

Socioeconomic Inequalities in Pregnancy Termination among Young Women in Cambodia: A Cross-sectional Analysis of the 2021–22 Demographic and Health Survey

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Abstract

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Background: Pregnancy termination among adolescents and young women reflects gaps in contraceptive access, unmet need for family planning, and unequal access to sexual and reproductive health information and services. In Cambodia, limited recent national evidence exists on socioeconomic patterns and determinants of pregnancy termination among young women, despite persistent adolescent fertility and early marriage. This study aimed to estimate the prevalence of pregnancy termination among adolescents and young women in Cambodia and examine socioeconomic patterns and associated factors using data from the Cambodia Demographic and Health Survey (CDHS) 2021–22. **Methods:** This cross-sectional secondary analysis used nationally representative data from the CDHS 2021–22 women's questionnaire. The study population included women aged 15–24 years (N=5,783). The outcome was a self-reported history of pregnancy termination, based on DHS standard definitions. Key exposures included wealth index, education level, and place of residence. Additional covariates included age group, marital status, parity, employment status, media exposure, and contraceptive use. Survey-weighted descriptive statistics and multivariable logistic regression were used to examine associations while accounting for complex survey design. **Results:** The overall prevalence of pregnancy termination was 5.28% (95% CI: 4.52–6.16). Prevalence varied significantly by socioeconomic status: 3.8% among women from poor households, 5.3% among middle-income, and 6.8% among wealthy households (p<0.001). Women with secondary or higher education had higher prevalence (6.2%) compared to those with no education (3.9%, p<0.001). In multivariable analysis, factors significantly associated with increased odds of pregnancy termination included wealthier households (aOR=1.82, 95% CI: 1.24–2.67), higher education (aOR=1.58, 95% CI: 1.09–2.29), urban residence (aOR=1.44, 95% CI: 1.08–1.92), older age 20–24 years (aOR=2.15, 95% CI: 1.61–2.88), union status (aOR=3.42, 95% CI: 2.48–4.71), and women with two or more children (aOR=5.68, 95% CI: 3.92–8.23). **Conclusion:** Pregnancy termination among young Cambodian women shows a distinct positive socioeconomic gradient, with higher prevalence among wealthier and more educated women, contrasting with patterns in some high-income countries. The strong association with parity indicates that termination is primarily used for birth spacing and limiting. These findings highlight the need for strengthening youth-focused sexual and reproductive health services and ensuring equitable access to quality contraception across all socioeconomic groups.

Keywords: Pregnancy termination; Induced abortion; Adolescents; Socioeconomic inequality; Reproductive health

Introduction

Pregnancy termination, including induced abortion and miscarriage, is a critical indicator of sexual and reproductive health (SRH) among young women. Globally, an estimated 73 million induced abortions occur annually, with approximately 45% classified as unsafe, leading to substantial maternal morbidity and mortality, particularly in low- and middle-income countries (LMICs) (Bearak et al., 2020; World Health Organization, 2021). Among adolescents and young women aged 15–24 years, unintended pregnancies and subsequent

terminations reflect gaps in contraceptive access, unmet need for family planning, and barriers to comprehensive sexuality education (Ganatra et al., 2017; Chandra-Mouli et al., 2013).

In Southeast Asia, Cambodia has made notable progress in reducing maternal mortality and improving access to family planning services over the past two decades. However, adolescent fertility remains a public health concern, with the adolescent birth rate at 52 per 1,000 women aged 15–19 as of 2021 (National Institute of Statistics et al., 2023). Early marriage and childbearing remain common, and comprehensive information about pregnancy termination among young women is limited (Guttmacher Institute, 2021; Loi Kheng et al., 2014; Yanagisawa et al., 2011). While Cambodia's abortion law permits termination up to 12 weeks of pregnancy under specific circumstances, evidence suggests that access to safe services may vary by socioeconomic status and geographic location (Loi Kheng et al., 2014; Yanagisawa et al., 2011).

