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Birth Outcomes in Mothers Presenting in First Stage Compared to Second Stage of Labour at Kakamega County General Hospital

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Abstract
Maternal mortality is unacceptably high. About 830 women die from pregnancy or childbirth-related complications around the world every day. It was estimated that in 2015, roughly 303 000 women died during and following pregnancy and childbirth. Almost all of these deaths occurred in low-resource settings, and most could have been prevented. Admission of women in second stage of labour is often associated with poor maternal and fetal outcomes. These outcomes include: postpartum haemorrhage, obstructed labour and ruptured uterus. This study aimed to compare the birth outcomes among mothers presenting in Second Stage of labour with those who presented in First Stage of labour at Kakamega County Referral hospital. Specifically, it examined maternal outcomes and reasons why mothers presented in Second Stage of labour. A cross-sectional study using mixed methods approach was conducted in the study area. Systematic sampling technique was used to recruit the participants. Data was collected using a pre-tested structured questionnaire administered to 320 women who presented in second stage and another 320 who were admitted in first stage of labour. Two focus group discussions were also conducted in groups of six mothers. Quantitative data were coded and analysed using Statistical Package for Social Sciences (SPSS) version 20. Chi-square test and multiple logistic regression were employed in the analysis. A $p < 0.05$ was considered significant at 95% confidence interval. Null hypothesis was tested at 5% significance level. A significantly higher proportion of mothers in second stage 90.9% (291/320) were housewives with the majority having attained primary education (98.4%) ($p < 0.0001$). Prolonged/obstructed labour (11.9%) and primary PPH (9.7%) were the leading complications recorded in mothers who reported in second stage compared to 3.1% and 0.3% respectively, among those who reported in first stage. The study revealed that mothers presenting in first stage of labour had higher chances of normal labour compared to those presenting in second stage of labour ($df=1$, $\chi 2 = 46$, $p<0.0001$). Mothers who reported in Second Stage (28.1%) had delayed at home because progress of labour was too fast while 26.3% presented in Second Stage because the husband was not at home.In conclusion, the study found out that most of mothers presenting in second stage of labour had either no formal education or were primary school leavers with the majority being housewives with no formal employment. It was also noted that mothers who attended ANC and completed the 4-visits presented early in labour. In regard to maternal complications, prolonged/obstructed labour and postpartum haemorrhage were most prevalent among mothers who reported in second stage of labour. For the wellbeing of the neonates and mothers, labour needs to be monitored and delivery conducted by skilled personnel. Therefore, male involvement and sensitising mothers during antenatal visits on birth preparedness would encourage them to present early in the hospital during labour.
Keywords: First Stage of labour, second stage, and factors for presentation in first and second stage, Term pregnancy.

1.0 Background

Maternal mortality is unacceptably high. About 830 women die from pregnancy- or childbirth-related complications around the world every day. It was estimated that in 2015, roughly 303 000 women died during and following pregnancy and childbirth. Almost all of these deaths occurred in low-resource settings, and most could have been prevented (Alkema *et al*., 2016, WHO,2016). One of the factors that may contribute high maternal mortality is delay in access to health facility during labour. The hospital environment is considered to be ideal place for labour and delivery due to the presence of midwives, other qualified health workers and equipment's that can be used for intrapartum care (Eryilmaz *et al*., 2013, Pacagnella *et al.,*2014). This could allow early identification of maternal complications and actions can be taken. However, these can only be achieved if the labouring mother presents to the labour ward during First Stage and submits to care of midwife and other healthcare workers. The midwives and other healthcare staffs are therefore responsible in assuring good maternal and neonatal outcome (Bako *et al.,* 2013; Story et al.,2012).

Vaginal delivery is not the only fundamental goal of good obstetric care, but a good maternal and fetal outcome are equally important. Mode of delivery cannot influence maternal and fetal outcomes if delivery is not timely and correctly done. Maternal and fetal monitoring with partograph would lead to early detection of conditions that militate against normal vaginal delivery and thereby offer early and useful interventions if mother presents in first stage of labour (Maanongun *et al*., 2016; Hart *et al*., 2013).

