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Initiation of breastfeeding among mothers attending a regional referral hospital in central Uganda: a cross-sectional study

Vivianne Nakayiza¹, Jonathan Izudi^{1,2,3*}, Esther. M. Nasuuna^{4,5} and Fiona Atim¹

Abstract

Background Breastfeeding initiation within the first hour of birth is beneficial in reducing the risk of maternal and neonatal mortality. However, a significant proportion of mothers delay initiating breastfeeding within an hour of birth, but the association with age has not been rigorously studied. We examined the association between maternal age and delayed initiation of breastfeeding in a large urban referral hospital in central Uganda.

Methods This analytic cross-sectional study was conducted at the Entebbe Regional Referral Hospital in Central Uganda. Data were collected using a researcher-administered questionnaire between October 1, 2019, and December 20, 2019. Delayed initiation of breastfeeding was the primary outcome, defined as putting the newborn to the breast after one hour of birth. The primary exposure was maternal age categorized as 15–24, 25–34, and 35–45 years. We performed a modified Poisson regression analysis to determine the independent association between maternal age and delayed initiation of breastfeeding, adjusting for other confounders. We stated the findings as an adjusted prevalence ratio (aPR) and 95% confidence interval (CI).

Results We studied 384 participants with a mean age of 27.5 ± 5.5 years. Of the 384 participants studied, 275 (71.6%) had delayed initiating breastfeeding, with the majority aged 15–24 years. In a multivariable analysis, delayed initiation of breastfeeding was significantly associated with maternal age groups of 15–24 years (aPR 1.28, 95% CI 1.01, 1.63) and 25–34 years (aPR 1.28, 95% CI 1.01–1.60) compared to the reference group of 35–45 years. Additionally, delivery through cesarean section compared to spontaneous vaginal delivery was associated with delayed initiation of breastfeeding (aPR 1.93, 95% CI 1.49–2.49).

Conclusion Delayed initiation of breastfeeding is common and is associated with maternal age (15–24 and 25–34 years) as well as delivery through cesarean section. Routine health education and staff mentoring are needed to enhance early initiation of breastfeeding to prevent maternal and neonatal morbidity and mortality.

Keywords Breastfeeding, Cesarean section, Maternal age, Uganda

*Correspondence:

Jonathan Izudi
jonahzd@gmail.com

¹Institute of Public Health and Management, Clarke International University, Kampala, Uganda

²Department of Community Health, Faculty of Medicine, Mbarara University of Science and Technology, Mbarara, Uganda

³Directorate of Graduate Training, Research and Innovation (DGTRI), Muni University, Arua, Uganda

⁴Makerere University Infectious Diseases Institute, Kampala, Uganda

⁵London School of Hygiene and Tropical Medicine, Faculty of Epidemiology and Population Health, London, UK



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Text box 1. Contribution to the literature

- In Uganda, delayed initiation of breastfeeding and low exclusive breastfeeding rates are significant public health challenges, with less than 60% of newborns being breastfed within an hour of birth.
 - The association between maternal age and delayed breastfeeding initiation is poorly understood, hence limiting the use of targeted public health interventions
 - This study highlights the age groups at risk for delayed initiation of breastfeeding, including the associated factors, and contributes new evidence to inform appropriate interventions, such as guiding maternal education and policy development, ultimately improving infant and maternal health outcomes
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Background

In 2020, over 2.4 million newborns died globally before their 28 days of life. Sub-Saharan Africa (SSA), with a neonatal mortality rate of 27 deaths per 1,000 live births, has the highest rate worldwide. Among the leading causes of neonatal death is infection [1]. The World Health Organization (WHO) recommends early (within the first hour) and exclusive breastfeeding for all newborns as a strategy to reduce neonatal mortality by protecting the newborn from infections, as colostrum is an important source of immunity [2]. Approximately 78 million (three in five) babies do not breastfeed within the first hour of life, and this puts them at a higher risk for illness and death, and less likely to continue breastfeeding [3]. A systematic review and meta-analysis showed that infants who were not breastfed within the first hour of life had a 33% higher risk of mortality than those who were breastfed within one hour of birth [4]. It is also thought that early initiation of breastfeeding could avert about 41% of deaths in the first month of life [5]. Despite the advantages of breastfeeding to both the mother and the newborn, only less than 50% of the world's newborns are breastfed within one hour of birth [6].

