied that personnel number influenced to a high extent the occurrence of postpartum hemorrhage compared to only 37.2% unsatisfied with personnel number who did not experience postpartum hemorrhage. Those who experienced postpartum hemorrhage believed that special skills influence only to a small extent the occurrence of postpartum hemorrhage were 52.4%. Influence of job satisfaction, 66.7% of those who experience postpartum hemorrhage said that it moderately influences occurrence postpartum hemorrhage. Leadership factors such as accessibility to services, infrastructure, assistance frequency, satisfaction with supervision, and frequency of assessment were all found to be statistically insignificant. However, from key informant interview, accessibility of services, assistance frequency, and frequency of assessment were important factors. Participant KII02 observed that,

> "Postpartum hemorrhage occurs due to late recognition and diagnosis of risk factors".

The interviewee continued,

> "TBA's equally determine this occurrence due to the time taken before response that results to multiple complications"

And the other,

> "2nd delays arise in delays in attending to her by the healthcare worker due to limited staffs" KII01.

4. Discussion

According to this study, effectiveness of quality health service delivery had relation to experiencing postpartum hemorrhage by Remya (2010). There was a significant improvement in the health status of mothers with postpartum hemorrhage. Similarly, Quality management of postpartum hemorrhage is attainable only with highly skilled health personnel (Kosińska et al., 2016).

The findings of this study reveal that changing work stations very frequently has got great statistically significant influence on occurrence of postpartum hemorrhage. Increasing the number of human resource for health was equally of statistical significance. This finding is indeed in support of the recommendations of the World Health Organization that sets an optimum number of health care workers in every cadre for quality service delivery. This

assertion is also confirmed in this study where those dissatisfied with the number of health personnel are 5.5 times more likely to experience occurrence of postpartum hemorrhage. In terms of quality of health care services, level of attention given to the postnatal woman was statistically significant with Pearson Chi-square 5.28 (P-value = 0.021).

5. Recommendations

This chapter gives recommendations according to the findings of this research. It also proposes the new research model for desirable outcomes.

According to the study result, availability and accessibility of medicines and technologies was statistically significant, therefore the stakeholders are encouraged to make arrangements to provide adequate medicines and technologies. The study recommendation is that the stakeholders should improve systems to improve accessibility of health care facilities Work load should be optimum.

Collectively, accessibility of quality service delivery, supervision by human resource for health, adequate and availability of medical and technologies, efficient nursing services, and rational work load at work place collectively influence occurrence of postpartum hemorrhage. accessibility of health care facility is key in preventing occurrence of postpartum hemorrhage. Level of attention was found important factor. This means that improving one factor and leaving the other will not reduce occurrence of postpartum hemorrhage. It is therefore important to stakeholders to have improvement of health system management comprising of these factors.

Changing work station should be regulated and not done frequently. This study recommends that the posting orders should be within three years and five years. Increasing health workers was also found to be a statistically significant and therefore there should be optimum number of health care workers. As reported in the key informant interview, skills in human resource is essential for prevention of occurrence of postpartum hemorrhage. This study therefore recommends that capacity building of health personnel should be prioritized.

