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Original Article

Birth Spacing Effect on Maternal Health

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1-ABSTRACT

Background: Suboptimal interpregnancy interval has been linked with negative maternal, perinatal, baby, and child outcomes**. Aim:** The study aimed to investigate the effect of birth spacing on maternal health. **Method:** A descriptive cross-sectional study was utilized. Study subjects: A convenient sample of 323 women who were admitted to antenatal clinics at Mansoura University Hospital's Obstetrics and Gynecology Centers, which are associated with the Ministry of Higher Education. **Data collection tool:** A structured interview questionnaire was utilized. **Results:** The study result revealed that around one-third of the studied women had birth spacing less than 2 years and around half of them had abortion and anemia during the antenatal period. Additionally, around one-fifth of them had oligohydramnios and gestational diabetes mellitus during the antenatal period and precipitated labor during the postpartum period. Furthermore, one-quarter of the studied women had birth spacing more than 5 years, and around one-fifth of them had labor dystocia and preeclampsia. **Conclusion:** There was a strong association between birth spacing and maternal health status. Birth spacing of less than 2 years and more than 5 years was associated with a greater risk of adverse maternal and neonatal outcomes. **Recommendation:** Raising women's awareness about the risks of inadequate birth spacing and its potential for poor maternal health outcomes.

Keywords*: Adverse Outcome, Birth Interval, Women's Awareness*

2-Introduction:

Pregnancy is the most significant event in a woman's life following marriage. Planning to have a child is critical to the mother's future, as well as the future of her family and society. Each pregnancy aims to produce healthy infants and mothers so managing birth spacing has important effects on maternal and infant health **(Dehesh, Salarpour, Malekmohammadi & kermani, 2020).**

Birth spacing is an essential topic that obstetricians discuss with women who are considering becoming pregnant. It is defined as the length between the date of the last delivery and the conception of the following pregnancy **(Abozeid, Salem., & Elboghdady, 2021).**

Optimal birth spacing, defined as 24-59 months, is unquestionably associated to superior health outcomes for both women and kids. The World Health Organization recommends that women wait at least two years after a live delivery, and six months following a miscarriage or induced abortion, before having another baby **(Ajayi., & Somefun, 2020; Gizachew et al., 2022)**. Adequate birth spacing can assist women recover from macro- and micronutrient depletion that happens during pregnancy and lactation, as well as improve subsequent pregnancies **(Aleni, Mbalinda, Muhindo, 2020).**

Birth intervals fewer than two years are considered short, whereas intervals greater than five years are considered long. Both short and long intervals are deemed inadequate **(Barbosa, 2020).** Shorter birth spacing is linked to early membrane rupture, abruptio placenta, and placenta previa. It is also related with poor maternal nutrition and folate deficiency, inefficient infant nursing, cervical insufficiency, infections, sibling competition, incomplete uterine repair, and aberrant endometrial blood vessel remodeling. Furthermore, it hinders women's and their families' economic development chances **(Pimentel., 2020).**

In contrast, long birth spacing has been linked to an increased risk of severe eclampsia and pre-eclampsia, labor dystocia, maternal hypertension, maternal gestational diabetes mellitus, and antepartum hemorrhage. Increasing birth spacing has increased the proportion of

cesarean sections (**Shrestha, Mahato, & Karmacharya., 2020).**

2.1 Significance of the Study

Birth spacing has been acknowledged as a critical life-saving strategy for women and children. Global research found that inadequate birth spacing increases the risk of maternal mortality and unfavorable pregnancy outcomes **(Mohammed et al., 2020).** Furthermore, closely spaced births had a considerable impact on population increase and hampered development efforts. A substantially big proportion of women worldwide have practiced short inter-birth intervals **(Muluneh et al., 2020).**

According to the WHO, over 830 women die each day as a result of preventable pregnancy and delivery complications. The bulk of these deaths occur in low- and middle-income nations, where access to adequate maternal health care is frequently restricted. Furthermore, many women have pregnancy and birthing problems, which can have long-term consequences for their health and well-being. Improving maternal health and reducing maternal mortality and morbidity is a global health priority, requiring a multifaceted approach that includes strengthening health systems, increasing access to family planning and reproductive health services, and promoting gender equality and women's empowerment **(Hababa & Assarag, 2023).**

Overpopulation is one of Egypt's key issues and the primary impediment to development attempts. It also undermines the state's attempts to provide the finest services to residents and combat other economic issues such as unemployment and poverty. About 60% of inhabitants are believed to live below or near the poverty line in a country afflicted by water scarcity, a lack of work prospects, and congested schools and hospitals (Ministry of Planning and Economic Development, 2023).