Breastfeeding rates within the first hour of birth are higher in Eastern and Southern Africa, and lowest in East Asia and the Pacific [7]. Breastfeeding is highly common in Sub-Saharan African countries, including Uganda, but initiation within 1 h is hardly practiced [8]. A cross-sectional study in Ethiopia showed that mothers with three or more infants, compared to those with only one infant, and those who started their antenatal care (ANC) in the fourth month of pregnancy or afterward, compared to those who began before the fourth month, were more likely to initiate breastfeeding within an hour of birth [9]. In Uganda, less than 60% of newborns are breastfed within an hour of birth, and 50% of the children under six months of age are not exclusively breastfed [10]. Another Ugandan study found that all children were breastfed at some point after birth, however, breastfeeding initiation was delayed, with only 42% of ever-breastfed children initiated within the first hour of birth. Additionally, the

study showed that 14.5% of the children were not initiated breastfeeding within the first 24 h of their birth [8]. A five-year study in 58 middle- and low-income countries showed that the mode and place of delivery were associated with delayed initiation of breastfeeding [11].

A study conducted in Northern Uganda identified cesarean delivery, home birth, and breastfeeding initiated by the mother instead of a healthcare provider as factors associated with delayed initiation of breastfeeding [12].

Whereas several factors influence breastfeeding initiation, as shown in previous studies in Uganda [8, 10, 12], little is known about the association between maternal age and delayed initiation of breastfeeding. We hypothesize that younger mothers (15–24 years) are more likely to delay initiating breastfeeding compared to older mothers due to a lack of breastfeeding experience. Therefore, we investigated the association between maternal age and delayed initiation of breastfeeding among mothers attending the Entebbe Regional Referral Hospital in central Uganda. Studying the association between maternal age and delayed initiation of breastfeeding in Uganda is crucial for understanding its impact on infant health outcomes, as delayed initiation is linked to increased morbidity and mortality. This research can guide targeted public health interventions, identifying at-risk age groups and addressing specific barriers to timely breastfeeding initiation. Additionally, it can inform policy development, support culturally and economically appropriate breastfeeding practices, and contribute to global knowledge on breastfeeding behaviors in low- and middle-income settings. Insights gained can also improve maternal education and behavior, ultimately promoting better infant health outcomes.

Methods and materials**Study design, setting, and population**

We conducted an analytic cross-sectional study among mothers aged 15–45 years who had given birth by either spontaneous vaginal delivery or cesarean section at the Entebbe Regional Referral Hospital in Entebbe district, central Uganda. Findings were reported based on the Strengthening of the Reporting of Observational Studies in Epidemiology (STROBE) guidelines for cross-sectional studies [13]. Entebbe Regional Referral Hospital is a government-owned health facility located in the central part of Entebbe town in Wakiso District, with a bed capacity of 100–200 patients. According to Uganda's Healthcare System, a Regional Referral Hospital serves approximately 2–2.5 million people. The hospital has a private and public wing, with the former where patients pay a moderate fee-for-service and the latter where the services are provided at no cost. Health services provided by the hospital include immunization, maternity (antepartum, intrapartum, and postpartum), radiology, pediatrics,

general surgery, orthopedics, laboratory, and medical. Entebbe Regional Referral Hospital has one of the highest numbers of institutional deliveries in the country.

Our study population consisted of postpartum mothers who had delivered in the hospital. We used a simple random sampling approach to select the mothers over 7–8 weeks based on the available data in the maternity register. We included mothers aged 15–45 years who had delivered in the hospital, were admitted to the postpartum ward at the time of the study, were clinically stable after delivery, had a singleton birth, and all were within 2–24 h of delivery. We excluded mothers who had a priori planned not to practice exclusive breastfeeding, as this would bias the proportion of mothers with delayed initiation of breastfeeding.

