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Pregnancy termination and determinant factors among women of reproductive age in Kenya, evidence from Kenyan Demographic and Health Survey 2022: Multilevel analysis

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Abstract

Background: Pregnancy termination is one of the common causes of maternal mortality, particularly in developing countries, and remains a global public health concern despite the efforts made to enhance maternal healthcare services. Maternal mortality is still the highest in sub-Saharan Africa, including Kenya, due to pregnancy termination.

Objectives: This study aimed to investigate the current burden of pregnancy termination and its determinants among reproductive-age women in Kenya.

Design: A cross-sectional study design with multilevel analysis.

Methods: The total weighted samples of 19,530 women of reproductive age were included in this study. The data were taken from the Kenyan Demographic and Health Survey 2022. A multilevel multivariable logistic regression model was used to identify the determinant factors of pregnancy termination. In the multivariable multilevel analysis, the adjusted odds ratio (AOR) with a 95% confidence interval (CI) was used to declare significant determinants of pregnancy termination among women of reproductive age.

Results: The overall prevalence of pregnancy termination among women of reproductive age in Kenya was 14.19%. The determinant factors associated with pregnancy termination were the age of the women; as age increased, the risk of pregnancy termination increased, 25–29 years (AOR = 2.23; 95 CI (1.08–4.60)), 30–34 years (AOR = 2.98; 95% CI (1.43–6.18)), 35–39 years (AOR = 3.24; 95% CI (1.55–6.76)), 40–44 years (AOR = 4.57; 95% CI (2.16–9.68)), 45– 49 years (AOR = 5.16; 95% CI (2.33–9.98)); marital status: married (AOR = 5.63; 95% CI (3.08–10.29)), ever married (AOR = 5.05; 95% CI (2.74–9.33)); wealth index: richest (AOR = 1.32; 95% CI (1.05–1.63)); employment status: employed (AOR = 1.23; 95% CI (1.09–1.38)); preceding birth interval: greater than 24 months (AOR = 1.21; 95% CI (1.06–1.38)); urban residence (AOR = 1.25; 95% CI (1.06–1.46)); and Islamic followers (AOR = 1.64; 95% CI (1.31–2.06)).

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Conclusion: Pregnancy termination among women of reproductive age in Kenya has become an important public health concern. Policymakers and other stakeholders should focus on maternal healthcare service programs to prevent the termination of pregnancy. The determinant factors are an important input to developing strategies to improve the accessibility of maternal healthcare services in the country.

Keywords
pregnancy termination, reproductive age, women, Kenya

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Introduction

Pregnancy termination is one of the most common health problems in both the developing and developed worlds. It is estimated that 56 million pregnancy terminations are performed around the globe annually. An estimated 36 per 1000 women terminated their pregnancy, and 45–65 per 1000 women have an unwanted pregnancy in the age group of 15–44 years worldwide.[1,2] Maternal mortality is made worse by unsafe abortions, which account for about 8%–9% of all maternal deaths worldwide.[3] In different African regions, the annual rate of pregnancy termination ranges from 31 per 1000 women of reproductive age in West Africa to 38 per 1000 in Northern Africa.[4,5] Overall, 15% of all pregnancies in Africa ended in abortion in the years 2010–2014.[6] Unsafe pregnancy termination is the leading cause of maternal mortality, particularly in developing countries. Most pregnancy-related-deaths occur in low- and middle-income countries.[7]

The burden of pregnancy termination is increasing at an alarming rate in Kenya, with a pregnancy termination rate of 48 per 1000 women. An estimated 464,000 induced pregnancy terminations occurred in Kenya in 2012.[8] One study conducted in Kenya showed that about half of all pregnancies were unintended, and 41% of unintended pregnancies ended in pregnancy termination.[9] Pregnancy termination is legally permitted in Kenya for the grounds stated as to save the lives of women in danger and to prevent the risk of mental or physical health for women.[10,11]

