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Research Article

Prevalence and Predictors of Short Birth Interval among Married Women in Mareka District, South Ethiopia

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Abstract

Background: Fertility is an important predictor of maternal mortality. Birth spacing is the time gap between two consecutive life births. Optimal birth spacing, three to five-year birth interval becomes the global public health agenda.

Objective: The study's aim was to assess the prevalence of short birth intervals and predictors among married women in Mareka District, South Ethiopia.

Methods: A community-based cross-sectional study was conducted. The study was done among 703 married women aged 15 - 49 years who had at least two live births using a multistage sampling technique.

Result: The short birth interval prevalence was 58.5%. Sex preference of index child (AOR: 4.049; 95% CI: 2.623 - 6.249), rural residence (AOR: 3.608; 95% CI: 2.315 - 5.623), marriage type (AOR: 5.708; 95% CI: 3.682 - 8.851), and paternal education (AOR: 6.473; 95% CI: 2.983 - 14.047) were predictors**.**

Conclusion: The prevalence of short birth interval practice was high (58.5%). Sex preference of index child, residence, marriage type, and paternal education were important predictors for the prevalence of short birth interval. Therefore, there should be promotion of long-acting family planning and other birth control methods through increased emphasis on the importance of the education of girls (future mothers).

Keywords: *Birth Interval; Fertility; Mareka District and Married Women*

Abbreviations

ANC: Antennal Care; AOR: Adjusted Odds Ratio; CI: Confidence Interval; DHS: Demographic and Health Survey; EBR: Ethiopian Birr; EDHS: Ethiopian Demographic and Health Survey; OR: Odds Ratio; SNNPRS: South Nations, Nationalities and Peoples Regional State; SPSS: Statistical Product Service Solutions; and WHO: World Health Organization

Introduction

Fertility is an important predictor of maternal mortality. Birth spacing is the time gaps between two consecutive life births [1,2]. The birth interval is one of the main determinants of the level of fertility in high populations. Birth interval is defined as the time interval between the index live birth and the preceding live birth [3]. The birth interval at least three years between births is one way that a mother can have more time for herself [4,5]. Natural fertility depends on the duration of the effective reproductive span and length of the birth interval [3]. Lengths of time between marriage and giving birth to the first child and the interval between births have a crucial role in women's reproductive health and child nutritional status [6]. The number of children a woman can have during her reproductive life depends on the birth interval [3] that affects the health of mothers and children [7].

Optimal birth spacing, three to five-year birth interval becomes the global public health agenda [8]. Birth intervals are affected by a complex range of factors; some of which are rooted in social and cultural norms, others in the reproductive histories and behaviors of individual women, utilization of reproductive health services, and other personal factors [9]. Differences among groups in reproductive behavior are usually explained from the characteristics and socio-cultural perspectives especially in Africa [9,10]. There are significant relations between birth interval, development of the region, and survival status of the children [11]. Birth interval length between index children has played a significant role in reducing the risk of child mortality [11].

Many mothers desire to have longer birth intervals. Others need to be informed of the advantages of longer intervals [12]. All Ethiopian women at age of 15 - 29 years practice short birth intervals [13]. Birth spacing for at least three years has many health benefits for children including lowering the risk for fetal, neonatal death, and lowering the risk of preterm birth, small for gestational age, birth weight, stunting, and underweight. It has also benefited to the mother including lowering the risk of maternal death, third trimester bleeding, membrane premature rupture, and anemia [14].

In Sub Saharan Africa total fertility was 5.6 births per woman from 2005 - 2010 [14]. Ethiopia is characterized by a very high fertility rate, low life expectancy, high maternal and child mortality, poor nutritional status, high infant mortality, low per capita income [15]. Every year over 245,000 African women die due to complications related to pregnancy and childbirth [16].

From the developing world, North Africa, and Sub Saharan, for instance, Uganda, Guatemala, Morocco, and Bolivia showed that 70%, 68%, 67%, and 65% respectively [17].

Ethiopia achieved for reducing child mortality remarkably but still, 1 in every 17 children died before 1 year of age [18]. A recent study in Southern Ethiopia showed that 58% of married women had short birth interval [19]. Family planning can improve child health and survival by preventing births to older and younger women, reducing the number of births per woman, and lengthening the interval between births [21].

