

DOMINANT FACTORS AFFECTING SHORT BIRTH INTERVAL BASED ON DATA OF IDHS 2017

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Published by *Fakultas Kesehatan Masyarakat Universitas Airlangga*

ABSTRACT

Keywords:

birth interval,
women's reproductive
health,
maternal and child
health

Short birth distances can be risky for the mother as well as for the baby. Mothers who experience pregnancy with too close a distance can be at risk of early rupture of amniotic fluid, bleeding, and anemia, while infants were at risk of low birth weight and death. To avoid such risks, couples of childbearing age should plan and determine the distance of pregnancy. The purpose of the study was to identify the most dominant factors that influence the incidence of short birth distances. Knowledge of birth distance is very beneficial for women's reproductive health. Furthermore, women are expected to delay pregnancy or provide birth distance after the previous birth. This study used secondary data from the Indonesian Health Demographics Survey (IDHS) 2017. The sample of this study is of women who gave birth to the last child born alive in the last five years when IDHS data were taken. The results of this study showed that the factor that most influences the occurrence of short birth distance is the survival status of the child after being controlled by other variables.

ABSTRAK

Kata Kunci:

jarak kelahiran
pendek,
kesehatan reproduksi
wanita,
kesehatan ibu dan anak

Jarak kelahiran pendek bisa berisiko bagi ibu dan juga bagi bayi. Ibu hamil berisiko mengalami ketuban pecah dini, perdarahan, dan anemia jika jarak antar kelahiran terlalu dekat. Sedangkan pada bayi berisiko mengalami BBLR dan kematian. Untuk menghindari risiko tersebut, penting bagi wanita usia subur untuk merencanakan jarak kehamilan. Tujuan penelitian adalah mengidentifikasi faktor paling dominan yang mempengaruhi kejadian jarak kelahiran pendek. Wanita diharapkan dapat memberikan jarak antar kelahiran setelah mendapatkan pengetahuan tentang manfaat jarak kelahiran bagi kesehatan reproduksi wanita. Penelitian ini menggunakan data sekunder Survei Demografi Kesehatan Indonesia (SDKI) 2017. Sampel penelitian ini adalah wanita yang melahirkan anak terakhir yang lahir hidup dalam lima tahun terakhir saat pengambilan data SDKI. Hasil penelitian ini menjelaskan bahwa faktor yang paling mempengaruhi terjadinya jarak kelahiran pendek adalah status kelangsungan hidup anak setelah dikontrol oleh variabel yang lain.

INTRODUCTION

Birth spacing of less than 6 months significantly increases maternal mortality due to an increased risk of third trimester bleeding, rupture of amniotic fluid, and anemia (1). Short birth spacing is also a risk for the baby. The risk of LBW (Low Birth Weight) in mothers with short birth intervals is 1.94 times greater than in mothers with optimal births (2). This can be caused by pregnant women whose birth intervals are less than 2 years, their physical and uterine health still need adequate rest. Mothers still have

to breastfeed their children so that the mother's condition is weak which has an impact on the health of the fetus and birth weight (3). Short birth spacing also has an impact on the nutritional status of children. Children born close together face the risk of malnutrition and stunting (4). The trend of short birth spacing in Indonesia from 2002 – to 2017 tends to decrease, namely 12.7% (2002), 12.8% (2007), 10.5% (2012), and 9% (2017) (5). The results of the study explained that infant mortality

Received in 08 December 2020 ; Accepted in 23 June 2021 ; p-ISSN 2302–707X - e-ISSN 2540–8828 ; DOI: <https://doi.org/10.20473/jbk.v11i1.2022.45-53>

Cite this as : Zaly NW, Raharja MB. Dominant Factors Affecting Short Birth Interval Based on Data of IDHS 2017. *J Biometrika dan Kependud* [Internet]. 2022;11(1):45–53. Available from: <https://doi.org/10.20473/jbk.v11i1.2022.45-53>

in Indonesia had the greatest risk of having birth spacing <18 months as much as 2.43 times compared to birth spacing of 18-23 months, 24-35 months, and >36 months. Even infant mortality in Cambodia has a greater risk of experiencing birth spacing <18 months as much as 4.39 times compared to birth spacing of 18-23 months, 24-35 months, and >36 months (6).

