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Determinants of hospital delivery among mothers attending post-natal mother-baby clinic services from January to August 2020: a cross-sectional study of Busia, Uganda

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ABSTRACT

Background: It is estimated that hospital delivery could reduce 16%–33% of maternal deaths. Despite the importance of delivering at health institutions, in many countries, mothers still prefer to give birth at home.

Study aim: The aim was to ascertain the determinants of hospital delivery among mothers attending post-natal mother-baby clinic services in Busia district.

Methods: We used analytical cross-sectional design, with mixed method approach. A sample of 385 respondent mothers were interviewed using semi-structured questionnaires. Two Focus Group Discussions (FGD) were held with mothers.

Results: Hospital delivery was at 82.6%, with most mothers delivering from government hospitals (50.9%) and private hospitals. Place of residence of mothers was associated with Hospital Delivery ($X^2_{(1)} = 1.515, p < 0.002$). Mothers who lived in urban settings were 2.7 times more likely to deliver from health facilities than mothers who lived in rural settings [cPR = 2.686, 95% CI (0.394–1.194)]. Husband's educational level was a determinant of Hospital Delivery ($X^2_{(3)} = 2.054, p < 0.006$). Mothers whose husbands had primary education, secondary education and tertiary education were 2.2 times, 1.5 times and 1.3 times more odd of delivering from health facility respectively.

Conclusion: Hospital delivery in Busia was acceptably high. Women's decision power enormously contributes to the choice of place of delivery.

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SUBJECTS

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1. Introduction

1.1. Background

Hospital delivery is a delivery of babies that takes place at any medical facility staffed by skilled delivery assistance. Hospital delivery is generally associated with significantly improved maternal and fetal outcomes compared to home birth (Lissu et al., 2021; Vidal et al., 2024). This is because hospitals provide access to skilled medical professionals, advanced monitoring technology, and immediate intervention capabilities in case of complications during labor and delivery, leading to a lower risk of maternal and infant mortality and morbidity (Kanyesigye et al., 2022; Gudayu & Araya, 2019).

It is estimated that using hospital delivery could reduce 16%–33% of maternal deaths. Despite the importance of delivering at health institutions, in

many countries mothers still prefer to give birth at home (Yoseph et al., 2020). According to trends in maternal health indices, the utilization of maternal health services by women has increased (Dapaah & Nachinaab, 2019). When delivery services are provided in medical facilities by qualified staff, maternal and neonatal health outcomes are said to improve. Berelie et al. (2020) found that women who had focused antenatal care (FANC) visit (AOR = 3.12, 95% CI: 2.73–3.56), were more likely to give birth at health facility compared to their counterpart. To encourage births in medical facilities, geographical factors are essential. In Ghana, hospital deliveries have climbed from 42% to 73% during the past 20 years. Nearly 30% of deliveries take place inside of residences, nevertheless. In reality, few low- and middle-income nations have high rates of hospital delivery (Enameh et al., 2016). There is widespread agreement among

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experts, that giving birth in a medical institution significantly lowers the chance of maternal mortality (Agha & Carton, 2011; Anyait et al., 2012). They asserted that by increasing the use of antenatal care (ANC), postnatal care (PNC) and family planning, the risk of maternal death can be further reduced. Globally, a number of factors affect place of birth of women (Tegegne et al., 2018). These are place of residence, family preferences for the delivery site, attendance at ANCs, socioeconomic status, third trimester of pregnancy, women's age and parity, transportation, placenta disposal, delivery position and complications at the previous delivery. Recent study found that in a health system with free choice of hospitals, many women chose a hospital close to their homes or according to their risks (Koller et al., 2024).

Similarly, age of pregnancy, women's education level and that of her partner, and having valid health insurance affect the choices of place of birth (Enuameh et al., 2016). Many more studies found similar opinions (Adeniyi et al., 2022; Gebregziabher et al., 2019; Kawaguchi et al., 2021; Omona, 2018; 2021a; Sato et al., 2019; Seljeskog et al., 2006). One of the causes leading to Uganda's high maternal morbidity and mortality is the high percentage of pregnant women who choose not to give birth in a medical facility under supervision (Anyait et al., 2012). Several factors were associated with this. These are; high socio-economic status (adjusted odds ratio [AOR] 2.8, 95% Confidence interval [95% CI] 1.2–6.3), previous difficult delivery (AOR 4.2, 95% CI 3.0–8.0), parity less than four (AOR 2.9, 95% CI 1.6–5.6), preference of supine position for second stage of labor (AOR 5.9, 95% CI 3.5–11.1), preference for health workers to dispose placenta (AOR 12.1, 95% CI 4.3–34.1), not having difficulty with transport (AOR 2.0, 95% CI 1.2–3.5), being autonomous in decision to attend antenatal care (AOR 1.9, 95% CI 1.1–3.4) and depending on other people (such as spouse) in making a decision of where to deliver from (AOR 2.4, 95% CI 1.4–4.6). These findings concur recent studies (Dapaah & Nachinaab, 2019). There are many important interventions in lowering maternal death and complications. Hagos et al. (2014) found that, the district where women resided had a significant impact on hospital delivery (AOR: 2.21, 95% CI: 1.28, 3.82), as did the women's age at interview (AOR: 1.96, 95% CI: 1.05, 3.62), level of education (AOR: 3.53, 95% CI: 1.22, 10.20), level of wealth (AOR: 16.82, 95% CI: 7.96, 35.54), occupation of women (AOR: 1.50, 95% CI: 1.01, 2.24), use of prenatal care (4+), and total number of pregnancies (AOR: 0.25, 95% CI: 0.18, 0.35). Women who made their own decisions

