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Factors associated with time to first birth after marriage: A systematic review

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Abstract

Time to first birth after marriage is a particularly interesting subject, because it unveils both the social behaviors and fertility patterns. Though, for a woman, who marries at an early age and gets sooner childbearing can be the health threat for both mother and child. The objective of this study is to systematically investigate significant predictors associated with time to first birth after marriage. Following the PRISMA guidelines; three databases Scopus, PubMed and EMBASE were used to capture relevant articles. A total of 21 articles with the thorough assessment of 326 articles published in English up to 10 January 2024 were included in the final review. Thirty-nine significant predictors associated with time to first birth after marriage have been explored. Predictors, such as age at marriage, education, residence, contraceptive, religion, wealth index were observed as some of the major significant predictors. The findings indicate to take care of those factors in order to deal with time to first birth after marriage. Understanding the impact of influential factors can be considered as important reference to formulate appropriate policy to intervene effective program as well as to plan such studies based on primary data with special reference to a certain country or region.

Keywords
Keywords: First Birth Interval, Predictor, PRISMA, Systematic Review.

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1 Introduction

Time to first childbirth after marriage depends on several factors. The term time to first birth after marriage, first birth interval, first childbirth after marriage are synonymously used in this paper. It varies in place to place, country to country and region to region. Age at first marriage, age at first childbirth and first birth interval (FBI) after marriage are some of the major determinants of fertility measures, influenced by a number of different co-factors of demographic, socio-economic and cultural things [1]. The interval between marriage and first childbirth is a particularly interesting subject, for it unveils both the social behaviors as well as fertility patterns with regard to reproduction.

The first childbirth is important for each individual woman. It becomes the most notable event in her life. Additionally, the first childbearing of woman starts undertaking the roles of motherhood as well as added further family responsibilities. First childbirth gives woman an unseen power to establish her new roles in the family [2]. In the traditional society, a woman's first pregnancy followed by the first childbirth constitutes an exciting moment for family and relatives, because first childbirth is an important indicator for woman to prove her ability to the continuation of future generation [3]. Moreover, the length of FBI after marriage is deeply connected to fertility patterns of women, population structure and its dynamics [4]. Shorter length of waiting time to the first birth of women who have got married before the age of 18 became a matter of public health with the increased risk of health care of mother and children [1,2], [5]. The shorter length of FBI is also connected to premature conception, unplanned pregnancies and high fertility, especially for the women, who marry at an early young age. Marriage in young age and then immediately getting first childbirth shown to have health hazards, unforeseen economic pressure, family burden and weak social presence [6]. Furthermore, it can also affect others birth patterns, as well as effects on fertility behavior and family size [7].

Women's marriage at an early young age, immediate desires of children, engaged in new family responsibilities direct to their rest of future career and quality life. Such events are profoundly prevailed in the women of lower socioeconomic conditions. High education, empowerment and reproductive awareness may provide women with the power to cope with the situation against sooner childbearing and faster family growth [8]. Proper knowledge of contraceptive use, work roles and empowerment make a substantial impact on women to postpone the time of first childbirth at an early young age [9], however, it can be varied according to personal behavior. Women, who live in the orthodox society are directly or indirectly governed by their existing socio-cultural system. With the impact of cultural constraints, they get first marriage in young age, and sooner give first child after marriage [10]. The compliance of being a sooner parenthoods in young age and other family duties disturb women for their career development, empowerment and social status [11]. Several mutually common factors, such as age at marriage, education, residence, contraceptive use [12–14], religion, wealth index, husband's education, women's employment status [5,15] were observed as the major determinants in playing a significant role for the time duration of getting first childbirth after marriage. On the other hand, a large number of particular single factors, which were not jointly common had been identified in many studies. These factors were also interesting and had observed as of its own significance to determine the first birth after marriage. Studies conducted in different places have reported different factors, where some factors are found to be common and some are not, varying from region to region, country to country and study to study.

Marriage at an early young age, sooner childbearing after marriage can lead women to school dropout, disturb their career development and stop other many activities that they need to accomplish in their life. As like other influential predictors (demographic, socioeconomic, cultural and geographical) for the timing of childbearing, women's personal beliefs and behavior also play an important role in reproduction, childbearing and fertility pattern [16]. In this backdrop, the proposition of this study has aimed to accumulate, and summarizes the significant predictors in influencing the duration of first birth after marriage. Moreover, the finding of this systematic review is expected to help policy makers to formulate appropriate policy, academia and researchers for identifying new research in the field of nuptiality, and development agencies to develop effective programs utilizing the identified parameters. The finding of this study could also be useful for specific location or country or region to take care of influential factors connected with FBI, specifically where there is high prevalence of starting marriage at an early young age as well as sooner first childbearing after marriage.

2 Material and Methods

2.1 Sources

This systematic review was accomplished using PRISMA standards [17]. The process of systematic review is presented in Fig.1. To select articles, a search in EMBASE, PubMed and Scopus were performed in December 2023 developing the following key search terms: [("factor*" OR "predictor*" OR "determinant*" OR "cause*") AND ("time to first birth" OR "first birth interval" OR "first child birth" OR "waiting time to firth birth" OR "time interval to first birth" OR "time duration to first birth") AND ("women" OR "female*")]. The search conducted in EMBASE and Scopus were confined in title or abstract or keywords. But, the search conducted in PubMed was confined in title and abstract. In addition, an option of English language only was applied to the search filter of each database.

2.2 Eligibility criteria

Articles matching to the outcome variable (time to first birth after marriage) were included in this systematic review. The articles further limited to the

following eligibility condition: (1) articles used time to event data, (2) peer-reviewed articles, (3) articles provided the evidence of the relationship between significant factors and outcome variable, and (4) study population of women of reproductive age who have ever married or/and at least having one live birth after marriage. For this study, outcome variable was considered to incorporate topics mostly associated with demographic characteristics, socioeconomic parameters and cultural system, including (but not limited to) age at marriage, contraceptive use, education level, geographical variation, religion and economic condition. Articles based on qualitative discussions, articles measuring the outcome only based on simple summary statistics, and the outcomes based on bivariate and multivariate analysis, such as chi-square and other statistical analysis were excluded, as they generally examine either simply the associations with outcome variable or explaining the average effects of predictors on outcome variable without the reference value.

2.3 Study selection

The articles, initially captured from three databases EMBASE, PubMed and Scopus were managed in the Zotero [18]. Duplicate records identified in the sources were omitted at the first phase of data management. The unique records after removing the duplicate data were exported to Rayyan [19]. To select studies, author (IKS) first conducted a title review of all identified records and examined the abstract in Rayyan, and removed any of those were ineligible for the review. Next, author (SPK) independently reviewed abstracts from the remaining records after the work was done in Rayyan. In the second phase, the ineligible articles considered with the agreement of both authors were excluded. The final eligible included articles were thoroughly and independently assessed by both authors. Articles receiving a doubt were resolved with the agreement of both authors. At the same time, the discrepancies occurred in identifying and extracting the information were solved by the mutual understanding of both authors.

2.4 Data extraction

A standardized form was designed to extract the data related to the study characteristics including; study design, study population, model used in the study and findings of the studies. Both authors were independently involved in the data extraction process. Any discrepancies acquired between two authors while extracting the information were resolved through the subsequent review. The extracted data were accumulated, checked, summarized and then placed in table format. Table1 describes the components of the study including; 'authors', 'title of the study', 'country', 'study design', 'sample/(source)', 'statistical method' and 'Significant factors with effect size'. Significant factors, as a predictor, associated with FBI after marriage were the findings measured by different statistical effect sizes (OR, HR, AHR, TR, Coeff., estimates based on Bayesian approach) CIs, p-value, etc.

2.5 Quality assessment

Quality assessment tool produced by AXIS [20] was used to assess the quality of all included articles. Quality of all articles were thoroughly reviewed focusing on objective, target study population, use of appropriate statistical models for analyses related to outcome variable, effect size, bias and non-response, consideration for confounders, study limitation and conflict of interest.

All 21(100%) articles included in this review clearly specified the study objectives, target population, and the methodology used. More than 57.1% articles included in this study strongly justified sample size likely to represent the target participants, since these articles used the data either of DHS survey or the national surveys which were conducted by the respective countries. Likewise, the findings and results presented in all 100% articles have clearly determined statistical significance and/or precision estimates, effect size using p-value and CIs. Of those, 80.1% articles were internally consistent to relate the results in the discussion and conclusion section. In regard to the issue of response bias, neither the articles raised the issues of non-response rate nor described its influences. However, articles based on cross-sectional data using nationally representative data or DHS often do not describe the information about non-response as they have used secondary data.