Normal labour though a continuous process has been divided into three stages: the first stage, the second

stage of labour and the third stage of labour (Cheng *et al.* 2012). Complications can occur at any stage of labour and have been associated with the power (uterine contractions and maternal expulsive efforts); the passenger (fetus) and the passage (the pelvis). One or a combination of complications may occur during the process of labour (Cheng *et al.,* 2012; Chuma *et al., 2013*). It is important that mothers should avail themselves to receive proper intrapartum care for all the three stages of labour.

The decision of the mother on the place of delivery is influenced by several factors. Feeling of being safe in a familiar environment, comfortable home environment and assistance of the relatives may provide some women with a more physiological support in the home than a hospital birth. In addition, the distance of the hospital from their homes, lack of finances, delay in referral, and absence of the husband at home are also factors involved in delaying getting to the hospital. Complications during delivery are usually associated to mothers' late presentation (Bako *et al.,* 2013; Janna *et al.,* 2013).

Even though antenatal care has led to a remarkable reduction in maternal and perinatal complications, these benefits may not be maximal if women do not receive proper intrapartum care during first stage of labour (Maanongun *et al*., 2016; Bako *et al.,* 2013).

Concern has been raised over the increasing number of mothers reporting Kakamega County General Hospital in second stage of labour. This study therefore examines the birth outcomes in mothers that presented in the second stage of labour compared to those who presented in first stage of labour.

2.0 METHODOLOGY

2.1 Study Design

This was a cross-sectional study which was conducted using mixed methods of data collection.

2.2 Study Area

The study was conducted in the Kakamega County Hospital, maternity unit. It is the largest referral hospital in the County and serves 12 sub-county hospitals with highest admission of mothers in labour. It is located along Kisumu - Kakamega Highway. The hospital has a bed capacity of 640 with 89 cots and serves approximately 16000 in-patients annually. Its maternity unit has 6 departments, namely: antenatal ward, labour ward, postnatal ward, nursery, maternity theatre, and gynaecology ward. Labour ward attends to approximately 600 deliveries in a month. The unit has 62 qualified midwives.

2.3 Study Population

The study population comprised all mothers who delivered in maternity during the study period, and that met the criteria for inclusion into the study.

2.4 Inclusion Criteria

The study population included all consenting mothers in first and second stage of labour with singleton term pregnancies with cephalic presentation and who delivered in the hospital between 1st February to 30th April 2017.

2.5 Exclusion Criteria

Mothers who had previous caesarian delivery, abnormal placentation recorded during ANC care or antepartum haemorrhage observed during antenatal were excluded.

2.6 Sampling Procedure

Systematic sampling was used to select the mothers presenting in first and second stage of labour. The first mother was selected randomly. If a mother declined, the immediate next mother was selected, as long as they met the criteria for mothers who reported in first stage of labour. The same selection procedure was used for mothers who reported in second stage of labour and who met the inclusion criteria.

2.7 Data Collection

Interviewer administered structured questionnaires was used to collect quantitative data. The tool that used (Chuma *et al.,* 2013) was adapted with modifications. The information collected included socio-demographic data, maternal complications, previous obstetric history, antenatal history and reasons why mothers present in first and second stage of labour data. Focus group discussions were conducted with two groups of eight members each in order to gather information that was triangulated with the quantitative data.

2.8 Data management and statistical analysis

Raw data collected was analysed by assigning numerical values to each response and entering into a coding table. Thereafter the numerical numbers representing responses from the questionnaires was transferred to a code sheet to obtain quantitative results from the closed-ended questionnaires. The researcher also formulated categories of

responses for all open-ended questionnaires and FGD to obtain qualitative data.

Management of data was done using a software package SPSS 20.0. Chi-square test and multiple logistic regressions were employed in the analysis. Statistical significance level was set at $p \leq 0.05$.

2.9 Ethical considerations

Approval to carry out this study was obtained from the Masinde Muliro University of Science and Technology. In addition, permission was acquired from Nursing Research and Ethical Review Committees of Kakamega County Hospital. Permission to conduct research was sought from National Commission for Science Technology and Innovation (NACOSTI).