about where to give birth had a lower likelihood of delivering in health facility (AOR: 0.38, 95% CI: 0.23, 0.63).

This study sought to investigate the determinants of hospital delivery among mothers attending post-natal mother-baby clinic services between January 2020 and August 2020 in Busia District, Eastern Uganda.

1.2. Specific objectives

The study was guided by the following research objectives;

1. To determine the level of hospital delivery among mothers attending post-natal mother-baby clinic services in Busia district.
2. To determine the factors affecting the hospital delivery among the mothers attending post-natal mother-baby clinic services in Busia District

1.3. Conceptual framework

The conceptual diagram is illustrated in Figure 1. The socio-demographic determinants under investigation were; age, marital status, educational level, religion, living environment (Rural/Urban), first pregnancy, occupation, income level. The hospital-related determinants were; free post-natal mother-baby clinic services, accessibility, counseling directed to facility delivery and perceived quality of care. The socio-cultural determinants were; husband providing transport, cultural norms and decision-making abilities. These variables interact, in the presence of moderating variables, to bring about hospital delivery of a mother. In event that moderating variables are strong enough, it can negate the outcome (hospital delivery) very severely.

2. Materials and methods

2.1. Study design

The study was an analytical cross-sectional study, undertaken between January and August, 2020. It was both qualitative and quantitative dimensions. The choice of this design was based on the strengths of the design. These are; relatively quick and easy to conduct (no long periods of follow-up), data on all variables is only collected once, ability to measure prevalence for all factors under investigation, multiple outcomes and exposures can be studied at the same time, among others (Health Knowledge, 2017).

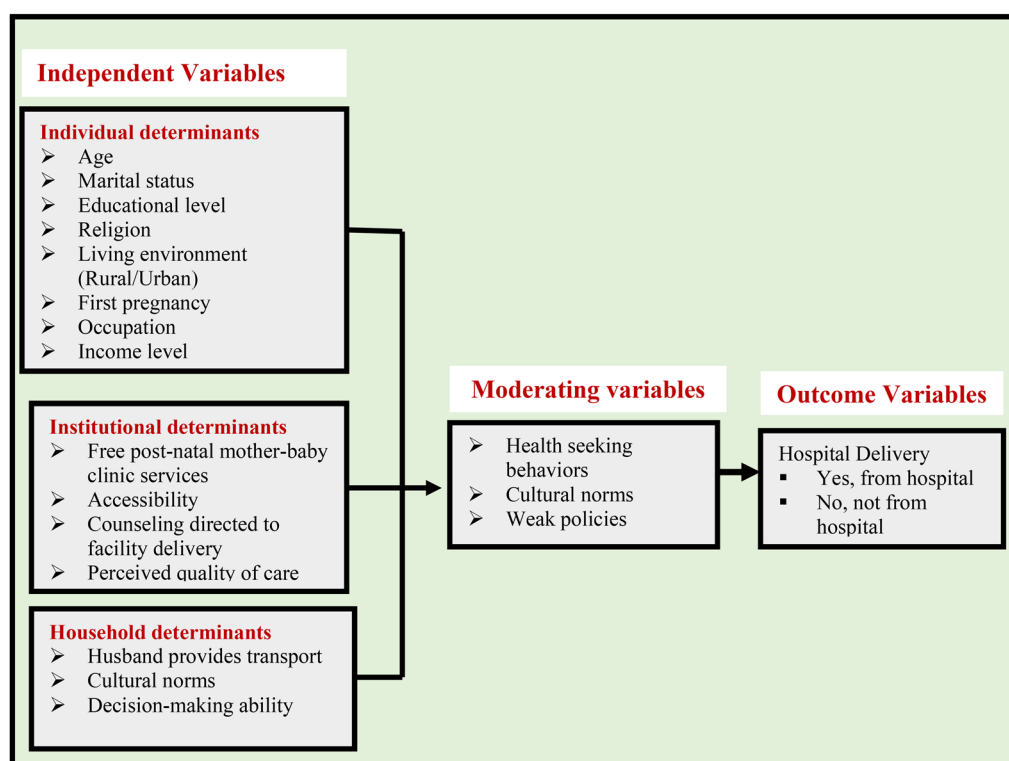


Figure 1. Conceptual framework diagram.

