

Original article

Prevalence and determinants of time to first intimate partner violence incidents among ever-married Ethiopian women

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ABSTRACT

Background: Intimate partner violence (IPV), including physical, emotional, and sexual abuse disproportionately affects women globally, particularly in sub-Saharan Africa.

Objective: This study examined the timing and determinants of first experiences of IPV among ever-married Ethiopian women.

Participants and setting: The study analyzed nationally representative data from 4720 ever-married women who participated in the 2016 Ethiopian Demographic and Health Survey.

Methods: Cox proportional hazards and parametric accelerated failure time (AFT) models were used to identify factors influencing time to first IPV. Women who had not experienced IPV by the survey date or who reported IPV occurring before marriage were treated as right-censored. Multiple AFT distributions were compared, and the best-fitting models were selected.

Results: Approximately 30 % of women reported experiencing at least one form IPV, most commonly emotional (22.3 %). The log-normal AFT model best fit physical and sexual violence, while the Weibull AFT model fit emotional violence. Older women (35–49 years) experienced IPV later than younger women (time ratios [TR]: 2.09 physical, 2.82 sexual, 3.00 emotional). Husband's alcohol use, controlling behavior, family violence history, and fear of the husband were associated with earlier IPV occurrence (TR < 1). More children delayed physical and emotional violence (TR > 1), while older age at marriage predicted earlier emotional violence (TR = 0.7).

Conclusions: Age, regional differences, family background, and husbands' behaviors significantly influence the timing of IPV onset among Ethiopian women. Targeted prevention programs addressing harmful partner behaviors, alcohol use, and intergenerational violence are essential to delay or prevent IPV and safeguard women's wellbeing.

1. Introduction

Intimate partner violence (IPV) refers to abusive behaviors within an intimate relationship, which can be broadly classified as physical, emotional, or sexual abuse.¹ Women are more likely to experience IPV than men globally as well as in Sub-Saharan Africa.² Estimates indicate that the lifetime prevalence of IPV varies significantly across regions. Southern Asia reports the highest prevalence at 35 %, followed by

Sub-Saharan Africa (33 %), Northern Africa (30 %), Western Asia (29 %), and Northern America (25 %). In Europe, prevalence rates range from 23 % in Northern Europe to 16 % in Southern Europe, with most of these sub-regions consisting of high-income countries. Despite their relatively lower prevalence, these figures remain alarmingly high.³ Although IPV is an issue everywhere, there are significant regional differences in its prevalence.⁴

Globally, 35 % of women experience some form of IPV, with 30 %

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suffering sexual or physical abuse by their partners.⁵ Sub-Saharan Africa, in particular, exhibits high levels of IPV, with prevalence rates of emotional, sexual, and physical violence at 30.58 %, 30.22 %, and 12.6 %, respectively.⁶ In Ethiopia, IPV remains a major concern, deeply rooted in cultural and societal structures. Like many other nations, Ethiopia grapples with the complex dynamics of IPV, as highlighted by Gashaw's study in 2021, which sheds light on the prevalence and associated risk factors within the Ethiopian context.⁷ The 2016 EDHS reported that 34 % of ever-married women aged 15–49 had experienced physical, sexual, or emotional violence from their spouses.⁸ Additionally, a review of studies conducted from 2000 to 2014 found that IPV rates among Ethiopian women ranged from 20 % to 78 %.⁹

While several studies have examined the prevalence and determinants of IPV among ever-married women in Ethiopia^{1,10–16}, limited attention has been given to the timing of first experiences of sexual, physical, and emotional violence. The existing study tends to aggregate different forms of IPV, failing to account for their distinct dynamics and risk patterns.^{17,18} Additionally, there is a lack of research exploring how long it takes for women to first experience each form of IPV after marriage and the specific factors that influence this timing.

From a theoretical standpoint, the timing of first IPV can be understood through multiple complementary frameworks. Coercive control theory emphasizes patterns of domination and surveillance within intimate relationships, whereby controlling behaviors, emotional abuse, and intimidation often precede or accompany physical and sexual violence. Such dynamics may accelerate the onset of IPV by normalizing power imbalances early in marriage. In parallel, a life-course perspective highlights how individual and relational trajectories such as age at first marriage, reproductive history, and cumulative exposure to family or community violence shape vulnerability to IPV over time. Early marriage, high parity, and intergenerational transmission of violence may act as stressors that shorten the time to first IPV, whereas older age and greater social maturity may delay exposure. Integrating these perspectives provides a conceptual basis for examining heterogeneity in the timing of IPV onset and motivates the use of survival models to identify factors that accelerate or decelerate first experiences of physical, sexual, and emotional violence after marriage.