Prior research has confirmed that women who terminate their pregnancy encounter psychological, emotional, mental, and spiritual crises.[12–14] In addition to maternal mortality, the impacts of pregnancy termination include lasting sadness or regret after termination, ambivalence about the decision, a lack of social support, and whether the pregnancy was originally intended or not.[15,16] Evidence has found that the overall rate of psychiatric morbidity among women undergoing termination of pregnancy was higher than that of the general population, indicating that women undergoing termination of pregnancy may be at risk of increased negative psychological consequences in their lives.[17,18]

Previous research has shown that termination of pregnancy is significantly linked to place of residence, maternal age, educational status, irregular menses, number of pregnancies, utilization of antenatal care, unknown pregnancy, place of delivery, maternal weight status, and maternal obstetric conditions.[19–22] The rate of pregnancy termination has fluctuated not only among countries but also within countries, and it is particularly prevalent among poor, rural residents, and marginalized populations.[23,24]

There are different causes and types of pregnancy termination. Pregnancy termination might be medically recommended termination, unsafe abortion (out of a health facility or use of traditional drugs), spontaneous abortion, or unwanted abortion due to illness or use of toxic drugs. Pregnancy termination is a broader term than abortion.[25,26] It includes medically recommended termination of pregnancy, unsafe abortion, and unwanted/sudden abortion due to illness or unexpected drug usage that harms the pregnancy. There is a lifesaving pregnancy termination if there is any danger to the life of the woman or the fetus. In this case, it is legally and medically recommended to terminate a pregnancy. Medical termination is usually due to a congenital anomaly or any danger to the health of the mother or fetus. But abortion might be due to an unwanted pregnancy. Among the common causes of pregnancy termination are congenital anomalies, an unwanted pregnancy, and pregnancy due to rape.[27,28]

Thus, to design evidence-based public health interventions, it is crucial to explore the current burden of pregnancy termination and its determinants. Although there are few studies related to pregnancy termination in Kenya, the current burden of pregnancy termination and its determinant factors are not known at the national level. As pregnancy termination and its impacts on maternal morbidity and mortality fluctuate from time to time and place to place, pregnancy termination is also an indicator of a country's quality and quantity of maternal healthcare services. Furthermore, the findings of this study could be an input to policymakers in designing strategies for effective maternal health interventions to reduce pregnancy termination and abortion-related maternal complications. Therefore, this study aimed to assess the prevalence of pregnancy termination and its determinants among women of reproductive age in Kenya, as evidenced by the most recent Kenyan Demographic and Health Survey (KDHS) 2022.

Methods

Study design and setting

The KDHS was carried out in 2022 and encompassed both urban and rural areas. Kenya is located in East Africa and borders Uganda to the west, Tanzania in the south, Sudan and Ethiopia in the north, and Somalia and the Indian Ocean in the east. The Kenya National Bureau of Statistics and other stakeholders worked together to implement the 2022 KDHS. This is the seventh KDHS implemented in the country. Data collection was conducted between February 17 and July 31, 2022.

Data source, extraction, sampling procedure, and study participants

The KDHS was the 7th to be carried out in Kenya, following similar surveys conducted in 1989, 1993, 1998, 2003, 2008–2009, and 2014. The survey aimed to provide up-to-date information on socioeconomic, demographic, nutrition, and health indicators to plan, monitor, and evaluate various health programs and policies. The Kenya Household Master Sample Frame (K-HMSF) was used to draw the sample for the 2022 KDHS, which included 129,067 enumeration areas. To create the HMSF, 10,000 enumeration areas with probabilities proportional to size were chosen. Subsample one of the K-HMSF was used to draw the 2022 KDHS sample. The clusters were developed through a process of household listing and georeferencing. Kenya is divided into 47 counties under the devolved system of government established by the Constitution of Kenya in 2010. The 2022 KDHS sampled a total of 42,022 households. Interviews were conducted only in the pre-selected households and clusters; no replacement of the pre-selected units was allowed during the survey data collection stages. This study followed the reporting guidelines for cross-sectional studies, strengthening the reporting of observational studies in epidemiology. A supplemental material file is attached.