Egypt's population growth rate has fallen by 46 percent, from 2.6 percent in 2017 to 1.4 percent in 2023, the lowest level in the last 50 years. National Population and Development Strategy (2015–2030). This strategy works on five axes: family planning services, youth and teenagers, education, women's empowerment, and media and social communication. Its goal is to improve citizens' quality of life by improving family planning and reproductive health services, with a focus on family planning programs. Additionally, it states that three laws are required to prevent school avoidance, child marriage, and child work **(EDHS, 2024).**

The overall fertility rate in 2021 was 2.85 percent, but it fell to 2.1 percent in 2023. Meanwhile, the use of family planning methods increased from 66.4% in 2021 to 75% in 2023. The illiteracy rate among people aged 10 and up decreased from 25.8 percent in 2021 to 12.6% in 2023. Educational enrollment rose from 94% in 2021 to 98% in 2023. The percentage of child marriages declined from 15.8% in 2021 to 8% in 2023 **(Ministry of Health and Population, 2023).**

Birth spacing affects maternal and neonatal health, and have a great socioeconomic effect on new generation and community and countries.

2.2 Aim of the Study

The current study intended to assess the birth spacing impact on maternal health.

2.3 Research Questions

Q:What is the impact of birth spacing on maternal health?

3. Method

3.1 Design A descriptive cross-sectional study design was utilized to investigate the birth spacing effect on maternal health.

3.2 Setting

The study was carried out in Antenatal clinics of the Obstetrics and Gynecology Centers at Mansoura University Hospital, which is affiliated with Mansoura University Hospital and the Ministry of Higher Education in Dakahlia, Egypt.

3.3 Subjects

The study subjects included an appropriate sample of 323 women who came to follow-up in antenatal clinics at Mansoura University Hospital's Obstetrics and Gynecology Center.

3.4 Data Collection Tool

One method was used.

A Structure Interview Questionnaire:

The researcher developed a structure interview questionnaire after reading the relevant literature **(Abozeid, SALEM, & Elboghdady, 2021),** it included 8 parts. part (1): sociodemographic data of the woman, part (2): surgical history, part (3): reproductive history, part (4): history of obstetric complications, part (5) fetal complications at birth in last delivery, (6): current obstetric data for studied pregnant women, part (7): physical examination, and part (8) the laboratory investigation.

3.5 Validity and Reliability of the Tool

Three specialists in the field of women's health & midwifery nursing tested and judged the content validity of the data collection instrument, and the requested changes were implemented. Some changes were made to the structure interview questionnaire (such as modifying the arrangement and sequencing of some lines and paraphrasing some sentences), and the final form was used for data collecting. Cronbach's alpha value was 0.834, indicating it was dependable.

3.6 Pilot Study

A pilot study of 10% of women (32) was conducted prior to data collection to assess the tool's clarity and applicability.

3.7 Ethical Considerations

The Ethics Committee of the Faculty of Nursing at Mansoura University provided an official approval letter for the study's conduct. The goal of the study was to define the study subjects, and the studied recently mothers provided written consent to participate in the study.

Participants could withdraw from the study at any moment, as it was fully voluntary. Throughout the study, anonymity, privacy, safety, and confidentiality were all maintained. The study participants were informed that the findings will be used as part of the required research for the Master's studies, as well as for publication and education.

3.8 Data Collection process

- The study lasted for three months, from May to July 2023.
- An official permission was obtained from Mansoura University's Faculty of Nursing to undertake the study to assess birth spacing effect on maternal health. The researcher came three days a week in the previously mentioned setting till the predetermined sample size was acquired.
- The investigator distributed the questionnaire to the studied mother to fill in its contents.
- The researcher was available for clarification and checked each sheet after filling for its completion.

