

# Patterns and determinants of birth intervals in a sample of women in Erbil city, Iraq

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## Abstract

**Background and objectives:** Birth spacing has been recognized as an indispensable life-saving measure for both mothers and newborns. The present study has been conducted in the northern part of Iraq (Erbil city) to assess birth spacing among a group of women and find its association with different variables.

**Methods:** A cross-sectional study was applied among women attendees to the Maternity Teaching Hospital and two primary health care centers in Erbil city over a one-year period from 1<sup>st</sup> of October 2019 to 30<sup>th</sup> of October 2020. A convenient sample size of 500 married women who have at least previous two consecutive births. Direct interview with women was used to collect data on demographic, social, and obstetric characteristics.

**Results:** The prevalence rate of short birth spacing for the whole study population was 63.4%. A significant relationship was detected among those with an educational level of intermediate & secondary school and below, housewives and those with low to medium Socioeconomic status as the rate of short birth spacing was highest in the reproductive age group of women (from age 35 to age 44), those with educational level of intermediate & secondary school and below, those who were housewife, and those with low to medium socioeconomic status ( $p < 0.001$ ,  $p < 0.001$ ,  $p < 0.001$ ,  $p < 0.008$ ) respectively. Also, the rate of socioeconomic status among those with history of abortion (69%) was significantly higher than the rate (58.6%) among those with no such history with ( $p < 0.016$ ).

**Conclusions:** it confirmed that the distribution of short birth spacing of women in Kurdistan region is significantly influenced by many determinant factors including maternal age, education, occupation, parity, socio-economic status and non-contraception use.

**Keywords:** Birth interval, Children, Education, Family, Socio-demographic.

## Introduction

Birth interval or spacing, either in years or in months, refers to the time duration between two consecutive live births. It is regarded as the chief strategies of health promotion program for the mothers and children, and also the important indicators of fertility scenario of a country.<sup>1</sup> Birth spacing has been recognized as an indispensable life saving measure for both the mothers and the children.<sup>2</sup> Longer distances between consecutive births reduce the number of children that the mother will have. This will lead to beneficial effects on the size of population, and on the health status of the mothers and

the children.<sup>3</sup> The birth interval considers as the number of months between two consecutive birth and World Health Organization (WHO) defined an interval of less than 24 months as a short birth interval that leaves the negative effects on maternal, perinatal and neonatal outcomes as well as on child health, though the precise mechanisms are poorly understood.<sup>4</sup> Lack of sufficient time to snap back to the normal pre-pregnancy metabolic condition before the next pregnancy may also launch with longer term complications.<sup>5</sup> A study was done in Nigeria showed the risk of prematurity and

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infant mortality in developing countries doubles when pregnancy is repeated within six months of the previous birth.<sup>6</sup> Birth spacing is a paramount, feasible and practical intervention to address these situations and should be included in the health programs of developing countries.<sup>7</sup> It is also important to proclaim that the

### Patients and methods

This cross-section study has been conducted among women attendees to Maternity Teaching Hospital (which is the main referral hospital in Erbil) and two primary health care centers (Shady center and Brayati Family Medicine Teaching Center) in Erbil city, Kurdistan region, Iraq. The study period was from 1st of October 2019 to 30th of October 2020. Convenient samples of 500 women were involved in this study who have at least previous two consecutive births. An agreement number (4573) at 08/04/2020 from the Research Ethics Committee of Kurdistan Higher Council of Medical specialties and all the women capable to participate in this study were interviewed after obtaining their verbal and written informed consents. Inclusion criteria were women being married once only and having at least two consecutive births while women with history of infertility (primary or secondary) and women who were married more than once were excluded. Data were obtained by standardized structured interview questionnaire adapted by supervisor and researcher to obtain information about determinant of birth interval which was consisting of three sections. The questionnaire included three sections A, B and C. The first section related to the information on socio-demographic

### Results

In this study, 500 women participated exclude those which have no all inclusion criteria. Their mean age  $\pm$  SD was 34.4  $\pm$  8.0 years, ranging from 19 to 56 years, the median was 33 years. The open

factors which influence decisions about childbearing varies between communities and could sound ambivalent.<sup>8</sup> The aim of this study was to assess birth space among group of women in Erbil city of Iraq and finding its association with different variables.