2.2. Study setting

The study was carried out in Busia district, Eastern Uganda. It is approximately 195 kilometers (121 miles) by road to Kampala, Uganda's capital city. Busia is bordered by the Republic of Kenya on its east, Tororo district on its north, Lake Victoria on its south, Bugiri district on its west, and Namayingo on its southwest. The average elevation of Busia is 1198 meters (3930 feet) above sea level. The language is Lusamia-Lugwe, and the people are Samia. There are 615 villages, 58 parishes, and 16 sub-counties in the Busia district with 33 government and private health-care institutions. There are two hospitals, one health center IV, eleven health centers III, and nineteen health centers II in the district. According to Uganda Demographic Surveys (Uganda Bureau of Statistics [UBOS], 2016, 2017), the overall population is 323,662 people (Total male-156,447, Total females-167,215). There are three (3) Constituencies: Samia-Bugwe North, Samia-Bugwe South, and Busia Municipality with population of; 61,918 Busia Municipality, 140,557 Samia-Bugwe North, and 157,725 Samia Bugwe South. Agriculture and border commerce are the primary economic activity (Busia District Local Government, 2018; UBOS, 2017). The district health service has Masafu General Hospital, also called Masafu Hospital, as a district hospital (Hartley, 2012), where this study was conducted. Masafu General

Hospital is a government-owned public hospital, with planned bed capacity of 100. Because of its central location, the catchment population of the hospital is the entire Busia district. The Post-natal mother-baby Clinic Services are provided for both mothers and their babies. Services provided for mothers are; general checks (Vital signs, genital area care, and checks for bleeding, tears, and blood clots), nutrition support with micronutrient supplementation, and support for eating and drinking. Others are; mental health (identification and management of postnatal depression), support and advice on breastfeeding, counseling on birth spacing (family planning). The services for babies are; monitoring of temperature and weight (growth monitoring), routine vaccines, such as vitamin K and tetracycline ointment and also monitoring and treatment of infection.

2.3. Study population and eligibility for recruitment

The study populations were mothers attending post-natal mother-baby clinic services [Post-natal visits] in Busia district, specifically, in the Masafu general hospital. The unit of study was a mother attending post-natal mother-baby clinic services [Post-natal visits]. The respondent included all those

mothers who came for post-natal mother-baby clinic services between January and August 2020 within this study period.

2.4. Sample size determination

Cochran's formula for calculating sample size (n_0) when the population size (N) is infinite: Cochran (1977) [was used (Sarmah & Hazarika, n.d.)

$$\text{Thus, } n_0 = \frac{Z^2 Pq}{e^2}$$

Where, n_0 is the sample size, Z is the selected critical value of desired confidence level, P is the estimated proportion of an attribute that is present in the population, $q=1-p$, E is the desired level of precision = 5% = Sampling error.

Note that the degree of variability in the attributes (P) being measured refers to the distribution of attributes in the population. The more heterogeneous a population, the larger the sample size required to obtain a given level of precision. The less variable (or more homogeneous) a population is, the smaller the sample size. Hence, a proportion of 50% indicates a greater level of variability than either 20% or 80%. This is because 20% and 80% indicate that a large majority do not or do, respectively, have the attribute of interest. Proportion of 0.5 indicates the maximum variability in a population; it is often used in determining a more conservative sample size (Israel, 1992; Polonia, 2013).

Thus; Samples (n_0):

$$n_0 = \frac{1.96^2 * 0.5 * (1-0.5)}{0.05^2} = \frac{0.9604}{0.0025} = 384.16 \approx \mathbf{385 \text{ Mothers}}$$

2.5. Sampling procedures

Simple random technique was used to identify the respondent mothers. All mothers who meet the inclusion criteria were assigned a random number, and the researcher had copies of those random numbers in wrap-up pieces of paper. The researcher then drew the numbers representing each mother randomly from the different group of mothers. This exercise continued by way of picking until the sample size, n, was reached for each day. The selected mothers were then interviewed. However, for focus group discussion, a purposive sampling was used to select all respondents to constitute the group. This was from among mothers who came for post-natal mother-baby clinic services.

2.6. Study variables

The outcome variable was hospital delivery, measured by asking respondents to state where their last delivery was, either hospital or somewhere else. The independent variables were household determinants, socio-cultural determinants and health facility-related factors, as shown in [Supplementary Appendix A](#).

2.7. Operational definitions

In this study, the following word were used as defined below;

1. **Hospital Delivery**- This is the proportion of births occurring in health facilities (WHO, 2020).
2. **Home delivery** – This is when a mother gives birth at home or when birth takes place outside of health facility (Yoseph et al., 2020).
3. **Woman's decision power** – This is the ability of a woman to independently decide where to give birth from or with her husband jointly deciding where to deliver from (Yoseph et al., 2020).
4. **Determinants** – These are factors which decisively affect the nature or outcome of something.