Couples can try to adjust the distance between the previous pregnancy and the next pregnancy. Thus, the couple can be more ready to accept and be ready to have another child (7). Birth spacing was calculated using the difference between the mother's current age and her age in the last pregnancy. Birth spacing was categorized into "adequate" (≥ 2 years or <5 years between births), "short birth spacing" (<2 years), and "long birth spacing" (≥ 5 years) based on WHO recommendations (8). Adequate birth spacing allows women to recover from previous pregnancies, but spacing that is too short or too long can be detrimental to maternal, perinatal, neonatal, and child health (9). Short birth spacing increases the risk of infant mortality by 61% and the risk of under-five mortality by 47%, namely at birth intervals of less than 24 months (1).

Several factors in the family that influence the decision to adjust the birth spacing include psychological factors of the partner, socioeconomic, cultural factors, and the age of the partner. However, there are still many couples of childbearing age whose knowledge is still lacking about the benefits of long-term spacing of pregnancies, so that they have children regardless of the birth spacing (10).

Variables related to birth spacing include the number of children they have, the use of modern contraception, the mother's educational status, and the child's gender (11). Several factors that influence the incidence of short birth spacing include the length of time breastfeeding, the use of contraception, the sex of the last child, the mother's age at delivery, and the place of delivery of the last child (12).

Short birth intervals have an impact on the incidence of maternal, infant, and child morbidity and mortality. Birth spacing of fewer than 24 months by 29% of births occurred in Ethiopia. However, this is not enough to become a basis for policymakers that birth spacing is very important for optimal maternal and child health (13).

The study aimed to identify the most influential factors in the occurrence of short birth spacing. The benefit of this research is to increase women's knowledge about reproductive health, especially regarding optimal birth spacing. This study hypothesizes that there is a dominant factor influencing the incidence of short birth spacing.

METHODS

The design of this study was cross-sectional and is an analysis of secondary data from the 2017 Indonesian Health Demographic Survey (IDHS). The population in this analysis is Women of Childbearing Age OR *Wanita Usia Subur* (WUS) aged 15-49 years in Indonesia in the 2017 IDHS. The results of the 2017 IDHS were conducted from September to December 2020. The inclusion criteria for this study were women who had given birth to at least two live births, where the birth of their last child was within the last five years when IDHS data were collected.

The dependent variable of this study is the birth distance between the last two children born. While the independent variables of this study are the mother's age (when giving birth to a previous child), duration of breastfeeding, number of surviving children (excluding the last-child), gender of the previous child, survival status of the previous child, contraceptive use, area of residence and mother's education level.

RESULT

Univariate Analysis

Univariate analysis was used in the study to identify the characteristics of the sample based on the observed variables. The variables analyzed included birth spacing, mother's age, duration of breastfeeding, number of surviving children, gender of the previous child, previous child's survival status, contraceptive use, area of residence, and mother's education level.

Table 1 shows the variables that affect birth spacing, including the percentage of short birth spacing (less than 2 years) of 9.8%, women aged 20-35 years at most 81.8% when giving birth to their previous child, mothers who gave breast milk for 0-18 months is 58.5%, the sex of the previous child was male by 52%, the number of children living with more than two children

was 48.9%, the survival status of the previous child who lived was 95.7%, the use of contraception by 93.6%, the area where they live in the countryside is 51.3% and the highest level of education of mothers is middle to high school by 53.8%.

Table 1. Frequency Distribution of Research Variables (n=10,446)

Variable/ Category	Frequency	%
Birth Distance		
≥ 24 months	9,424	90.2
< 24 months	1,022	9.8
Mother's Age at Childbirth Before		
20-35 years old	8,548	81.8
<20 and >35	1,898	18.2
Previous Child's Gender		
Man	5,434	52.0
Woman	5,012	48.0
Breastfeeding Duration		
Not breastfed	495	4.7
0-18 months	6,113	58.5
>18 months	3,838	36.7
Number of Children Still Alive		
≤ 2 children	5,342	51.1
> 2 children	5,104	48.9
Ever Use Contraception		
Yes	9,782	93.6
No	664	6.4
Previous Child Survival Status		
Life	9,999	95.7
Dead	447	4.3
Mother's Education Level		
Unschooling	182	1.7
Primary School	3,097	29.6
Middle School	5,620	53.8
College	1,547	14.8
Residential Area		
Urban	5,092	48.7
Rural	5,354	51.3

Source: IDHS 2017 data, processed

Bivariate Analysis

Bivariate analysis was used to determine the relationship between birth spacing with the observed independent variables. The independent variables observed were the mother's age, duration of breastfeeding, number of surviving children, gender of the previous child, previous child's survival status, use of contraception,

area of residence, and mother's education level.