Data collection process

The data were collected using a researcher-administered questionnaire between October 1, 2019, and December 20, 2019, mostly in the local language (*Luganda*) since the majority of the mothers were residents. A few mothers responded in English. The mothers who knew the local language but were illiterate provided data in the local language, while those who were literate provided data in either the local language or English. However, for mothers who did not know the local language and were literate, the data were collected in English. There were no mothers who did not know the local language or were illiterate. We collected data on demographic factors, knowledge of mothers on the Baby-Friendly Hospital Initiative (BFHI) package, obstetric factors such as parity and mode of delivery, and the timing of initiation of breastfeeding. We used the maternity register records to identify all eligible mothers as our sampling frame. We divided the entire sample size by the duration of the study (7–8 weeks, October to December 2019) to provide the minimum number of participants needed per day. On each day, we used the mothers' registration numbers (unique identifiers) to randomly select the required number of mothers in an Excel sheet. This process was repeated until the sample size was reached.

Variables and measurements

The primary exposure was maternal age measured as a continuous variable and then disaggregated into three categories, namely 15–24 years, 25–34 years, and 35–45 years. These age bands depicted younger, middle-aged, and mature mothers. The covariates included the mode of delivery (spontaneous vaginal delivery or cesarean section) obtained from the maternity register, marital status (single or never married and married or cohabiting), level of education (none, primary, secondary, and tertiary or university), and whether the mother was employed or not.

Other covariates included multiparity defined as more than one child ever born (no vs. yes), awareness about the importance of breastfeeding and the source of the information, awareness about the Baby-Friendly Hospital Initiative (BFHI) package, support in positioning a baby for breastfeeding, and whether there was an immediate skin to skin contact between the mother and the baby. Awareness about the BFHI package was determined by asking the mothers whether they knew of the package's requirement to initiate breastfeeding within an hour of birth. For mothers who provided an affirmative response, they were asked to mention what the BFHI package stipulated.

The outcome variable was delayed initiation of breastfeeding. Consistent with previous studies [14–16], we measured delayed initiation of breastfeeding as putting the baby on the breast within the first hour of birth, recorded as a binary response (no vs. yes). All the mothers were asked to state when they started to breastfeed their baby following delivery. Specifically, the question posed was “How long after birth did you first put the baby to the breast?” The responses were captured as less than an hour and more than an hour, verified using the maternity register data.

Statistical analysis

Data analysis was performed in Stata version 15. We hypothesized that younger mothers (15–24 years) are more likely to delay initiating breastfeeding compared to older mothers (aged ≥ 35 years). The rationale for this hypothesis was that younger mothers lack the experience and exposure to birthing and breastfeeding, and hence might be more likely to delay initiating breastfeeding compared to older mothers. We estimated the sample size based on the confidence interval approach. We assumed a 50% proportion of delayed initiation of breastfeeding, as no previous data existed in the study area, a 5% margin of error, and a 95% confidence level, leading to 384 participants.

We summarized categorical data as frequencies and percentages, and numerical data as mean and standard deviation. In establishing differences in maternal age with other variables, we cross-tabulated the variables with the maternal age groups and tested for any statistically significant differences using the Chi-square test if the cell count for categorical data was large (≥ 5) or the Fisher's exact test if it was small (< 5). To test mean differences in numerical data with the maternal age groups, we performed the Student's *t*-test as the data were normally distributed. The level of statistical significance was taken as less than 5% in the bivariate analysis.

To determine the independent association between maternal age groups and delayed initiation of breastfeeding, we used a modified Poisson regression analysis as the outcome was large. The covariates included in the model

for adjustment were selected a priori based on theoretical relevance, previous literature, and known associations with the outcome, including those significant at the bivariate association ($p < 0.20$). Furthermore, we allowed for robust standard errors to avoid violations of the assumption of the modified Poisson regression model as recommended by Cameron and Trivedi [17, 18]. We computed both unadjusted prevalence ratio (PR) and adjusted PR (aPR) along with the 95% confidence interval (CI). Our regression model was a priori specified and consisted of both socially and clinically relevant covariates as well as variables that demonstrated statistical significance in the bivariate analysis.

Goodness-of-fit for the modified Poisson regression model was assessed using both the deviance and Pearson chi-square statistics. The deviance assessed the model's fit by comparing observed and expected values, while the Pearson statistic measured the difference between observed and expected counts. Both tests were conducted with 372 degrees of freedom.