Understanding the prevalence and determinants of pregnancy termination among adolescents and young women is essential for designing effective SRH policies and programs. Previous studies in LMICs have documented socioeconomic inequalities in abortion access, with wealthier and more educated women often having better access to safe services (Hosseinpour et al., 2012; Singh et al., 2018). Unsafe abortion remains a major contributor to maternal mortality worldwide, accounting for an estimated 4.7–13.2% of maternal deaths annually (Say et al., 2014). However, patterns may differ across contexts depending on legal frameworks, service availability, and cultural norms. In Cambodia, limited recent national-level evidence exists on the socioeconomic and demographic factors associated with pregnancy termination among young women (Guttmacher Institute, 2021; Loi Kheng et al., 2014).

This study addresses this knowledge gap by using nationally representative data from the 2021–22 CDHS to: (1) estimate the prevalence of pregnancy termination among women aged 15–24 years; (2) examine socioeconomic patterns in termination by wealth, education, and residence; and (3) identify demographic and reproductive health factors independently associated with pregnancy termination. Findings will inform policy and programmatic efforts to strengthen youth-focused SRH services and reduce health inequities in Cambodia.

Methods

Study Design and Data Source

This study is a cross-sectional secondary analysis of the 2021–22 Cambodia Demographic and Health Survey (CDHS), conducted by the National Institute of Statistics in collaboration with the Ministry of Health and ICF International (National Institute of Statistics et al., 2023). The CDHS employs a two-stage stratified cluster sampling design: enumeration areas (EAs) were selected with probability proportional to size in the first stage, followed by systematic random sampling of households within each EA. The survey achieved a response rate of over 95% among eligible women aged 15–49 years (National Institute of Statistics et al., 2023). Data were collected between September 2021 and March 2022 using standardized questionnaires administered by trained interviewers. Ethical approval was obtained from the Cambodian National Ethics Committee for Health Research and the ICF Institutional Review Board. For this secondary analysis, publicly available de-identified data were obtained from the DHS Program (dhsprogram.com) (Croft et al., 2018; Boyle et al., 2022).

Study Population

The study population comprised women aged 15–24 years who participated in the CDHS 2021–22 and had complete data on the outcome variable. This age range captures both adolescents (15–19 years) and young adults (20–24 years), reflecting a critical life stage for reproductive decision-making (Chandra-Mouli et al., 2013). Of the 19,496 women interviewed in the full CDHS sample, 5,783 were aged 15–24 years and included in this analysis.

Outcome Variable

The primary outcome was history of pregnancy termination, defined as any self-reported pregnancy ending in induced abortion, miscarriage, or stillbirth, derived from DHS standard variable v228 (Croft et al., 2018). For this analysis, the outcome was dichotomized as a binary indicator: ever experienced pregnancy termination (yes/no). Women who had never been pregnant were classified as not having experienced termination.

Exposure Variables

Socioeconomic exposures. The primary exposures of interest were socioeconomic status indicators:

- **Wealth index:** The DHS wealth index is a composite measure of household economic status constructed using principal components analysis of household assets, housing characteristics, and access to services (Croft et al., 2018). The standard five-category wealth quintile was used and collapsed into three categories (poor, middle, rich) for regression models.
- **Education level:** Highest level of education attained, categorized as no education, primary, secondary, and higher education.
- **Place of residence:** Urban versus rural residence.

Demographic and reproductive health covariates. Additional covariates included: age group (15–19 vs. 20–24 years); marital status (never married, currently married/in union, formerly married/in union); parity (0, 1, 2+ children); employment status; media exposure; internet use; and current contraceptive use (none, modern method, traditional method).