Study population and eligibility criteria

Reproductive-age women who are 15–49 years old in Kenya were the source population. The study population was all the reproductive-age women who were in the selected enumeration areas included in the analysis. A total of 19,530 participants were included in this study. Women who are not within the reproductive age range as defined by the study, survey responses that are incomplete or missing crucial data for the multilevel logistic regression analysis, and data from women who did not consent to the use of their information for research purposes were excluded from this study.

Study variables

The dependent variable in this study was pregnancy termination, which was derived from the KDHS question. The Demographic and Health Survey (DHS) code of the dependent variable is "v228," "Have you ever had a terminated pregnancy?" The outcome variable was dichotomized as "yes" if a woman had experienced pregnancy termination and "no" if a woman didn't experience pregnancy termination within the study period. We used the weighted sample, and DHS data managed the missed observations during data recording, so there were no missed observations in the study. We used a KR file; the data and variables are clearly available in the KR file. We aimed to identify all types of pregnancy termination except medically recommended termination in cases of very high-risk pregnancy for the mother or the fetus. The independent variables included in the study were maternal age, marital status, place of residence, educational status, religion, watching television, listening to radio, wealth status, occupational status, preceding birth interval, and birth history.

Statistical analysis

To restore the survey's representativeness, the sample weights were applied to compensate for the unequal probability of selection between the strata. The STATA version 14 software was used to conduct descriptive statistics and multilevel analysis. A multilevel multivariable logistic analysis was employed to identify the determinant factors associated with pregnancy termination. The data in DHS is hierarchal and clustered in nature; there are individual-level variables and community-level variables. So, the variables are analyzed at the individual level, at the community level, and at the overall level. While conducting multilevel analysis, four models were fitted: the null model (a model without explanatory variables), model I (a model with individual-level explanatory variables only), model II (a model with community-level variables only), and model III (a model with both individual- and community-level variables). Both bivariable and multivariable multilevel logistic analyses were conducted. Variables with a p-value of <0.2 in the bivariable analysis were eligible for multivariable analysis. In the multivariable analysis, an adjusted odds ratio (AOR) with a 95% confidence interval (CI) was reported, and variables with a p-value of <0.05 were declared to be statistically significant factors for pregnancy termination. For examining the cluster-level variability of pregnancy termination, we have employed random effect analysis. The intra-class correlation coefficient (ICC), deviance, proportional change in variance (PCV), median odds ratio (MOR), and log likelihood ratio (LLR) were used as indicators

Table 1. Sociodemographic characteristics of the participants in Kenya ($n = 19,530$).

Variables	Category	Frequency	Percent (%)
Place of residence	Urban	6686	34.23
	Rural	12,844	65.77
Maternal age in years	15–19	948	4.85
	20–24	4388	22.47
	25–29	5547	28.40
	30–34	4182	21.41
	35–39	3049	15.61
	40–44	1140	5.84
	45–49	276	1.41
Maternal education	No education	4464	22.86
	Primary education	6896	35.31
	Secondary education	5542	28.38
	Higher education	2628	13.46
Marital status	Unmarried	1573	8.05
	Married	14,632	74.92
	Ever marred	3325	17.03
Religion	Catholic	3196	16.36
	Protestant	5906	30.24
	Evangelical churches	3983	20.39
	African instituted churches	1415	7.25
	Muslim	4216	21.59
	Others[a]	814	4.17

[a]Hindu, orthodox, no religion.

of heterogeneity. The degree of heterogeneity of pregnancy termination between clusters was quantified by ICC, calculated as ICC = $V_c/(V_c + 3.29)$*100% where V_c is the cluster-level variance. The MOR quantifies the variation in pregnancy termination between clusters in terms of the odds ratio scale and is calculated as MOR = e0.95 $\sqrt{}$variance. Moreover, PCV demonstrates the variation in pregnancy termination explained by the determinants computed as PCV = $(V_{null}-V_c)/_{Vnull}$*100%, where V_{null} = variance of the null model and V_c = cluster level variance. Due to the nested nature of the models, deviance and LLR were used for model comparison. The model with the lowest deviance and highest LLR was considered the best fit.