characteristics plus socio economic status. A 21 point scoring system was used to classify the women according to their socio economic status (SES). The total score (21) was divided into three equal categories including (1-7) as a low, (8-14) as a medium, while (15-21) as a high SES, the scoring system adapted from previous study<sup>9</sup>. Section B sought information about the past obstetrical history of respondents (parity, abortion history, survival status and gender of children, birth intervals, mode of delivery of last pregnancy, and if there was unwanted (unplanned) pregnancy). Section C was employed to review breast feeding, and contraception use. The birth interval in this study was calculated as the time (in months) between two consecutive birth dates by considering less than 24 months as low births pace and birth dates was used to calculate the inter-birth interval<sup>4</sup>. Data statistical analysis was done by using the Statistical Package for the Social Science (SPSS version 23) which was considering two approach informative in number, percentage and analytic approach by using Chi square. Chi square test was used to find the association between variables. Fisher's exact test was used when the expected count of more than 20% of the cells of the table was less than 5. A p-value of  $\leq 0.05$  was considered statistically significant.

interval between the last birth and the interview was omitted from our analysis. The rate of short birth spacing (< 24 months) was 49.2% for the spacing between the first and second child, 39.2%

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for the spacing between the second and third child, 19.7% for the spacing between the third and fourth child, then increase to 25.8% for the spacing between fourth and fifth child, and to 28.8% for the spacing

between the fifth and sixth child, then decrease to 12.5% for the spacing between sixth and seventh and increase again to 28.6% for the spacing between the seventh and eight children as shown in Table (1).

**Table (1):** Rate of short birth spacing in the studied sample.

Sequence of births	Number of women	Rate of short birth spacing	
		Frequency	(%)
First and second	500	246	(49.2)
Second and third	362	142	(39.2)
Third and fourth	234	46	(19.7)
Fourth and fifth	128	33	(25.8)
Fifth and sixth	66	19	(28.8)
Sixth and seventh	24	3	(12.5)
Seventh and eighth	7	2	(28.6)

Table (2) shows that the rate of short birth spacing for the whole sample was 63.4%. There was significant association between short birth spacing and maternal age, education, occupation, and SES as the rate of short birth spacing was highest in the reproductive age group of women (from age 35 to age 44), those with educational

level of intermediate & secondary school and below, those who were housewife, and those with low to medium SES with p value of (p<0.001, p<0.001, p<0.001, p<0.008) respectively. No significant association was detected between short birth spacing rate and residency (p=0.609).

**Table (2):** Association between birth spacing and sociodemographic variables.

	Short birth spacing		Normal birth spacing		Total	
	No.	(%)	No.	(%)	No.	p-value
Age (years)						
< 25	29	(51.8)	27	(48.2)	56	
25-34	126	(56.5)	97	(43.5)	223	< 0.001
35-44	119	(75.3)	39	(24.7)	158	
≥ 45	43	(68.3)	20	(31.7)	63	
Mother education						
Illiterate	19	(70.4)	8	(29.6)	27	
Read and write	63	(64.3)	35	(35.7)	98	
Primary	91	(71.7)	36	(28.3)	127	< 0.001
Intermediate & secondary	113	(71.5)	45	(28.5)	158	
Institute & above	31	(34.4)	59	(65.6)	90	
Mother occupation						
High rank occupations	4	(44.4)	5	(55.6)	9	
Non-manual worker	30	(43.5)	39	(56.5)	69	< 0.001
Skilled manual	44	(60.3)	29	(39.7)	73	
Housewives	56	(66.7)	28	(33.3)	84	
Residency						
Urban	272	(63.0)	160	(37.0)	432	
Rural	45	(66.2)	23	(33.8)	68	0.609
Socio-economic status						
Low	65	(64.4)	36	(35.5)	101	
Medium	210	(67.1)	103	(32.9)	313	0.008
High	42	(48.8)	44	(51.2)	86	
Total	317	(63.4)	183	(36.6)	500	

Table (3) shows that the higher the parity, the higher the rate of short birth spacing (SBS) ( $p < 0.001$ ). Higher rates of SBS were detected when the age at marriage was less than 24 years ( $p = 0.010$ ). No significant association was detected

between SBS and age at last child ( $p = 0.098$ ). Regarding the duration of marriage, it is evident that the more the duration of marriage, the more the rate of SBS ( $p < 0.001$ ).