Statistical Analysis

All analyses accounted for the complex survey design of the CDHS using sampling weights, clustering, and stratification in Stata 17 (StataCorp, College Station, TX) (Croft et al., 2018). Sampling weights (v005) were normalized by dividing by 1,000,000. Survey-weighted descriptive statistics were used to estimate the overall prevalence and prevalence by subgroup, presented with 95% confidence intervals (Table 1, Table 2, Figure 1). Pearson's chi-square tests adjusted for survey design were used to test bivariate associations.

Multivariable logistic regression models were fitted in three nested steps: Model 1 included socioeconomic exposures only (wealth, education, residence); Model 2 added demographic factors (age, marital status, parity); and Model 3 (full model) further included employment, media exposure, internet use, and contraceptive use. Results are reported as adjusted odds ratios (aOR) and 95% CIs (Table 3, Figure 2). Sensitivity analyses stratified by age group and marital status were conducted to explore effect modification. Statistical significance was defined as $p < 0.05$. All analyses used Stata version 17 (Croft et al., 2018).

Results

Sample Characteristics

The study sample comprised 5,783 women aged 15–24 years (Table 1). Approximately 53.6% were adolescents (15–19 years) and 46.4% were young adults (20–24 years). The majority resided in rural areas (75.8%) and were never married (63.4%). Over two-thirds (72.3%) had no children, while 20.3% had one child and 7.5% had two or more children. Education levels were diverse: 4.2% had no formal education, 18.7% completed primary education, 63.8% had secondary education, and 13.3% attained higher education. Regarding socioeconomic status, 22.5% were from the poorest wealth quintile and 16.9% from the richest. Approximately 28.3% were currently employed, 73.5% had regular media exposure, 45.2% used the internet, and 18.4% were currently using any form of contraception (14.9% modern methods, 3.5% traditional methods) (Table 1) (National Institute of Statistics et al., 2023).

Table 1. Sociodemographic Characteristics of Women Aged 15–24 Years, Cambodia DHS 2021–22 (N=5,783)

Characteristic	Weighted % (n)
Age group	
15–19 years	53.6 (3,101)
20–24 years	46.4 (2,682)
Residence	
Urban	24.2 (1,400)
Rural	75.8 (4,383)
Wealth quintile	
Poorest	22.5 (1,302)
Richest	16.9 (978)

Note: Percentages are weighted to account for complex survey design. Sample sizes (n) are unweighted. Source: CDHS 2021–22 (National Institute of Statistics et al., 2023).

Prevalence of Pregnancy Termination

The overall weighted prevalence of pregnancy termination among women aged 15–24 years was 5.28% (95% CI: 4.52–6.16), corresponding to approximately 329 women in the sample (Table 2, Figure 1). Among women who had experienced termination, the majority (78.4%) reported one termination, while 18.6% had two and 3.0% had three or more. This prevalence is comparable to estimates from prior Cambodia-specific studies (Guttmacher Institute, 2021; Loi Kheng et al., 2014).

Table 2. Prevalence of Pregnancy Termination by Socioeconomic and Demographic Characteristics, Cambodia DHS 2021–22