The respondents were informed about their rights in the study. The purpose of the study, any foreseen risks, and guarantee of anonymity, benefits and compensation or lack of them were explained to the respondents. The participants were asked of their free will to take part in the research without coercing them. Oral and written Consent were obtained and documented from all the study subjects prior to the interview. The respondents were assured that their participation was voluntary and that the data would be handled in a confidential manner and that their names were not be used in any publication or presentation. All mothers were given equal chance to be selected in the study. The information given by the respondents was kept confidential and anonymous. Those who opted out did so without loss of any benefits or intrapartum care. The researcher obtained results which did not affect them directly or indirectly. The respondents were allowed to ask questions and sought clarification where necessary.

The researcher provided feedback to the Ministry of Health and Masinde Muliro University of Science and Technology during annual conference.

3.0 RESULTS

A total of 640 respondents consented and participated in the study, 50% of whom were mothers who were admitted in first stage and another 50% in second stage of labour. As presented in Table 1, most of the mothers admitted in Stage 1 (58.4%), and Stage 2 (67.0%) were aged 30 – 39 years. The mean age for mothers reporting in Stage 1 (33.2±5.8) was comparable with those who reported in Stage 2 (33.2±5.2). There was no significant difference between the two mean ages ($t= -0.09$; $df=638$; $p = 0.9$). There was no association between stage of labour and age groups ($p = 0.14$). The difference in level of education between the two groups was statistically significant ($p < 0.0001$). There was significant association between stage of labour and mother's occupation ($p < 0.0001$). A significantly higher proportion of women reporting in Stage 2 (98.4%) were housewives compared to 38.1% in Stage 1. On the contrary, a higher proportion of women in Stage 1 (17.8%) were formally employed unlike their counterparts in Stage 2 (0.3%).

Table 1: Socio-demographic characteristics

Variable	Category	Stage 1		Stage 2		p value
		N	%	N	%	
Age group in years	20 – 24	16	5.1	11	3.5	0.14
	25 – 29	67	21.1	59	18.6	
	30 – 34	94	29.6	120	37.7	
	35 – 39	91	28.7	93	29.3	
	>=40	49	15.5	35	11.0	
	Total	**317**	**100.0**	**318**	**100.0**	
Mean±SD (Range)		33.2±5.8 (17.0 – 46.0)		33.2±5.2 (18.0 – 45.0)		t= -0.09; df=638 p=0.9
Marital status	Single	36	11.3	42	13.1	0.8
	Married	234	73.1	225	70.3	
	Separated	26	8.1	24	7.5	
	Widow	15	4.7	16	5.0	
	Divorced	9	2.8	13	4.1	
	Total	**320**	**100.0**	**320**	**100.0**	
Level of education	None	0	6.3	19	5.9	<0.0001
	Primary	13	4.1	291	90.9	
	Secondary	195	60.9	7	2.2	
	Tertiary	112	35.0	3	0.9	
	Total	**320**	**100.0**	**320**	**100.0**	
Religion	Catholic	21	6.6	24	7.5	0.5
	Protestant	285	89.1	288	90.0	
	Muslim	7	2.2	3	0.9	
	Atheist	7	2.2	5	1.6	
	Total	**320**	**100.0**	**320**	**100.0**	
Occupation	Housewife	122	38.1	315	98.4	<0.0001
	Farmer	56	17.5	1	0.3	
	Employed	57	17.8	1	0.3	
	Business	85	26.6	3	0.9	
	Total	**320**	**320**	**320**	**100.0**	

3.1 Maternal complications during labour and delivery

As is shown in Table 2, most of the mothers reporting in Stage 1 (90%) had normal delivery in contrast to 68.1% of those who reported in Stage 2. The leading complications recorded for mothers in the latter group were prolonged/obstructed labour (11.9%) and primary PPH (9.7%) unlike those who came in Stage 1 with leading complication being lacerations/tears of the cervix (5.9%).

Table 2: Maternal complications during labour and delivery

Monitored parameters	Results monitoring of labour	Stage 1		Stage 2	
		n	%	n	%
Maternal complications after delivery	Normal puerperium	288	90.0	218	68.1
	Lacerations/tears of the cervix	19	5.9	7	2.2
	Rupture of the uterus	0	0.0	6	1.9
	Primary PPH	10	3.1	31	9.7
	Retained placenta	2	0.6	16	5.0
	Prolonged labour	1	0.3	38	11.9
	Maternal death	0	0.0	4	1.3

3.1.1 Socio-demographic factors associated with first and second stage of labour

Table3 shows socio-demographic factors that are associated with stage of presentation in the labour ward. Mothers who were housewives were 103 times more likely to report in stage 1 compared with mothers who were not housewives (OR: 103.5; 95% CI: 41.5 – 258.1; p <0.0001). Other variables such as age group (p=0.88), marital status (0.42) and religion (0.53) were not significantly associated with mothers presenting in second stage of labour.