However, Ethiopia has formulated a national population policy before two decades and increased improvements in access to reproductive health services both in urban and rural areas of the country [20,21]. Hence further studies needed as a recommendation to be conducted to determine factors that contribute negatively to optimum birth spacing practice in Ethiopia [22]. A few studies were conducted on the birth interval and associated factors in the Southern region, and no research has been documented on the same topic in the study area. Therefore, this study assessed the prevalence of short birth intervals and associated factors among childbearing women to fulfill the gaps particularly in the study area and to those with similar socio-cultural and demographic characteristics.

Method study area, period and participants

A community-based cross-sectional study was conducted in Mareka District, South Ethiopia from April to May 2014. All women aged 15 - 49 years were a source population in this District. All married women aged 15 - 49 years who had at least two live births during the data collection time were also a study population. The study subjects were currently married women who had at least two live births and satisfied the inclusion criteria. Women aged 15 - 49 years currently married had at least two live births 5 years prior to this study were included for the study. Married women, who were seriously ill, had only one birth and one child were excluded from this study.

Sample size determination

Single population proportion formula was used for sample size calculation with assumption of confidence level (1.96), d = margin of error 0.05, p = 35% proportion of women practicing optimal birth interval in SNNPR from similar studies (20). $n = (1.96)^2*0.35\ (1-0.35) / (0.05)^2$. n = 349. By using design effect 2 with non-response rate 10%. Finally, the sample size for this study was 768.

Sampling technique, and procedure

A multi-stage sampling technique was employed. Hence, a preliminary assessment of reproductive age women live in each selected kebele was conducted to identify households with their corresponding family folder identification numbers. Using respective family folder identification number, frames of households containing study participants identified. Then sample size was proportionally distributed for each selected kebele depending on the family folder identification information during preliminary study. Finally, married women were carefully chosen using simple random sampling techniques from a frame containing the respective source of population. Whenever more than one eligible respondent was found in the same household, only one was included in the study by lottery method. The questionnaire consists of socio-economic/demographic and reproductive variables (Figure 1).

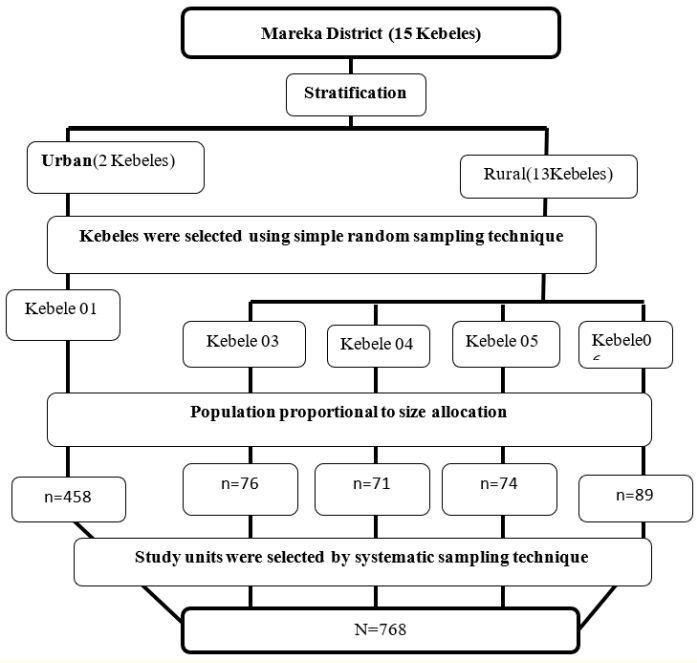

Figure 1: *Sampling procedures for Prevalence and Predictors of Short Birth Interval among Married Women in Mareka District, South Ethiopia.*

Variables

Dependent variables

Birth interval (short/optimal spacing).

Operational definition birth interval

It refers to the time interval from one child's birth date until the next child's birth date between two consecutive live births.

Short inter birth interval

It refers to less than 3 years' birth interval between the latest consecutive live births.

Optimal birth interval

When the duration between two successive live births is 3 - 5 years.

Independent variables

- Socio-demographic factors such as age, ethnicity, religion, type of marriage, educational level of the mother, educational level of the husband, and occupational status of the husband.
- Obstetrics and birth history related factors such as regularity of menstruation, ANC visited preceding last birth, place of delivery, postnatal complication, history of infertility, had history of neonatal death, sex of preceding child, and husband perception regarding birth spacing.
- Contraceptive and breast feeding related factors like preceding to last child was exclusive breast feeding (EBF), during preceding to last birth breast feeding (BF), ever used contraceptive, using family planning (FP) is important for birth spacing, and husband perception on FP.