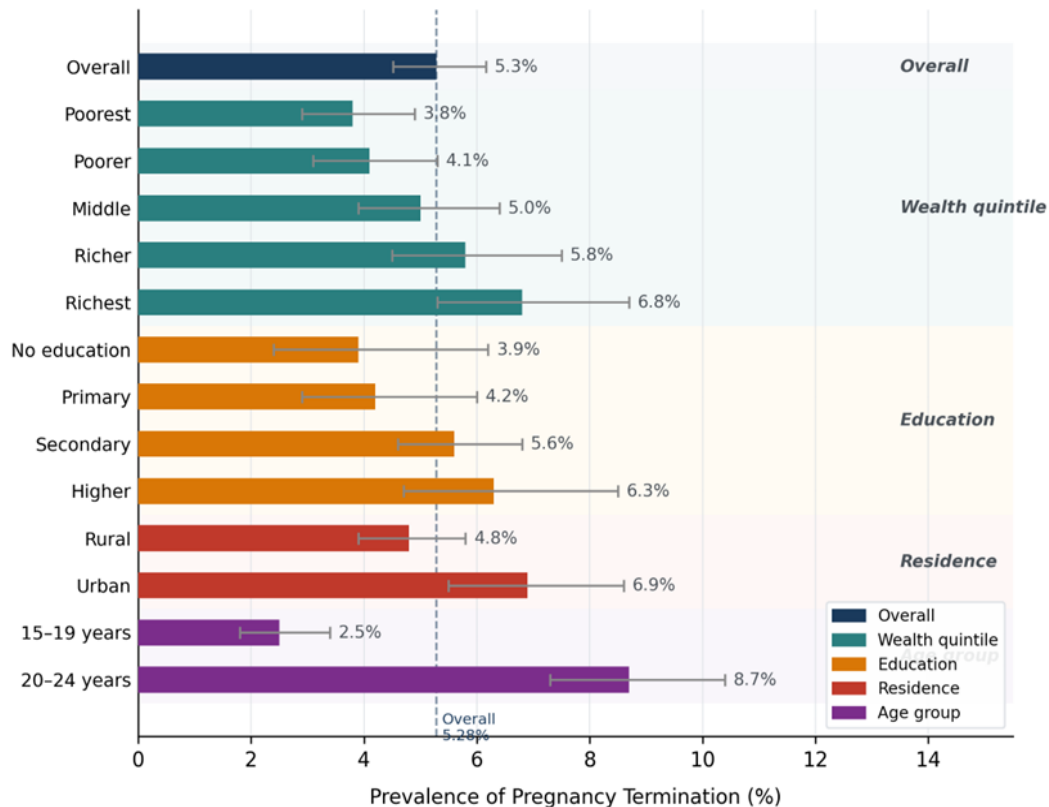
Characteristic	Prevalence %	95% CI
Overall	5.28	4.52–6.16
Wealth quintile		
Poorest	3.8	2.9–4.9
Richest	6.8	5.3–8.7

*Note: CI = confidence interval. All estimates account for complex survey design. *p<0.05, **p<0.01, ***p<0.001. Source: CDHS 2021–22 (National Institute of Statistics et al., 2023).*

Socioeconomic Patterns in Pregnancy Termination

A positive socioeconomic gradient was observed, with prevalence increasing from 3.8% (95% CI: 2.9–4.9) among women from the poorest households to 6.8% (95% CI: 5.3–8.7) among those from the richest households ($p<0.001$) (Table 2, Figure 1). Prevalence also increased with education: 3.9% (95% CI: 2.4–6.2) with no education to 6.3% (95% CI: 4.7–8.5) with higher education ($p=0.021$). Urban women had higher prevalence (6.9%, 95% CI: 5.5–8.6) compared to rural women (4.8%, 95% CI: 3.9–5.8), though this difference did not reach statistical significance ($p=0.056$) (Figure 1).

Figure 1. Prevalence of Pregnancy Termination by Socioeconomic and Demographic Subgroups Among Women Aged 15-24 Years, Cambodia DHS 2021-22



Error bars represent 95% confidence intervals. Dashed vertical line indicates overall prevalence (5.28%). Source: Cambodia Demographic and Health Survey 2021–22.

Demographic and Reproductive Health Patterns

Strong demographic patterns were evident (Table 2, Figure 1). Prevalence was substantially higher among young adults aged 20–24 years (8.7%, 95% CI: 7.3–10.4) compared to adolescents aged 15–19 (2.5%, 95% CI: 1.8–3.4, $p < 0.001$). Marital status showed marked differences: prevalence was 2.1% among never-married women, 10.5% among currently married/in union women, and 15.2% among formerly married women ($p < 0.001$). The strongest association was with parity: prevalence was 2.3% among nulliparous women, 11.8% among women with one child, and 18.3% among women with two or more children ($p < 0.001$) (Table 2). Currently employed women had higher prevalence (6.9%) than unemployed women (4.6%, $p = 0.013$).