3.9 Data Analysis

All statistical analyses were carried out using SPSS for Windows version 20.0 (SPSS, Chicago, IL). Continuous data were normally distributed and reported as mean ± SD. Categorical data were presented as numbers and percentages. Variables with categorical data were compared using the chi-square test (or Fisher's exact test, where applicable). The reliability (internal consistency) of the questionnaires used in the study was calculated. Statistical significance was determined at $p < 0.05$.

4. Results

Table (1) Reveals that the average age of the investigated women was 27.6 ± 4.1. Also, 71.2%& 57% respectively) of them were from rural areas and were middle educated. Additionally, (55.7%& 83% respectively) of them were housewives who lacked sufficient income.

Table (2) Shows that (78.4%) of the investigated women were para 2-3. Also, (80.8%, 42%& 22.3% respectively) of them had cesarean section in their last delivery, had contraceptive methods and had abortion.

Table (3) shows (67.2%, 24.8%& 25.4% respectively) of the investigated women had complications during previous pregnancies, during previous deliveries and during previous postpartum.

Table (4) Shows that there was a statistically significant link between the examined women's obstetric complications and their birth spacing as anemia, oligohydramnios, gestational diabetes and labor dystocia (<0.001**, 0.003*, 0.006** and 0.043) respectively.

Figure 1. Distribution of birth spacing between 1st and 2nd delivery of the studied women

Table 1. *Sociodemographic Data of the Investigated Women*

Items	No. (323)	%
Age (Years)		
< 20	11	3.4
20 – 35	283	87.6
> 35	29	9.0
Mean ±SD	**27.6 ± 4.1**	
Residence		
Urban	93	28.8
Rural	230	71.2
Educational level		
Illiterate	31	9.6
Read and write	55	17.0
Middle education	184	57.0
High education	53	16.4
Occupation		
Worked	143	44.3
Not Worked (Housewife)	180	55.7
Income		
Not enough	268	83.0
Enough	45	13.9
Enough and save	10	3.1

Table 2. *Reproductive History of the Studied Women*

Variables	No. (323)	%
Parity		
2 – 3	253	78.4
4 – 5	70	21.6
Abortion		
Yes	72	22.3
Number of abortions (n=72)		
Once	55	76.4
2 – 3	12	16.7
> 3	5	6.9
Mode of last delivery		
Spontaneous vaginal delivery (SVD)	62	19.2
Cesarean Section (CS)	261	80.8
Use of Contraceptive methods		
Yes	237	73.4
Types of Contraceptive methods (n=237)		
IUD	100	42.1
Pills	94	39.6
Injection	36	15.2
Others *	7	3.1

*Indicate breast feeding, natural, and mechanical

Table 3. *History of Obstetric Complications of the Studied Women*

Items	No. (323)	%
Complications during last pregnancy (2nd pregnancy)		
Yes	217	67.2
Complications during last delivery (2nd delivery)		
Yes	82	25.4
Complications during last postpartum (2nd postpartum)		
Yes	80	24.8

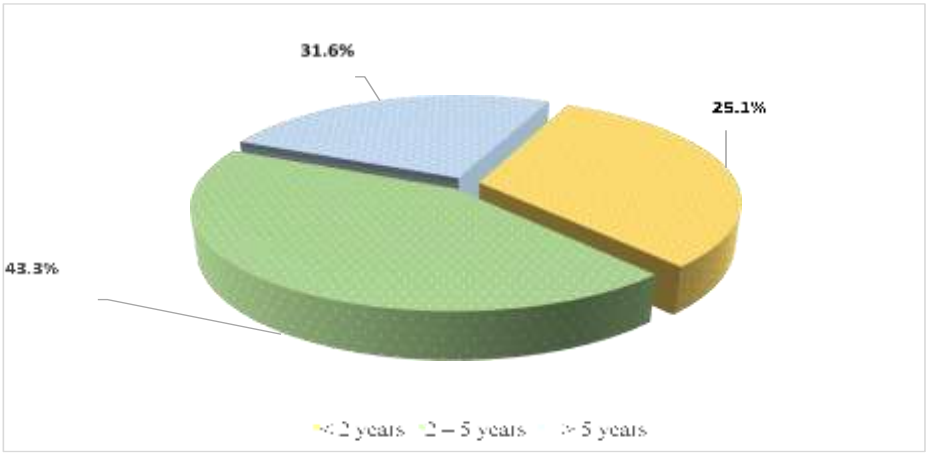
Table 4. *Association Between Obstetric Complications and Birth Spacing of the Studied Women*