Table 3: Logistic regression model of association between socio-demographic factors and presentation in 2nd and 1st Stage

Variables	Categories	OR	95% CI	p Value
Age group	< 30 vs >=30 years	1.0	0.6 – 1.6	0.88
Marital status	Married vs others	0.8	0.5 – 1.3	0.42
Religion	Protestant vs others	0. 8	0.4 – 1.6	0.53
Occupation	Housewife vs others	103.5	41.5 – 258.1	<.0001

3.1.2 Association between previous pregnancy/delivery history and stage of presentation during labour

Table 4 displays factors associated with mother's previous pregnancy/delivery history and stage of presentation during labour. Results show that there was marginal association between mothers with less than three previous pregnancies and those who had three or more previous deliveries. Mothers with less than three previous pregnancies were two times more likely to report in second stage of labour than those with three or more previous pregnancies (OR: 1.9; 95% CI: 1.0 – 3.9; p=0.06). There is a strong association between past history of livebirth and presenting in second stage of labour. Mothers with past history of live birth were six-fold more likely to report in second stage of labour compared with those who came in first stage (OR: 6.2; 95% CI: 2.7 – 14.3; p <0.0001). Previous mode of delivery was also independently related to reporting in second stage of labour. Those who had had SVD in the past were three times more likely to report in second stage of labour (OR: 2.8; 95% CI: 1.3 – 5.9; p=0.006). Conversely, mothers who had previous hospital delivery were less likely to report in second stage of labour compared with mothers who had delivered outside the health facilities (OR: 0.02; 95% CI: 0.01 – 0.04; p<0.0001). There was no evidence of previous history of miscarriage influencing stage of presentation in labour ward (p=0.93).

Table 4: Logistic regression model of association between previous pregnancy/delivery and stage of presentation during labour

Variables	Effect	OR	95% CI	p value*
Number of previous pregnancies	Less than 3 vs three and more	1.9	1.0 – 3.9	0.06
Previous history of miscarriage	No miscarriage vs history of miscarriage	1.0	0.3 – 3.2	0.93
History of previous births	Past history of livebirth vs Past history of stillbirth	6.2	2.7 – 14.3	<0.0001
Where past delivery took place	Hospital vs other places	0.02	0.01 – 0.04	<0.0001
Previous mode of delivery	SVD vs other modes	2.8	1.3 – 5.9	0.006

*Significant if p value < 0.05

3.1.3 Antenatal factors influencing stage of presentation during labour

The study also examined the relationship between antenatal factors and stage of presentation in labour ward by mothers (Table 5). Evidence shows that mothers whose spouses decided that they attend ANC were 40% less likely to report in second stage of labour compared to those who made own decision (OR: 0.6; 95% CI: 0.42 – 0.96; p=0.03). The number of focused ANC visits was also equally important as an independent factor influencing stage of reporting in the labour ward. Results indicate higher tendency for mothers with less than 4 visits reporting in second stage of labour in contrast to those who had met the recommended minimum number of ANC visits which is 4 or more (OR: 26.7; 95% CI: 18.1 – 45.6; p <0.0001). There was no significant relationship between ANC attendance when ANC visit was started and stage of presentation in labour ward.

Table 5: Logistic regression model of association between antenatal factors and stage of presentation during labour

Variables	Categories	OR	95% CI	p value*
ANC attendance	Attended vs did not attend	5.1	0.7 – 37.1	0.11
Who decided that respondent attends ANC	Spouse vs others	0.6	0.42 – 0.96	0.03
When started ANC visits	1st Trimester vs 2nd and above	0.8	0.3 – 2.3	0.68
Number of focused ANC visits	Less than 4 visits vs 4 and more visits	26.7	18.1 – 45.6	<0.0001

*Significant if p value < 0.05

3.2 Reasons why mothers report in first or second stage of labour

Figures 1, display the leading reasons why mothers reported in first stage were severe abdominal pain (47.8%), fear for labour to progress at home (25.1%) and per vaginal bleeding (19.4%).