Table 3. Multivariable Logistic Regression Models: Adjusted Odds Ratios for Pregnancy Termination, Cambodia DHS 2021–22

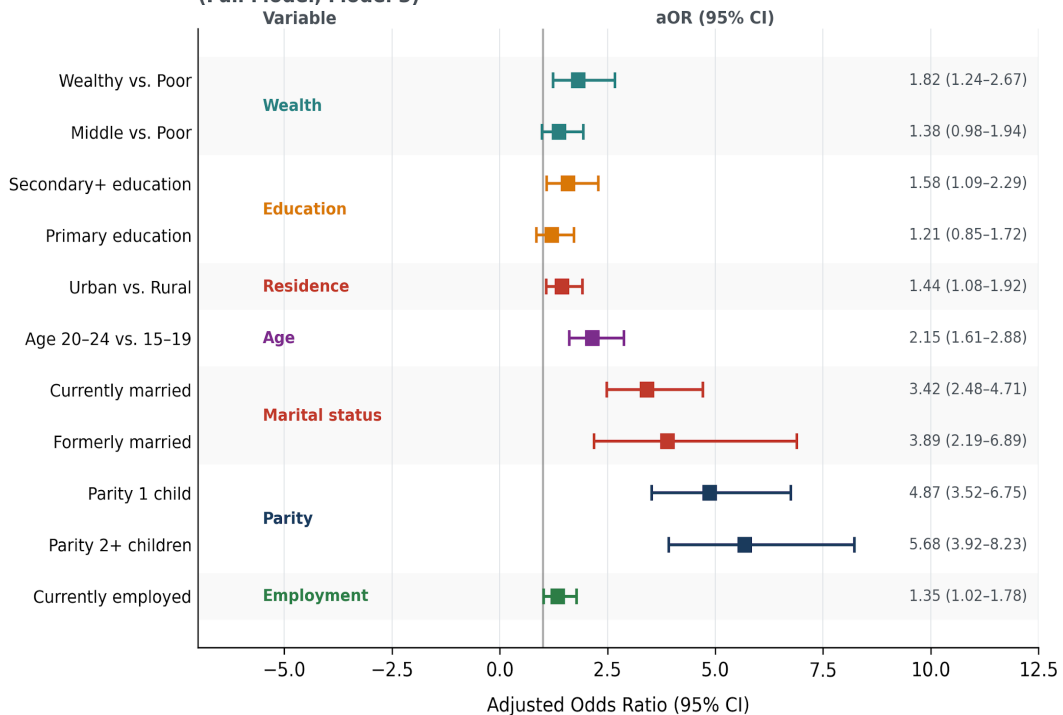
Variable	Model 1	Model 2	Model 3
Wealth (ref: Poor)			
Rich	1.92 (1.35–2.74)**	1.76 (1.22–2.53)*	1.82 (1.24–2.67)**
Parity (ref: None)			
2+ children	—	6.15 (4.15–9.11)***	5.68 (3.92–8.23)***

*Note: Values are adjusted odds ratios (95% confidence intervals). Model 1: socioeconomic factors only. Model 2: Model 1 + demographics. Model 3: full model. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Source: CDHS 2021–22 (National Institute of Statistics et al., 2023).*

Multivariable Analysis

Results from three nested multivariable logistic regression models are presented in Table 3 and summarized visually in Figure 2. In Model 1 (socioeconomic factors only), wealthy women had 1.92 times higher odds compared to poor women (aOR=1.92, 95% CI: 1.35–2.74), women with secondary or higher education had 1.67 times higher odds compared to those with no education (aOR=1.67, 95% CI: 1.18–2.37), and urban residence was associated with increased odds (aOR=1.52, 95% CI: 1.17–1.97) (Table 3, Figure 2).