To address these gaps, the current study applies both parametric and semi-parametric survival models to estimate the time to first experience of sexual, physical, and emotional IPV using data from the 2016 Ethiopian Demographic and Health Survey (EDHS). Although the DHS is cross-sectional, time-to-event data were reconstructed using reported years since marriage and age at first IPV, a method adopted with caution in previous studies. This study provides new insights into the onset and determinants of IPV in Ethiopia by modeling the three forms of violence separately. This study's findings aim to inform more effective and targeted interventions for preventing intimate partner violence (IPV) in Ethiopia and other low- and middle-income countries facing similar challenges. To achieve this, we applied the semi-parametric Cox proportional hazards (PH) model to estimate hazard ratios without assuming a specific baseline hazard and the parametric accelerated failure time (AFT) model to assess covariate effects on time-to-event outcomes without the proportional hazards assumption. The AFT model was further evaluated using exponential, Weibull, gamma, log-normal, and log-logistic distributions, offering a flexible alternative to the Cox model for analyzing survival data.¹⁹

2. Methods

2.1. Data sourcing and sampling

The data for this study were sourced from the 2016 Ethiopia Demographic and Health Survey (EDHS), part of the global DHS program, which covers many low-to middle-income countries (<https://dhsprog.am.com>). The DHS, conducted every five years, provides the most accurate and comprehensive data on maternal, individual, and child

health indicators.⁸ The EDHS employed a two-stage sampling technique in which the first stage is the primary sampling unit, including 645 (443 from rural and 202 from urban), and the second stage is households; an average of 28 households per PSU was systematically selected. This study used the 2016 EDHS individual ever-married women aged 15 to 49, resulting in a sample of 15,683 women. For the domestic violence module, only one married woman per household was interviewed, yielding a final sample of 5860 women.⁸ This study specifically analyzed data from 4720 women who reported ever being married and completed the intimate partner violence questionnaire. Data management and variable construction were conducted in STATA, while all statistical analyses were performed in R. The complex sampling design of the 2016 EDHS was fully accounted for in the survival analyses by incorporating primary sampling units, and stratification variables. Survey survival models with robust variance estimation were fitted to obtain nationally representative estimates and valid standard errors.

2.2. Study variables

This study examined three times to event outcome variables corresponding to the first occurrence of physical, sexual, and emotional intimate partner violence (IPV) among ever-married women. For each IPV type, an event was defined as the first reported experience of IPV perpetrated by a husband or intimate partner after first marriage. The time origin was the age at first marriage, and the time scale was measured in years since marriage. Accordingly, time to first IPV was calculated as the difference between the reported age at first IPV and age at first marriage, yielding the number of years after marriage to the first IPV event. Women who have never experienced any form of IPV by the survey date and those who reported experiencing their first IPV before first marriage were treated as right-censored at their duration of marriage. According to the 2016 EDHS, intimate partner violence was assessed through a series of questions: seven for physical IPV, three for emotional IPV, and three for sexual IPV.⁸

Based on existing literature,^{6,8,10,12,20} the independent variables for this study include demographic characteristics, factors related to women, factors related to husbands, and other relevant factors. These variables were selected due to their significant associations with the outcomes of interest in previous studies.

2.3. Statistical analysis

Survival analysis was used to model the time to first intimate partner violence (IPV) incident. The survival function $S(t) = P(T > t)$ describes the probability that an event has not occurred by time t , while the hazard function $h(t) = -\frac{d}{dt}(\log S(t))$ represents the instantaneous event risk.²¹

2.3.1. Cox proportional hazards model

The Cox model estimated the effect of covariates on the hazard rate, assuming that hazard ratios remain constant over time. It is defined as:

$$h(t|\mathbf{X}) = h_0(t) \exp(\boldsymbol{\beta}'\mathbf{X}),$$

where; $h_0(t)$ is the baseline hazard, $\boldsymbol{\beta}$ represents coefficients for the covariates, and $\exp(\boldsymbol{\beta}'\mathbf{X})$ shows how covariates affect the baseline hazard. Model assumptions were checked using Schoenfeld residuals and log-log plots. When the proportional hazards assumption was violated, parametric models were considered as alternatives.^{19,21,22}

2.3.2. The accelerated failure time (AFT) model

The AFT model examined how covariates accelerate or decelerate survival time by modeling the log of survival time:

$$\log(T) = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_p x_p + \sigma$$

Equivalent multiplicative forms of T were also evaluated. Several AFT distributions Weibull, Exponential, Log-normal, Log-logistic, and

Gamma were assessed to identify the best-fitting model.^{19,22}

The main parameter of interest was the acceleration factor (>1 indicating delayed events; <1 indicating earlier events). AFT models were particularly useful when the proportional hazards assumption did not hold and provided direct interpretation of covariate effects on survival time.

2.4. Model comparison

Model comparison was conducted using AIC and log-likelihood values, with lower AIC and higher log-likelihood indicating better fit.^{19,21} AFT models were preferred not only due to potential violations of the proportional hazards assumption but also because they directly quantify covariate effects on survival time via time ratios. The optimal parametric distribution for each IPV outcome was selected based on the lowest AIC.

2.5. Ethical considerations

This study used secondary data from the 2016 Ethiopian Demographic and Health Survey (EDHS). In the original survey, all participants provided informed consent prior to data collection. Permission to use the EDHS dataset for this secondary analysis was formally granted by the DHS Program following an approved data request. The data were fully anonymized, and no additional informed consent was required for the present analysis.