Items	***< 2 Years (n=102)***		***2 – 5 Years (n=140)***		***> 5 Years (n=81)***		***Chi – Square***	
	No.	***%***	***No.***	***%***	***No.***	***%***	***X2***	***P***
Complications during previous pregnancy (N=217)	*(N=99)*		*(N=70)*		*(N=48)*			
Preeclampsia	*9*	*9.1*	*13*	*18.5*	*21*	*43.7*	*2.822*	*0.244*
Anemia	*43*	*43.4*	*13*	*18.5*	*20*	*41.6*	*42.961*	***<0.001*****
Gestational diabetes	*19*	*19.2*	*17*	*24.2*	*0*	*0.0*	*16.675*	***0.003****
Oligohydramnios	*24*	*24.2*	*17*	*24.2*	*6*	*12.5*	*80.216*	***0.006****
Others	*4*	*4.0*	*10*	*14.2*	*1*	*2.0*	*2.822*	*0.244*
Complications during previous last deliveries (N=82)	*(N=48)*		*(N=4)*		*(N=30)*			
Precipitated labor	*14*	*29.1*	*0*	*0.0*	*0*	*0.0*	*2.979*	*0.226*
Labor dystocia	*8*	*33.3*	*1*	*25.0*	*22*	*45.8*	*56.254*	***0.043****
Perennial tears	*5*	*10.4*	*1*	*25.0*	*20*	*66.6*	*4.981*	*0.082*
Bleeding	*6*	*14.5*	*1*	*25.0*	*1*	*3.3*	*2.898*	*0.234*
Others	*1*	*1.0*	*1*	*25.0*	*1*	*3.3*	*2.979*	*0.226*
Complications during previous last postpartum (N=80)	*(N=27)*		*(N=35)*		*(N=18)*			
Bleeding	*2*	*7.4*	*10*	*28.6*	*4*	*22.2*	*4.339*	*0.114*
Infection	*3*	*11.1*	*5*	*14.3*	*6*	*33.3*	*4.139*	*0.126*
Cracked nipple	*14*	*51.9*	*19*	*60.0*	*7*	*50.0*	*0.643*	*0.725*
Others	*8*	*29.6*	*1*	*2.8*	*1*	*5.5*	*0.643*	*0.725*

**Statistically significant ($p < 0.05$).*

***High level of statistical significance ($p < 0.001$).*

Figure 1. *Distribution of Birth Spacing Between 1st and 2nd Delivery of the Studied Women*



5. Discussion

The current study sought to investigate the effect of birth spacing on maternal health. The current study findings, which demonstrated a robust link between birth spacing and women's health, helped to achieve the study's goal. Birth spacing of less than two years and more than five years was related with a higher risk of unfavorable maternal outcomes. Therefore, the findings of the current study answered the research question.

The results of the current study indicated that the majority of the studied women had cesarean section (C.S)**.** In contrary of the study done by **Degu et al., (2021),** about the decision to delivery interval, fetal outcomes, and variables among emergency C.S deliveries in Ethiopia revealed that the majority of participants had no prior history of caesarean section delivery. These findings reflected as high C.S rate in Egypt.

In the present study, a higher percentage of the investigated women used contraceptive methods. Nearly, three quarter of them used contraceptive methods. In the exact same line with a study done in Pakistan by **Nausheen et al., (2021),** found that over than half used contraceptive methods. The finding could be explained by there is continuous awareness directed to Egyptian women about benefits of Family Planning, and on its basis, the government has provided all types of contraceptive methods to help these women.

Almost one-fifth of the women examined had abortion. This is not congruent with the study done by **Jones, Foster & Biggs, (2021),** about fertility intentions and recent births they found that about two fifth of individuals had abortions. The difference between studies could be related to increasing rate of seeking abortion in United States, contrarily on Egypt seeking abortion is prohibited and illegal.