Data collection

The data were collected using structured interviewer administered questionnaire that was modified after reviewing different literatures. The data were collected by six diploma female Midwifes who were fluent in local language including investigators and three bachelor degree holder supervisors.

Data quality assurance and analysis

Two days training was given for data collectors and supervisors on data collection procedures, interview techniques, and confidentiality of the information obtained from the study participants. Data were collected by using pretested structured questionnaire that was translated from English to local language and back translated to English. A Pre-test was conducted on 10% of the study subjects to test the data collection tool. Data were checked, cleaned and edited for completeness. Quantitative data were entered to Epi data entry version 3.1.0 and exported to SPSS windows version 25 software for analysis. Study result was presented by descriptive analysis such as frequency, tables, proportion and texts. Bi-variable analysis was employed to check association between dependent and independent variables. Variable with p - value < 0.25 on bi-variable analysis was entered to multivariable logistic regression model to identify predictors. Statistical significance was declared on P - value < 0.05 with adjusted odds ratio and 95% confidence interval.

Result

Socio-demographic characteristics of study participants

In this study 703 participants were included with a response rate of 91.5%. Their median age was 28 years with mean (19 ± 5.5). Relatively large number of them 309 (44%) were within the age group of 25 - 29 years (Table1).

Variable	Category	Total	Short birth interval		X^2 P value
			Yes	No	
		n (%)	n (%)	n (%)	
Age	15 - 24	93 (13.2)	55 (13.4)	38 (13.0)	0.989
	25 - 34	475 (67.6)	277 (67.4)	198 (67.8)	
	35 and above	135 (19.2)	79 (19.2)	56 (19.2)	
Monthly income in EBR	Below 1000	643 (91.5)	375 (53.3)	268 (38.1)	0.948
	1000-1500	29 (4.1)	17 (2.4)	12 (1.7)	
	1500 and above	31 (4.4)	19 (2.7)	12 (1.7)	
Ethnicity	Dawro	680 (96.7)	405 (57.6)	275 (39.1)	0.002
	*Others	23 (3.3)	6 (0.9)	17 (2.4)	
Religion	Orthodox	190 (27.0)	113 (16.1)	77 (11.0)	0.774
	Protestant	477 (67.9)	277 (39.4)	200 (28.4)	
	**Others	36 (5.1)	21 (3.0)	15 (2.1)	
Maternal education	No formal	369 (52.5)	304 (43.2)	65 (9.2)	0.000
	Primary	175 (24.9)	54 (7.7)	121 (17.2)	
	Secondary and above	159 (22.6)	53 (7.5)	106 (15.1)	
Paternal education	No formal	362 (51.5)	305 (43.4)	57 (8.1)	0.000
	Primary	131 (18.6)	41 (5.8)	90 (12.8)	
	Secondary and above	210 (29.9)	65 (9.2)	145 (20.6)	
Residence	Rural	245 (34.9)	102 (14.5)	143 (20.3)	0.000
	Urban	458 (65.1)	309 (44.0)	149 (21.2)	
Work load	No	529 (75.2)	318 (45.2)	211 (30.0)	0.132
	Yes	174 (24.8)	93 (13.2)	81 (11.5)	
Husband living place	No	251 (35.7)	136 (19.3)	115 (16.4)	0.940
	Yes	452 (64.3)	275 (39.1)	177 (25.2)	
Contraceptive decision maker	Husband	638 (90.8)	372 (52.9)	266 (37.8)	0.895
	Wife	65 (9.2)	39 (5.5)	26 (3.7)	
Media exposure	No	85 (12.2)	53 (7.6)	32 (4.6)	0.482
	Yes	614 (87.8)	355 (50.8)	259 (37.1)	
Living near to mother in law	No	376 (53.5)	222 (31.6)	154 (21.9)	0.759
	Yes	327 (46.5)	189 (26.9)	138 (19.6)	
Index child sex	Female	370 (52.6)	154 (21.9)	216 (30.7)	0.000
	Male	333 (47.4)	257 (36.3)	76 (10.8)	
*Wolaita, Amhara, and Konta ** Catholic					

Table 1: *Socio - demographic characteristics among child bearing women in Mareka District, South Ethiopia, 2015 (n = 703).*

Reproductive and child health status characteristics among childbearing women

Mean number of children ever born to a woman was 3.5. Most women 562 (80%) had children currently living with them. Among the study subjects, 661 (94%) had a history of live index child whereas 42 (6%) of them had death history of index child. From the total study subjects, 333 (47%) were male index child. About 395 (56%) study subjects had under children aged one year in their household currently. One hundred ninety seven (28%) of the births were occurred less than 25 months. Nearly one - third (30%) births were also occurred within 25 - 35 month. The median length of month for birth interval in this study was 33 months. The practice of short birth interval was 411 (58.5%) (Table 2).