Quality control measures

Two research assistants with 2–3 years of experience in quantitative research collected the data after an orientation on the study procedure and responsible conduct of research. They were supervised by the Principal Investigator (PI, VN). Filled questionnaires were reviewed in real-time for completeness by the research assistants, but also before the data entry in Epi-Data version 3.1. To minimize erroneous data entry, quality control measures such as skips, alerts, and range and legal values were employed in Epi-Data.

Ethical issues

We obtained ethical approval from the Clarke International University Research Ethics Committee (CIUREC/0178). We obtained administrative clearance from the Management of Entebbe Regional Referral Hospital. Before the data collection, we obtained informed consent from all the participants aged ≥ 18 years per local research guidelines. For adolescents under 18 years, the parents gave assent. Each parent was provided with detailed information about the study, including the potential benefits and risks, compensation for time, the voluntary nature of participation and withdrawal, the confidentiality of information, protection of personal identity, and the social and scientific value of the research.

Results

General characteristics of study participants at the Entebbe Regional Referral Hospital in Uganda between October and December 2019

We studied 384 participants, giving a 100% response rate (Table 1). The majority (51.0% or 196) of the participants

were aged 25–34 years (younger mothers). The overall mean age for all 384 participants was 27.5 years (standard deviation = 5.5). Of the participants, 338 (88.0%) were married or cohabiting, 200 (52.1%) had reached a secondary level of education, 244 (63.5%) had no formal employment, and 291 (75.8%) were multiparous. Furthermore, 135 (35.2%) were aware that breastfeeding is important, 225 (58.6%) were aware of the BFHI package, 108 (28.1%) were supported in positioning their baby to breastfeed, and 183 (47.7%) had immediate skin-to-skin contact with their baby. Across all three age groups, the majority of the participants were married/or cohabiting, had ended at a secondary level of education, were unemployed, multiparous, aware of the BFHI package, and never needed any support in positioning the baby to breastfeed. However, the majority of the mothers who had no immediate skin-to-skin contact with the baby were 15–24 years (55.9%) and 25–34 years (53.6%), while 61.5% of those aged 35–45 years had immediate skin-to-skin contact with the baby.

Table 1 further shows that the participants were systematically different concerning the level of education ($p < 0.001$), employment status ($p < 0.001$), multiparity ($p < 0.001$), awareness about the importance of breastfeeding ($p < 0.001$), source of information about the importance of breastfeeding ($p = 0.001$), awareness about BFHI package ($p = 0.034$), and support in positioning a baby to breastfeed ($p < 0.001$) across the age groups. However, we did not find any statistically significant differences regarding marital status ($p = 0.939$) and immediate skin-to-skin contact between the mother and the baby ($p = 0.09$).

Distribution of delayed initiation of breastfeeding across maternal age groups at the Entebbe Regional Referral Hospital in Uganda between October and December 2019

Of the 384 participants, overall, 275 (71.6%) had delayed initiating breastfeeding (Fig. 1), with the majority being among those aged 15–24 years ($n = 106$ or 77.9%), followed by 25–34 years ($n = 142$ or 72.4%) and lowest among those aged 35–45 years ($n = 27$ or 51.9%). Delayed initiation of breastfeeding was significantly deferred between the different age groups ($p = 0.002$).

Association between maternal age and delayed initiation of breastfeeding with and without adjustment for confounders at the Entebbe Regional Referral Hospital in Uganda between October and December 2019

In Table 2, we present the association between maternal age groups and delayed initiation of breastfeeding. In the unadjusted analysis, mothers aged 15–24 years (PR 1.50, 95% CI 1.14–1.98) and 25–34 years (PR 1.40, 95% CI 1.06–1.84) were more likely to delay initiating breastfeeding compared to those aged 35–45 years. Mothers

Table 1 General characteristics of study participants at the entebbe regional referral hospital in Uganda between October and December 2019