Figure 2. Forest Plot of Adjusted Odds Ratios for Factors Associated with Pregnancy Termination Among Women Aged 15-24 Years, Cambodia DHS 2021-22 (Full Model, Model 3)



aOR = adjusted odds ratio; CI = confidence interval. Squares represent point estimates; horizontal lines represent 95% CIs. Reference line at OR=1.0. Model 3 adjusted for all covariates. Source: Cambodia Demographic and Health Survey 2021-22.

In Model 2, after adjusting for age, marital status, and parity, socioeconomic associations were attenuated but remained significant. Young adults aged 20–24 had 2.24 times higher odds than adolescents (aOR=2.24, 95% CI: 1.70–2.95). Currently married women had 3.76 times higher odds (aOR=3.76, 95% CI: 2.78–5.08) and formerly married women even higher (aOR=4.21, 95% CI: 2.45–7.24). The parity gradient was pronounced: one child (aOR=4.87, 95% CI: 3.52–6.75) and two or more children (aOR=6.15, 95% CI: 4.15–9.11) compared to nulliparous women (Table 3).

In the full model (Model 3), all core patterns persisted (Table 3, Figure 2). Women from wealthy households retained 1.82 times higher odds (aOR=1.82, 95% CI: 1.24–2.67), higher education remained significant (aOR=1.58, 95% CI: 1.09–2.29), and urban residence (aOR=1.44, 95% CI: 1.08–1.92), older age (aOR=2.15, 95% CI: 1.61–2.88), union status (aOR=3.42–3.89), and parity 2+ children (aOR=5.68, 95% CI: 3.92–8.23) were strong predictors. Current employment was also significant (aOR=1.35, 95% CI: 1.02–1.78). Media exposure, internet use, and contraceptive use did not show statistically significant independent associations in the full model.

Sensitivity Analyses

Among adolescents (15–19 years), the socioeconomic gradient was less pronounced and did not reach statistical significance, likely reflecting lower overall prevalence and smaller sample size. Among young adults (20–24 years), the wealth and education gradients remained significant, consistent with the overall pattern. When stratified by marital status, among never-married women the socioeconomic associations were attenuated. Among currently married women, the positive socioeconomic gradient persisted, with parity remaining the strongest predictor across all subgroups.

Discussion

This nationally representative study provides comprehensive evidence on pregnancy termination among adolescents and young women in Cambodia. Three main findings emerge: (1) the overall prevalence is 5.3% with substantial socioeconomic variation (Figure 1); (2) a distinct positive socioeconomic gradient exists, with wealthier and more educated women reporting higher prevalence; and (3) parity is the strongest predictor, indicating that termination is primarily used for birth spacing and limiting rather than delaying first birth (Figure 2).

Socioeconomic Gradient in Pregnancy Termination

The positive association between socioeconomic status and pregnancy termination (Figure 1, Figure 2) contrasts with patterns observed in some high-income countries where abortion rates tend to be higher among lower-income women (Jones and Jerman, 2017). However, this is consistent with evidence from other LMICs, where wealthier and more educated women have better access to safe abortion services even where legal restrictions exist (Hosseinpour et al., 2012; Singh et al., 2018; Ganatra et al., 2017). In Cambodia's context, this gradient likely reflects differential access to: (1) information about termination services; (2) financial resources to pay for services; (3) transportation to urban centers where services are concentrated; and (4) autonomy in reproductive decision-making (Gutmacher Institute, 2021; Vlassoff et al., 2008).

The urban-rural disparity (6.9% vs. 4.8%, Figure 1) aligns with evidence from neighboring countries showing geographic inequalities in access to safe abortion (Sedgh et al., 2016; Yanagisawa et al., 2011). Rural women face multiple barriers including limited health facility infrastructure, lack of trained providers, transportation costs, and stigma in close-knit communities (Vlassoff et al., 2008; Yanagisawa et al., 2011). The persistence of wealth and education gradients after adjusting for urban residence suggests within-area socioeconomic inequalities, pointing to the need for interventions that extend beyond geographic targeting.