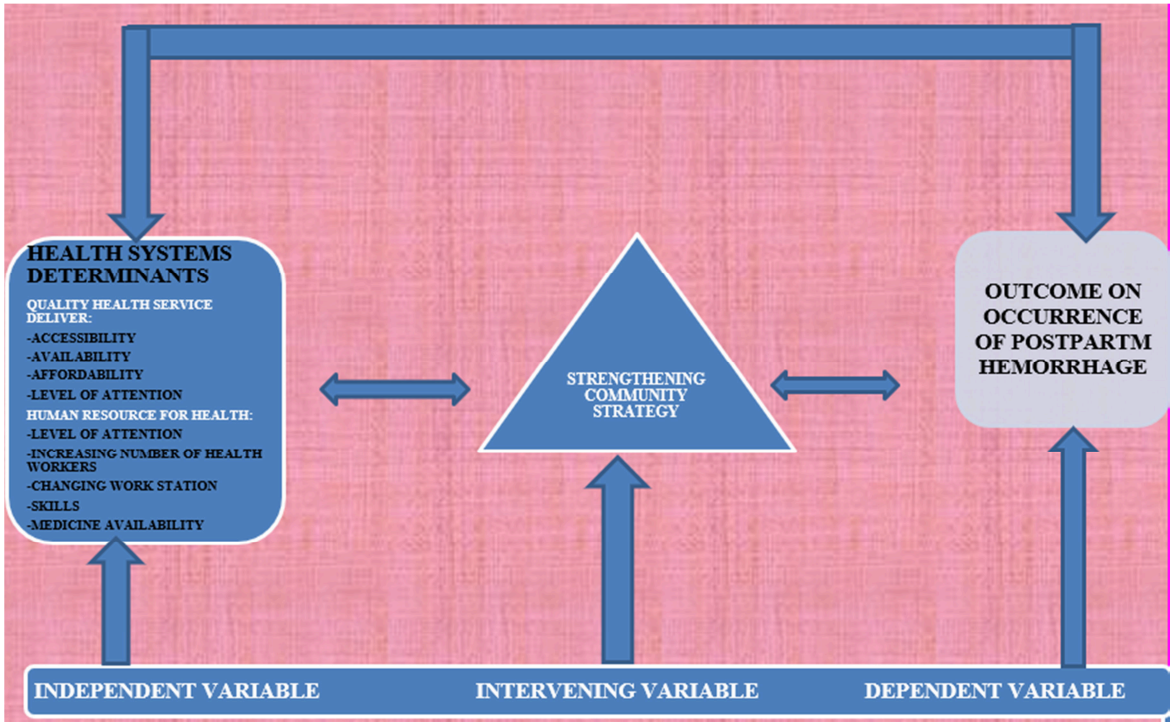

Figure 1. *Emerging model: Focused health system management reducing occurrence of postpartum hemorrhage*

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Appendix A

POSTNATAL MOTHER QUESTIONNAIRE

Introduction and Consent:

Adel W. Ottoman is a student at Jaramogi Oginga Odinga University of Science And Technology; School of Health Sciences pursuing Doctor of Philosophy in Public Health The focus of the interview is to better understand the influence of health system on management of postpartum hemorrhage among women of reproductive age in Homa Bay County. Findings from this study will be shared with care-givers, health workers, policy makers and other stakeholders to facilitate designing, implementation and strengthening of programs that will aim at reducing the morbidity and mortality among this age group. Your participation in this

discussion is voluntary ad any response given to the question will be treated with confidentiality. Thank you for taking the time to participate in this study.

By signing this form, I understand the conditions and willingly participate in the research as indicated above.

Signature: ---------- Date----------

Age of respondent: ----------Gender----------

QUESTIONS:

- From the hospital records, did this woman experience postpartum hemorrhage?

  [ ] Yes

  [ ] No

PATIENT FACTORS:

A. SOCIO-DEMOGRAPHIC DATA

1. GENDER

   [ ] Male

   [ ] Female

2. AGE

   [ ] 15-19 [ ] 20-24 [ ] 25-29 [ ] 30-34

   [ ] 35-39 [ ] 40-44 [ ] 45-49

3. MARITAL STATUS

   [ ] Married [ ] Single

   [ ] Separated [ ] Widowed

4. RESIDENCE

   [ ] Urban [ ] Rural

5. LEVEL OF EDUCATION

   [ ] None [ ] Primary

   [ ] Secondary [ ] College/University

6. RELIGION

   [ ] Protestant [ ] Catholic [ ] Muslim

   [ ] Other (Specify)

7. OCCUPATION

[ ] Unemployed [ ] Casual job

[ ] Self-employed [ ] Salaried job

8. Husband/partner's occupation

[ ] Unemployed [ ] Self-employed

[ ] Casual job [ ] Salaried job

9. Type of housing

[ ] Temporary [ ] Semi-permanent [ ] Permanent

10. Ownership of house

[ ] Own home [ ] Rental

[ ] Others (Specify)