2.8. Data collection, tools and techniques

Primary data was collected from the respondent mothers using semi-structured questionnaires for quantitative data and focus group discussion (FGD) guide for qualitative data. The semi-structured questionnaire was researcher administered through research assistants. Two Focus group discussions were held with mothers, with numbers ranging from 8 to 12 members per group. Age categories of mothers were taken care of to constitute each group. With the help of the guide, the researcher asked the appropriate questions and recorded the responses.

2.9. Statistical methods

The data generated was double-checked for completeness; appropriateness and correctness before entering in the Microsoft excel sheet and Statistical Package for Social Sciences (SPSS) for analysis. After entry, another counter-check was made. For the qualitative data, repeated reading was made to appreciate the information and make substantive meaning out of it, which enabled the development of the appropriate thematic areas (Yang et al., 2018).

For quantitative data, univariate analysis, bivariate analysis (binary logistic regression) and multivariate analysis (multivariate logistic regression analysis) was run using SPSS. Likewise, the qualitative data was coded, transcribed and content analyzed. The result was presented in narrative/descriptive statements, as appropriate. Dataset associated with this study was published in Mendeley data repository (Omona, 2021b).

2.10. Ethical considerations

The researchers undertook a number of ethical considerations. Clearance the study was sought and granted by Uganda Martyrs University. All other ethical approval was sought as necessary (Ref. No: UMUREC/09/2020). Written informed consents were sought. The names of the respondents were not used for the analysis to conceal their identities for purpose of confidentiality. Informed consents from the respondents were sought.

3. Results

3.1. Participant selection and characteristics

385 participants were recruited and their socio-demographic characteristics are shown in Table 1.

Most of the respondents (52.7%) were age 20–40years followed by those who were more than 40years (34.5%). Most of the mothers were married (72.5%). Catholics and Anglicans were the dominant religion of the respondents accounting for 39.2% and 33.8% in that respective order. Majority of the respondents had primary education (45.5%) whereas up to 59.0% lived in rural areas. Of the 385mothers, up to 318 (82.6%) delivered from health facility. Up to 65.5% of the mothers were employed while up to 343 (89.1%) of their husbands were employed. The nature of respondents' occupation ranged from petty businesses (50.6%) to salary earners (8.6%) and others (6.2%).

3.2. Participant selection and level of hospital delivery among mothers

Mothers attending post-natal mother-baby clinic services were asked to state whether or not they delivered in health institutions. The results are summarized in Figure 2.

The study found that up to 318 (82.6%) of the mothers delivered from health facilities (See Figure 2). Of those who delivered from health facilities,

most of them (50.9%) delivered from government hospitals (see Table 2).

3.3. Individual level determinants of hospital delivery

Individual level factors which determined hospital delivery among mothers attending post-natal mother-baby clinic services in Busia were ascertained. A bivariate analysis was made and the cross tabulated results are shown in Table 3.

The study found that place of residence of the mothers was associated with Hospital Delivery ($X^2_{(1)} = 1.515$, $p = 0.002$). Mothers who lived in urban settings were 2.7times more likely to deliver from health facilities than mothers who lived in rural settings [cPR = 2.686, 95% CI (0.394–1.194)]. Husband's educational level was found to be a determinant of Hospital Delivery ($X^2_{(3)} = 2.054$, $p = 0.006$). In comparison with mothers whose husbands had no education, mothers whose husbands had primary education, secondary education and tertiary education were 2.2times, 1.5times and 1.3times more likely to deliver from health facility respectively [cPR = 2.249, 95% CI(0.581–8.698), cPR = 1.546, 95% CI(0.537–4.453), cPR = 1.329, 95% CI (0.501–3.523)] in that order.

Although there was no statistical significance between Hospital Delivery and age ($p = 0.0903$), mothers aged 20–40years [cPR = 1.122, 95% CI(0.437–2.884)] and mothers older than 40years [cPR = 1.198, 95% CI (0.642–2.235)] were slightly more likely to deliver from health facility than the younger mothers less than 20years of age. Similarly, in comparison with mothers from Anglican religious denomination, mothers whose denomination were Catholic (cPR = 21, 95% CI (0.000–1.271)), Muslim (cPR = 24), Born-again (cPR = 35) and others (cPR = 49) were far more likely to deliver from health facilities. Uniquely, mothers who were not employed were found to be 1.4times more likely to deliver from health facilities (cPR = 1.381, 95% CI (0.400–4.766)) than those who were employed.