Study limitation and the potential bias were discussed in more than 52.4% of the included articles, dealing the issues of study area, selection of study methodologies and the measurements used. Nearly 48% articles clearly reported about the funding source and declared the absence of conflict of interest, but 52.4% articles did not disclose anything about funding. The deceleration of conflict of interest and ethical consideration were reasonably attained by all 21 (100%) papers. Most of the criteria set by AXIS has rationally fulfilled by the reviewed articles. The detail QA report of each article done in AXIS tool has maintained in separate Excel file.

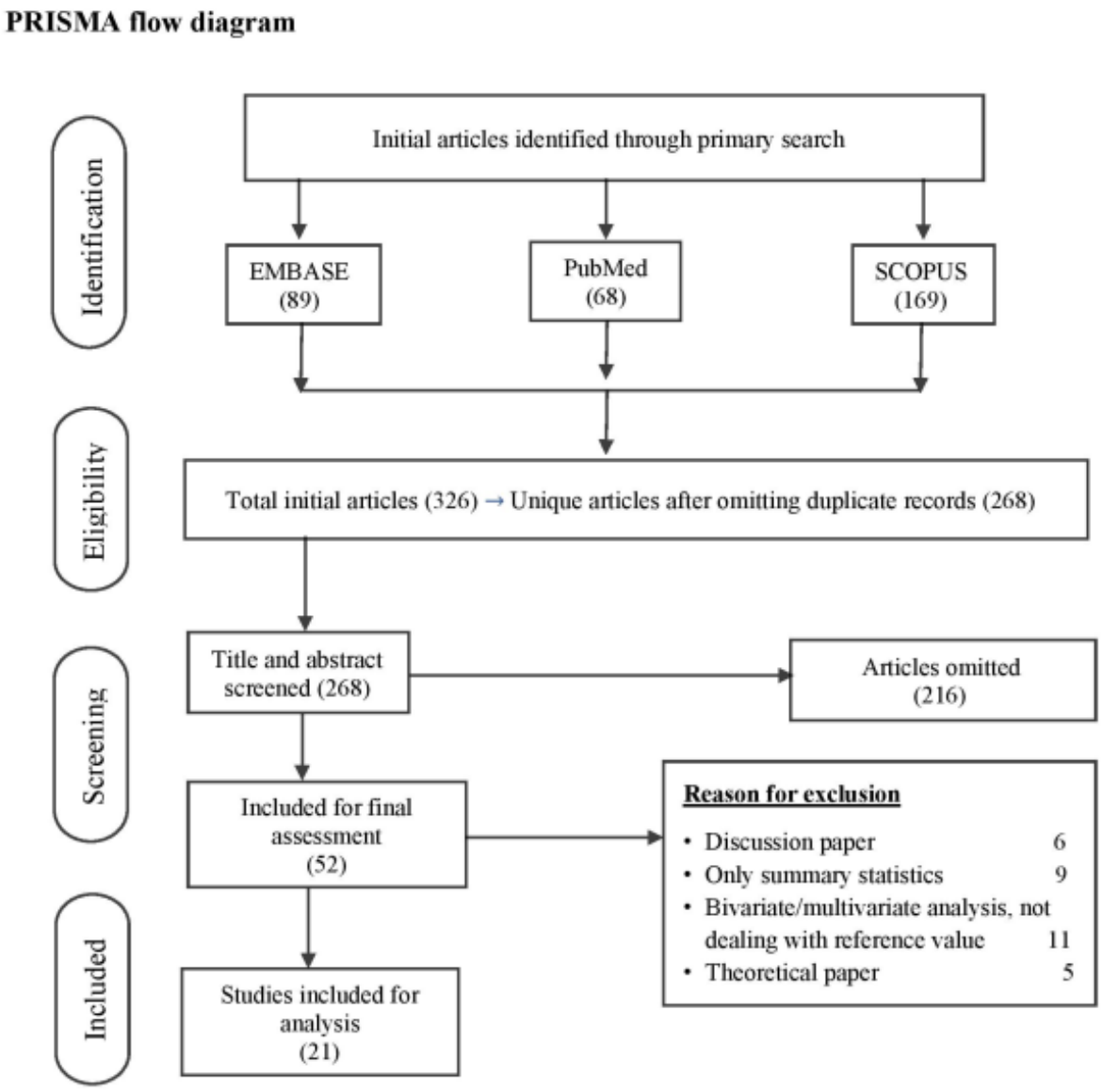

Figure 1: PRISMA flowchart for the process of systematic review.

3 Findings

The primary search done in EMBASE, PubMed and Scopus captured a total of 326 records (Fig. 1) from the sources. Of the initially captured records, 58 duplicates were eliminated. The remaining 268 records were retained for title and abstract review. While going through the title and abstract screening, a total of 216 records were excluded, and a total of 52 records were selected for full review. In the full article review only 21 were matched as per the study objective, which are included in this systematic review. The articles excluded for the final review were due to different reasons. Among the excluded articles, 9 were based on only summary statistics, 11 were based on bivariate or multivariate analysis using Chi-square and other statistical techniques but not dealt with reference values. Other 5 articles were theory based mathematical models, not discussed about outcomes and predictors, and 6 papers did not have access for its full text download because electronic versions of these papers were not available in the database. The excluded 25 papers were from different countries (Korea, France, United Stated, Nepal, Malaysia, Morocco, Massachusetts, Taiwan, Vietnam, Spain, Singapore, Congo, Canada).

References for Table 1 are [4, 5, 9–16, 21–31]

Table 1: Studies characteristics (n = 21).