Result

A total of 19,530 women of reproductive age participated in this study. Among the total, about one-third (34.23%) of the participants lived in urban residences, and about 28.4% of the women were in the age category of 25–29 years. Regarding maternal educational status, about 22.86% of them did not attend formal education. The majority (74.92%) of the participants were married. Among the total participants, about 30.24% of them followed the protestant religion (Table 1).

Table 2. Socioeconomic and obstetric characteristics of the participants in Kenya ($n = 19,530$).

Variables	Category	Frequency	Percent (%)
Wealth index	Poorest	6432	32.93
	Poorer	3330	17.05
	Middle	3379	17.30
	Richer	3664	18.76
	Richest	2725	13.95
Occupational status	Unemployed	9493	48.64
	Employed	10,022	51.36
Media exposure through radio	No	8557	43.81
	Yes	10,973	56.19
Media exposure through television	No	11,213	57.41
	Yes	8317	42.59
Birth history	One birth	5161	26.43
	Two birth	4265	21.84
	Three birth	3255	16.67
	Four birth	2233	11.43
	Five and more birth	4616	23.64
Preceding birth interval	Less than 24 months	2999	20.96
	⩾24 months	11,306	79.04
Terminated pregnancy	No	16,758	85.81
	Yes	2772	14.19

Socioeconomic and obstetric characteristics of the participants

Among the total participants, nearly one-third (32.93%) of the respondents were from the poorest households in terms of their economic status. Regarding the participants' occupational status, nearly half (48.64%) of them were unemployed or had no job. About 43.81% and 57.41% of the participants had no media exposure through radio and television, respectively. From the total participants, 2772 (14.19%) of the respondents terminated their pregnancy during the KDHS 2022 survey (Table 2).

Pregnancy termination in Kenya, KDHS 2022

In this study, the overall prevalence of termination of pregnancy among women of reproductive age in Kenya during KDHS 2022 was 14.19% with a 95% CI (13.71%–14.69%).

Random effect analysis for cluster variability and model fitness

The total variation in pregnancy termination among women of reproductive age in Kenya KDHS 2022 was attributable to clustering. The clustering effect is shown in the table, which was directed to conduct multilevel analyses to identify the determinant factors associated with pregnancy termination among women of reproductive age in Kenya. The ICC in the null model was 0.1643,

Table 3. Model estimation for determinant factors associated with pregnancy termination among women of reproductive age in Kenya (n = 19,530) KDHS 2022.

Parameter	Null model	Model I	Model II	Model III
Variance	0.8471065	0.7891262	0. 6292425	0.7883134
ICC	16.43%	19.34%	16.05%	19.33%
MOR	2.07	2.29	2.05	2.29
PCV	Reference	7.34%	3.5%	7.45%
Model fitness				
LLR	−7754.8226	−5965.4053	−7734.1018	−5965.3135
Deviance	15,509.6452	11,930.810	15,468.2036	11,930.627

ICC: Intra-Cluster Correlation; LLR: Log-Likelihood Ratio; MOR: Median Odds Ratio; PCV: Proportional Change in Variance.

indicating that approximately 16% of the variations in pregnancy termination among reproductive-age women were attributed to cluster differences. The MOR value of the null model was 2.07, which indicated that the odds of terminating pregnancy among the participants were different between clusters. Moreover, PCV demonstrates the variation in pregnancy termination explained by the determinant factors. Model III was considered the best fit because of its lowest deviance (11,930.627) and highest LLR (−5965.3135). Model I and Model II were used for model comparison (Table 3).