Variables	Level	Maternal age groups in years				P-value
		Overall (n=384)	35–45 (n=52)	25–34 (n=196)	15–24 (n=136)	
Age (years)	mean (SD)	27.5 (5.5)	37.2 (2.0)	28.6 (2.8)	22.1 (1.8)	<0.001
Marital status	Single or never married	46 (12.0)	7 (13.5)	23 (11.7)	16 (11.8)	0.939
	Married/ or cohabiting	338 (88.0)	45 (86.5)	173 (88.3)	120 (88.2)	
Level of education	None	25 (6.5)	11 (21.2)	10 (5.1)	4 (2.9)	<0.001
	Primary	89 (23.2)	13 (25.0)	35 (17.9)	41 (30.1)	
	Secondary	200 (52.1)	20 (38.5)	103 (52.6)	77 (56.6)	
	Tertiary or University	70 (18.2)	8 (15.4)	48 (24.5)	14 (10.3)	
Employed	No	244 (63.5)	27 (51.9)	113 (57.7)	104 (76.5)	<0.001
	Yes	140 (36.5)	25 (48.1)	83 (42.3)	32 (23.5)	
Multiparity	No	93 (24.2)	3 (5.8)	35 (17.9)	55 (40.4)	<0.001
	Yes	291 (75.8)	49 (94.2)	161 (82.1)	81 (59.6)	
Aware of the importance of breastfeeding	No	249 (64.8)	23 (44.2)	126 (64.3)	100 (73.5)	0.001
	Yes	135 (35.2)	29 (55.8)	70 (35.7)	36 (26.5)	
Aware of BHFI	No	159 (41.4)	14 (26.9)	77 (39.3)	68 (50.0)	0.011
	Yes	225 (58.6)	38 (73.1)	119 (60.7)	68 (50.0)	
Mode of delivery	Spontaneous vaginal delivery	177 (46.1)	32 (61.5)	88 (44.9)	57 (41.9)	0.048
	Cesarean section	207 (53.9)	20 (38.5)	108 (55.1)	79 (58.1)	
Had immediate skin-to-skin contact with the baby	No	201 (52.3)	20 (38.5)	105 (53.6)	76 (55.9)	0.09
	Yes	183 (47.7)	32 (61.5)	91 (46.4)	60 (44.1)	
Mother received support in positioning a baby to breastfeed	No	276 (71.9)	46 (88.5)	143 (73.0)	87 (64.0)	0.003
	Yes	108 (28.1)	6 (11.5)	53 (27.0)	49 (36.0)	

Note: 1) BHFI: Baby-Friendly Hospital Initiative; 3) SD: Standard deviation

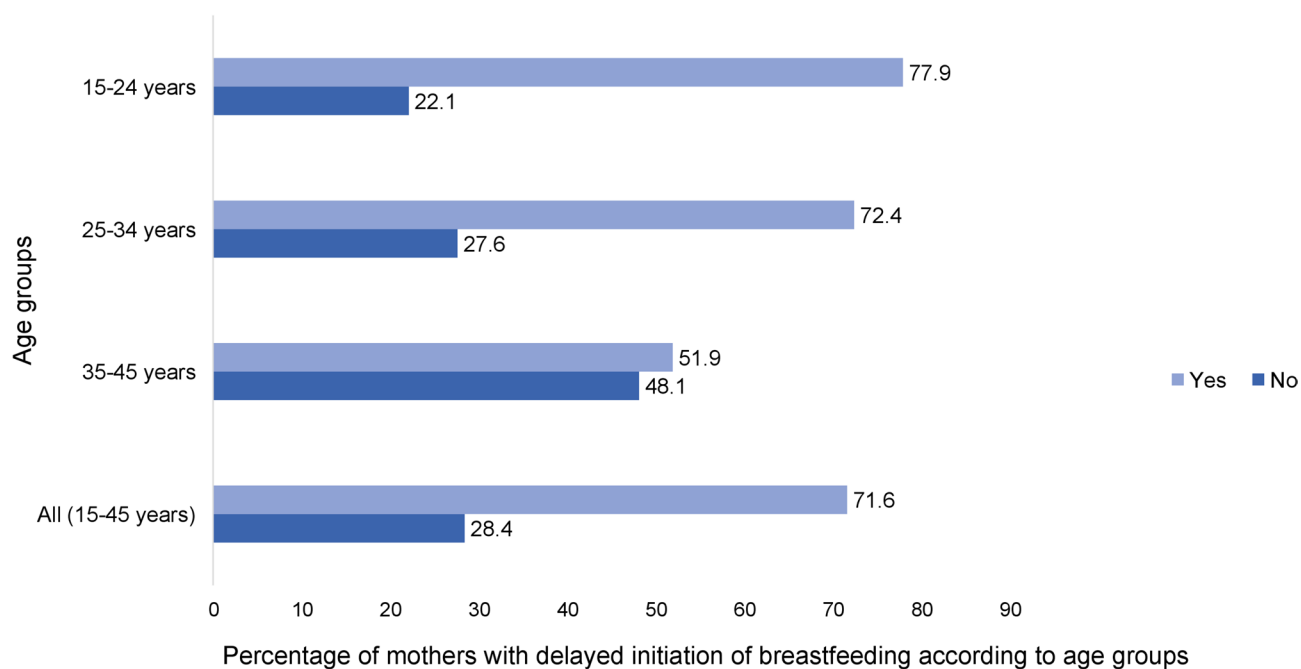
**Fig. 1** Percentage of delayed initiation of breastfeeding by age groups at the Entebbe Regional Referral Hospital in Uganda between October and December 2019