Authors	Title of the study	Country	Study design	Sample (Source)	Statistical model	Significant factors with effect Size
Aazbih et al., 2023 [4]	Determinants of time to first marriage and birth intervals among women of child bearing age in Dabat Health and demographic surveillance system site, Northwest Ethiopia	Ethiopia	CS	1683 (FS)	Log-normal regression	**Divorce before 1st birth:** yes w.r.t. no (TR:1.86, 95%C.I.:1.62-2.15, p < 0.001); **Ideal children:** 5+ w.r.t. <= 4 (TR:0.88, 95%C.I.:0.79-0.99, p < 0.05); **Women empowerment:** none w.r.t. empowered (TR:0.86, 95%C.I.:0.76-0.96, p < 0.05); **Women marriage cohort:** before 1990 w.r.t. 1990-1999 (TR:1.33, 95% CI:1.14-1.57, p < 0.001), 2000-2009 (TR:0.76, 95%C.I.:0.63-0.92, p<0.01), 2010-2019 (TR:0.73, 95% CI:0.54-0.98, p < 0.05).
Bitew et al., 2021 [10]	Time to first birth and its determinants among married female youths in Ethiopia, 2020: survival analysis based on EDHS 2016	Ethiopia	CS	2597 (EDHS 2016)	Cox regression	**Residence:** rural w.r.t. urban (AHR:1.49, 95%C.I.:1.13-1.97, p < 0.05); **Religion:** Muslim w.r.t. Orthodox (AHR:1.57, 95%C.I.:1.22-2.02, p < 0.001), Protestant (AHR:1.73, 95%C.I.:1.34-2.24, p < 0.001); **Age at first sex:** <15 w.r.t. >=18 (AHR:1.68, 95%C.I.:1.23-2.29, p < 0.001), 15-17 (AHR:1.54, 95%C.I.:1.29-1.85, p < 0.001); **Age at first marriage:** <15 w.r.t. >=18 (AHR:6.52, 95%C.I.:4.91-8.64, p < 0.001), 15-17 (AHR:2.63, 95%C.I.:2.20-3.14, p < 0.001); **Demand for contraceptive:** unmet need w.r.t. met need (AHR:1.23, 95%C.I.:1.00-1.52, p < 0.05).
Chernet et al., 2019 [16]	Determinant of time-to-first birth interval after marriage among Ethiopian women	Ethiopia	CS	7925 (EDHS 2011)	Log-normal gamma shared frailty model	**Place of residence:** urban w.r.t. rural ($\varphi = 1.292$, 95%C.I.:1.231-1.357, p<0.001); **Employment status:** employed w.r.t. unemployed ($\varphi = 1.080$, 95%C.I.:1.042-1.120, p<0.001); **Contraceptive user:** user w.r.t. non-user ($\varphi = 1.116$, 95%C.I.:1.072-1.162, p<0.001); **Women education:** primary w.r.t. no education ($\varphi = 0.828$, 95%C.I.:0.796-0.862, p<0.001).
Dehesh et al., 2022 [12]	Associated factors of first-birth interval among women in reproductive age, addressing maternal and child health	Iran	CS	1350 (FS)	Cox regression	**Women's education:** university education w.r.t. illiterate (HR:1.473, 95%C.I.:1.35-2.57, p = 0.026); **Contraceptive user:** user w.r.t. not user (HR:2.275, 95%C.I.:1.12-2.86, p <0.001); **Husband's education:** university education w.r.t. illiterate (HR:1.392, 95%C.I.:1.32-2.51, p = 0.021); **Place of residence:** town w.r.t. rural (HR:2.041, 95%C.I.:1.26-2.95, p = 0.031); **Family Income:** (HR:2.255, 95%C.I.:1.12-2.96, p < 0.001); **Husband's employment:** employed w.r.t. none (HR:1.853, 95%C.I.:1.52-3.05, p = 0.021).
Dewau et al., 2021 [5]	Time to first birth and its predictors among reproductive-age women in Ethiopia: inverse Weibull gamma shared frailty model	Ethiopia	CS	15626 (EDHS 2016)	Inverse-Weibull gamma shared frailty	**Region:** oromia w.r.t. most urban (AHR: 1.18, 95%C.I.:1.06-1.30, p < 0.01), SNNP (AHR: 1.19, 95%C.I.:1.06-1.33, p < 0.01), eastern (AHR: 1.16, 95%C.I.:1.05-1.28, p < 0.01), western (AHR: 1.37, 95%C.I.:1.24-1.52, p < 0.01); **Education:** secondary w.r.t. no education (AHR: 0.86, 95%C.I.:0.78-0.96, p < 0.01), higher (AHR: 0.75, 95%C.I.:0.65-0.85, p < 0.01); **Wealth index:** richer w.r.t. poorest (AHR: 1.10, 95%C.I.:1.01-1.19, p < 0.05); **Spouse age difference:** >= 5 years w.r.t. < 5 years (AHR: 1.11, 95%C.I.:1.05-1.16, p < 0.01); **Contraceptive use:** ever use w.r.t. ever not use (AHR: 0.91, 95%C.I.:0.86-0.97, p < 0.01); **Age at first marriage:** 15-17 years w.r.t. >= 18 years (AHR: 2.33, 95%C.I.:2.08-2.63, p < 0.01); **Age at first sex:** < 15 years w.r.t. >= 18 years (AHR: 27.78, 95%C.I.:23.26-32.26, p < 0.01), 15 – 17 years (AHR: 2.60, 95%C.I.:2.07-2.63, p < 0.01); **Religion:** Muslim w.r.t. Orthodox (AHR: 1.10, 95%C.I.:1.03-1.19, p < 0.01); **Intercourse and marriage:** 15-17 intercourse <15 marriage w.r.t. > 18 intercourse and marriage (AHR: 4.55, 95%C.I.:2.13-10.02, p < 0.01), 15-17 intercourse 15-17 marriage (AHR: 0.025, 95%C.I.:0.016-0.039, p < 0.01).
Fagbamigbe & Idemudia, 2016 [21]	Survival analysis and prognostic factors of timing of first childbirth among women in Nigeria	Nigeria	CS	39,104 (NDHS 2013)	Cox PH	**Region:** North East w.r.t. South West (AHR: 1.20, 95%C.I.:1.13-1.28, p <0.05), North West (AHR: 1.26, 95%C.I.:1.18-1.35, p <0.05); **Residence:** rural w.r.t. urban (AHR: 1.15, 95%C.I.:1.12-1.19, p <0.05); **Education:** no education w.r.t. higher (AHR: 3.36, 95%C.I.:3.17-3.55, p <0.05), primary (AHR: 3.24, 95%C.I.:3.08-3.42, p <0.05), secondary (AHR: 1.79, 95%C.I.:1.71-1.88, p <0.05); **Age at first marriage:** before 15 years w.r.t. never married (AHR: 0.19, 95%C.I.:0.18-0.20, p <0.05), 15-19 years (AHR: 6.31, 95%C.I.:5.92-6.56, p <0.05), 20+ years (AHR: 3.02, 95%C.I.:2.92-3.13, p <0.05); **Religion:** other Christian w.r.t. Catholics (AHR: 1.08, 95%C.I.:1.03-1.13, p <0.05), Islam (AHR: 1.16, 95%C.I.:1.10-1.23, p <0.05), others (AHR: 1.21, 95%C.I.:1.09-1.35, p <0.05); **Ethnicity:** Igbo/Ibiobio(AHR: 0.85, 95%C.I.:0.78-0.93, p <0.05), Hausa/Fulani (AHR: 1.16, 95%C.I.:1.09-1.24, p <0.05); **Pregnancy termination:** yes w.r.t. no (AHR: 1.09, 95%C.I.:1.05-1.13, p <0.05); **Ever used contraceptive:** no w.r.t. yes (AHR: 0.79, 95%C.I.:0.76-0.81, p <0.05).
Faruk, 2018 [15]	The comparison of proportional hazards and accelerated failure time models in analyzing the first birth interval survival data	Indonesia	CS	27488 (IDHS 2012)	Log-normal AFT model	**Women education level:** primary w.r.t. no education ($\hat{\beta} = -0.079$, p <0.05), secondary & above ($\hat{\beta} = -0.197$, p <0.001); **Husband's education level:** primary w.r.t. no education ($\hat{\beta} = -0.131$, p <0.001), secondary & above ($\hat{\beta} = -0.179$, p <0.001); **Contraceptive knowledge:** yes w.r.t. no ($\hat{\beta} = -0.438$, p <0.001); **Wealth index:** middle & above w.r.t. poor ($\hat{\beta} = -0.027$, p <0.001); **Employment status:** yes w.r.t. no ($\hat{\beta} = 0.047$, p <0.001).
Fentaw et al., 2022 [22]	Bayesian Shared Frailty Models for Time to First Birth of Married Women in Ethiopia: Using EDHS 2016	Ethiopia	CS	8810 (EDHS 2016)	Bayesian Weibull-gamma shared frailty	**Contraceptive use:** no w.r.t. yes (Me=0.1134, 95%C.I.:0.06222–0.1643, p <0.05); **Residence:** rural w.r.t. urban (Me=0.2112, 95%C.I.:0.1392 – 0.2837, p <0.05); **Age at first marriage:** 18-34 w.r.t. <18 (Me= -1.385, 95%C.I.:-1.434 – -1.336, p <0.05), greater than 34 (Me= -2.864, 95%C.I.:-3.415 – -2.372, p <0.05); **Husband education level:** primary w.r.t. no education (Me=0.0998, 95%C.I.:0.0461–0.1549, p <0.05), secondary or above (Me=0.1148, 95%C.I.:0.0388–0.1893, p <0.05); **Mother education level:** primary w.r.t. no education (Me=0.1826, 95%C.I.:0.1272–0.2382, p <0.05); **Media exposure:** yes w.r.t. no (Me= -0.1168, 95%C.I.: -0.174 – -0.0585, p <0.05); **Sex of household head:** female w.r.t. male (Me= -0.1682, 95%C.I.: -0.2243 – -0.1124, p <0.05).
Gurmu & Etana, 2014 [23]	Age at First Marriage and First Birth Interval in Ethiopia: Analysis of the Roles of Social and Demographic Factors	Ethiopia	CS	10240 (EDHS 2005)	Cox Regression	**Region:** Tigray w.r.t. Amhara (HR=1.28, p <0.001), Oromia (HR=1.65, p <0.001), SNNP (HR=1.63, p <0.001), Eastern Peripheral (HR=1.30, p <0.001), Western Peripheral (HR=1.32, p <0.001), others (HR=1.59, p <0.001); **Place of residence:** urban w.r.t. rural (HR=0.86, p <0.001), Addis Ababa (HR=0.84, p <0.01); **Religion:** Protestant w.r.t. Orthodox (HR=1.17, p <0.001), Muslim (HR=1.07, p <0.05); **Age at first marriage:** less than15 w.r.t. 18-20 (HR=0.69, p <0.001), 15-17 (HR=0.87, p <0.001); **Marriage cohort:** before 1980 w.r.t. 2000-2005 (HR=0.84, p <0.001), 1980-1989 (HR=0.89, p <0.01); **Women's education:** primary w.r.t. no education (HR=1.16, p <0.001), secondary & above (HR=1.20, p <0.001).
Kunnuji et al., 2018 [24]	A survival analysis of the timing of onset of childbearing among young females in Nigeria: are predictors the same across regions?	Nigeria	CS	14619 (NDHS 2013)	Cox PH	**Education:** secondary w.r.t. no education (AHR=0.70, 95%C.I.:0.64-0.77, p < 0.001), higher (AHR=0.36, 95%C.I.:0.29-0.45, p < 0.001); **Wealth index:** poorer w.r.t. poorest (AHR=0.89, 95%C.I.:0.83-0.96, p < 0.01), middle (AHR=0.86, 95%C.I.:0.79-0.94, p < 0.01), richer (AHR=0.72, 95%C.I.:0.65-0.81, p < 0.001), richest (AHR=0.56, 95%C.I.:0.49-0.64, p < 0.001); **Ever/never married:** ever married/cohabited (AHR=0.10.60, 95%C.I.:9.56-11.75, p < 0.001); **Region:** North East w.r.t. North Central (AHR=1.24, 95%C.I.:1.12-1.37, p < 0.001), North West (AHR=1.21, 95%C.I.:1.10-1.33, p < 0.001), South-South (AHR=1.45, 95%C.I.:1.29-1.62, p < 0.001), South West (AHR=1.14, 95%C.I.:1.01-1.29, p < 0.05).