**Table (3):** Association between birth spacing and marriage parameters.

	Short birth spacing		Normal birth spacing		Total	
	No.	(%)	No.	(%)	No.	p
Parity						
< 3	43	(31.4)	94	(68.6)	137	
3-4	156	(67.2)	76	(32.8)	232	
≥ 5	118	(90.1)	13	(9.9)	131	< 0.001
Age at marriage (years)						
12-17	112	(69.6)	49	(30.4)	161	
18-23	163	(64.7)	89	(35.3)	252	
24-29	31	(48.4)	33	(51.6)	64	
≥ 30	11	(47.8)	12	(52.2)	23	0.010
Age at last child						
< 25	75	(61.5)	47	(38.5)	122	
25-29	85	(56.7)	65	(43.3)	150	
30-34	92	(70.2)	39	(29.8)	131	
≥ 35	65	(67.0)	32	(33.0)	97	0.098
Duration of marriage (years)						
< 10	84	(50.9)	81	(49.1)	165	
10-19	130	(65.0)	70	(35.0)	200	
≥ 20	103	(76.3)	32	(23.7)	135	< 0.001
Total	317	(63.4)	183	(36.6)	500	

Table (4) shows that there was no significant association detected between short birth spacing (SBS) with the following variables: religion ( $p = 0.716$ ), wife rank ( $p = 0.844$ ), the child before the last child, whether dead or alive ( $p > 0.999$ ), sex of child before the last child ( $p = 0.795$ ), mode of delivery of the last pregnancy ( $p = 0.401$ ), and exclusive breast feeding ( $p = 0.327$ ). The rate of SBS among those with history of abortion (69%) was significantly higher than the

rate (58.6%) among those with no such history ( $p = 0.016$ ) and it was also significantly ( $p < 0.001$ ) high among those with history of unplanned pregnancy (74.9%) compared with the rate among those with planned pregnancy (57.4%). Regarding the contraception use before last pregnancy, the rate of SBS was significantly high among those with no history of contraception use (95.7%) compared with 61.8% among those with history of contraception use ( $p = 0.001$ ).

**Table (4):** Rate of birth spacing by the studied variables.

	Short birth spacing		Normal birth spacing		p-value
	No.	(%)	No.	(%)	
Religion					
Muslim	311	(63.2)	181	(36.8)	
Christian	6	(75.0)	2	(25.0)	0.716*
Wife rank					
First	293	(63.4)	169	(36.6)	
Second	22	(64.7)	12	(35.3)	
Third	2	(50.0)	2	(50.0)	0.844*
Abortion history					
Positive	160	(69.0)	72	(31.0)	
Negative	157	(58.6)	111	(41.4)	0.016
The child before the last child					
Alive	310	(63.4)	179	(36.6)	
Dead	7	(63.6)	4	(36.4)	>0.999*
Sex of child before the last child					
Male	158	(64.0)	89	(36.0)	
Female	159	(62.8)	94	(37.2)	0.795
Mode of delivery of the last pregnancy					
Vaginal	194	(64.9)	105	(35.1)	
CS	123	(61.2)	78	(38.8)	0.401
Unplanned pregnancy					
Yes	128	(74.9)	43	(25.1)	
No	189	(57.4)	140	(42.6)	<0.001
Exclusive breast feeding (n = 481)					
Yes	143	(66.2)	73	(33.8)	
No	164	(61.9)	101	(38.1)	0.327
Contraception before last pregnancy					
Yes	295	(61.8)	182	(38.2)	
No	22	(95.7)	1	(4.3)	0.001
Total	317	(63.4)	183	(36.6)	

\*By Fisher's exact test

## Discussion

The present study found the relationship between some sociodemographic variables with birth intervals, as Al-Nahedh and Bella found that there was significant relationship between socio-demographic variables and birth intervals in rural Saudi Arabia.<sup>10, 11</sup> The statistical results of the present study showed the rate of short birth spacing (< 24 months) between the first and second child, second and third, third and fourth, fourth and fifth, fifth and sixth, sixth and seventh, and seventh and eighth which were 49.2%, 39.2%, 19.7%, 25.8%, 28.8%, 12.5%, and 28.6%, respectively. The prevalence rate of short birth spacing for the whole current study population was