Table 2 Association between mode of delivery and delayed initiation of breastfeeding with and without adjustment for confounders at the entebbe regional referral hospital in Uganda between October and December 2019

Variables	Level	Modified Poisson Regression Analysis	
		PR (95% CI)	aPR (95% CI)
Age group (years)	35–45	1	1
	25–34	1.40* (1.06–1.84)	1.28 [†] (1.01,1.60)
	15–24	1.50* (1.14–1.98)	1.28 [†] (1.01,1.63)
Level of education	None	1	1
	Primary	1.25 (0.91,1.70)	1.08 (0.85,1.39)
	Secondary	1.15 (0.85,1.56)	0.97 (0.76,1.24)
	Tertiary/University	0.92 (0.64,1.30)	0.82 (0.62,1.10)
Employed	No	1	
	Yes	1.01 (0.89,1.15)	
Multiparity	No	1	
	Yes	0.88 (0.78,1.01)	0.93 (0.82,1.06)
Marital status	Single or never married	1	
	Married/ or cohabiting	1.20 (0.94,1.53)	
Aware of the importance of breastfeeding	No	1	1
	Yes	0.85* (0.74,0.99)	1.00 (0.88,1.14)
Aware of BFHI	No	1	1
	Yes	1.09 (0.96,1.25)	1.03 (0.91,1.16)
Mode of delivery	Spontaneous vaginal delivery	1	1
	Cesarean section	2.01*** (1.71,2.37)	1.93*** (1.49,2.49)
Had immediate skin-to-skin contact with the baby	No	1	1
	Yes	0.53*** (0.46,0.62)	1.01 (0.81,1.25)
Mother received support in positioning a baby to breastfeed	No	1	1
	Yes	1.26*** (1.12,1.42)	1.06 (0.95,1.18)

Note: (1) Exponentiated coefficients; 95% confidence intervals in brackets; (2) * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; BFHI: Baby-Friendly Hospital Initiative; PR: Prevalence ratio; aPR: Adjusted prevalence ratio

who had delivered by cesarean section were more likely to delay initiating breastfeeding compared to those who had delivered vaginally (PR 2.01, 95% CI 1.71–2.37). Also, delayed initiation of breastfeeding was more likely among mothers who received support in positioning a baby to breastfeed compared to those who never needed the support (PR 1.26, 95% CI 1.12–1.42). Awareness of the importance of breastfeeding (PR 0.85, 95% CI 0.74–0.99) and immediate skin-to-skin contact between the mother and the baby (PR 0.53, 95% CI 0.46–0.62) were associated with a lower likelihood of delayed initiation of breastfeeding. The other variables, such as level of education, employment status, multiparity, marital status, and awareness of the BFHI package, were not associated with delayed initiation of breastfeeding at the unadjusted analysis.

Following covariate adjustment, delayed initiation of breastfeeding was more likely among mothers aged 15–24 years (aPR 1.28, 95% CI 1.01,1.63) and 25–34 years (aPR 1.28, 95% CI 1.01–1.60) than those aged 35–45 years. Mothers who had delivered through cesarean section were more likely to delay initiating breastfeeding compared to those who had a spontaneous vaginal delivery (aPR 1.93, 95% CI 1.49–2.49). Level of education, multiparity, awareness of the BFHI package, immediate

skin-to-skin contact, and receipt of support in positioning a baby to breastfeed was not significantly associated with delayed initiation of breastfeeding at the adjusted analysis.