Mhele, 2015 [25]	Determinants of Time to First Birth among Women in Ages 15-24 in Swaziland	Swaziland	CS	2320 (DHS 2007)	Cox PH	**Education:** secondary w.r.t. primary or less (HR=0.73, 95%C.I.:0.60-0.88, p < 0.001), secondary+ (HR=0.48, 95%C.I.:0.34-0.67, p < 0.001); **Sexual debut:** 15 years w.r.t. < 15 years (HR=0.48, 95%C.I.:0.35-0.65, p < 0.001), 16 years (HR=0.39, 95%C.I.:0.29-0.52, p < 0.001), 17 years (HR=0.26, 95%C.I.:0.18-0.35, p < 0.001), >17 years (HR=0.11, 95%C.I.:0.08-0.15, p < 0.001); **Contraceptive use:** after birth w.r.t. before birth (HR=4.4, 95%C.I.:3.44-5.55 p < 0.001); **Marital status:** married after birth w.r.t. never married (HR=1.49, 95%C.I.:1.18-1.86, p < 0.001); **Household size:** 7-8 w.r.t. 1-4 (HR=1.29, 95%C.I.:1.01-1.64, p < 0.001), 9 and above (HR=1.26, 95%C.I.:1.01-1.57, p < 0.001); **Residence:** town w.r.t. large city (HR=1.50, 95%C.I.:1.14-1.96, p < 0.001), rural (HR=1.33, 95%C.I.:1.04-1.67, p < 0.05); **Religion:** Manzini w.r.t. Hhohho (HR=0.83, 95%C.I.:0.69-0.99, p < 0.05).
Miri & Malaki Moghadam, 2017 [26]	Determinants of Marriage to First Birth Interval in Birjand, Iran: A Retrospective-Prospective Cohort and Survival Analysis	Iran	CS	180 (FS)	Cox regression	**Type of marriage:** familiar w.r.t. non-familiar (HR=1.648, 95%C.I.:1.047-2.593, p = 0.03); **Place of residence:** urban w.r.t. rural (HR=0.577, 95%C.I.:0.352-0.946, , p = 0.03); **Family income:** 501000 to 1000000 w.r.t. over 1.5 million (HR=0.324, 95%C.I.:0.113-0.927, , p = 0.01); **Insurance covered:** yes w.r.t. no (HR=11.581, 95%C.I.:4.118-32.568, , p < 0.001); **Desired to have a son:** yes w.r.t. no (HR=1.827, 95%C.I.:1.212-2.753, , p = 0.003).
NATH et al., 1999 [11]	Effects of the Status of Women on the First-Birth Interval in Indian Urban Society	India	CS	1650 (FS)	Cox regression	**Age at marriage:** 17-25 years w.r.t. 15-17 ($\beta=-0.3875$, p < 0.001), >= 25 ($\beta=-0.1461$, p < 0.01); **Female education:** E<LP w.r.t. >= HSSLC ($\beta=0.3224$, p < 0.001), LP<=E< HSSLC ($\beta=0.2345$, p < 0.01); **Female current age:** < 25 years w.r.t. >= 30 years ($\beta=0.2823$, p < 0.001), 25-30 years ($\beta=0.3396$, p < 0.001); **Decision participation:** in all cases w.r.t. in some or no cases ($\beta=-0.1135$, p < 0.05); **Per capita income:** PCI <Rs. 500 w.r.t. >= 1000 ($\beta=0.2184$, p < 0.05), Rs. 500-1000 ($\beta=0.2165$, p < 0.01); **Social status:** low w.r.t. high ($\beta=0.3627$, p < 0.01), middle ($\beta=0.1158$, p < 0.05).
Nath et al., 1993 [9]	Age of Marriage and Length of the First Birth Interval in a Traditional Indian Society: Life Table and Hazards Model Analysis	India: Assam and Uttar Pradesh	CS	1998 (FS)	Cox PH	**Age at marriage:** <= 13 years w.r.t. >= 17 years ($\beta=-0.5436$, p < 0.01), 14 years ($\beta=-0.2583$, p < 0.01), 15 & 16 years ($\beta=-0.1311$, p < 0.01); **Present age:** < 20 years w.r.t. 20-30 years ($\beta=-0.5923$, p < 0.01), 30-35 years ($\beta=-0.1059$, p < 0.05); **Women's occupation:** household work w.r.t. other ($\beta=-0.2280$, p < 0.01); **Income group:** middle w.r.t. rich ($\beta=-0.0693$, p < 0.05).
Negash & Asmamaw, 2022 [27]	Time to first birth and its predictors among reproductive age women in high fertility countries in Sub-Saharan Africa: Inverse Weibull gamma shared frailty model	Sub-Saharan Africa: Niger, Democratic Republic of Congo, Mali, Chad, Angola, Burundi, Nigeria, Gambia, and Burkina Faso	CS	186771 (DHS 2010 -18)	Inverse-Weibull gamma shared frailty	**Residence:** rural w.r.t. urban (AHR=1.02, 95%C.I.:1.00-1.04); **Occupation of respondent:** agricultural employee w.r.t. no working (AHR=1.14, 95%C.I.:1.13-1.17), non-agricultural employee (AHR=1.06, 95%C.I.:1.05-1.08); **Age at first sex:** < 15 years w.r.t. >= 18 years (AHR=1.57, 95%C.I.:1.54-1.61), 15 - 17 years (AHR=1.41, 95%C.I.:1.38-1.43); **Age at first marriage:** < 15 years w.r.t. >= 18 years (AHR=5.47, 95%C.I.:5.37-5.57), 15 -17 years (AHR=3.27, 95%C.I.:3.22-3.32); **Demand for contraceptive:** unmet need for contraceptive w.r.t. no demand (AHR=1.39, 95%C.I.:1.37-1.42), met need for contraceptive (AHR=1.32, 95%C.I.:1.30-1.35); **Spousal age gap:** >= 5 years w.r.t. < 5 years (AHR=1.17, 95%C.I.:1.15-1.19); **Contraceptive knowledge:** no w.r.t. yes (AHR=1.02, 95%C.I.:1.01-1.04).
Saadati & Bagheri, 2020 [28]	Analysing First Birth Interval by A CART Survival Tree	Iran	CS	610 (FS)	Cox PH	**Kinship:** non-family w.r.t. family (HR= 1.374, P = 0.005); **Partner's race:** Turk w.r.t. Fars (HR= 1.272, P = 0.037).
Saadati et al., 2017 [29]	Marriage to First Birth Interval; A Cross-Sectional Study in Tehran (Iran)	Iran	Cs	610 (FS)	Cox PH	**Education:** secondary and high school w.r.t. MS & PhD (HR = 2.111, p = 0.002), Diploma (HR = 1.632, p = 0.014).
Shayan, 2014 [30]	Prognostic factors of first birth interval using the parametric survival models	Iran	CS	858 (FS)	Cox PH	**Age at marriage:** HR = 1.03, p=0.006**; Education:** primary and middle school w.r.t. illiterate (HR=1.33, p = 0.03); **Menstrual status:** regular w.r.t. irregular (HR=1.68, p <0.001).
					Log-logistic	**Age at marriage:** TR = 0.98, p < 0.001**; Education:** primary and middle school w.r.t. illiterate (TR=0.90, p = 0.03); **Menstrual status:** regular w.r.t. irregular (TR=0.82, p = 0.001).
					Generalized Gamma	**Age at marriage:** TR = 0.99, p = 0.006**; Education:** primary and middle school w.r.t. illiterate (TR=0.90, p = 0.007); **Menstrual status:** regular w.r.t. irregular (TR= 0.88, p = 0.004).
Singh et al., 2012 [13]	Determinants of Birth Intervals in Tamil Nadu in India: Developing Cox Hazard Models with Validations and Predictions	India	Cs	3948 (NFHS-I 1992)	Cox PH	**Education:** >=high school w.r.t. illiterate ($\exp(\beta)$=0.58, 95%C.I.:0.38-0.90); **Ever contraceptive use:** yes w.r.t. no ($\exp(\beta)$=0.70, 95%C.I.:0.52-0.93); **Ever fatal loss:** yes w.r.t. no ($\exp(\beta)$=0.70, 95%C.I.:0.50-0.97); **Survival status of index child:** alive w.r.t. dead ($\exp(\beta)$= 1.86, 95%C.I.:1.18-2.96).
Tavares, 2016 [31]	Who Delays Childbearing? The Associations Between Time to First Birth, Personality Traits and Education	Britain	CS	5754 (FS)	Log-logistic regression	**Education:** A-level w.r.t. below A-level (Coeff. = 0.099, SE=0.026, p < 0.001), above A-level (Coeff. = 0.202, SE=0.019, p < 0.001).
Zhenzhen, 2000 [14]	Social–Demographic Influence on First Birth Interval in China, 1980–1992	China	CS	46209 (NFFPS 1992)	Cox regression	**Place of residence:** rural w.r.t. urban (Coeff. = 0.0549, S.E.=0.0198, p < 0.005); **Education:** illiteracy w.r.t. middle school (Coeff. = -0.0887, S.E.=0.0163, p < 0.001), high school or higher (Coeff. = -0.0686, S.E.=0.0167, p < 0.001); **Age at marriage:** 15-19 years w.r.t. 20-24 (Coeff. = -0.0964, S.E.=0.0132, p < 0.001), 30+ years (Coeff. = -0.2312, S.E.=0.0588, p < 0.001); **Month of marriage:** Jan.-Mar. w.r.t. Oct.-Dec. (Coeff. = 0.1731, S.E.=0.0127, p < 0.001), Apr.-Sept. (Coeff. = 0.1498, SE=0.0127, p < 0.001); **Marriage cohort:** 1980-84 w.r.t. 1990-92 (Coeff. = 0.1789, S.E.=0.0169, p < 0.001), 1885-89 (Coeff. = 0.2079, S.E.=0.0165, p < 0.001).