Demographic Patterns and Birth Spacing

The strong association between parity and pregnancy termination (aOR=5.68 for 2+ children, Figure 2) indicates that most terminations occur among women seeking to space or limit births rather than delay first birth. This reflects a rational reproductive strategy consistent with evidence from other Southeast Asian countries: women who have achieved desired family size use termination as a backup method when contraception fails or is not used (Sedgh et al., 2016; Susheela et al., 1994). The higher prevalence among married compared to never-married women (10.5% vs. 2.1%) reinforces this interpretation (Loi Kheng et al., 2014).

The age gradient (aOR=2.15 for ages 20–24 vs. 15–19, Figure 2) partly reflects greater cumulative exposure to pregnancy risk among older women but also suggests that adolescents may face additional barriers to accessing termination services (Chandra-Mouli et al., 2013; Warenus et al., 2006). Qualitative research is needed to understand adolescent-specific barriers and decision-making processes.

Contraceptive Failure and Unmet Need

While current contraceptive use did not show a significant association with termination in the full model, this reflects the cross-sectional nature of the data: current use may differ from use at the time of the conception leading to termination. The high termination prevalence among women with children suggests substantial unmet need for effective contraception for birth spacing and limiting. Previous studies in Cambodia have documented gaps in contraceptive counseling, method availability, and continuation rates, particularly for long-acting reversible contraceptives (LARCs) (National Institute of Statistics et al., 2023; Ngo et al., 2011). Media and digital platforms remain important channels for disseminating information about contraception and safe abortion services among young people, even if information access alone is insufficient without service availability (Vlassoff et al., 2008; Ngo et al., 2011).

Policy and Programmatic Implications

These findings have several implications for strengthening SRH services for young women in Cambodia: Expanding equitable access to contraception is central to improving reproductive health outcomes. The strong relationship between parity and pregnancy termination highlights how closely linked unintended pregnancies are to gaps in effective birth spacing. Many women—particularly those who already have children—may lack access to reliable contraceptive options, including long-acting reversible contraceptives (LARCs). Addressing this requires not only increasing availability but also ensuring that services are accessible early in the reproductive life course. Youth-friendly delivery models are especially important, as they can reach adolescents and young women before their first birth, equipping them with the tools and knowledge needed to make informed decisions about their reproductive health.

At the same time, socioeconomic inequalities continue to shape access to safe termination services. The observed gradient—where poorer and less-educated women face greater barriers—points to structural inequities within health systems. Women in rural or underserved areas often encounter shortages of trained providers, high out-of-pocket costs, and limited availability of quality care. To reduce these disparities, interventions must be multifaceted: expanding provider training in rural settings, subsidizing user fees, improving the quality of post-abortion care, and adopting task-shifting approaches that allow a broader range of trained health workers to provide medication abortion safely and effectively.

Strengthening comprehensive sexuality education is another critical pillar. When delivered effectively in schools and communities, such education goes beyond basic information, fostering the skills, confidence, and agency young people need to make healthy reproductive choices. It helps them understand how to prevent unintended pregnancies, where to access contraception, and how to navigate relationships and consent. This foundation is particularly important for adolescents, who are often at higher risk of misinformation and limited-service access.

Finally, integrating post-abortion contraceptive counseling into routine care is essential for breaking the cycle of repeat unintended pregnancies. The high prevalence of termination among women with multiple children underscores the need for immediate, high-quality counseling and access to contraception following abortion services. Offering effective methods—especially LARCs—at this point of care ensures that women can leave with a method that aligns with their reproductive intentions, reducing the likelihood of subsequent unintended pregnancies and supporting healthier spacing between births. Together, these strategies form a comprehensive, equity-focused approach that addresses both the immediate and underlying factors influencing reproductive health outcomes.