3. Results

Of the 4720 ever-married women in this study, 1417 (30 %) experienced at least one form of IPV by their partner during their lifetime. Emotional violence was the most prevalent, affecting 1053 (22.3 %) women, followed by physical violence, 962 (20.4 %) and sexual violence, 303 (6.4 %). Notably, 7.6 % of women experienced emotional abuse without any accompanying physical or sexual violence, highlighting emotional abuse as a significant issue, and 10.4 % experienced

both physical and emotional violence, indicating that these forms of abuse often co-occur. Additionally, 3.6 % of women experienced all three forms of violence, underscoring the severe impact on those affected by multiple types of abuse (Fig. 1).

The result in Table 1 shows that among women who experienced IPV, the mean time to first physical violence was 3.5 years after marriage (SD = 4.6), with a median of 2 years. Sexual violence occurred later, with a mean time of 6.73 years (SD = 7.3) and a median of 4 years. Emotional violence had the longest delay, with a mean time to first occurrence of 10.03 years (SD = 7.3) and a median of 9 years.

Table 2 presents the within-category prevalence of sexual, emotional, and physical intimate partner violence among 4720 ever-married women across sociodemographic characteristics. Emotional violence was the most prevalent form of IPV across nearly all subgroups. The prevalence of IPV increased with age, with women aged 35–49 reporting the highest proportions of sexual (7.3 %), emotional (26.2 %), and physical (21.8 %) violence. Rural women report greater exposure to violence (sexual 7.2 %, emotional 22.7 %, physical 20.8 %) compared to their urban counterparts. Similarly, women with no formal education exhibit the highest rates of abuse (sexual 7.1 %, emotional 23.3 %, physical 20.3 %). Regionally, Oromia reports the highest prevalence across all violence types (sexual 10.5 %, emotional 26.5 %, physical 30.7 %), followed by Amhara and Tigray, while Somali and Afar show the lowest. Divorced women experience higher levels of abuse (sexual 11.8 %, emotional 32.5 %, physical 35.3 %) than married or widowed women, and violence also increases with the number of living children,

Table 1

Mean, median and standard deviation years of first instance of IPV after marriage.

Forms of IPV	Mean year	Median year	SD
Physical violence	3.5	2	4.6
Sexual violence	6.73	4	7.3
Emotional violence	10.03	9	7.3

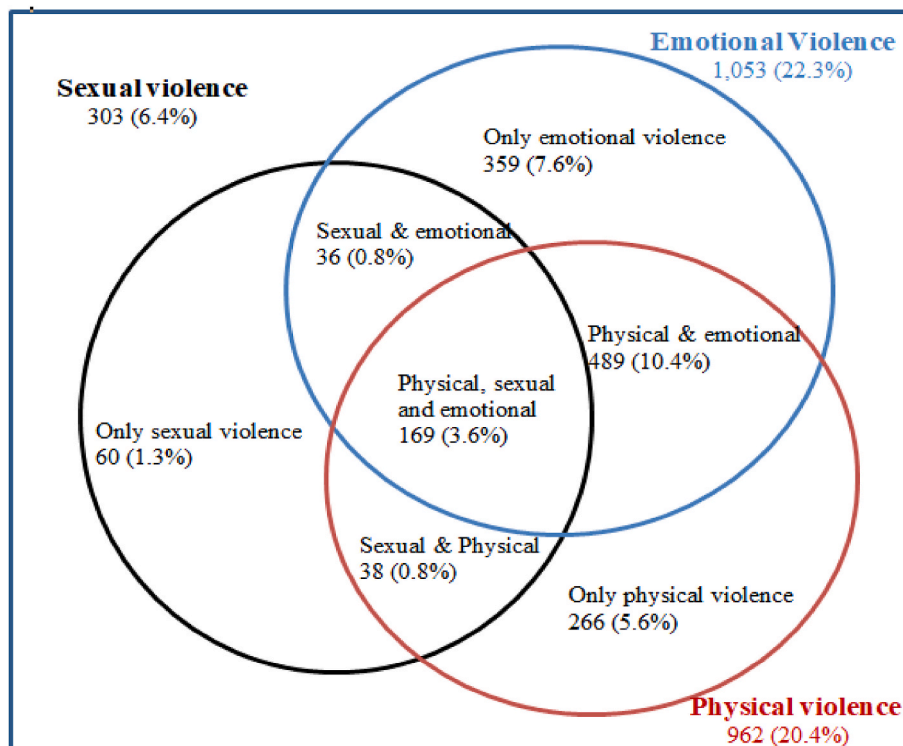


Fig. 1. Distinct categories of IPV among ever-married women across Ethiopia.

Table 2
Log-rank test and distribution of ever married women by socio demographic characteristics and violence experience among women in Ethiopia.