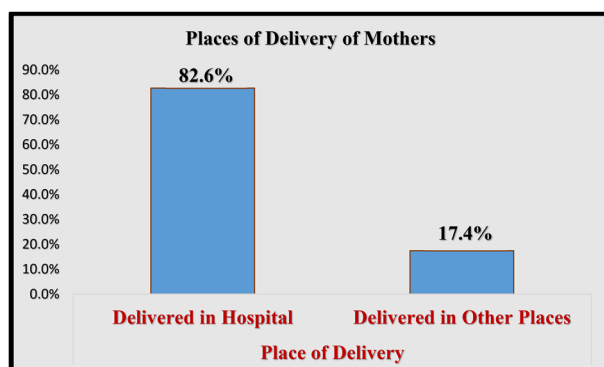
3.4. Hospital-related determinants of hospital delivery

The study found that 196(50.9%) of the mothers delivered from government hospitals, 55(14.3%) from private hospitals, 53(13.8%) from health centre IVs and 14(3.6%) from health centre IIIs. A bivariate analysis was made and the cross tabulated results are shown in Table 4.

Table 1. Socio-demographic characteristics of mothers.

S. No	Variables	Frequency (n=385)	Percentage (%)
1)	Age in years		
	▪ Less than 20	49	12.7%
	▪ 20–40	203	52.7%
	▪ More than 40	133	34.5%
2)	Marital status		
	▪ Single	51	13.2%
	▪ Married	279	72.5%
	▪ Separated	38	9.9%
	▪ Widowed	17	4.4%
3)	Religion		
	▪ Anglican	130	33.8%
	▪ Catholic	151	39.2%
	▪ Muslim	67	17.4%
	▪ Born again	26	6.8%
	▪ Others	11	2.9%
4)	Educational level		
	▪ No educ.	23	6.0%
	▪ Primary educ.	175	45.5%
	▪ Secondary educ.	128	33.2%
	▪ Tertiary educ.	59	15.3%
5)	Place of residence		
	▪ Rural	227	59.0%
	▪ Urban	158	41.0%
6)	Parity of mothers		
	▪ 1–3 children	181	47.0%
	▪ 4–5 children	123	31.9%
	▪ More than 5 children	81	21.0%
7)	Employment status		
	▪ Employed	252	65.5%
	▪ Not employed	133	34.5%
8)	Employment type		
	▪ Petty business	195	50.6%
	▪ Salary earner	33	8.6%
	▪ Others	24	6.2%
	▪ Not employed	133	34.5%
9)	Place of delivery		
	▪ Health facility	318	82.6%
	▪ Other places	67	17.4%
10)	Husband's education		
	▪ No educ.	24	6.2%
	▪ Primary educ.	97	25.2%
	▪ Secondary educ.	204	53.0%
	▪ Tertiary educ.	60	15.6%
11)	Husband's employment		
	▪ Employed	343	89.1%
	▪ Not employed	42	10.9%
12)	Husband's employment type		
	▪ Petty business	249	64.7%
	▪ Salary earner	69	17.9%
	▪ Others	25	6.5%
	▪ Not employed	42	10.9%

Born Again—This is Christian denomination known for being highly charismatic in their way of serving God.

**Figure 2.** Hospital delivery in Busia District between January and August 2020.**Table 2.** Types of facilities where mothers delivered from.

		Frequency(n)	Percent(%)
Types of Health facilities	▪ Government Hospital	196	50.9%
	▪ Private Hospital	55	14.3%
	▪ Health Centre IV	53	13.8%
	▪ Health Centre III	14	3.6%
Other places of delivery	▪ At home	41	10.6%
	▪ Traditional Birth Attendant	20	5.2%
	▪ Others	6	1.6%

The study found that history of having ever delivered from a health facility was associated with the recent hospital delivery ($\chi^2_{(1)} = 0.076$, $p=0.007$), as out of the 298

Table 3. Cross tabulation of individual determinants and hospital delivery.