11. Total monthly family income

[ ] Less than 1000 Ksh [ ] 1000–5000 Ksh

[ ] 5000–10 000 Ksh [ ] Above 10 000 Ksh

SECTION B. PATIENT HEALTH CHARACTERISTICS DATA

12. GESTATION AT BIRTH

[ ] Below 20 weeks [ ] 20–28 weeks

[ ] 28–37 weeks [ ] above 37 weeks

13. PARITY

[ ] First

[ ] Second

[ ] Third

[ ] Forth

[ ] Above Forth

14. AGE AT FIRST BIRTH

[ ] Below 15 [ ] 15–19 [ ] 20–24

[ ] 25–29 [ ] 30 and above

1. Where did you deliver your baby?

[ ] Hospital [ ] Health center [ ] Home [ ] Others (Specify)

2. How long ago did you deliver the last child (Years)_____?

[ ] 1 [ ] 2 [ ] 3 [ ] 4 [ ] More than 4

3. Did you attend ANC visits during your recent or current delivery?

[ ] Yes [ ] No

4. If Yes, how many ANC visits did you attend during your recent or current delivery?

[ ] 1 [ ] 2 [ ] 3 [ ] 4

5. Which facility did you attend ANC?

[ ] Public facility [ ] Private facility

[ ] TBA [ ] Others (Specify)

6. Who decided on where you will attend ANC?

[ ] Self [ ] Husband/partner

[ ] Friend [ ] Others (Specify)

7. When did you start attending ANC?

[ ] First trimester [ ] Second trimester [ ] Third trimester

Governing structure influencing occurrence of postpartum hemorrhage

8. How frequent did the professional or senior health workers assist you after delivery

[ ] None

[ ] Less frequently (20%)

[ ] Some time (50%)

[ ] Most of the time (80%)

[ ] Every time (100%)

9. How satisfied were you with the supervision of health workers who handled you after delivery?

[ ] So satisfied

[ ] Less satisfied

[ ] Not satisfied

10. How frequent were you assessed on the danger signs for PPH at ANC visits

[ ] None

[ ] Less frequently (20%)

[ ] Some time (50%)

[ ] Most of the time (80%)

[ ] Every time (100%)

11. The following statements are descriptive of leadership and governance in health facilities during the time of your delivery. Using 5 = Very satisfied, 4 = Satisfied, 3 = Undecided, 2 = Unsatisfied, 1 = Very unsatisfied). Please indicate by ticking (√) in the applicable box the extent to which you are satisfied that leadership and governance in this facility have impacted the following entities to reduce the occurrence of postpartum hemorrhage in this facility.

Statement	**1**	2	3	4	5
Infrastructure					
Efficiency and safety of treatment					
Number of personnel					
Access to preventive and curative services					
Cost of the healthcare services					

SECTION C: Influence of human resource for health on the occurrence of postpartum hemorrhage

12. The following statements are descriptive of quality of health care service delivery as determined by knowledge, attitude and practice by health care workers. Using **1** = Not at all, **2** = Small extent, **3** = moderate extents, **4** = large extent, **5** = very large extent, please indicate by ticking (√) in the applicable box the extent to which the following statements are barriers to mothers utilizing postnatal care in this facility.

Statement	**1**	2	3	4	5
The way health care workers communicate with their clients					
The perception of the wrong attitude of the health care workers towards their clients					
The efficiency of health care workers providing services					
The level of attention given to the clients by health care workers					
Treatment given without any instruction					
Lack of room/time to for postnatal mothers to ask questions					
Jumping of queues by known or well-to-do patients postnatal mothers					
Time/Duration taken before attendance to postnatal mothers					
Special skills and experience					
Privacy for postnatal mothers					
Special practices					
Change of working stations					
Increased number of healthcare workers					
Job dissatisfaction by health workers					

SECTION E: Health service delivery influence occurrence of postpartum hemorrhage

13. Did you receive all the services you were looking for?

[ ] Yes

[ ] No

If No, why?