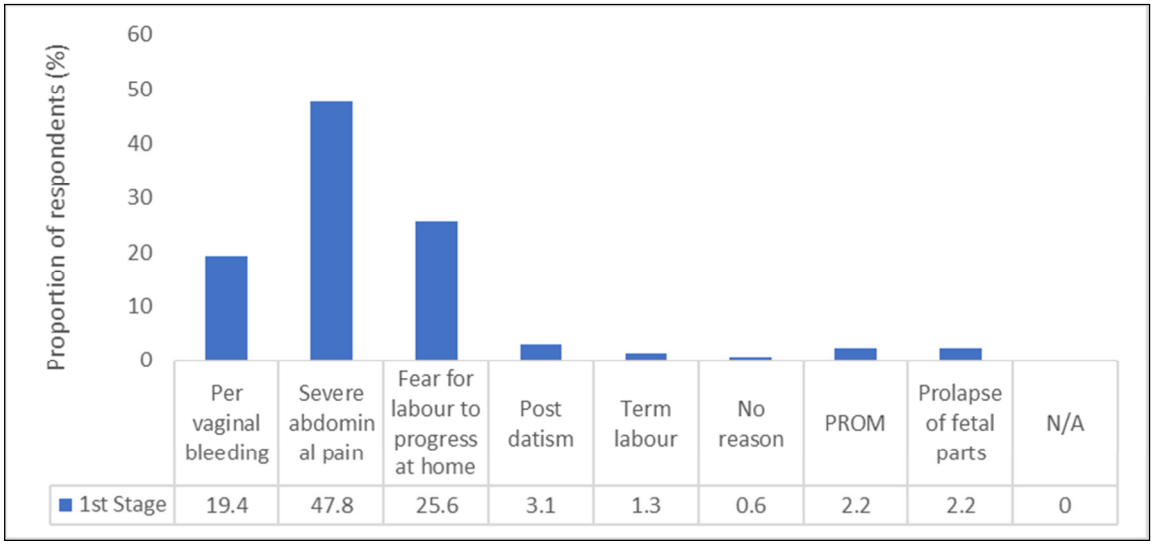

Figure 1: Reasons why mothers presenting in second stage of labour.

Majority of mothers who reported in second stage of labour (28.1%) delayed because progress of labour was too fast while 26.3% did so because the husband was not at home.