Multilevel analysis for the determinant factors of pregnancy termination

The multilevel analysis was carried out to identify factors associated with termination of pregnancy among women of reproductive age in Kenya and was presented with an AOR and 95% CI. In model I, the determinant factors were identified at the individual/household level. The significant factors associated with pregnancy termination were the age of the women; the age of the women was positively associated with pregnancy termination. As age increased, the risk of pregnancy termination increased: 25–29 years (AOR = 2.23; 95 CI (1.08–4.60)), 30–34 years (AOR = 2.98; 95% CI (1.43–6.18)), 35–39 years (AOR = 3.24; 95% CI (1.55–6.76)), 40–44 years (AOR = 4.57; 95% CI (2.16–9.68)), 45–49 years (AOR = 5.16; 95% CI (2.33–9.98)), marital status: married (AOR = 5.63; 95% CI (3.08–10.29)), ever married (AOR = 5.05; 95% CI (2.74–9.33)), the odds of pregnancy termination were higher among married and ever married women, wealth index: richest (AOR = 1.22; 95% CI (1.05–1.63), employment status: employed (AOR = 1.23; 95% CI (1.09–1.38), preceding birth interval: greater than 24 months (AOR = 1.21; 95% CI (1.06–1.38) At the community level, the significant factor associated with pregnancy termination was place of residence. Those reproductive-age women who lived in urban areas had higher odds of pregnancy termination (AOR = 1.25; 95% CI (1.06–1.46)). In multivariable multilevel analysis, the significant factors associated with termination of pregnancy were the age of the women: 25–29 years (AOR = 2.23; 95 CI (1.08–4.61)), 30–34 years (AOR = 2.98; 95% CI (1.43–6.19)), 35–39 years (AOR = 3.24; 95% CI (1.55–6.78)), 40–44 years (AOR = 4.58; 95% CI (2.16–9.70)), 45–49 years (AOR = 5.16; 95% CI (2.33–11.42)); marital status: married (AOR = 5.63; 95% CI (3.07–10.29)), ever married (AOR = 5.06; 95% CI (2.74–9.34)); religion: those women who followed Islam religion had higher odds of pregnancy termination as compared to catholic followers (AOR = 1.64; 95% CI (1.31–2.06)); wealth index: richest households (AOR = 1.56; 95% CI (1.13–2.14)); employment status: employed (AOR = 1.22; 95% CI (1.08–1.38)); preceding birth interval: greater than 24 months (AOR = 1.21; 95% CI (1.06–1.38)), those women who had history of preceding birth interval greater than 24 months had higher odds of pregnancy termination as compared to those women with preceding birth interval less than 24 months (Table 4).

Discussion

Pregnancy termination among women of reproductive age in Kenya has become an important public health concern that requires immediate attention. This study was aimed at investigating the prevalence and determinants of pregnancy termination among women of reproductive age in Kenya using the most recent data from KDHS 2022. Based on this study, the prevalence of pregnancy termination among women of reproductive age was 14.19% with a 95% CI (13.71%–14.69%) in the 2022 national survey of Kenya. Pregnancy termination was affected by sociodemographic, socioeconomic, and obstetric factors. Studying the status of pregnancy termination is an important indicator of maternal healthcare quality and the country's healthcare system.

In this study, the prevalence of pregnancy termination was higher than in a study conducted in Mozambique 9%[29] and Uganda 12%.[30] It is also higher than a study conducted in Asian countries 10.9%.[31] This discrepancy

Table 4. Multilevel analysis for the determinant factors associated with pregnancy termination among women of reproductive age in Kenya ($n = 19,530$) KDHS 2022.