Variables	Categories	Sexual violence		Emotional violence		Physical violence					
		Event (%)	Log-rank test	Event (%)	Log-rank test	Event (%)	Log-rank test				
Current age groups	15–24	56 (4.9 %)	20.4**	208 (18.3 %)	422***	201 (17.6 %)	16.4*				
	25–34	132 (6.6 %)		434 (21.6 %)		419 (20.8 %)					
	35–49	115 (7.3 %)		411 (26.2 %)		342 (21.8 %)					
Place of residence	Rural	251 (7.2 %)	7.4**	798 (22.7 %)	0.9	731 (20.8 %)	0.2				
	Urban	52 (4.3 %)		255 (21.1 %)		231 (19.1 %)					
Educational status of respondents	no formal education	194 (7.1 %)	2	638 (23.3 %)	36.6***	556 (20.3 %)	13.4 **				
	Primary	81 (6.1 %)		304 (30 %)		288 (21.8 %)					
	Secondary	20 (4.6 %)		78 (18 %)		86 (19.9 %)					
	Higher	8 (3.5 %)		33 (14.2 %)		32 (13.8 %)					
Region	Tigray	52 (10.6 %)	78.9***	127 (25.8 %)	114***	89 (18.1 %)	136***				
	Afar	10 (2.6 %)		54 (14 %)		46 (11.9 %)					
	Amhara	54 (9.4 %)		134 (23.4 %)		120 (20.9 %)					
	Oromia	68 (10.5 %)		172 (26.5 %)		199 (30.7 %)					
	Somali	2 (0.4 %)		36 (7.8 %)		32 (6.9 %)					
	Benishangul	29 (7.6 %)		110 (28.7 %)		84 (21.9 %)					
	Snnpr	29 (5.14 %)		121 (21.5 %)		103 (18.3 %)					
	Gambela	25 (7.3 %)		88 (25.7 %)		86 (25.1 %)					
	Harari	11 (3.9 %)		93 (33.1 %)		84 (29.9 %)					
	AA	11 (3.8 %)		59 (20.5 %)		60 (20.8 %)					
	Dire Dawa	12 (4.1 %)		59 (19.9 %)		59 (19.9 %)					
	Religion of respondents	Orthodox		141 (7.8 %)		14.4***		437 (24.2 %)	20.1***	391 (21.7 %)	20.9***
		Muslim		95 (4.8 %)				374 (18.8 %)		345 (17.3 %)	
Others		67 (7.3 %)	242 (26.3 %)	226 (24.5 %)							
Current marital status	Married	240 (5.9 %)	24.7***	861 (21.4 %)	35.5***	753 (18.7 %)	72.8***				
	Widowed	12 (4.7 %)		52 (20.2 %)		57 (22.2 %)					
	Divorced	51 (11.8 %)		140 (32.5 %)		152 (35.3 %)					
Respondent alcoholic use	No	177 (5.6 %)	9.9**	653 (20.5 %)	9.6**	593 (18.6 %)	16.9***				
	Yes	126 (8.2 %)		400 (26.1 %)		369 (24.1 %)					
Respondent chewed chat	No	261 (6.3 %)	0.4	900 (21.7 %)	5.1*	783 (18.9 %)	42.9***				
	Yes	42 (7.4 %)		153 (26.9 %)		179 (31.5 %)					
Ever terminated pregnancy	No	267 (6.3 %)	0.0019	912 (21.6 %)	1.1	843 (19.9 %)	1.5				
	Yes	36 (7.2 %)		141 (28.3 %)		119 (23.9 %)					
Numbers of living children	no or one children	68 (4.9 %)	6.7*	260 (19 %)	152***	246 (17.9 %)	18.9***				
	2-3 children	99 (6.7 %)		324 (21.99 %)		338 (22.9 %)					
	4 or more	136 (7.2 %)		469 (24.9 %)		378 (20.1 %)					
Wealth status of the respondent	Poor	150 (7 %)	8.3*	468 (21.9 %)	1.7	420 (19.6 %)	2.6				
	Middle	56 (8.5 %)		166 (25.2 %)		147 (22.2 %)					
	Rich	97 (5.1 %)		419 (21.8 %)		395 (20.6 %)					
	not justified	103 (5.3 %)		434 (22.1 %)		377 (19.2 %)					
Wife beating attitude	Justified	200 (7.3 %)	6.5**	619 (22.4 %)	0.0009	585 (21.2 %)	2.5				
	No	542 (16.6 %)		185 (5.7 %)		148***		582 (17.8 %)			
Respondent's father ever beat her mother	No	357 (30.6 %)	9.9**	95 (8.1 %)		407 (34.8 %)	107***				
	Yes	63 (22.3 %)		23 (8.1 %)		64 (22.6 %)					
	I don't know	240 (7.4 %)		777 (23.8 %)		699 (21.5 %)					
Media exposure	No	63 (4.3 %)	7.1**	276 (18.9 %)	0	263 (18 %)	1.6				
	Yes	193 (6.4 %)		638 (21.2 %)		560 (18.6 %)					
Working status of respondent	No	110 (6.4 %)	0.1	415 (24.2 %)	2.2	402 (23.4 %)	12.9***				
	Yes	108 (5.5 %)		639 (23.2 %)		581 (21.1 %)					
Women participation in decision making	No	195 (7.1 %)	3.2	670 (24.5 %)	2.9	580 (21.2 %)	0.0009				
	Yes	223 (8.2 %)		383 (19.3 %)		382 (19.2 %)					
First time you got married who decide on your marriage?	Parents	80 (4.0 %)	56.5***	229 (11.0 %)	233***	215 (10.4 %)	218***				
	Myself	236 (8.9 %)		824 (31.2 %)		747 (28.3 %)					
Women afraid of husband	No	60 (2.7 %)	102***	190 (8.5 %)	639***	175 (7.8 %)	563***				
	Yes	243 (9.8 %)		863 (34.7 %)		787 (31.7 %)					
Husband controlling behavior issue	<25 years	6 (2.4 %)	4.2	33 (13.4 %)	101***	32 (12.95 %)	7.4*				
	25–34 years	85 (5.5 %)		314 (20.3 %)		308 (19.9 %)					
	35 or above	212 (7.2 %)		706 (24.1 %)		622 (21.2 %)					
Husband education level	no formal education	140 (6.7 %)	10.8**	453 (21.5 %)	38.4***	387 (18.4 %)	23.5***				
	Primary	115 (7.8 %)		386 (26 %)		348 (23.5 %)					
	Secondary	24 (3.99 %)		117 (19.5 %)		126 (21.0 %)					
	Higher	24 (4.5 %)		97 (18.2 %)		101 (18.98 %)					
Husband alcoholic use	No	167 (4.7 %)	58.7***	633 (18.1 %)	135***	546 (15.6 %)	189***				
	Yes	136 (11.2 %)		420 (34.5 %)		416 (34.2 %)					
Husband working status	Not working	21 (4.3 %)	4.7*	85 (17.5 %)	11.9***	74 (15.3 %)	10**				
	Working	282 (6.7 %)		968 (22.9 %)		888 (21.0 %)					