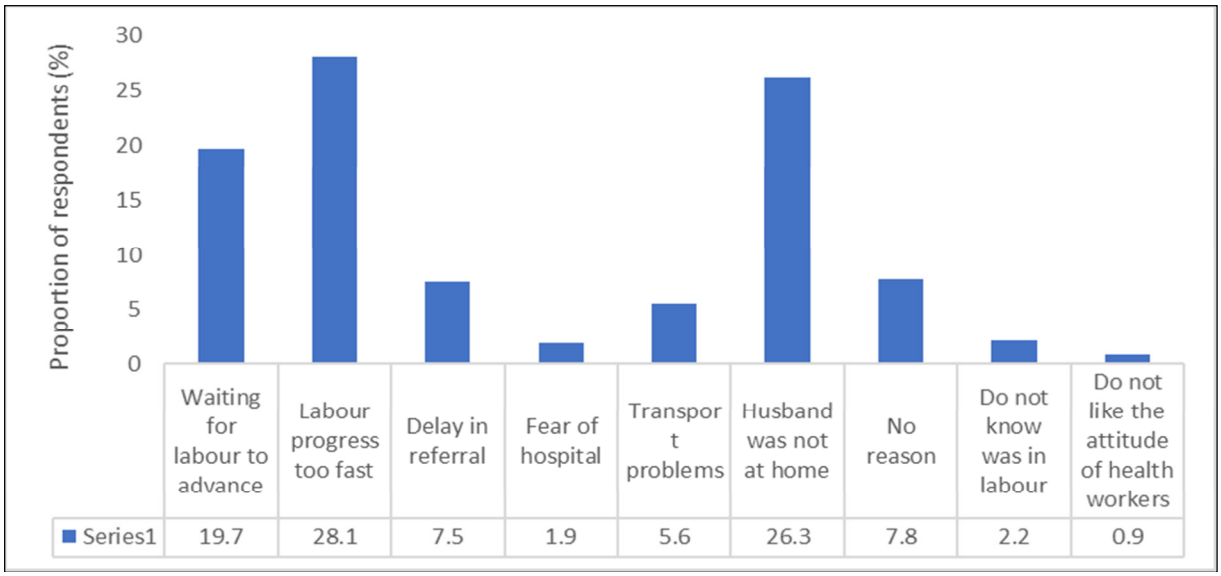

Figure 2: Factors influencing mothers presenting second Stage of labour

3.2.1 Predictors of mother presenting in 2nd Stage of labour

Results from the pooled multivariable analyses for each of the variables that were significantly associated with mothers presenting in second stage are presented in Table 6. Independent predictors of mothers reporting in second stage of labour included: occupation, place of past delivery, previous mode of delivery and number of ANC visits. The remaining factors such as the number of previous pregnancies, history of previous births and who decides that mother visits ANC were not significant. The odds of reporting in second stage of labour among housewives was 83.9 times higher than non-housewives. In addition, women with previous history of SVD were four-fold more likely to report in second stage of labour compared with mothers with abnormal modes of delivery.

Similarly, the odds of reporting in second stage of labour was 13 times higher for mothers who had less than 4 ANC visits in comparison to those who met the minimum recommended FANC visits. Past place of delivery was also a strong independent predictor of mothers presenting in second stage of labour. Mothers with previous hospital delivery history were less likely to report in second stage of labour.

Table 6: Multivariable model of association with mothers' presentation in second stage of labour

Variables	Categories	OR	95% CI	p value*
Occupation	Housewife vs others	83.9	28.0 – 251.7	<0.0001
Number of previous pregnancies	Less than 3 vs three and more	0.5	0.2	0.32
History of previous births	Past history of livebirth vs Past history of stillbirth	1.7	0.5 – 5.6	0.36
Where past delivery took place	Hospital vs other places	0.03	0.01 – 0.1	<0.0001
Previous mode of delivery	SVD vs other modes	4.0	1.4 – 11.3	0.01
Who decided that respondent attends ANC	Spouse vs others	0.8	0.5 – 1.5	0.60
Number of focused ANC visits	Less than 4 visits vs 4 and more visits	13.0	6.8 – 24.9	<0.0001

4.0 DISCUSSION

4.1 Socio-demographic characteristics

The study found out that majority of the mothers who presented in second stage of labour had either no education or had attained primary with the majority being housewives ($p < 0.0001$). Low level education and lack of employment negatively influence mothers' ability to make own decision regarding health facility delivery since they depend on others for decision making and financial support. These findings are at variance with previous studies (Maanongun *et al.,* 2016, Bako *et al*., 2013) where educational level and employment did not influence their stage of presentation in labour.

4.2 Maternal outcome among mothers admitted in Second Stage and First Stage of labour during delivery

The study revealed that mothers presenting in first stage of labour had higher chances of normal labour compared to those presenting in second stage of labour ($\chi 2$; df=1 =46; $p<0.0001$). Mothers who present early in labour benefit from labour monitoring in the hospital by health care team, complications are detected early and required management administered promptly. A study done in India on outcomes of labour among mothers presenting in first and second stage revealed that mothers who were monitored with partograph had good outcomes since the complications were identified early and proper management done (Sinhg, 2010). Other similar studies found out that mothers presenting in second stage of labour are associated with abnormal labour (Maanongun *et al.,2016* and Bako *et al.,*2013). In our case, mothers presenting in second stage of labour could not have benefitted from close monitoring of lanour using partogram.

From the current study, normal labour outcome increased by 231% if one had attended ANC than those who had not ($p = 0.01$). This is attributed to the fact that those attending ANC clinic received health talks on signs of labour, danger signs, birth preparedness and advice on early presentation in labour. A study done by Tanwira (2011) at Coast General Hospital found out that, failure to attend antenatal clinic attendance by mother during pregnancy is one of the reasons why these mothers are not presenting to hospital for delivery early. Not attending antenatal clinic and lack of knowledge on birth and emergency preparedness during antenatal care were significantly associated with the risk of presenting in second stage of labour.