Also, nearly two thirds of the studied women had complications during previous pregnancies and few percentages had complications during previous deliveries and postpartum. In the contrary the study done in Indonesia by **Tauho, Tampubolon, & Mone, (2023)**, They discovered that the majority of the investigated women had no past pregnancy difficulty and only half of the women had no prior intrapartum issue. The difference between studies could be explained by delay seeking antenatal care in Egypt.

The current study's findings revealed a statistically significant relationship between the analyzed women's obstetric complications during pregnancies and their birth spacing as women who had anemia, gestational diabetes and oligohydramnios (Complications during previous pregnancy) were significant with birth spacing. In the same line as results of a study done by **Agrawal et al., (2022),** About the relationship between short and lengthy birth spacing with maternal outcomes, found that women with longer birth spacing had higher chances of anemia, gestational diabetes and oligohydramnios. The findings could be explained by poor birth spacing which leads to poor pregnancy outcomes and poor maternal health conditions.

The current study found a statistically significant connection between the examined women's obstetric complications during delivery and their birth spacing as women who had labor dystocia were significant associated with birth spacing. Similarly, a study conducted in Iran by **Akhlaghdoust et al., (2024)** about investigation of the relationship between delivery dystocia and birth spacing in Iran, it was discovered that the interval

between pregnancies had a substantial link with delivery dystocia. The findings could be explained by when women had long birth spacing, they had more experience of labor dystocia.

The finding of this study indicated that there wasn't a statistically significant relationship between the examined women's obstetrics complications during postpartum and their birth spacing as women who had postpartum hemorrhage. otherwise, a study done by **Rao et al., (2022),** about "Is there an ideal inter-delivery interval in women who underwent trial labor following cesarean delivery?", found there was an association between birth spacing and postpartum hemorrhage. The difference could be explained by providing careful care for women with poor birth spacing in Egypt.

About one-third of the studied women were less than two years intervals between 1st and 2nd delivery. This was in agreement with the participants who registered in the study, done by **Byamukama et al., (2022),** about the short interbirth gap and associated variables among women with previous cesarean births at a tertiary hospital in southern Uganda, and found that those who had short interbirth interval nearly one third. as well as the study done in India by **Agrawal et al., (2022),** who explored the relationship between long and short interpregnancy intervals with maternal outcomes and discovered roughly three quarters of the studied women had a short interval.

6. Conclusion

Birth spacing was strongly associated with maternal health. Birth spacing less than 2 years and more than 5 years were related with an elevated risk of negative maternal and perinatal outcomes.

7. Recommendations

Raising women's awareness about the risks of inadequate birth spacing and its potential for poor maternal health outcomes.

10. References

Abozeid, I., Salem, H.A., & Elboghdady, A.A. (2021). Effects of a Short Interpregnancy interval on Pregnancy Outcomes. *Al-Azhar International Medical Journal, 2(5), 12-17.*

Agrawal, S., Chaudhary, M., Das, V., Agarwal, A., Pandey, A., Kumar, N., & Mishra, S. (2022). Association of long and short interpregnancy intervals with maternal outcomes. Journal of Family Medicine and Primary Care, 11(6), 2917.

Ajayi, A.I., & Somefun, O., D. (2020). Patterns and determinants of short and long birth intervals among women in selected sub-Saharan African countries. *Medicine* 99(19).

Akhlaghdoust M, Zarbati N, Amirkhani Z, Naimi S, Sadeghi M, Mohammadi Fateh S, Jafarabadi M. (2024). Evaluation the Association between Labor Dystocia and Birth Spacing in Iranian Women. J Family Reprod Health. 2014 Sep;8(3):101-5. PMID: 25628718; PMCID: PMC4275550.

Aleni, M., Mbalinda, S. N., & Muhindo, R. (2020). Birth intervals and associated factors among women attending young child clinic in Yumbe Hospital, Uganda. *International journal of reproductive medicine*.