Findings about model assumptions

The deviance goodness-of-fit test yielded a statistic of 149.34 with a p-value of 1.000, suggesting no significant lack of fit. Similarly, the Pearson goodness-of-fit test showed a statistic of 106.56, also with a p-value of 1.000. This also indicated that the model fit the data well and no overdispersion was present.

Discussion

We assessed the association between maternal age and delayed initiation of breastfeeding among postpartum mothers aged 15–45 years who had delivered in one of the larger urban referral hospitals in Uganda. The study found a higher prevalence of delayed initiation of breastfeeding, which was more likely among mothers aged 15–24 years and 25–34 years compared to those aged 35–45 years. Additionally, cesarean section delivery was associated with a higher likelihood of delayed initiation of breastfeeding compared to vaginal delivery. The finding that more than 7 in 10 mothers have delayed

initiating breastfeeding is higher than the 48% prevalence of delayed initiation of breastfeeding in a community study done in the Northern region of Uganda [12].

This rate was also higher than the 52% found in a study conducted in South Sudan at a tertiary institution among 806 mothers [19]. However, it is similar to the 70% prevalence of delayed initiation of breastfeeding at a tertiary (referral) hospital in Eastern Uganda [20].

The study indicated that delayed initiation of breastfeeding was more likely among mothers aged 15–34 years compared to those aged ≥ 35 years. This was also true for a large community and facility-based study in Guinea-Bissau, which found that younger mothers were more likely to delay initiating breastfeeding [21]. Another study in Ethiopia also found that older mothers were less likely to delay initiating breastfeeding [22], consistent with the present results. Furthermore, the finding supports our hypothesis stating that younger mothers (15–24 years) lack experience and exposure to birthing and breastfeeding, making them more likely to delay initiating breastfeeding compared to older mothers. Biologically, delayed breastfeeding initiation is more common in mothers aged ≥ 35 years due to reduced hormonal responses, more pregnancy complications, and higher rates of cesarean deliveries [23]. For younger mothers (<35 years), delayed initiation is more likely driven by non-biological factors such as limited breastfeeding knowledge, lower confidence, less exposure to breastfeeding support, and health system barriers like inadequate postnatal care, among others [12, 20].

The study indicated that delivery through cesarean section compared to spontaneous vaginal delivery was associated with delayed initiation of breastfeeding. This finding is consistent with previous findings, which indicate that a significant proportion of mothers who deliver by cesarean section delay initiating breastfeeding within an hour of birth [11, 12, 20]. Our finding agrees with the results of a systematic review and meta-analysis that included 58 low- and middle-income countries [11]. Furthermore, a meta-analysis of Demographic and Health Survey data from 33 low- and middle-income countries in Sub-Saharan Africa found that delivery by cesarean section was associated with delayed initiation of breastfeeding [24]. A study in northern Uganda also found this association [12]. Another study in Cameroon among women who delayed initiating breastfeeding also found this to be true [25]. It is thought that this could be due to breastfeeding practices around cesarean section that are not conducive to early breastfeeding initiation [26]. These could include the separation of the mother and baby immediately following cesarean section, long recovery from anesthesia, and the indication for the cesarean section that could lead to the baby and the mother being separated for further observation or treatment [27]. The

health workers could also be focused on keeping the mother or baby alive and might not prioritize early initiation of breastfeeding. Overall, the cesarean section prevalence is high in this study.

The cesarean section rate of 53.9% was higher than the current global estimate of 21.1% from 2010 to 2018, according to data from 154 countries [28]. It is also higher than the national estimate of 36% in 2021 [29] and the sub-Saharan Africa (SSA) rate of 4% [19, 28]. This could be because the study site (Entebbe Regional Referral Hospital) is a tertiary care institution receiving all difficult obstetric cases from lower health facilities, necessitating cesarean section.

In our study, some factors previously shown as being associated with delayed initiation of breastfeeding did not demonstrate statistically significant associations. This discrepancy may be attributed to several reasons. First, contextual and population differences, such as variations in cultural norms, healthcare practices, and socioeconomic conditions, may influence breastfeeding behaviors differently across settings. Second, our study may have had limited statistical power due to a relatively small sample size. This may have potentially led to a Type II error. Third, differences in the outcome definitions and measurement tools used to assess both the outcome and explanatory variables could also account for the observed inconsistencies with prior findings. Additionally, unmeasured confounding or interaction effects may have masked true associations. Lastly, recent improvements in maternal health education, breastfeeding promotion, including certain health system interventions in the study setting, may have diminished the influence of factors that were previously significant. These considerations highlight the importance of context-specific investigations and the need for further research with larger, more diverse populations.