Note: P-value: <0.001 '***' <0.01 '**' <0.05 '*'.

with women having four or more children reporting the highest proportions (sexual 7.2 %, emotional 24.9 %, physical 20.1 %).

Socioeconomic and behavioral factors further highlight disparities in IPV exposure. Women from middle households are more vulnerable (sexual 8.5 %, emotional 25.2 %, physical 22.2 %), as are those who justify wife-beating (sexual 7.3 %, emotional 22.4 %, physical 21.2 %). Non-working women report more abuse than those employed, and violence is also more common among women whose parents arranged their marriages (sexual 8.2 %, emotional 24.5 %, physical 21.2 %) and those who fear their husbands (sexual 8.9 %, emotional 31.2 %, physical 28.3 %). The husband's characteristics play a key role: women with controlling, older, less educated, or working husbands experience substantially higher rates of violence particularly those whose husbands display controlling behaviors (sexual 9.8 %, emotional 34.7 %, physical 31.7 %). In contrast, women with husbands under 25 or with higher education report the lowest proportions of all violence types.

Table 2 summarizes women's experiences of partner violence, analyzed with the log-rank test. Significant differences in timing of first violence were found by age, region, religion, number of children, alcohol use, marital status, fear of husband, parental abuse, education, employment, controlling behavior, and husband's alcohol use. Education, khat chewing, and husband's age were significant for physical and emotional violence; wealth, media exposure, wife-beating attitudes, and marriage decisions were significant for sexual violence; employment was significant for physical violence. Variables significant in univariate Cox regression were included in multivariable models to identify predictors of time to sexual, physical, and emotional violence.

The Cox-Snell residual plot (Fig. 2) compares the estimated residuals (black line) with the reference line (red, slope = 1) for time to first physical, sexual, and emotional violence. The scaled Schoenfeld residuals results, which demonstrate non-proportionality in certain variables, are consistent with the apparent departure from the straight line, which suggests a poor fit of the Cox proportional hazards (PH) model. These results suggest that the parametric AFT model provides a more appropriate and accurate approach for analyzing the survival data.

Fig. 3 shows AIC and $-2 \log L$ values for all parametric AFT survival models and the semi-parametric Cox PH model. For time to first sexual and physical violence, the log-normal parametric AFT model had the lowest AIC, making it the most appropriate when the proportional hazards assumption is violated. For emotional violence, the Weibull parametric AFT model was preferred, with a lower AIC and higher $-2 \log L$, indicating a better fit.

Table 3 shows results from the log-normal AFT model for time to first physical and sexual violence and the Weibull AFT model for emotional violence after marriage. Factors such as age, region, marital status, wealth, fear of husband, husband's controlling behavior, and his alcohol

use significantly affected survival times. Regional variations indicated both delayed and early onset of violence. Khat chewing was linked to earlier physical violence, while having more children delayed physical and emotional violence. A family history of violence was associated with earlier physical (TR = 0.52; 0.42–0.65) and emotional (TR = 0.76; 0.71–0.82) violence. Marrying at an older age (>18 years; TR = 0.70; 0.65–0.76) was also linked to earlier emotional violence.

The timing of intimate partner violence varied significantly by age, marital status, number of children, and wealth. Women aged 25–34 experienced physical (TR = 1.62; 1.17–2.23), sexual (TR = 1.87; 1.09–3.19), and emotional (TR = 1.93; 1.72–2.17) violence later than those aged 15–24, while women aged 35–49 experienced these forms of violence even later physical (TR = 2.09; 1.42–3.07), sexual (TR = 2.82; 1.50–5.29), and emotional (TR = 3.00; 2.63–3.43). Having four or more children was associated with a delayed occurrence of emotional (TR = 1.32; 95 % CI: 1.18–1.47) and sexual violence (TR = 1.54; 95 % CI: 1.09–2.18) compared with women who had none or one child. Divorced women were at higher risk of earlier physical (TR = 0.41; 0.29–0.57), sexual (TR = 0.46; 0.27–0.76), and emotional (TR = 0.83; 0.74–0.93) violence than married women, while wealthier women experienced delayed physical (TR = 1.41; 1.07–1.87), sexual (TR = 1.83; 1.17–2.86), and emotional (TR = 1.18; 1.08–1.30) violence.