Variable	Category	Total	Short birth interval		X^2 P value
			Yes	No	
		N (%)	N (%)	N (%)	
ANC	No	246 (35)	154 (21.9)	92 (13.1)	0.109
	Yes	457 (65)	257 (36.6)	200 (28.4)	
Delivery	No	308 (43.8)	190 (27)	118 (16.8)	0.143
	Yes	395 (56.2)	221 (31.4)	174 (24.8)	
PNC	No	301 (42.8)	187 (16.2)	114 (26.6)	0.088
	Yes	402 (57.2)	224 (25.3)	178 (31.9)	
Index child birth order	Four and above	153 (21.8)	97 (13.8)	56 (8.0)	0.166
	Less than four	550 (78.2)	314 (44.7)	236 (33.6)	
Birth type	Twin	107 (15.2)	57 (8.1)	50 (7.1)	0.243
	Single	596 (84.8)	354 (50.4)	242 (34.4)	
Duration of marriage	Less than fifteen	589 (83.8)	355 (50.5)	234 (33.3)	0.029
	Fifteen and above	114 (16.2)	56 (8.0)	58 (8.3)	
Additional people in house hold	No	519 (73.8)	324 (46.1)	195 (27.7)	0.000
	Yes	184 (26.2)	87 (12.4)	97 (13.8)	
Marriage type	Monogamy	262 (37.3)	81 (11.5)	181 (25.7)	0.000
	Polygamy	441 (62.7)	330 (46.9)	111 (15.5)	
Continuation of child breast feeding	24 and above	98 (13.9)	69 (9.8)	167 (23.8)	1
	Below 24	313 (44.5)	223 (31.7)	536 (76.2)	

Table 2: *Reproductive, behavioural and child status characteristics among women of child bearing age in Mareka District, South Ethiopia, 2015.*

Associated factors of short birth interval

Predictor variables that were statistically significant at p-value < 0.25 at bi-variable analysis were incorporated at the final multivariable logistic regression model sex of index child, residence, maternal marriage type, number of children living in the household, duration of maternal marriage, maternal education status, additional people in household, work load, husband living place, paternal educational status, antenatal care services, place of delivery, postnatal care services, index child birth order, Ethnicity, birth type and utilization of contraceptive methods. Variables such as duration of breast feeding, maternal religion, maternal age, media exposure and contraceptive decision maker were not associated with the bi-variable logistic regression analysis (Table 3).

Variables /Categories	Short birth interval		COR (95% CI)	AOR (95% CI)
	Yes	No		
Sex of index child				
Male	257	76	1	1
Female	154	216	4.743 (3. 413 - 6.591)	4.049 (2.623 – 6.249)
Residence				
Urban	102	143	1	1
Rural	309	149	2.907 (2.110 - 4.006)	3.608 (2.315 – 5.623)
Marriage type				
Polygamy	81	181	1	1
Monogamy	330	111	6.643 (4.733 - 9.324)	5.708 (3.682 – 8.851)
Paternal education				
No formal	305	57	11.863 (8.242- 17.073)	6.473 (2.983-14.047)
Formal education	106	235	1	1
Variable (s) entered to the model were: Sex of index child, maternal residence, maternal marriage type, number of children living in the household, duration of maternal marriage, maternal education status, additional people in household, work load, husband living place, paternal educational status, antenatal care services, place of delivery, postnatal care services, index child birth order, Ethnicity, birth type and utilization of contraceptive methods.				

Table 3: *Multivariable analysis of predictors for short birth interval among childbearing women in Mareka District, South Ethiopia, 2015.*

Discussion

The prevalence of short birth interval in this study was found to be 58.5%. This study indicated that more than half of the study respondents were practicing short birth interval. It was higher than studies revealed from northern Ethiopia 23.3% [23], Ethiopia 46% [22,24], Pakistan 22.9% [25], and Brazil 34.6% [26]. The overall study finding was comparable with studies revealed from south Ethiopia and EDHS report about 57.6% and 56% respectively [13,19]. This finding was slightly similar with study revealed from Ugand 52.4% [27]. This consistent might be due to relative similarity in sociocultural background of the study respondents(religion) [21,28] which was confirmed by a decomposition analysis from socioeconomic inequality in short birth interval in Ethiopia [24].