[ ] Unavailable

[ ] Lack of staff

[ ] Lack of equipment

[ ] Others (specify)

14. What is the distance from your home to the heath facility?

[ ] Less than 1KM

[ ] 1–5KM

[ ] More than 5KM

15. What do you think of the health facility staff?

[ ] Extremely good

[ ] Good

[ ] Fair

[ ] Bad

[ ] Extremely bad

16. How long did it take for you to be attended to at the health facility?

[ ] Less than 30 minutes

[ ] 1–2 hours

[ ] More than two hours

17. Are you aware of PPH?

[ ] Yes

[ ] No

18. Did you experience PPH in this delivery (confirm from health records)?

[ ] Yes

[ ] No

19. Have you experienced postpartum hemorrhage in the past? ----------

[ ] Yes

[ ] No

Appendix B

KEY INFORMANT INTERVIEW

DATE: ---------- LOCATION CODE---------- HEALTH FACILITY TIER: --------

Introduction and Consent:

Adel W. Ottoman is a student at Jaramogi Oginga Odinga University of Science and Technology; School of Health Sciences pursuing Doctor of Philosophy in Public Health. The focus of the interview is to better understand the influence of the health system on the management of postpartum hemorrhage among women of reproductive age in Homa Bay County. Findings from this study will be shared with caregivers, health workers, policymakers and other stakeholders to facilitate designing, implementation, and strengthening of programs that will aim at reducing the morbidity and mortality among this age group. Your participation in this discussion is voluntary and any response given to the question will be treated with confidentiality. Thank you for taking the time to participate in this study.

By signing this form, I understand the conditions and willingly participate in the research as indicated above.

Signature: ---------- Date----------

Age of respondent: ----------Gender----------

QUESTIONS:

1. Tell me about yourself

a. Profession----------

b. Qualification----------

c. Years of experience----------

2. How many years have you worked with the postnatal mothers experiencing PPH? ---

3. In your own observation and experience, what are the **health system management factors influencing** occurrence of postpartum hemorrhage among women of reproductive age in Homa Bay County?

Appendix C

HEALTH FACILITY QUESTIONNAIRE

Interview with the public level 4 hospitals' maternity In-Charges on health system management effects influencing postpartum hemorrhage

SOCIO-DEMOGRAPHIC DATA

1. Name of the facility……

2. Type of the facility

[ ] Public facility

[ ] Private facility

[ ] Mission Hospital

[ ] Others (Specify) ----------

3. Gender

[ ] Male

[ ] Female

4. Please indicate your cadre

[ ] Nursing officer

[ ] Auxiliary Nurse Midwife

[ ] Medical Officer

[ ] Gynecologist

[ ] Clinical officer

[ ] Any other

5. Please indicate your highest level of training

[ ] Certificate

[ ] Basic Diploma

[ ] HND

[ ] Bachelor

[ ] Master

[ ] PhD

6. How long have you worked in this department/section?

[ ] Below 2 years

[ ] 2 to 3 years

[ ] 4 to 5 years

[ ] 6 to 7 years

[ ] 8 to 9 years

[ ] 10 and above

7. Does governance factors influence occurrence of postpartum hemorrhage among women of reproductive age in this facility?

[ ] Yes

[ ] No

8. What are the governance factors that influence occurrence of postpartum hemorrhage among women of reproductive age in this facility? Specify……

9. Are the steps for correctly performing Active management of the third stage of labor (AMTSL) incorporated with service delivery guidelines?

[ ] Yes

[ ] No

10. Are midwives authorized to perform manual removal of placenta in all cases of delivery?

[ ] Yes

[ ] No

11. How many times does the facility organize for PPH management relevant training per year?

[ ] None

[ ] Once

[ ] Twice

[ ] Thrice

[ ] Four times

[ ] More than four times

12. How regular does the facility carry out continuous medical education (CME) on topics related to PPH management?

[ ] None

[ ] Daily

[ ] Weekly

[ ] Every two weeks

[ ] Monthly

[ ] Quarterly

13. How frequent do your internal supervisor(s) assess your work?

[ ] None

[ ] Daily

[ ] Weekly

[ ] Every two weeks

[ ] Monthly

[ ] Quarterly

14. How frequent are you updated on the guidelines on PPH management?

[ ] None

[ ] Less frequently (20%)

[ ] Some time (50%)

[ ] Most of the time (80%)

[ ] Every time (100%)

15. How frequent do you assess the danger signs for PPH at ANC visits?

[ ] None

[ ] Less frequently (20%)

[ ] Some time (50%)

[ ] Most of the time (80%)

[ ] Every time (100%)

16. Where do you access the current PPH management protocol?

[ ] My phone

[ ] Facility desktop/lap top

[ ] Facility file

[ ] Delivery room

[ ] Not possible

17. What is the minimum qualification required to be a PPH procedure specialist?