Women who feared their husbands experienced earlier physical (TR = 0.26; 0.21–0.33), sexual (TR = 0.35; 0.24–0.51), and emotional (TR = 0.58; 0.53–0.63) violence. Similarly, husbands with controlling behavior were linked to earlier physical (TR = 0.16; 0.13–0.20), sexual (TR = 0.24; 0.17–0.36), and emotional (TR = 0.47; 0.42–0.51) violence. Partners who consumed alcohol also accelerated the onset of violence physical (TR = 0.25; 0.19–0.33), sexual (TR = 0.37; 0.24–0.56), and emotional (TR = 0.67; 0.61–0.73) highlighting the strong influence of partner behavior on women's risk of early exposure to violence (see Table 3).

4. Discussion

This study examined the timing and factors influencing the first incidents of physical, sexual, and emotional abuse after marriage. Previous research has paid limited attention to the timing of first experiences of specific forms of IPV after marriage. While only one prior Ethiopia/DHS survival study relied on Cox models using aggregated IPV,^{17,18} the present study systematically compared accelerated failure time (AFT) distributions, identifying log-normal models as best for first physical and sexual IPV and Weibull for emotional IPV, highlighting that IPV onset patterns differ by type. A substantial proportion of Ethiopian women experience partner violence, highlighting its continued public health importance. Approximately 30 % of women experienced at least one

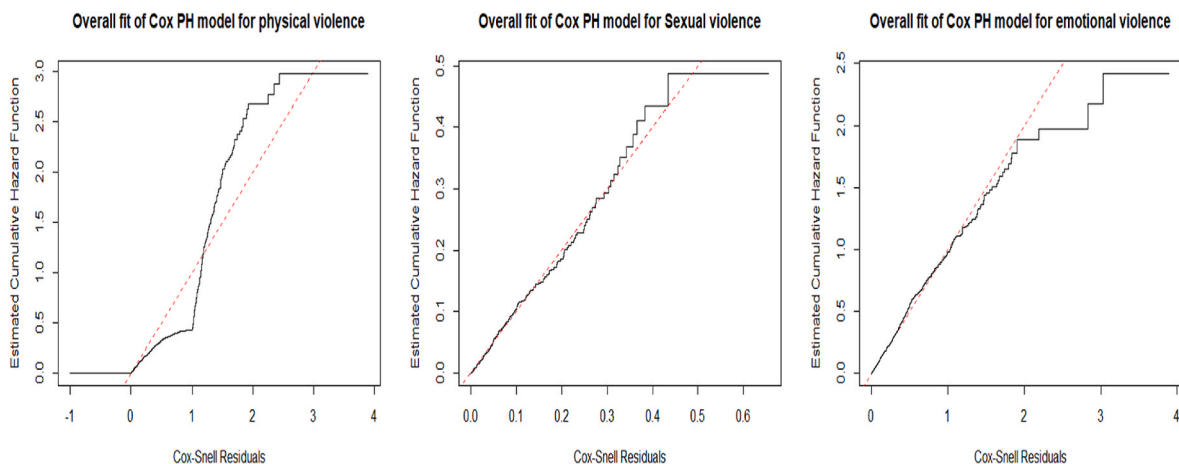


Fig. 2. Cox-Snell residual plots for Cox PH.

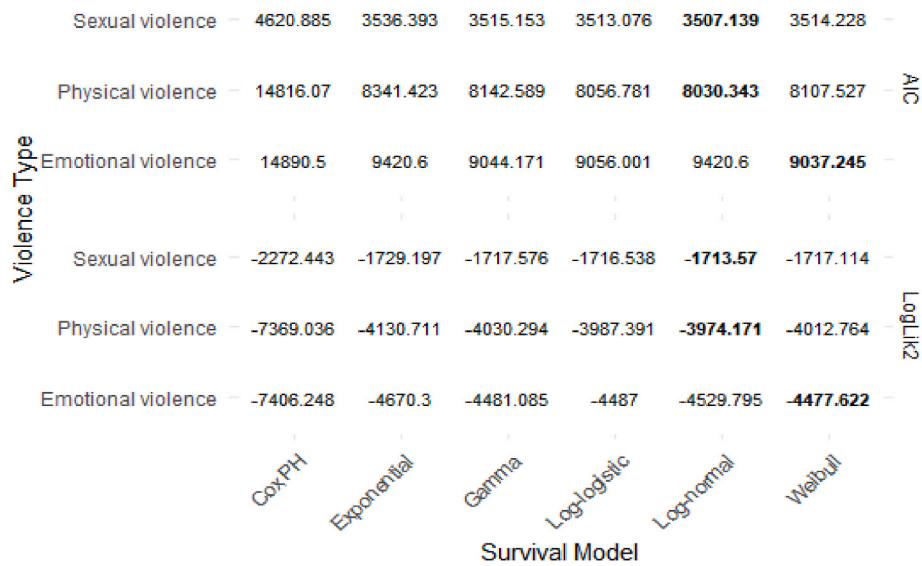


Fig. 3. Heatmap of model comparison based on AIC and $-2 \log$ -likelihood.