The study had also identified as significantly associated factors with short birth interval such as, paternal education, sex preference of index child, marriage type, and maternal place of residence.

In this study, women with preceding daughter were more likely to practice short birth interval as compared to women with male index child. This might be due to sex preferences. This finding was supported studies in India, Egypt, and Ethiopia [3,9,19,22,29]. It might be due to the fact that parents put typically high value on son since it is valued as an economic asset and old age assurance as well as the bearer of family name [3]. This finding was contradicts with study in Mozambique [2]. It is confirmed by different studied conducted from multilevel study of Ethiopia [22], Pakistan [30], and South Asia [31]. This might be attributable to the male patriotism in some communities, and families. This indicted that females may be less socially and nutritionally favored which leads them to be mare malnourished as compared with the male children. This was supported by systematic review of low and middle income countries [32]. This influence might be confirmed by maternal education [25,28]. This could be the underlying reason that put pressure on fertility as couples continued to have children until they had their desired number of sons.

The other predictor of short birth interval was rural resident women were more likely to practice short birth interval as compared to urban residents. It was supported study revealed in Ethiopia [6,7,11,19,21,22]. The possible explanation might be due to the residential variation in reproductive health care services for instance integrating post-partum family planning service [21,22,27,28,33,34]. Besides, urban women are more educated and know the maternal and child health implication of short birth intervals.

Those married women with monogamy type of marriage had more likely to practice short birth interval than those of polygamy. According to this study, women whose husband monogamous marriage types were about fivefold more likely to have short birth intervals as compared with women married to polygamous husbands. This may be due to the cultural influence of the society; it may also be due to the husbands' decision-making power [27,35] towards getting so many children. Another possible explanation might be a competition related to fertility, which encourages wives to give birth quickly and have multiple children [36]. This could be due to women's marriage duration [37]. The married women who were younger age might practice short birth intervals [25,29].

Married women who had illiterate husband practiced short birth interval than those of women who had educated husband. This is supported by study revealed from Jimma zone [34], and Brazil [26]. This might not only due to paternal education status but might be also influenced by maternal education [22,25,38]. This might be also due to the fact that the number of family size [21,26]. This was supported by a study done in Ethiopia [22], and Mozambique [2]. This study might be also due to non-contraceptive that can delay conception after childbirth and one of the best practices that can lead to achievement of recommended birth intervals and therefore optimal maternal and child health outcomes [21,35,39]. Participants reason for non-use of contraceptives were fear of change in breast milk content, feeling of not exposed to the risk of pregnancy due to breast feeding duration [22], religion reason [21,28], side effect and partner refusal for using contraceptives [32]. Not having history of antenatal care follow up and not having desire number of the last child [23,35] can also lead to the prevalence of short birth interval.

Strength and limitation of the study

The study had enough sample size and it was important as baseline information. However, recall bias in birth history of child, misreporting of age and deaths were there. Finally, it also shared limitations of cross-sectional study design.

Conclusion

In conclusion, more than half of childbearing age women practiced short birth interval. Sex preference of the index child, maternal place of residence, marriage type and paternal education were highly significant predictors for short birth intervals. Thus, it is recommended that involving women and child affairs office on sex preferences, and improving rural resident maternal health services for decreasing the prevalence of short birth interval should be focused in the study area with any other concerned stakeholders. Further study including qualitative method is needed to identify other correlates for minimizing prevalence of short birth interval.

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Availability of Data

The data sets analysed during the current study are available from the corresponding author upon reasonable request.

Author Contribution

YLL: Designed the study, analysed, interpreted the data and drafted the manuscript.

FWF: Involved in the analysis, data interpretation, manuscript drafting and approval.

Ethical Approval and Consent to Participate

It was obtained from Health Research and Post Graduate Institute of Health science and Medicine Institutional Review Board of Jimma University. Formal letter of permission was obtained from administrative bodies of the Dawro zone, Mareka District and selected kebeles. Finally, written consent obtained from every study subjects included in the study during data collection time after explaining the objectives of the study and the right to withdraw from the study. Privacy and confidentiality was ensured at all levels. Informed written consent was obtained from study participants. Interview was conducted in private area and their name was not requested and recorded. Counseling and linkage to appropriate health care and support were given.

Consent for Publication

This manuscript does not report personal data such as individual details, images, or videos; therefore consent for publication is not necessary.

Competing Interests

The authors declare that they have no competing interests.

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