AFT = Accelerated Failure Time, AHR = Adjusted Hazard Ratio, C.I.= Confidence Interval, Coeff. = Coefficient, CS = Cross-sectional, DHS = Demographic Health Survey, FS = Field Survey, HR= Hazard Ratio, ME = Marginal Effect, NFFPS = National Fertility and Family Planning Survey, NFHS-I= National Family Health Survey-1, OR = Odds Ratio, p = p-value, S.E. = Standard Error, w.r.t = with reference to, TR = Time Ratio.

All twenty-one (100%) articles included in the study were based observational or cross-sectional study design, of them nine (43.9%) studies were based on primary data and remaining 57.1% studies were based on secondary data. The number of samples included in the study were ranged from 180 participants (primary data) to 186771 (DHS data of nine countries of Sub-Saharan Africa) participants. Of the reviewed articles; seven (33.3%) articles were published in between 2020 to 2023, elven (52.4%) articles were published in between 2011 to 2019, and three (14.3%) articles were published in between 1990 to 2000. Ten (47.6%) of the twenty-one studies included in the review were conducted in Africa (Ethiopia - 6, Nigeria – 2, Sub-Saharan Africa -1 and Swaziland - 1). Of the eleven remaining studies, five were from Iran, three were from India and one each from Britain (UK), China and Indonesia. Fig. 2 represents the number of studies conducted in the country. Fig.3 represents the proportion of studies by World Health Organization (WHO) regional classification. According to WHO regional classification; ten (47.6%) studies were captured from Africa (Ethiopia, Nigeria, Sub-Saharan Africa and Swaziland), five (23.8%) form Eastern Mediterranean (Iran), four (19.0%) from South East Asia (India and Indonesia), and one (4.8%) each from Europe (Britain) and Western Pacific (China). According to World Bank country classifications by income level 202-23; six (28.6%) studies were of low-income countries, twelve (57.1%) studies were of lower middle-income countries and one (4.8%) was of low-income & middle-income country representing by Sub-Sharan Africa. Remaining one study

was of upper middle-income country, and the another one was of high-income country.

This study has explored thirty-nine significant predictors connected with FBI after marriage, where measurements of these predictors were found to be varied across studies. A detailed description of the outcome measure and how the effect size is commonly measured has indicated in table 1. The effect size of outcomes in the studies also varied significantly from study to study and place to place. The significance of effect size measured in majority of the studies were obtained either by HR or AHR or β – coefficient at 95% CIs or $p < 0.05$. Nineteen (90.5%) studies out of twenty-one explored two or more than two significant predictors connected with FBI after marriage. Fifteen (71.4%) studies indicated that female's education is one of the major determinants, associated with time to first birth after marriage, while ten (47.6%) studies indicated the place of residence as a significant factor. Other two factors such as; age at first marriage and contraceptive use were explored in nine (42.9%) studies. Likewise, religion was identified in five (23.8%) studies, place of region and wealth index were identified in four (19.0%) studies, and age at first sex, marriage cohort and husband education were identified in three (14.3%) studies. Similarly, type of occupation, family income, employment status, contraceptive knowledge, spouse age difference and current age were identified in two (9.5%) studies. Other 23 remaining single factors were not mutually common to any of the studies.

Fig. 4 describes the number of factors explored in the reviewed articles.

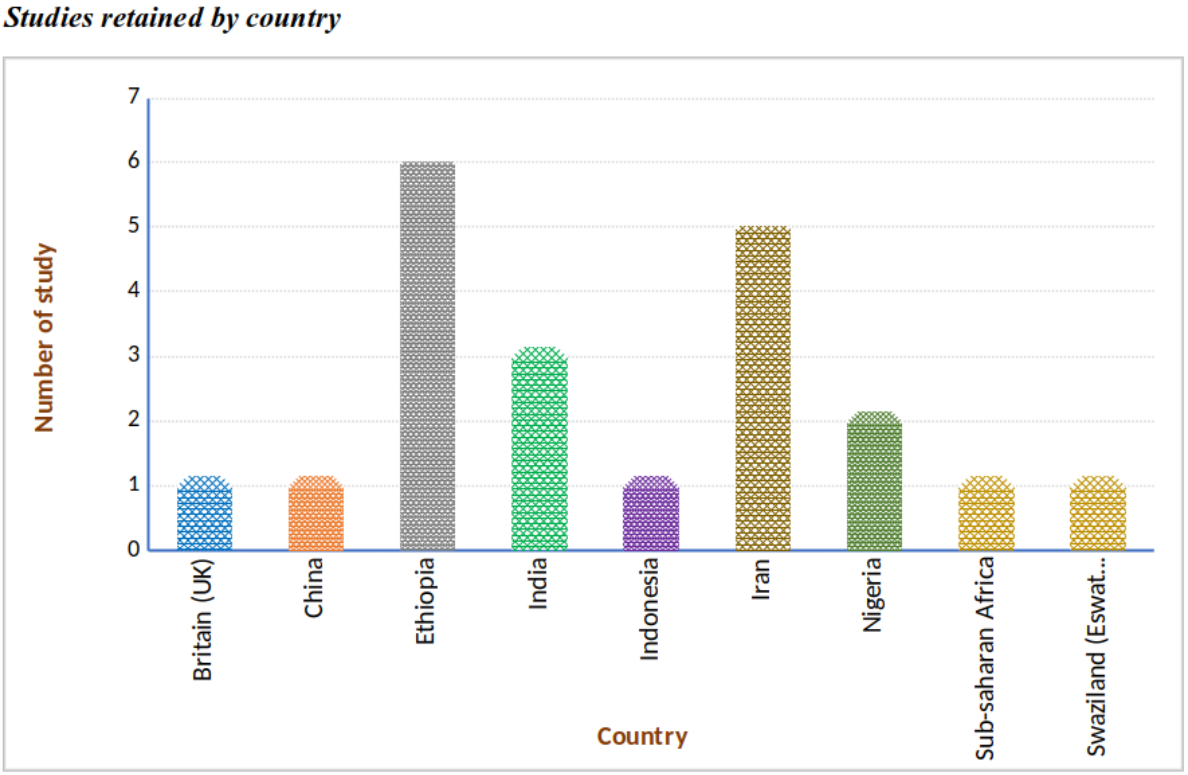

Figure 2: Articles captured from the countries.