Variables	Delivered in hospital		Total	cPR, 95%CI (L–U)	Chi Sq (χ^2), Df	p value
	Yes, n(%)	No, n(%)				
1) Age						
▪ Less than 20 years	41(10.6%)	8(2.1%)	49	1	$\chi^2 = 0.204$, Df = 2	0.903
▪ 20–40 years	166(43.1%)	37(9.6%)	203	1.122(0.437–2.884)		
▪ More than 40 years	111(28.8%)	22(5.7%)	133	1.198(0.642–2.235)		
2) Marital status						
▪ Single	42(10.9%)	9(2.3%)	51	1	$\chi^2 = 1.804$, Df = 3	0.614
▪ Married	234(60.8%)	45(11.7%)	279	0.726(0.183–2.879)		
▪ Separated	29(7.5%)	9(2.3%)	38	0.589(0.178–1.950)		
▪ Divorced	13(3.4%)	4(1.0%)	17	0.944(0.235–3.785)		
3) Religion						
▪ Anglican	111(45.5%)	19(26.0%)	130	1	$\chi^2 = 5.822$, Df = 4	0.213
▪ Catholic	125(32.5%)	26(6.8%)	151	21(0.000–1.271)		
▪ Muslims	52(13.5%)	15(3.9%)	67	24(0.000–2.656)		
▪ Born-again	19(4.9%)	7(1.8%)	26	35(0.000–3.001)		
▪ Others	11(2.9%)	0(0.0%)	11	49(0.000–3.201)		
4) Educational level						0.88
▪ No educ.	20(5.2%)	3(0.8%)	23	1	$\chi^2 = 0.67$, Df = 3	
▪ Primary educ.	145(37.7%)	30(7.8%)	175	0.456(0.101–2.045)		
▪ Secondary educ.	106(27.5%)	22(5.7%)	12	0.697(0.287–1.690)		
▪ Tertiary educ.	47(12.2%)	12(3.1%)	59	0.674(0.272–1.671)		
5) Place of residence						
▪ Rural	192(49.9%)	35(9.1%)	227	1	$\chi^2 = 1.515$, Df = 1	0.002**
▪ Urban	126(32.7%)	32(8.3%)	158	2.686 (0.394–1.194)		
6) Parity						
▪ 1–3 children	149(38.7%)	32(8.3%)	181	1	$\chi^2 = 0.02$, Df = 2	0.990
▪ 4–5 children	102(26.5%)	21(5.5%)	123	1.098(0.531–2.273)		
▪ More than 5 children	67(17.4%)	14(3.6%)	81	1.055(0.482–2.308)		
7) Employment status of mothers						
▪ Employed	207(53.8%)	45(11.7%)	252	1	$\chi^2 = 0.105$, Df = 1	0.746
▪ Not employed	111(28.8%)	22(5.7%)	133	1.381 (0.400–4.766)		
8) Employment type (n = 252)						
▪ Petty business	160(41.6%)	35(9.1%)	195	1	$\chi^2 = 0.132$, Df = 2	0.988
▪ Salary earner	27(7.0%)	6(1.6%)	33	0.784(0.233–2.637)		
▪ Others	20(5.2%)	4(1.0%)	24	1.029(0.200–5.280)		
9) Husband's educational level						
▪ No educ.	18(4.7%)	6(1.6%)	24	1	$\chi^2 = 2.054$, Df = 3	0.006**
▪ Primary educ.	78(20.3%)	19(4.9%)	97	2.249 (0.581–8.698)		
▪ Secondary	170(44.2%)	34(8.8%)	204	1.546 (0.537–4.453)		
▪ Tertiary educ.	52(13.5%)	8(2.1%)	60	1.329 (0.501–3.523)		
10) Husband's employment status						
▪ Employed	286(74.3%)	57(14.8%)	343	1	$\chi^2 = 1.346$, Df = 1	0.246
▪ Not employed	32(8.3%)	10(2.6%)	42	1.051(0.307–3.601)		
11) Husband's employment type (n = 343)						
▪ Petty business	205(53.2%)	44(11.4%)	249	1	$\chi^2 = 0.132$, Df = 2	0.988
▪ Salary earner	62(16.1%)	7(1.8%)	69	0.679(0.240–1.923)		
▪ Others	19(4.9%)	6(1.6%)	25	0.404(0.110–1.486)		

cPR: Crude Prevalence Rate; CI: Confident Interval; Df: Degree of freedom; χ^2 : Chi square; U: Upper limit; L: Lower limit.

mothers who had ever delivered from health facility, up to 247(64.2%) of them again delivered from health facility. Getting partner support for hospital delivery was also a determinant for hospital delivery ($p=0.003$).

In a focus group discussion with the mothers, they reported as follows;

[...] you see, from my previous hospital delivery, I was counseled and advised to delivery only from health facilities. So, how can I avoid it? [...]–
Respondent X in FGD 1

[...] Yes, my husband supports me to deliver from hospitals. He sometimes talks to me about it, other times escort me to health facility and other times he gives me money. I can confirm that he is really positive about me delivering from health facility [...] –
Respondent Y in FGD 2

[...] my husband gave me transport and asked me to go [...] – **Respondent H in FGD 1**

The findings from the focus group discussions were similar

Table 4. Cross tabulation of hospital variables and hospital delivery.