Our study also demonstrated that presentation during second stage of labour was significantly associated with adverse maternal outcomes. Prolonged/obstructed labour (11.9%) and primary PPH (9.7%) were leading complications recorded in second stage group compared to 3.1% and 0.3%, respectively among mothers who presented in first stage. These are among the commonest causes of maternal mortality globally. Late presentation during labour denies health care team chance to do early investigations and offer the ideal management that would help prevent complications. The results are supported by similar studies done in Nigeria where haemorrhage was the leading complication in mothers reporting in second stage of labour (Maanongun *et al.,2016;* Bako *et al.,2013*). In yet another study done at Coast General Hospital, mothers presenting late had postpartum haemorrhage.

4.3 Reasons why mothers presented in Second Stage of labour

Several reasons factors were given as reasons why mothers presented in second stage of labour. Among these were related to absence of spouse/relatives, lack of finances, lack of transport and labour progressing too fast. The study demonstrates that most of mothers who were housewives were 103 times more likely to report in second stage compared with mothers who had some form of occupation ($p <0.0001$). This is contrary to other study results which showed no evidence of association between maternal occupation and stage of reporting during labour (Maanongun *et al.,* 2016, Bako *et al.,* 2013). Lack of power in decision making would also hinder them from presenting early in labour ward since they depend on other members of family in decision making and financial support. Findings further showed that mothers whose spouses decided that they attend ANC were 40%

less likely to report in second stage (p=0.03). Spouse plays a key role in decision-making regarding pregnancy and labour. This is confirmed by a study done in Kinshasha, Zaire (Wassie *et al.,* 2012, Kakaire *et al*.,2011),) on male involvement on antenatal care where male spouses were considered as providers and custodian of money.

Results also showed that a significant proportion of mothers with past history of live birth, mothers who had had spontaneous vaginal delivery and grand multiparity mothers presented in second stage of labour. Based on the previous experience, such mothers are more likely to compare outcome of labour with previous deliveries. And since the previous deliveries had no complications, they thought that the present one would be the same as confirmed by Maanongun *et al.* (2016).

Notably, a significant proportion of mothers who previously delivered in the hospital presented in first stage of labour ($p<0.0001$). Mothers with previous hospital delivery may have benefitted from health education given to mothers at hospital during pregnancy, labour and delivery.

Results also indicate higher tendency for mothers with less than 4 visits reporting in second stage in contrast to those who had met the recommended minimum number of ANC visits which is 4 or more ($p<0.0001$). Those who met the minimum number of FANC were likely to have gained from health talks from healthcare providers which encourages them to present early in labour.

Another reason for late reporting during labour was fast progress of labour (28.1%) which could be due to limited knowledge on symptoms of labour. This agrees with other similar studies (Maanongun *et al.,2016* and Bako *et al.,2013*) which identified waiting for labour to progress, delay in referral and transportation problems as causes of delayed reporting in hospital by mothers during labour.

5.0 CONCLUSION

Most of mothers presenting in second stage of labour had no education or had attained primary school education with majority having no formal employment. Lack of employment negatively influences mother's decision-making and directly leading to delays in reporting to hospital during labour It was also noted that mothers whose spouses decided for them to attend ANC met the minimum FANC and presented early in labour. These mothers might have benefitted from health talks during antenatal clinic visits.

A significant proportion of mothers who presented during first stage of labour had normal puerperium compared with those presented in second stage of labour. This might be due to the fact that mothers who presents early are monitored in the hospital possible complications identified and managed early. Maternal complications prolong/obstructed labour and postpartum haemorrhage are found to be the leading in second stage group. Postpartum haemorrhage is a life-threatening condition which is preventable if detected early. Fast progress of labour and husband not being at home when labour started were the main reasons why mothers presented in second stage of labour in the hospital.

6.0 Recommendations

The following recommendations made based on the study findings and conclusions:

- Health talk on early presentation during labour in the hospital should target multiparas and grandmultiparas to improve on birth outcomes
- Birth preparedness education should be enhanced during antenatal health talks to promote early presentation during labour.
- Male involvement on matters related to pregnancy, labour and delivery should be encouraged.

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