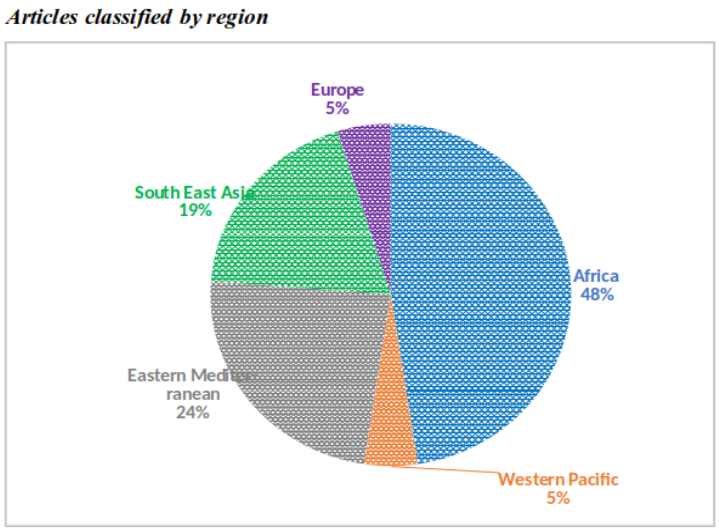

Figure 3: Studies included in the review according to WHO regional classification.

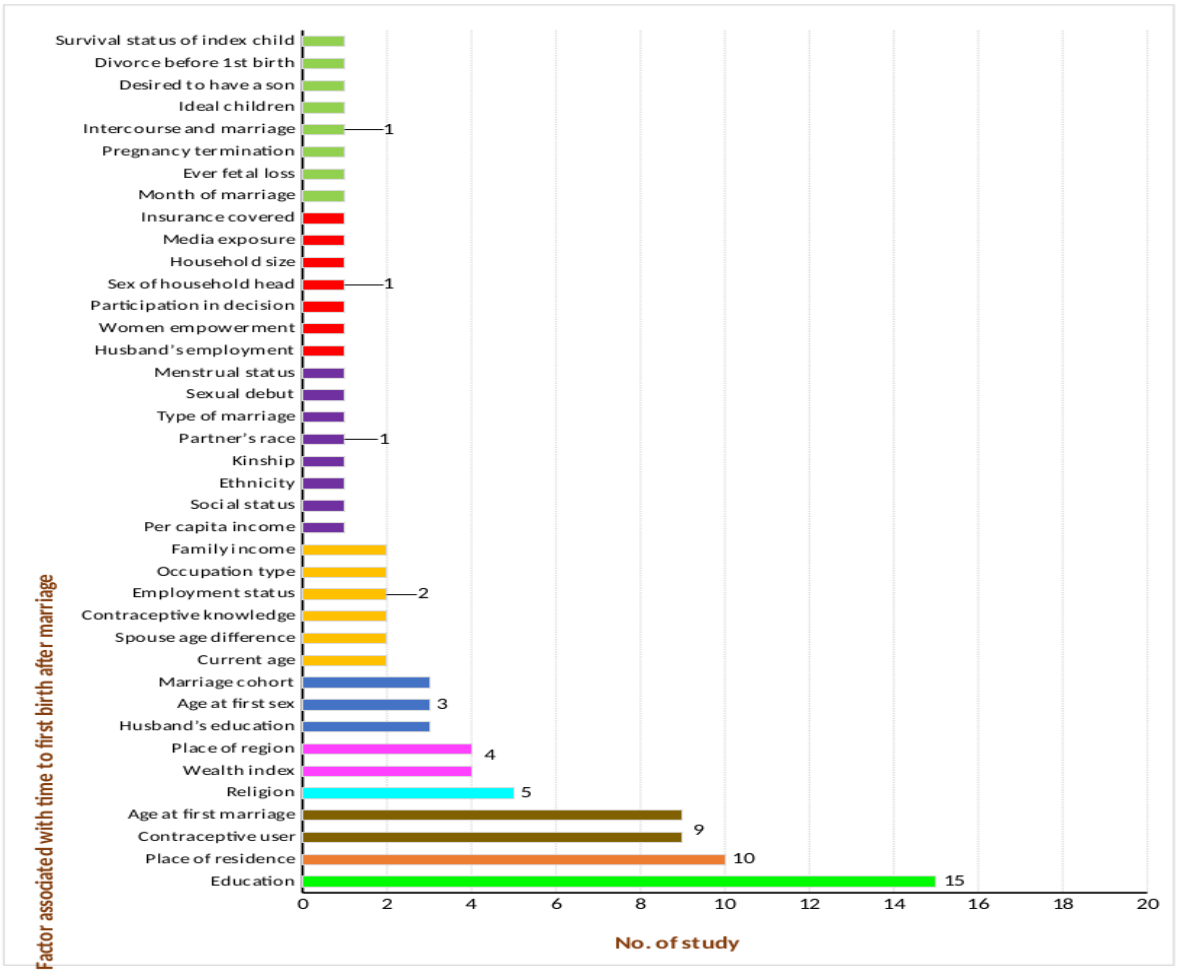

Figure 4: Factors associated with FBI after marriage.

3.1 Statistical models used

All 21 studies incorporated in this systematic review had applied statistical model(s) considering the data as time to occur the event. The occurrence of first child birth has considered as 'event', and the time interval till the occurrence of first child birth has considered as 'time'. The time is consid-

ered censored for a female who did not have first child birth till the study period. The response variable is the time to first birth of females. There are different models available in statistical literature for handling the time to event data or the data related to survival analysis in order to identify the factors associated with the outcome and to quantify the effect of each independent variable on the response variable. Among these methods Cox Proportional Hazard (CPH) or simply Cox regression [32] is the most popular model since it is considered as the robust technique. Out of these 21 studies, thirteen studies were found to be applied the Cox regression model, one study had applied Cox regression, log-logistic, and generalized gamma parametric model, two studies had used lognormal AFT model and other two studies had used Inverse Weibull gamma shared frailty model. Of the other remaining studies, one study used lognormal shared frailty model, another one study used Bayesian Weibull-gamma shared frailty model, and the other one applied log-logistic model (as shown in table1).

Studies applying Cox regression reported regression coefficient (β) or HR (hazards ratio) which is the exponentiation of the regression coefficient $\left(e^{\beta}\right)$ for each independent variable. The effect size of each independent variable used in the model along with 95% confidence interval was also reported. It is easier to interpret HR as compared to regression coefficient. The reference value of HR is 1; if the value of HR >1, it indicates the increase in the risk of the occurrence of event due to the presence of certain predictor, and if HR $<$ 1, it shows the decrease in the risk of the occurrence of event. For an instance, if HR = 3.36 for those females who have no education with respect to those who have higher education indicates that the hazards of first birth is 3.36 times more among females with no education in comparison to females having higher education [21]. Among those studies which had applied Cox regression model, only 7 studies checked the proportionality of hazards assumption. Proportionality of hazards assumption is required to be met for the Cox PH model. None of these 14 studies had attempted for regression diagnostics tests.