63.4%, which mismatching with the results of a study that conducted in Iran which revealed that only 3.8% of the women had short birth intervals.<sup>12</sup> But its matching with the results of previous studies reported short birth intervals in Nigeria which were 65.9%.<sup>8</sup> and in Uganda (52.4%).<sup>13</sup> Education level is considered to be one of the most significant socio-economic factors that indirectly affect birth interval length.<sup>14</sup> Women with educational level of secondary stage and above more likely to have longer birth intervals than those with elementary or no formal education.<sup>15</sup> In this study, the level of mother educations showed significant

association with short birth spacing ( $p < 0.001$ ) and the highest percentage of short birth interval reported among those with educational level of intermediate & secondary school and below. This result consistence with the results of two previous studies that one of them done in Ethiopia and other done in Jordan which revealed that long birth interval was indirectly predicted with women's higher education.<sup>16, 17</sup> Thus, one of the most beneficial steps to increase birth intervals and decrease fertility is the participation of women in education. Female education also is considered to be a strong predictor of Birth intervals.<sup>17</sup> The significant relationship was detected regarding the occupation as the p value for housewife was ( $p < 0.001$ ). Previous studies from Ethiopia, Iran, and Tanzania reported longer birth interval among working mothers,<sup>17, 18</sup> The same result which obtained from research that done Saudi which observed optimum birth interval (3–5 years) more frequently among women who were employed.<sup>19</sup> In this study, SES also showed significant association with short birth interval and highest prevalence of short birth interval reported among mothers with low to medium SES. Research conducted in Saudi Arabia found that lower family income was indirectly expected for shorter birth intervals.<sup>20</sup> Regarding maternal age in the present study there was significant association

### Conclusions

The present study revealed that two third of women involved with SBS which were significantly associated with age, educational level, occupation, parity, SES, contraception misuse. Approximately half

### Conflicts of interest

The author reports no conflicts of interest.

### References

1. Lugalla J, Yoder S, Sambaiga RF. Determinants of the Duration of Birth Intervals in Tanzania.

with SBS as it revealed decreased birth interval with increased maternal age which is parallel to the result of study that done in northern Iran.<sup>12</sup> The number of parity played an important role in this study which significantly affected the rate of short birth spacing. This result agrees with the results of other studies done in southern Jordan, in Saudi women, in and Bangladesh.<sup>21</sup> which observed that women with low parity had short birth interval. It has been confirmed that the duration breastfeeding and the route of contraceptive are significantly correlated variables with birth intervals.<sup>12</sup> A number of studies have revealed contraceptive use as a major determinant of the length of the birth interval.<sup>16, 22</sup> Regarding the contraception use before last pregnancy in the present study, the rate of short birth interval was significantly high among those with no history of contraception use (95.7%) compared with 61.8% among those with history of contraception use ( $p = 0.001$ ). In current study there was significant association of SBS with history of abortion and unplanned pregnancy and this result was revealed due to un-proper use of contraception methods or not using contraception at all. Therefore, continuous health education and active practicing of family planning program and updating in uses the different methods of contraception may decrease SBS problems.

of women in Kurdistan region of Iraq, are unaware of the advantages of an adequate birth interval. Therefore, to ensure women's education, better policies should be continued.

- Regional Contrasts and Temporal Trends. Journal of University of Dar Es Salam. 2013; 19. Available