Variables	Category	Model I	Model II	Model III
Maternal age in years	15–19	1.0	—	1.0
	20–24	1.37 (0.66–2.86)	—	1.38 (0.66–2.87)
	25–29	2.23 (1.08–4.60)*	—	2.23 (1.08–4.61)*
	30–34	2.98 (1.43–6.18)*	—	2.98 (1.43–6.19)*
	35–39	3.24 (1.55–6.76)*	—	3.24 (1.55–6.78)*
	40–44	4.57 (2.16–9.68)*	—	4.58 (2.16–9.70)*
	45–49	5.16 (2.33–9.98)*	—	5.16 (2.33–11.42)*
Maternal education	No education	1.0	—	1.25 (0.95–1.66)
	Primary education	0.98 (0.82–1.17)	—	1.18 (0.96–1.45)
	Secondary education	0.96 (0.78–1.19)	—	1.15 (0.94–1.41)
	Higher education	0.83 (0.64–1.08)	—	1.0
Marital status	Unmarried	1.0	—	1.0
	Married	5.63 (3.08–10.29)*	—	5.63 (3.07–10.29)*
	Ever married	5.05 (2.74–9.33)*	—	5.06 (2.74–9.34)*
Religion	Catholic	1.0	—	1.0
	Protestant	1.09 (0.92–1.28)	—	1.08 (0.92–1.28)
	Evangelical churches	0.91 (0.76–1.10)	—	0.91 (0.76–1.09)
	African churches	0.85 (0.66–1.09)	—	0.84 (0.66–1.08)
	Islam	1.59 (0.98–1.98)	—	1.64 (1.31–2.06)*
	Others[a]	0.91 (0.67–1.25)	—	0.92 (0.67–1.25)
Wealth index	Poorest	0.85 (0.70–1.03)	—	1.0
	Poorer	1.00 (0.83–1.20)	—	1.16 (0.97–1.38)
	Middle	1.0	—	1.18 (0.96–1.46)
	Richer	1.09 (0.91–1.31)	—	1.15 (1.00–1.69)
	Richest	1.32 (1.05–1.63)*	—	1.56 (1.13–2.14)*
Occupational status	Unemployed	1.0	—	1.0
	Employed	1.23 (1.09–1.38)*	—	1.22 (1.08–1.38)*
Media exposure through radio	No	1.07 (0.95–1.21)	—	1.08 (0.96–1.22)
	Yes	1.0	—	1.0
Media exposure through TV	No	1.13 (0.97–1.31)	—	1.12 (0.96–1.31)
	Yes	1.0	—	1.0
Birth history	One birth	1.0	—	1.0
	Two birth	0.79 (0.58–1.01	—	1.20 (1.00–1.43)
	Three birth	0.96 (0.83–1.12)	—	1.15 (0.98–1.35)
	Four birth	0.84 (0.71–1.01)	—	1.01 (0.86–1.18)
	>Five birth	0.83 (0.69–1.00)	—	0.94 (0.69–1.01)
Preceding birth interval	<24 months	1.0	—	1.0
	⩾24 months	1.21 (1.06–1.38)*	—	1.21 (1.06–1.38)*
Place of residence	Urban	—	1.25 (1.06–1.46)*	1.06 (0.87–1.29)
	Rural	—	1.0	1.0
Community poverty level	High	—	0.93 (0.79–1.09)	0.89 (0.72–1.09)
	Low	—	1.0	1.0
Community illiteracy level	High	—	0.87 (0.75–1.01)	1.15 (0.90–1.47)
	Low	—	1.0	1.0

[a]Hindu, orthodox, no religion.
*Statistically significant at a p-value <0.05.

might be due to the sociodemographic, sociocultural, lifestyle, and healthcare system variations between Kenya and other countries. Currently, termination of pregnancy is a common practice in many countries around the world. So, in this study, we used the most recent data from KDHS 2022, so the prevalence of pregnancy termination might be higher.