Implications of findings for policy, practice, and research

The study findings have several ramifications for the healthcare system in Uganda and other similar settings. First, routine health education programs should be implemented to educate mothers, particularly those aged 15–34 years, about the importance of breastfeeding initiation within the first hour after delivery. This education should begin during antenatal care visits to ensure the mothers are informed before childbirth and equipped with the knowledge to promote early breastfeeding. Second, there is a need for training and mentoring of healthcare providers, particularly those involved in cesarean section deliveries and postpartum care. They should receive specialized training to facilitate immediate skin-to-skin contact and assist in the timely initiation of breastfeeding. Ongoing mentorship would ensure that these practices are consistently applied. Third, the

implementation of postpartum care protocols should be strengthened to ensure that all mothers, especially those who have undergone cesarean sections, receive adequate breastfeeding support.

This could include follow-up visits by healthcare providers or trained lay health workers to assist in overcoming any breastfeeding challenges and reinforce the importance of early initiation. Fourth, community health workers and Village Health Teams (VHTs) may play an active role in supporting breastfeeding practices at the community level. These individuals can provide additional education, particularly for younger mothers in rural and peri-urban settings, helping to reduce delays in breastfeeding initiation. Fifth, while Uganda already has policies like the Baby-Friendly Hospital Initiative (BFHI) in place, efforts should be made to strengthen the widespread implementation across all healthcare facilities. This would standardize breastfeeding support and ensure that best practices are adhered to consistently across the country.

Study strengths and limitations

Our study has some strengths and limitations. We had a sufficient sample size, enabling us to find associations that are less likely to result from chance. We used the prevalence ratio instead of the odds ratio as our outcome was large. Therefore, the measure of association was not inflated. Some of the limitations included the study being conducted in a tertiary care institution, which serves the general population but also acts as a referral center for obstetric complications. Therefore, the findings might not be representative of lower-level health facilities, especially the cesarean section rate. Also, since the study sample was drawn from a single tertiary care hospital, which typically manages high-risk pregnancies and performs more cesarean sections, the rate of delayed breastfeeding initiation may have been overestimated due to the increased likelihood of maternal-infant separation. The outcome was determined by self-reporting, so there is a possibility of inaccuracies. However, we mitigated this problem by focusing on mothers who were within the first 2–24 h following delivery. We conducted the study in a referral-level health facility, so it may have limited the ability to capture certain relevant factors in primary care or community settings. For instance, factors such as traditional beliefs, access barriers, and community-level support systems may have been underrepresented in the present study. Additionally, the higher prevalence of cesarean deliveries and the availability of better postnatal care may have overshadowed other predictors of delayed initiation of breastfeeding.

Conclusion

Delayed initiation of breastfeeding was prevalent at Entebbe Regional Referral Hospital. Mothers aged 15–34 years and those who deliver by cesarean section are more likely to have a delayed initiation of breastfeeding.

Routine health education on the benefits of breastfeeding initiation within an hour of birth, along with mentoring of health staff on appropriate breastfeeding practices following delivery by cesarean section, are needed to reduce delays in initiating breastfeeding in this study setting and similar areas in Uganda. Additionally, younger mothers should be targeted for the timely initiation of breastfeeding to avert both maternal and neonatal morbidity and mortality.

Abbreviations

aPR	Adjusted Prevalence ratio
BFHI	Baby-Friendly Hospital Initiative
SSA	Sub-Saharan Africa

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Author contributions

VN and FA: Study conception and design. VN: Acquisition of data. VN and JI: Analysis and interpretation of data. VN, JI, EMN, and FA: Drafting of the manuscript. EMN and JI: Critical revision. VN, JI, EMN, and FA: Final approval of the manuscript.

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Data availability

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Declarations

Ethics approval and consent to participate

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Consent for publication

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Competing interests

The authors declare no competing interests.

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