- from:<https://dhsprogram.com/pubs/pdf/QRS19/QRS19.pdf>
- Al-Saffar AJ. Duration and Some Determinants of Interbirth Intervals in a Sample of Women from Baghdad/Iraq. *Iraqi JMS*. 2012; (1): 1-10.
  - Nti CA, Gadegbeku C, Sarah N, et al. Knowledge, attitude and practice of birth spacing among Ghanaian mothers. implications for maternal and child nutritional status. *World Appl. Sci. J*. 2014; 31(11): 1971-8.
  - Shallo S, Gobena T. Duration of Birth Interval and Associated Factors among Married Women in Dodota Woreda. Arsi Zone, Ethiopia. *J Health Educ Res Dev*. 2019; 7(1).
  - Grundy E, Kravdal Ø. Do short birth intervals have long-term implications for parental health results from analyses of complete cohort Norwegian register data. *J Epidemiol Community Health*. 2014; 68(10): 958-64.
  - Owonikoko KM, Adeniji O, Oke OF, et al. Contraception, Obstetrics, Gynecology. Determinants of Inter-Pregnancy Interval in Ogbomoso. An Unmet Need for Contraceptive Usage. *Int J Reprod Contracept Obstet Gynecol*. 2015; 4(2): 316-21.
  - Rizvi F, Khan A. Birth spacing as a health intervention. *Ann. Pak. Inst. Med. Sci*. 2011; 7(3): 113-4.
  - Basse G, Nyengidiki TK, Dambo N. Determinants of interpregnancy interval among parturient in Port Harcourt, Nigeria. *Sahel Medical Journal*. 2016; 19(4): 180-4.
  - Hamad Kj. Assesment of clinets's satitisfaction regarding health care delivered at primary health care centers in Erbil city. Hawler Medical University, PhD Diss. 2010.
  - Al Nahedh N. The effect of sociodemographic variables on child-spacing in rural Saudi Arabia. *East Mediterr Health J*. 1999; 5(1): 136-40.
  - Bella H, Al-Almaie S. Do children born before and after adequate birth intervals do better at school. *J Trop Pediatr*. 2005; 51(5): 265-70.
  - ian-Tilaki K, Asnafi N, Aliakbarnia-Omrani F. The patterns and determinants of birth interval in multiparous women in Babol, northern Iran. *Southeast Asian J Trop Med Public Health*. 2009; 40(4): 852-60.
  - Aleni M, Mbalinda S, Muhindo R. Birth Intervals and Associated Factors among Women Attending Young Child Clinic in Yumbe Hospital, Uganda. *Int J Reprod Med*. 2020; 2020(1): 11-21.
  - RamaRao S, Townsend J, Askew I. Correlates of inter-birth intervals: implications of optimal birth spacing strategies in Mozambique. *Social and Behavioral Science Research*. 2006. Available from: [https://knowledgecommons.popcouncil.org/cgi/viewcontent.cgi?article=1443&context=departments\\_bsr-rh](https://knowledgecommons.popcouncil.org/cgi/viewcontent.cgi?article=1443&context=departments_bsr-rh)
  - Vidya S, Ushma U. Birth spacing: three to five saves lives. *Popul Rep L*. 2002; (13):1-23. Available from: <https://pubmed.ncbi.nlm.nih.gov/12469475/>
  - Youssef R. Duration and determinants of interbirth interval: community-based survey of women in southern Jordan. *East Mediterr Health J*. 2005; 11(4): 559-72.
  - Hailu D, Gulte T. Determinants of short Interbirth interval among reproductive age mothers in Arba Minch District, Ethiopia. *Int J Reprod Med*. 2016; 17(1): 1-17.

18. Rasekh A, Momtaz M. The determinants of birth interval in Ahvaz-Iran. a graphical chain modelling approach. *J Data Sci.* 2007; (5): 555-76. Available from: <http://www.jds-online.com/files/JDS-354.pdf>.
19. Rasheed P, Dabal B. Birth interval: perceptions and practices among urban-based Saudi Arabian women. *East Mediterr Health J.* 2007; 13(4): 881-92.
20. Abdel-Fattah M, Hifnawy T, El Said T, et al. Determinants of birth spacing among Saudi women. *J Family Community Med.* 2007; 14(3): 103–11.
21. Chakraborty N, Sharmin S, Islam M. Differential pattern of birth intervals in Bangladesh. *Asia Pac Popul J. Asia Pac Popul J.* 1996; 11(4): 73-86.
22. Trussell J, Martin LG, Feldman R, Palmore JA, Concepcion M, Dato'Abu DNBJD. Determinants of birth-interval length in the Philippines, Malaysia, and Indonesia: A hazard-model analysis. *Demography.* 1985; 2(1): 145-68.