The prevalence of pregnancy termination in this study was lower than in other studies conducted in Kenya 16%[32] and Ghana 25%.[29] This discrepancy might be due to the

fact that the previous study in Kenya was a single-area study with a small sample size, whereas this study was conducted with large-scale sample data from a national survey covering all areas of the country, including rural and urban communities, whereas a study in Ghana's DHS was higher than this study. This might be because in Ghana there is a higher tendency for unintended pregnancy and a lower level of contraceptive usage among reproductive-age women than in Kenya. The educational status of the women has no significant association with pregnancy termination in this study, but in another study in Kenya, uneducated women had higher odds of pregnancy termination as compared to educated women.[32] This discrepancy might be due to the study sample size variation. In our study, we used the overall national health survey data with a large sample size, whereas other studies conducted in Kenya used data only from health facilities with a small sample size. Another possible discrepancy might be the date of study variation; our study was conducted in 2022 after 10 years; the other study was conducted in Kenya.

The significant determinant factor associated with pregnancy termination was marital status in both model I and model III analyses. Those married or ever-married women were about five times more likely to terminate their pregnancy as compared to unmarried women. This finding was supported by other studies in Uganda,[30] Ghana,[33] and Nigeria.[34] This might be because married and ever-married women do not use contraceptives to prevent unwanted pregnancy because they are faithful to their husband or sexual partner. But unmarried women usually use contraceptives to prevent unwanted pregnancy, so pregnancy termination was higher among non-contraceptive users or married women than contraceptive users or unmarried women.

Employment status was another significant factor in the individual and multilevel analyses. Women without work had lower odds of pregnancy termination as compared to employed women. This finding was consistent with other studies conducted in Ghana.[33] Previous studies showed that pregnancy in the workplace impacts the psychosocial well-being and pregnancy discrimination of women.[35] Employed pregnant women might also face challenges related to fear of their future employment status when they bear children because some employers do not give maternal leave permission. Even if they deliver their child, they will not get an income. As a result, employed pregnant women have higher odds of pregnancy termination.

Another significant factor associated with the termination of a pregnancy was the age of women. In this study, the age of women was positively associated with the termination of pregnancy. As the age of women increases, the risk of pregnancy termination will increase. This finding was in congruence with other studies conducted in Ghana[29] and China.[36] According to the previous studies, older women will be at higher risk of spontaneous pregnancy termination as compared to younger women due to the fact that older women are more likely to develop medical conditions during pregnancy like anemia, obesity, and diabetes. Some studies demonstrate that older pregnant women are more vulnerable to experiencing pregnancy-related anxiety and have less social or partner support during pregnancy.[37,38] This entire possible reason ends up with the termination of pregnancy in older women.

The result of this study revealed that birth intervals greater than 24 months had higher odds of pregnancy termination as compared to those less than 24 months preceding the birth interval. Previous studies showed that both shorter and longer birth intervals have an association with adverse pregnancy outcomes.[39,40] Based on evidence, there is an association between longer birth intervals and pregnancy termination. This is because there is an increased risk of fetal and maternal obstetric complications that necessitate terminating the pregnancy to save the life of women if it is uncontrolled, such as preeclampsia and eclampsia.

At the community level, the significant factor associated with pregnancy termination was place of residence. Reproductive-age women who lived in urban areas had higher odds of pregnancy termination in comparison to rural areas. This result was consistent with other studies conducted in Ghana,[33] Latin America, and the Caribbean.[41] This might be due to the fact that sexual relationships without legal marriages in rural areas are less common than in urban areas. Such cultural beliefs are important to prevent unwanted pregnancy and termination of pregnancy. In addition, prostitution is usually available in urban areas, which leads to unwanted pregnancy. Urban women are prone to unwanted pregnancies due to addiction and alcoholic intoxicants. Therefore, the chances of termination of pregnancy are higher in urban women than in rural women. On the contrary, some studies have stated that rural women have a higher rate of pregnancy termination as compared to urban women.[42,43] This might be due to cultural and lifestyle variations between Kenya and other studies. It might also be due to variations in the accessibility of reproductive healthcare services.