In order to apply the statistical model(s), if one is able to capture the distribution of time until the event occurs then the parametric model may be applied. In this study, Aazbih et al.(2023) [4] had applied lognormal AFT model in order to quantify the effect of independent variables on time to first birth. AFT models can be used as an alternative to proportional hazards (PH) model if the constant proportionality assumption is violated [15]. Time Ratio (TR) with 95% confidence interval is generally reported in AFT models. It is also the exponentiation of regression coefficient of a predictor. The reference value of TR is also equal to 1 similar to HR. However, the interpretation of TR is a bit different than HR. If TR >1, it signifies that the time to first birth is longer, and if TR <1, it indicates that the time to first birth is a shorter. If TR = 0.86, for those women who had not empowered for the decision of household's expenditure in comparison with those women who had empowered for the decision of household's expenditure. This indicates that there is shorter first birth interval for those women who had not empowered to their counterparts [4]. Faruk, 2018 [15] applied Cox PH model, AFT models based on exponential distribution, Weibull distribution and lognormal distribution, and finally selected the lognormal AFT model having the minimum Akaike information criterion (AIC). Furthermore, this study had indicated that the PH assumption was also not met by this first birth interval in this dataset. In this study, only the regression coefficient with 95% confidence interval was reported but not reported TR. Both these studies; Aazbih et al., 2023 [4] and Faruk, 2018 [15] also did not attempt to perform regression diagnostics except the use of AIC criteria. Dewau et al.(2021) [5] had applied Inverse-Weibull gamma shared frailty regression model and reported HR for each independent predictor used in the model, which was associated with time to first birth. It was reported that the data were correlated to cluster level, and in order to capture this structure of the dataset, the shared frailty models were used. Enumeration areas or clusters were used as random effects predictors in the model. By exploring different shared frailty models such as lognormal gamma, lognormal inverse Gaussian, log-logistic gamma, log-logistic inverse Gaussian, inverse-Weibull gamma and inverse-Weibull inverse Gaussian, finally, the inverse-Weibull gamma shared frailty was considered as the best model for this data set. In order to select the best plausible model, different criteria such as log-likelihood, AIC, etc. were applied. Similarly, Negash & Asmamaw(2022) [27] had also recommended the inverse-Weibull gamma shared frailty model after exploring Gompertz gamma shared frailty along with this. In order to select the best model in this study too, the same criteria was used as used by Dewau et al.(2021) [5]. Both the studies have examined the PH assumption, and reported HR for each independent variable associated with time to first birth. Fentaw et al.(2022) [22] had explored different parametric shared frailty models including Cox PH model. Bayesian approach of standard Weibull and Weibull with gamma shared frailty model was also compared based on AIC, Bayesian Information Criterion (BIC) and Deviance Information Criteria (DIC), and recommended the Bayesian Weibull-gamma shared frailty model as the best model in this dataset. Median with 95% C.I. was reported for each predictor associated with

time to first birth. Tavares(2016) [31] had applied the log-logistic regression model for the time to first child birth as the error terms follow the logistic regression.

3.2 Thematic factors

All identified significant factors associated with FBI after marriage are further classified into the following six thematic group namely; ***i) Socioeconomic factor 13 (33.3%):*** Education, household size, family income, per capita income, wealth index, ideal children, social status, husband's education, husband's employment, women empowerment, occupation type, employment status, insurance covered; ***ii) Reproductive health factor 8 (20.5%):*** Menstrual status, pregnancy termination, ever fetal loss, survival status of index child, sexual debut, contraceptive use, contraceptive knowledge, intercourse and marriage; ***iii) Demographic factor 6 (15.4%):*** Current age, age at first marriage, age at first sex, marriage cohort, spouse age difference, month of marriage; ***iv) Cultural factor 5 (12.8%):*** Ethnicity, religion, kinship, type of marriage, divorce before 1st birth; ***v) Community factor 4 (10.3%):*** Place of residence, place of region, partner's race, media exposure; and **vi)** ***Gender factor 3 (7.7%):*** Sex of household head, participation in decision, desired to have a son. Fig. 5 shows the distribution factors according to thematic classification.

3.3 Factors explored in the region

Studies captured from five different regions explored a total of thirty-nine significant factors found to be associated with time to first birth after marriage. Of them, twenty-one (53.8%) factors were explored in Africa, twelve (30.8%) factors in the Eastern Mediterranean, one (2.6%) factor in Europe and fourteen (35.9%) factors in South-East Asia. Table 2 has indicated the region wise presence of determinants associated with FBI after marriage.

3.4 Common factors explored in the regions

In the study ten factors were found to be mutually common for two or more than two regions. The factor "level of education" was common in five regions i.e. "South East Asia", "Africa", "Eastern Mediterranean", "Europe" and "Western Pacific" regions. The factor "place of residence" was common in Africa, Western Pacific and Eastern Mediterranean regions. The factors "contraceptive used" and "wealth index" were common in "Africa", "Eastern Mediterranean" and "South East Asia". Likewise, the factor "age at first marriage" was common in Africa and Western Pacific regions. Three factors 'husband education', 'contraceptive knowledge' and 'employment status' were common in Africa and Western Pacific regions. Similarly, the factor 'type of occupation is common in Africa and South East Asia, the factor 'marriage cohort' was common in African and Western Pacific regions. Fig.6 shows the distribution of common factors associated with FBI after marriage.

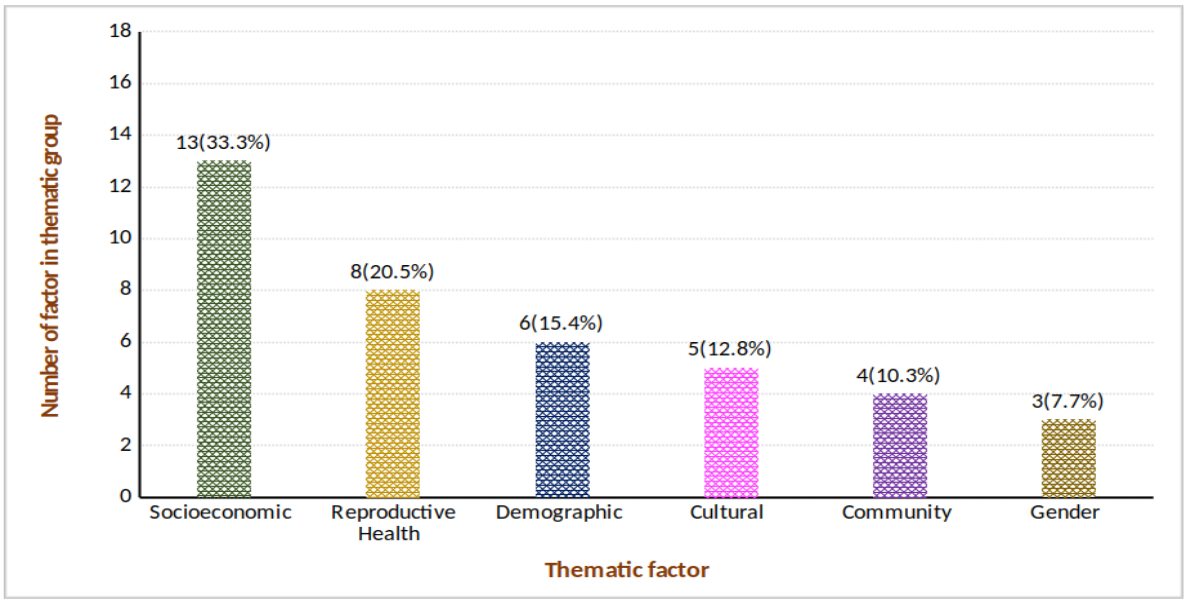

Figure 5: Thematic determinants associated with FBI after marriage.

Table 1: Regional Factors.

Regions	Factors	n (%)
Africa	Level of education, place of residence, place of region, contraceptive use, religion, age at first marriage, marriage cohort, age at first sex, employment status, husband wealth index, spouse age difference, intercourse and marriage, ethnicity, pregnancy termination, contraceptive knowledge, media exposure, sex of household head, sexual debut, household size, type of occupation.	21 (53.8)
Eastern Mediterranean	Level of education, place of residence, contraceptive use, husband education level, family income, husband's employment, type of marriage, insurance covered, desired to have a son, kinship, partner's race, menstrual status.	12 (30.8)
Europe	Level of education.	1(2.6)
South-East Asia	Level of education, age at first marriage, contraceptive use, employment status, husband education level, wealth index, contraceptive knowledge, current age, decision participation, per capita income, social status, type of occupation, ever fetal loss, survival status of index child.	14(35.9)
Western Pacific	Level of education, place of residence, age at first marriage, marriage cohort, month of marriage.	5(12.8)