Barbosa R, Alves MTSSB, Nathasje I, Chagas D, Simões VF, Silva L. (2020). Factors Associated with Inadequate Birth Intervals in the BRISA Birth Cohort, Brazil. *Rev Bras Ginecol Obstet*,42(2):67-73. https://doi.org/10.1055/s-0040-1701463

Byamukama, O., Migisha, R., Kalyebara, P. K., Tibaijuka, L., Lugobe, H. M., Ngonzi, J., ... & Kanyesigye, H. (2022). Short interbirth interval and associated factors among women with antecedent cesarean deliveries at a tertiary hospital, Southwestern Uganda. *BMC Pregnancy and Childbirth*, *22*(1), 1-8. DOI**:** 10.1186/s12884-022-04611-4

Conde-Agudelo A, Rosas-Bermúdez A., & Kafury-Goeta AC, (2007). Effects of birth spacing on maternal health: a systematic review. *Am J Obstet Gynecol*. 2007;196(4):297-308.

Degu Ayele, A., Getnet Kassa, B., Nibret Mihretie, G., & Yenealem Beyene, F. (2021). Decision to delivery interval, fetal outcomes and its factors among emergency caesarean section deliveries at south gondar zone hospitals, Northwest Ethiopia: Retrospective cross-sectional study, (2020). *International Journal of Women's Health*, 395-403.

Dehesh, T., Salarpour, E., Malekmohammadi& kermani, S. A. (2020). Associated factors of pregnancy spacing among women of reproductive age Group in South of Iran: cross-sectional study. *BMC Pregnancy Childbirth* **20**, 554.

Egypt Demographic and Health Survey. (2024). Egypt population growth rate declined by 46% from 2017 to 2023. *Ahram online.* Retrieved from:

https://english.ahram.org.eg/News/520112.aspx

Hababa, H., & Assarag, B. (2023). Measurement of maternal morbidity during postpartum with the WHO-WOICE tools in Morocco. *BMC Pregnancy and Childbirth*, *23*(1), 310.

Jones, R. K., Foster, D. G., & Biggs, M. A. (2021). Fertility intentions and recent births among US abortion patients. *Contraception*, *103*(2), 75-79.

Ministry of Planning and Economic Development. (2023). Cabinet's information centre survey. *Ahram online.* Retrieved from: *https://english.ahram.org.eg/NewsContent/1/2/485125/Egypt/Society/More-than--of-Egyptians-aware-of-;overpopulation-p.aspx*

Mohammed, M. M. M., El Gelany, S., Eladwy, A. R., Ali, E. I., Gadelrab, M. T., Ibrahim, E. M., & Abdallah, A. A. (2020). A ten-year analysis of maternal deaths in a tertiary hospital using the three delays model. *BMC Pregnancy and Childbirth*, *20*, 1-8.

Muluneh AA, Kassa ZY, Siyoum M, Gebretsadik A, Woldeyes Y, Tenaw Z. (2020). Determinants of Sub-Optimal Birth Spacing in Gedeo Zone, South Ethiopia: A Case-Control Study. Int J Womens Health. Jul 24; 12:549-556. https://doi.org/10.2147/ijwh.s252516

Nausheen, S., Bhura, M., Hackett, K., Hussain, I., Shaikh, Z., Rizvi, A., ... & Soofi, S. (2021). Determinants of short birth intervals among married women: a cross-sectional study in Karachi, Pakistan. *BMJ open*, *11*(4), e043786.

Pimentel, J., Ansari, U., Omer, K., Gidado, Y., Baba, M. C., Andersson, N., & Cockcroft, A. (2020). Factors associated with short birth interval in low-and middle-income countries: a systematic review. *BMC pregnancy and childbirth*, *20*(1), 1-17.

Rao, J., Fan, D., Ma, H., Lin, D., Zhang, H., Zhou, Z., ... & Liu, Z. (2022). Is there an optimal inter-delivery interval in women who underwent trial of labor after cesarean delivery (TOLAC)? Reproductive Health, 19(1), 14.

Shrestha, P., Mahato, V., & Karmacharya, S. (2020). Effect of inter-pregnancy interval on maternal and fetal outcome. *Nepal Journal of Obstetrics and Gynaecology*, *15*(1), 58-61. https://doi.org/10.1371/journal.pone.0246348

Tauho, K. D., Tampubolon, R., & Mone, D. M. (2023). The Profile of Women Suffering Postpartum Hemorrhage: Recent Update in Salatiga Region General Hospital, Central Java, Indonesia. International Journal of Nursing and Health Services (IJNHS), 6(4), 266-272. https://doi.org/10.35654/ijnhs.v6i4.739