Religion is also one of the significant factors associated with pregnancy termination. Those women who followed the Islamic religion had higher odds of pregnancy termination as compared to Catholic followers. This might be due to the fact that the number of Islamic followers in this study was high, and Islamic religion allows termination of pregnancy if the life of the woman is at risk of death, but contraceptive usage is usually not recommended.[44] In addition, most of the women who terminated their pregnancy in this study were younger age groups, and usually they might not follow the principles of their religion strictly and be exposed to unwanted pregnancy and end up with termination of pregnancy. Thus, religious practices are important to prevent unwanted pregnancy and termination of pregnancy. Religion is one of the non-modifiable

risk factors. In our study, religion was statistically significant with termination of pregnancy. The reason for this situation is unclear and requires further study of social, cultural, and healthcareseeking behavioral aspects. We suggest that unnecessary termination of pregnancy without medically recommended termination of pregnancy should be avoided among women of Islamic followers.

In this study, reproductive-aged women from the richest households were observed to have higher odds of pregnancy termination in comparison to the poorest women. This finding was supported by other studies conducted in Ethiopia,[43] Ghana,[45] and Nepal.[46] This might be due to the fact that the wealth index status of reproductive-aged women determines their accessibility to maternal healthcare services. Pregnancy termination usually takes place in a healthcare facility since it requires a skilled healthcare provider and requires many more costs for medication or instrumentation. Thus, the richest women can access any maternal healthcare costs necessary to terminate their unwanted pregnancy. But the poorest women might face challenges related to maternal healthcare costs like transportation to health facilities, medication costs, and other service costs that can hinder pregnant women from terminating pregnancy.

Limitations of the study

This study was based on DHS data, certain variables such as sexual violence, peer pressure, family planning, knowledge of reproductive health, substance use, and obstetric-related factors were not included. Future researchers can address this gap by conducting more comprehensive studies that incorporate these additional variables. Their findings could provide valuable insights into the complex dynamics surrounding pregnancy termination. The other limitation in secondary DHS data is the absence of power analysis or sample size calculation.

Conclusion

Pregnancy termination among women of reproductive age in Kenya has become an important public health concern that requires immediate attention. The significant factors associated with termination of pregnancy among women of reproductive age in Kenya were the age of the women: age of the women was positively associated with pregnancy termination; marital status: the odds of pregnancy termination were higher among married and ever-married women; wealth index: higher odds of pregnancy termination were observed among richest women; employment status: higher odds of pregnancy termination were observed among employed women; preceding birth interval: pregnancy termination was higher among women with a greater than 24 month birth interval; and place of residence. Those reproductive-age women who lived in urban areas had higher odds of pregnancy termination based on religion; those women who followed Islamic religion had higher odds of pregnancy termination as compared to Catholic followers. Therefore, policymakers and other stakeholders, such as governmental and non-governmental organizations, should focus on maternal healthcare service programs to prevent unintended pregnancy and termination of pregnancy, with special emphasis on the above determinant factors that are an important input to developing strategies for improving the accessibility of maternal healthcare services in the country.

Declarations

Ethics approval and consent to participate

This study was based on secondary data analysis of publicly available national survey data from the DHS program. Ethical approval and participant's consent were not necessary for this particular study. We requested permission to download the DHS program, and it was granted. It uses data from http://www.dhsprogram.com. The Institution Review Board-approved procedures for DHS public-use datasets do not in any way allow participants, households, or sample societies to be identified. The names of individuals or household addresses in the data file were not stated. Each enumeration area primary sampling unit has a number in the data file, but the numbers do not have any labels to indicate their names or locations.

Author contributions

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Availability of data and materials

All data are available upon request. The reader could contact the corresponding author for all data.

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Supplemental material

Supplemental material for this article is available online.

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