Hospital variables	Delivered in hospital		Total	cPR, 95%CI (L–U)	Chi Sq (χ^2), Df	p value
	Yes, n(%)	No, n(%)				
1) Ever delivered from HF before						
▪ Yes	247(64.2%)	51(13.2%)	298	1	$\chi^2 = 0.076$, Df = 1	0.007**
▪ No	71(18.4%)	16(4.2%)	87	0.451(0.017–1.004)		
2) Effect of previous hospital delivery on recent decision (n = 298)						
▪ Positively	169(43.9%)	32(8.3%)	201	1	$\chi^2 = 0.69$ Df = 2	0.876
▪ Negatively	53(13.8%)	13(3.4%)	66	0.98(0.002–1.076)		
▪ Neither	25(6.5%)	6(1.6%)	31	0.99(0.003–1.956)		
3) Wish to deliver from HF						
▪ Yes	263(68.3%)	54(14.0%)	317	1	$\chi^2 = 0.169$ Df = 1	0.681
▪ No	55(14.3%)	13(3.4%)	68	0.36(0.780–2.373)		
4) Knew HIV status						
▪ Yes	267(69.4%)	52(13.5%)	319	1	$\chi^2 = 1.571$ Df = 1	0.210
▪ No	51(13.2%)	15(3.9%)	66	0.756(0.100–2.147)		
5) Got support from spouse						
▪ No	47(12.2%)	11(2.9%)	58	1	$\chi^2 = 0.116$ Df = 1	0.003**
▪ Yes	271(70.4%)	56(14.5%)	327	0.289(0.194–1.094)		
6) Type of support got from spouse: Partner (n = 327)						
▪ Accepted HF delivery	146(37.9%)	28(7.3%)	174	1	$\chi^2 1.225$ Df = 3	0.874
▪ EscPRted me to HF	35(9.1%)	7(1.8%)	42	1.068(0.031–2.203)		
▪ Provided transport	26(6.8%)	8(2.1%)	34	1.056(0.082–2.318)		
▪ Provided finance	64(16.6%)	13(3.4%)	77	1.021(0.062–2.401)		

CPR: Crude Prevalence Rate; CI: Confident Interval; Df: Degree of freedom; χ^2 : Chi square; U: Upper limit; L: Lower limit; HF: Health facility.

4. Discussion

The aim was to ascertain the determinants of hospital delivery among mothers attending postnatal mother-baby clinic services in Busia district. The study found that up to 82.6% of births took place in hospitals. Place of residence and husband levels of education were the key individual determinants of hospital delivery in this study. Similarly, history of having ever delivered from a health facility and getting husband support for hospital delivery were among the hospital related determinants of hospital delivery.

4.1. Level of hospital delivery among mothers

In this current study, up to 82.6% of births took place in health facilities, with the majority of mothers giving birth in public hospitals (50.9%) and private hospitals (14.3%). Recent studies in Uganda (Rukungiri and Kanungu) found that the majority of mothers (90.2%, 806/894) delivered in health facilities, which is similar in this present study (Mugambe et al., 2021). In rural settings of Uganda, it was found that cultural and community patterns of behavior have the strongest impact on delivery options (Dantas et al., 2020). However, in other parts of Africa, this current study finding is comparable to one from the Congo, where it was shown that 93.8% of women gave birth in a medical institution (Abel et al., 2012).

Otherwise, generally speaking, hospital delivery is quite poor in many low-income countries including African countries. In the Ethiopia, Amano et al. (2012) found that only 12.3% of deliveries took place in medical facilities. Other scholars (Anyait et al., 2012) found that only 45.4% of 500 women gave birth in medical facilities. In another study (Karanja et al., 2018), 39% of the women interviewed in Kenya gave birth at the medical facility. Once more, of 528 women who used postnatal care (PNC) services, only 47.3% of them delivered in medical facilities (Nigatu & Gelaye, 2019). Additionally, it was found that only 34% of 674 respondents mothers had their most recent birth at a medical facility in Ethiopia (Kidanu et al., 2017). In Eritrea (Kifle et al., 2018), 75.4% of respondents gave birth to their last children at home, compared to 24.6% who did so in a medical facility.

4.2. Individual level determinants of hospital delivery among mothers

This current study discovered a relationship between mothers' residency and birth at a medical institution ($p=0.002$). Compared to mothers who resided in rural areas, urban mothers were 2.7 times more likely to give birth in a medical facility (CPR = 2.686, 95% CI (0.394–1.194)). Hospital Delivery was also shown to be influenced by the husband's educational level ($p=0.006$). Mothers whose husbands had primary, secondary, or tertiary education were, respectively, 2.2 times, 1.5 times and 1.3 times more likely to give birth

in a medical facility than mothers whose husbands had no education. This finding is comparable with other studies (Amano et al., 2012) where urban mothers were found to be 2.3 times more likely than rural mothers to give birth in medical facilities (AOR = 2.27, 95%CI: 1.17, 4.40). When compared to mothers who couldn't read or write, mothers with at least a secondary education were 4.3 times more likely to give birth in a hospital (AOR = 4.31, 95%CI: 1.62, 11.46). According to Amano et al. (2012), ANC visits during the previous pregnancy were another significant predictor of using hospital delivery services. Mothers who received antenatal care (ANC) in a health facility during their pregnancy were 4.2 times (AOR = 4.18, 95%CI: 2.54, 6.89) more likely to give birth there than mothers who did not. Mothers under the age of 20 were six times (AOR = 6.06, 95%CI: 1.54, 23.78) more likely to give birth in a hospital than mothers aged 35 and older. This is, however, contrary to what was found in this current study, where mothers under the age of 20 were more likely to give birth outside of medical facilities.