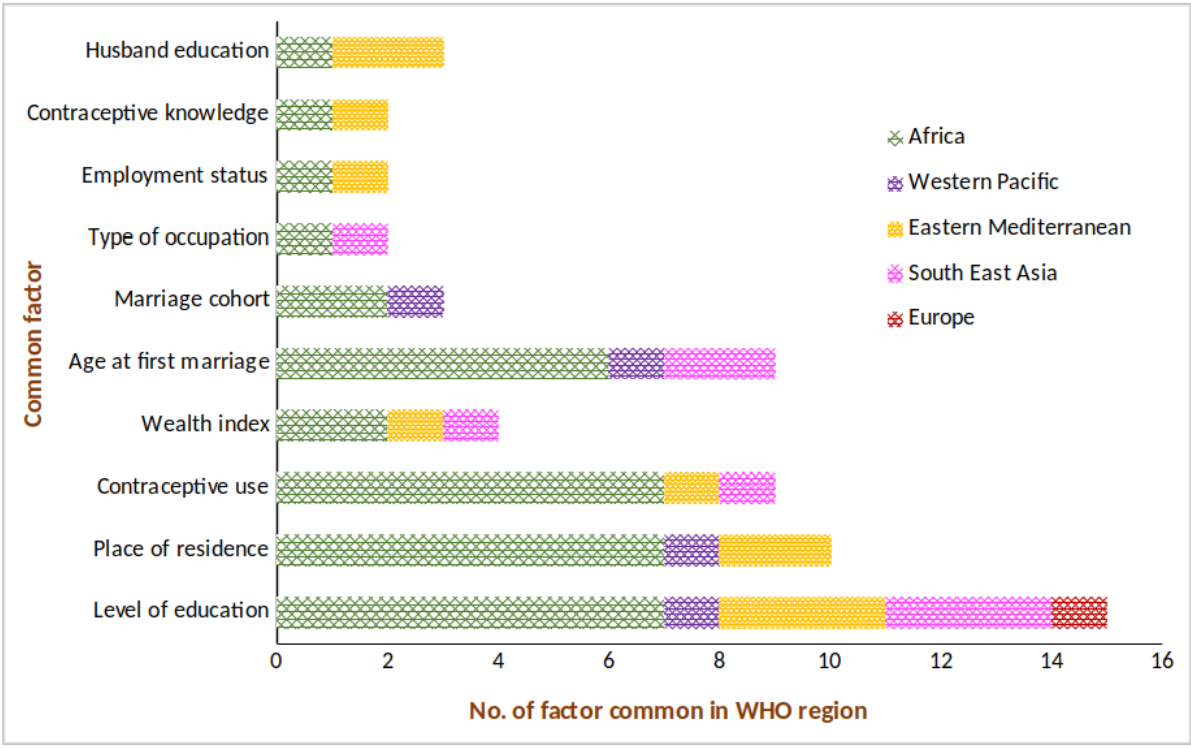

Figure 6: Common factors associated with FBI after marriage by region.

3.5 Uncommon factors

Of the total thirty-nine identified factors, twenty-three (58.97%) factors such as; divorce before first birth, ideal children, women empowerment, husband's employment, intercourse and marriage, ethnicity, pregnancy termination, media exposure, sex

of household head, sexual debut, household size, type of marriage, insurance covered, desired to have a son, decision participation, per capita income, social status, kinship, parent's race, menstrual status, ever fetal loss, status of index child and month of marriage were not common both in country and the region. These twenty-three uncommon factors were explored in six countries (Ethiopia -3, Iran - 4, India - 2, Nigeria -1, Swaziland - 1 and China -1) by twelve different studies.

4 Discussion

Findings of this systematic review indicates that FBI after marriage is related to a number of predictors, including demographic, reproductive health, socioeconomic, cultural, gender and community. Additionally, time to first birth after marriage appears to be related to certain personal behavior such as age at first sex, sexual debut, intercourse and marriage, and contraceptive use, but its relationship with other risk factors, such as pregnancy termination, ever fetal loss, menstrual status, divorce before first birth, survival status of index child, are less clear. Evidence suggests a link between time to first birth after marriage with some major factors, such as "education", "place of residence", "age at first marriage", "contraceptive used" [4,27], "contraceptive knowledge", "wealth index", "husband's education", "women employment status", "marriage cohort" and "type of marriage" [9, 12, 15], but few studies have been also explored the link to other factors dealing with personal behavioral and family characteristics.

More than seventy-one percent of studies included in this study unveiled that females with low education were exhibited negligence behavior to take part in marriage and first childbirth. Women with no formal education get married at an early age and immediately attempt to get first childbirth sooner than those with primary, and secondary or higher-level education [16]. Likewise, females lived in rural areas were observed high chance of early childbirth at an early age than females in the urban areas [24]. The association between age at first marriage and FBI after marriage is inverse [29], i.e. the likelihood of a woman who is married at an early young age has higher chance to bring first childbirth sooner. A study conducted in China [14] revealed that young couples residing in rural area lack a motive to delay first childbirth. Most of women staying in rural area do not need to do work away from home. Their cost of raising a child is less as compared to urban couples. Otherwise, desire to delay parenthood of couples might attempt in stopping the first delivery of their first pregnancy by induced abortion. In addition, most of the studies conducted in Iran [29–31] highlighted that employed women had children later as compared to unemployed women. But the disagreement between childbirth and involving in economic activity occur due to the conflict of work barriers and opportunity costs of childbirth. Women's engagement in economic activities can be anticipated to lead into the prolong length in delay first childbirth and reduce in the number of children, and the delayed first childbirth can be beneficial for the countries where the fertility rate is high.

Likewise, women who had used contraceptives after marriage can manage a long-time gap to get first childbirth than the nonusers, which help women in preventing early and unplanned pregnancy [5, 7, 21]. FBI after marriage also linked to age at marriage of women. The study conducted in Ethiopia, Nigeria, Swaziland and Iran explored that women who married below the age of 18 years had their first childbirth sooner than women who married above the age of 18 years [25]. A study conducted in Britain (UK) has conceptualized the variation of FBI after marriage based on five personality qualities. These five qualities were differentiated by "extraversion", "agreeableness", "conscientiousness", "neuroticism" and "openness" [31]. The study concluded that high "agreeableness", "extraversion" and "neuroticism" expedite first birth, but too openness is correlated with delaying first birth. Of these five personality qualities, openness showed strongest association with FBI after marriage, and it was also identified as the most influential factor in terms of reproductive behavior [33]. The factor "openness" is a person's individual characteristic developed by the synthesis of education, culture, family environment and the opportunities to take part in different activities. Poverty, lack of access to education, lower employment participation rate, disparities between urban and rural service facilities, geographical variation, sexual debut in early young age, early pregnancy, lack of contraceptive knowledge, lower contraceptive prevalence rate, poorer healthcare access and lower level of self-efficacy [34] are some of the increased distress in regard to the issues of marriage and first child birth. Hence, understanding the reasons of these differences are essential to generate recommendations, whether it is education literacy or health literacy or women empowerment or some other factor, to participate women in decision making, provide better education and access to employment. Addressing these help women to prevent from unpredicted health hazards, career constrains and livelihood challenges happening due to early age at marriage and early pregnancy after marriage. Advanced time to event analysis techniques such as Cox PH model, different parametric AFT models including shared frailty models were found to be attempted keeping in view to capture the original structure of the dataset of time to first birth, and

to quantify the effect of independent predictor on time to first child birth. The effect sizes were reported mostly in terms of HR and TR in such a way that the interpretations are easier in comparison to regression coefficient. However, the residuals analysis of the developed models were not found attempted rigorously except using AIC, BIC and DIC for choosing the most plausible model.

This systematic review suggests that first birth after marriage plays an important role in women's physical, psychological and reproductive health across a number of different contexts, including fertility, contraception, maternal-child health care, social status, women empowerment and sexual health. The findings of this study related to influential factors associated with FBI may be a useful reference for certain countries or regions to plan new studies based on primary data.

4.1 Limitation

This systematic review is not free from limitations, since the findings were focused on time-to-event data. Publication bias is another limitation of this review study. We did not include gray literatures and other articles published in other databases rather than EMBASE, PubMed and Scopus. For example, the search in Web of Science did not perform because of access limitation. On the other hand, we only assessed articles originally published in the English language, hence other eligible articles published in other languages may have ignored. The studies based on medical concerns dealing on clinical parameters; such as anxiety disorders, depression, psychiatry, and other medical issues based on treatments were also excluded.

5 Conclusion

Evidence shows that being an educated woman in the low-income economy is an influential determinant of getting first child in an adequate time gap. But, being a rural resident is another influential determinant of getting first child in a short gap after marriage, even if, married in an early young age. On the other hand, understanding of contraceptive knowledge and its proper use should be more announced by health services for the young couples to mitigate their reproductive health hazards and unplanned pregnancy, and to manage their birth-spacing and fertility. However, the study explored thirty-nine significant factors, more than ten pronounced predictors are found to be common in five different regions that influence to the time interval of first birth after marriage. Some other large number of particular single factors identified in the articles, but not mutually common to the regions are also important with its own significance in relation to first birth after marriage.

The study findings can be helpful to the government and policy makers to develop appropriate policies and programs in taking care of the factors associated with shorter FBI of female, those married at an early young age. It also helpful to intervene programs effectively to make aware of about marriage at an early age, shorter first-birth spacing after marriage and its negative consequences. All of these efforts can help to mitigate challenges of health hazards occurring due to unplanned childbearing and thus manage fertility rate.

Conflict of Interest

There is not any conflict of interest of the authors in publishing this paper.

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