form of violence after marriage, with emotional violence being the most prevalent (22.3 %), followed by physical (20.4 %) and sexual violence (6.4 %). Similar studies reported comparable results, such as 52.3 % emotional violence in Nigeria²³ and 25 % in Tigray, Ethiopia.²⁴

The study found that women aged 25–34 and 35–49 years' experience physical, sexual, and emotional violence later than younger women aged 15–24. This acceleration aligns with research showing that the likelihood of IPV increases with age and the duration of the relationship. For instance, the WHO 2021 has reported that IPV tends to peak in mid-adulthood, possibly due to accumulated relationship stresses, economic pressures, and social expectations. Studies by previous researchers also suggest that older women may have fewer opportunities to leave relationships, potentially accelerating the occurrence of violence.¹⁰

Divorced women experienced earlier physical, sexual, and emotional violence than married women, consistent with findings from Tigray, Ethiopia.²⁴ However, economic and social challenges often discourage women from leaving violent unions. Having more children was linked to later emotional and physical violence, aligning with studies from sub-Saharan Africa⁶ showing that larger families face greater stress and economic strain, increasing the risk of intimate partner violence.

The accelerated time to first violence among women who fear their husbands or have husbands with controlling behaviors might indicate underreporting. Fear and control can suppress women's ability to recognize and report violence, as noted in a previous study, which highlights the insidious nature of coercive control in IPV. The finding that husband's early occurrence of all forms of violence could relate to the unpredictability of alcohol-fuelled aggression.⁶ While alcohol use is a well-documented risk factor for different forms of IPV, its impact on the timing of violence may reflect episodic rather than chronic abuse patterns.²⁰ These findings show that IPV is shaped by demographic, social, and behavioral factors, emphasizing the need for context-specific, multi-level interventions. Understanding these interactions can help policymakers design targeted programs and adopt holistic approaches addressing individual, relational, and societal drivers of violence.

4.1. Methodological limitations

The EDHS is cross-sectional, and time to first IPV was reconstructed retrospectively from self-reported data, which is prone to recall bias and misreporting, particularly for distant or sensitive events. Because exposures and outcomes were measured at the same survey wave, temporal ordering cannot be fully established, and causal inference is not possible.

5. Conclusion

The study concludes that several factors significantly influence the timing of the first occurrence of physical, sexual, and emotional violence by a partner after marriage, including age, marital status, fear of the husband, controlling behavior, partner's alcohol use, regional differences, and family history of violence. Early onset of violence is linked to behaviors such as chewing khat, while having more children tends to delay violence. Furthermore, marrying at an older age is linked to experiencing emotional violence earlier. These insights highlight the importance of considering a range of social, demographic, and behavioral factors when addressing partner violence. These findings underscore the need for targeted interventions focused on reducing partner alcohol use, addressing controlling behaviors, and providing support to women with a family history of violence. Tailoring programs to regional contexts and high-risk groups can help delay or prevent first-time IPV and improve women's safety and well-being.

Ethics approval and consent to participate

Not applicable. This study utilized secondary data obtained from the Ethiopian Demographic and Health Survey (EDHS), which is publicly available and anonymized. All necessary ethical guidelines were followed during data access.

Consent for publication

Not applicable.

Author contributions

AAM contributed to data management, methodology, software, formal analysis, writing original draft, review and editing. DBB and HMF participated in the study's conception, design, data interpretation, and manuscript review and revisions. DGC critically reviewed and edited the manuscript. All authors read and approved the final manuscript. All authors conducted literature searches, read, and approved the final manuscript.

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Table 3

The adjusted factors associated with the time of first sexual, physical and emotional violence after marriage in Ethiopia.