Strengths and Limitations

This study has several notable strengths. It draws on nationally representative data with high response rates, enhancing the generalizability of the findings. The analysis applied rigorous survey methods that account for complex sampling design, ensuring more reliable estimates. In addition, a wide range of socioeconomic and demographic factors were examined with sufficient statistical power, allowing for a comprehensive assessment of inequalities. Sensitivity analyses were also conducted to explore potential effect modification, further strengthening the robustness of the results.

However, several limitations should be acknowledged. First, the cross-sectional nature of the data limits the ability to establish causal relationships between variables. Second, pregnancy termination is self-reported and may be underreported due to stigma or recall bias; if such underreporting varies across socioeconomic groups, it could affect the observed gradients. Third, the measure of termination does not distinguish between induced abortion, miscarriage, and stillbirth, which limits the specificity of the findings. Fourth, the study could not assess important dimensions such as service quality, safety of methods, or reasons for termination. Finally, women who migrated out of households or died because of unsafe abortion are not captured in the data, which may lead to an underestimation of the true prevalence.

Future Research Directions

Key research priorities should focus on deepening understanding and improving evidence for action. Qualitative studies are needed to explore women's decision-making processes and the barriers they face in accessing services, providing context that quantitative data alone cannot capture. Facility-based research is also important to assess the availability, quality, and safety of abortion services across different settings. In addition, longitudinal studies would help clarify causal pathways and better track changes in reproductive behaviors over time. Finally, there is a need for intervention-based research that tests practical strategies to increase contraceptive uptake and expand access to safe services, particularly among disadvantaged and underserved populations.

Conclusion

Pregnancy termination among adolescents and young women in Cambodia reveals a clear and consistent socioeconomic pattern. The findings show a distinct positive gradient, with higher prevalence among women who are wealthier, more educated, and living in urban areas. This contrasts with patterns often observed in high-income settings and suggests that access to safe termination services in Cambodia may be unevenly distributed along socioeconomic lines. Rather than reflecting differences in need alone, this pattern likely points to disparities in access to information, affordability, and availability of safe services.

The strong association with parity further deepens this interpretation. Pregnancy termination appears to be used primarily as a strategy for birth spacing and limiting family size, rather than as a response to early or unintended first pregnancies. The fact that nearly one in five women with two or more children report having experienced termination underscores a substantial unmet need for effective and accessible contraception, particularly for women seeking to manage the timing and number of their children.

Taken together, these findings highlight the importance of a comprehensive and multi-pronged response. Expanding equitable access to a full range of contraceptive methods—especially through youth-friendly service delivery—remains a critical priority to ensure that young women can prevent unintended pregnancies early in their reproductive lives. At the same time, addressing socioeconomic and geographic barriers to safe termination services is essential to reduce inequities and ensure that all women, regardless of background, can access care when needed.

There is also a clear need to strengthen and scale up comprehensive sexuality education, particularly to reach adolescents before sexual debut. Providing accurate information, building decision-making skills, and fostering self-efficacy can empower young people to make informed reproductive choices. In addition, integrating post-abortion contraceptive counseling into routine reproductive health services is key to preventing repeat unintended pregnancies and supporting healthier birth spacing.

Ultimately, ensuring that all young women in Cambodia have access to high-quality sexual and reproductive health information and services is fundamental to advancing their reproductive rights and reducing preventable maternal morbidity and mortality.

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Ethical approval: This study used publicly available de-identified data from the DHS Program. The original survey received ethical approval from the Cambodian National Ethics Committee for Health Research and the ICF Institutional Review Board. No additional ethical review was required for this secondary analysis.

Data availability: The dataset analyzed in this study is publicly available from the DHS Program at <https://dhsprogram.com> upon registration and approval.

Conflicts of interest: The author declares no conflicts of interest.

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