Kifle et al. (2018) found that women were less likely [AOR = 0.02; 95% CI 0.01–0.54] to give birth at a medical institution if their husbands had no formal education. Women were more likely to give birth at a health facility when they and their husbands jointly decided on the delivery location (AOR = 5.42; 95% CI 1.78–16.49) and when their husbands selected a health facility (AOR = 2.32; 95% CI 1.24–5.11). This shows the decision power of a woman or couple. Again, women who used conventional transportation were more likely to give birth in a medical institution (AOR = 9.78; 95% CI 1.23–77.26) and women who had previously given birth in a hospital and had poor experiences [AOR = 2.69; 95% CI 0.94–7.68]. These are similar to findings in many other studies (Kifle et al., 2018; Nyeta & Omona, 2020; Ojok et al., 2021; Omona, 2018, 2021c). Women who had previous facility delivery [AOR = 2.69; 95% CI 0.94–7.68], had negative experiences of delivery outcomes in her community [AOR = 1.31; 95% CI 1.00–4.96] or perceive home delivery as life threatening [AOR = 1.84; 95% CI 1.46–3.38] were more likely to deliver in health facility (Kifle et al., 2018). Again, many other studies had varied views (Nyeta & Omona, 2020; Ojok et al., 2021; Omona, 2018, 2021c).

4.3. Hospital-related determinants of hospital delivery among mothers

In this current study, history of having ever delivered from a health facility was associated with Hospital

Delivery ($p < 0.007$). Similarly, women's power decision, that is, getting partner support for Hospital Delivery was a determinant for Hospital Delivery ($p < 0.003$). This finding is similar to those found elsewhere (Kifle et al., 2018). For example, Kifle et al. (2018) found that women who had previous facility delivery [AOR = 2.69; 95% CI 0.94–7.68], had negative experiences of delivery outcomes in her community [AOR = 1.31; 95% CI 1.00–4.96] or perceive home delivery as life threatening [AOR = 1.84; 95% CI 1.46–3.38] were more likely to deliver in health facility. In terms of partner support (women's power decision), it was found that Women with traditional means of transport [AOR = 9.78; 95% CI 1.23–77.26] were also more likely to deliver in health facility (Assefa et al., 2020; Berhan & Berhan, 2014; Bishanga et al., 2018).

4.3.1. Strengths and limitations of the study

Being primary data, the main strengths are in the greater accuracy and relevance to the research question, direct control over data quality, the ability to gather specific information tailored to the study, and capturing real-time insights as the data is collected directly from the source. This allowed for deeper understanding and better decision-making based on the findings.

The limitations of this study are rooted in the cross-section design used, that is, its inability to establish a causal relationship between variables because it measured exposure and outcome (hospital delivery) at a single point in time, meaning it could not determine which factor came first. This makes it difficult to understand the true direction of the association between variables. Again, as data is collected only once, trends and changes in variables over time could not be assessed.

Since postnatal services only capture views of women who had recently delivered live infants and not those who were no longer attending postnatal visits, or did not deliver live infants, this could have also posed a limitation to this study.

5. Conclusion

Globally, hospital delivery is encouraged as a single most important strategy in preventing maternal and neonatal morbidity and mortality. However, access to facility-based delivery care remains low in many low-income countries. Otherwise, literature has evidently shown that hospital delivery is quite poor in many low-income countries including African countries.

The level of hospital delivery in this study (Busia, Uganda) was acceptably high as opposed to other studies in low-income countries. It is far much better than many parts of Africa, especially in low-income countries where hospital delivery is reportedly very low. When mothers are supported by their husbands for hospital delivery, the level improves, as is the case in this study. In terms of partner support (women's power decision), Women with traditional means of transport or husband support tend to likely deliver in health facilities.

6. Recommendations

Basing on the study findings, the researchers recommend as follows;

1. Husbands' support for hospital delivery should be encouraged at antenatal visit attendance.
2. Midwife-led continuity-of-care models, in which a known midwife or small group of known midwives supports a woman throughout the antenatal, intra-partum and postnatal continuum should be encouraged to improve quality of care and mothers' experience. Mothers who had history of having delivered in health facilities were more likely to deliver in hospital, as per this study finding.
3. Packages of interventions that include household and community mobilization and antenatal home visits are hereby recommended to improve antenatal care utilization and perinatal health outcomes.
4. Paying for performance (PFP) would help improve hospital delivery. Currently, there is a growing interest in paying for performance as a means to align the incentives of health workers and health providers with public health goals.

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Authors contributions

All the authors have significantly contributed to the research.

O. K: Conceptualization, Methodology, Resources, Investigation, analysis, or interpretation of data for the

work, reviewing it critically for important intellectual content, Final approval of the version to be published and agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

O.V. R: Conceptualization, Methodology, Formal analysis, Writing - Original draft preparation, approved the final manuscript and agreed to be accountable for all intellectual contents.

Disclosure statement

No potential conflict of interest was reported by the author(s).

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Data availability statement

Dataset related to this study is published in Medeley data repository and can be accessed by anyone through <https://data.mendeley.com/datasets/xng6jt7658>. The research tools are attached as appendix to this manuscript.

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