Characteristics	adjusted determinants (TR [95 %CI])		
	Physical violence	Sexual violence	Emotional violence
Current age groups (15–24 ref.)			
25–34	1.62 [1.17–2.23]**	1.87 [1.09–3.19]*	1.93 [1.72–2.17]***
35–49	2.09 [1.42–3.07]***	2.82 [1.498–5.29]***	3.004 [2.631–3.43]***
Place of residence (Rural ref.)			
Urban		1.09 [0.59–2.03]	
Educational status of women (no formal education ref.)			
Primary	0.94 [0.72–1.23]		0.96 [0.875–1.05]
Secondary	0.78 [0.51–1.22]		0.97 [0.83–1.13]
Higher	1.25 [0.67–2.33]		1.09 [0.87–1.37]
Region (Tigray ref.)			
Afar	0.88 [0.49–1.56]	6.27 [2.35–16.71]***	1.32 [1.078–1.61]**
Amhara	0.91 [0.59–1.395]	1.61 [0.88–2.95]	1.098 [0.95–1.27]
Oromia	0.5 [0.32–0.79]**	1.2 [0.62–2.32]	1.08 [0.93–1.25]
Somali	1.21 [0.65–2.24]	2.89 [1.04–5.35]***	1.39 [1.098–1.76]**
Benishangul	0.57 [0.34–0.93]*	1.82 [0.86–3.85]	0.87 [0.74–1.018]
Snnpr	1.17 [0.71–1.94]	3.38 [1.54–7.398]**	1.25 [1.05–1.48]**
Gambela	0.64 [0.37–1.09]	2.11 [0.91–4.86]	1.03 [0.86–1.23]
Harari	0.38 [0.22–0.66]***	3.26 [1.23–8.62]*	0.83 [0.69–0.99]*
Addis Adaba	0.48 [0.27–0.84]**	1.38[0.55–3.49]	0.94 [0.77–1.14]
Dire Dawa	0.48 [0.27–0.84]**	2.73 [1.06–7.03]*	0.99 [0.82–1.21]
Religion of respondents (Orthodox ref.)			
Muslim	0.69 [0.47–1.03]	0.79 [0.42–1.49]	0.93 [0.82–1.07]
Others	0.52 [0.35–0.76]***	0.61 [0.32–1.16]	0.88 [0.77–0.99]*
Current marital status (Married ref.)			
Widowed		1.36 [0.61–3.03]	1.09 [0.92–1.28]
Divorced	0.41 [0.29–0.57]***	0.46 [0.27–0.76]**	0.83 [0.74–0.93]***
Respondent alcoholic use (No ref.)			
Yes	1.14 [0.93–1.39]	1.11 [0.66–1.86]	1.025 [0.92–1.14]
Respondent chewed chat (No ref.)			
Yes		0.49 [0.36–0.67]***	0.93 [0.83–1.03]
Numbers of living children (no or one children ref.)			
2-3 children	1.199 [0.89–1.61]	1.32 [0.81–2.15]	1.29 [1.17–1.43]***
4 or more children	1.54 [1.09–2.18]**	1.51 [0.86–2.65]	1.32 [1.18–1.47]***
Wealth status of the respondent (Poor ref.)			
Middle	1.05 [0.78–1.43]	1.16 [0.73–1.85]	1.03 [0.92–1.14]
Rich	1.41 [1.07–1.87]*	1.83 [1.17–2.86]**	1.18 [1.079–1.298]***
Wife beating attitude (no justified wife beating ref.)			
justified wife beating	0.82 [0.67–1.014]	0.79 [0.56–1.11]	
Respondent's father ever beat her mother (No ref.)			
Yes	0.52 [0.42–0.65]***	0.86 [0.66–1.11]	0.76 [0.71–0.82]***
I don't know	0.89 [0.59–1.34]	0.89 [0.63–1.29]	0.97 [0.84–1.13]
Age at first marriage (Less than 18 years ref.)			
Greater than 18 years		1.02 [0.68–1.497]	0.69 [0.65–0.76]***

Table 3 (continued)

Characteristics	adjusted determinants (TR [95 %CI])		
	Physical violence	Sexual violence	Emotional violence
Media exposure (No ref.)			
Yes	1.26 [0.92–1.72]	0.89 [0.53–1.51]	
Working status of respondent (No ref.)			
Yes	0.89 [0.72–1.11]		1.013 [0.94–1.09]
Women participation in decision making (No ref.)			
Yes		0.78 [0.55–1.11]	
First time you got married who decide on your marriage? (Parents ref.)			
Myself		1.39 [0.93–2.07]	0.99 [0.91–1.08]
Women afraid of her husband (No ref.)			
Yes	0.26 [0.21–0.33]***	0.35 [0.24–0.51]***	0.58 [0.53–0.63]***
Husband controlling behavior issue (No controlling behavior issue ref.)			
Has controlling behavior issue	0.16 [0.13–0.2]***	0.24 [0.17–0.36]***	0.47 [0.42–0.51]***
Husband age category (under 25 year's ref.)			
25–34 years	0.58 [0.34–1.012]	0.51 [0.18–1.41]	0.86 [0.697–1.05]
35 or above years	0.68 [0.39–1.21]	0.47 [0.16–1.33]	0.98 [0.79–1.21]
Husband education level (no formal education ref.)			
Primary	0.93 [0.73–1.19]	0.86 [0.59–1.27]	0.94 [0.87–1.03]
Secondary	0.94 [0.66–1.35]	1.57 [0.83–2.96]	1.03 [0.91–1.18]
Higher	0.91 [0.61–1.35]	1.45 [0.74–2.87]	1.03 [0.89–1.18]
Husband alcoholic use (No ref.)			
Yes	0.25 [0.19–0.33]***	0.37 [0.24–0.56]***	0.67 [0.61–0.73]***
Husband working status (Not working ref.)			
Working	0.72 [0.498–1.03]	0.76 [0.41–1.39]	0.91 [0.8–1.04]

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Abbreviations

AFT: Accelerated Failure Time; CI: Confidence Interval; EDHS: Ethiopian Demographic and Health Survey; IPV: Intimate partner violence; TR: Time Ratio.

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