Based on Table 2, it is explained that the factors that influence the occurrence of births with a value of $p=0.00$. Variables that affect birth spacing include duration of breastfeeding, mother's age, contraceptive use, number of children, mother's education level, and child status before the last child. This is in line with research that states factors that influence birth spacing are the mother's age and education level, use of contraception, survival of the last child, duration of breastfeeding, and the number of children (14).

Multivariate Analysis

Multivariate analysis is used to analyze the relationship between several dependent variables and independent variables together. Table 3 shows the results of multivariate analysis on the factors that influence short birth spacing. The variable that most strongly influences the occurrence of short birth spacing is the previous child's survival status, after controlling for other variables.

DISCUSSION

Birth Distance

The results of this study indicate that the birth spacing is short by 9.8%. Birth spacing is the period between the previous child's birth date and the last child's birth date (15). Optimal birth spacing is beneficial for the health of mothers and babies. Short birth spacing (space between births less than 24 months) can be detrimental to the health of mothers and children (4). The ideal birth interval is more than 24 months. Reproductive organs can prepare to get pregnant again at that time (16). Therefore, the distance between births is very important to pay attention to because it is closely related to the reproductive health of women and the health of the children born. The risk of low birth weight babies (LBW) will also be reduced by keeping the distance between births.

Effect of Maternal Age on Birth Distance

The healthy reproductive age range is a safe age for women to experience pregnancy and childbirth, which is 20 to 35 years (17). The

results of bivariate analysis obtained a p value = 0.01 which means that maternal age affects birth spacing. Table 2 shows that mothers aged less than 20 years and more than 35 years (11.3%) are more likely to experience short birth spacing than mothers aged 20-35 years (9.5%). The age of the mother referred to in

this study was the age of the mother at the time of giving birth to the child before the last child. This is because the researchers used secondary data from the 2017 IDHS, to obtain data on birth spacing by comparing the data of the last child with the previous child.

Table 2. Relationship between Birth Distance and Independent Variables observed (n=10,446)

Variable/Category	Birth Distance				<i>p</i> value
	≥ 24 months		< 23 months		
	n	%	N	%	
Mother's Age					
20-35 years old	7,740	90.5	808	9.5	0.016
<20 years and >35 years	1,684	88.7	214	11.3	
Previous Child's Gender					
Man	4,924	90.6	510	9.4	0.154
Woman	4,500	89.8	512	10.2	
Breastfeeding Duration					
No breast milk	435	87.9	60	12.1	0.001
0-18 months	5,475	89.6	638	10.4	
>18 months	3,514	91.6	324	8.4	
Number of Children Still Alive					
≤ 2 children	4,856	90.9	486	9.1	0.016
> 2 children	4,568	89.5	536	10.5	
Ever Use Contraception					
Yes	8,881	90.8	901	9.2	0.000
No	543	81.8	121	18.2	
Previous Child Survival					
Live	9,100	91.0	899	9.0	0.000
Dead	324	72.5	123	27.5	
Mother's Education Level					
Unschooling	150	82.4	32	17.6	0.000
Primary School	2,861	92.4	236	7.6	
Middle School	5,089	90.6	531	9.4	
College	1,324	85.6	223	14.4	
Residential Area					
Urban	4,600	90.3	492	9.7	0.684
Rural	4,824	90.1	530	9.9	
Total	9,424	90.2	1,022	9.8	

Source: IDHS 2017 data, processed

Maternal age is also related to the current trend of marriage. Reproductive age will be shorter due to delays in marriage. Therefore, women who marry late will speed up the birth gap. This is confirmed by research which explains that women who experience social pressure due to late marriage will try to accelerate the birth rate (by shortening the

birth distance) (18). This is also in line with research in Ethiopia which states that women who marry late are closely related to short birth intervals. Women who marry late have an older age, so they must have children soon after marriage and plan to have the desired number of children, before the end of the reproductive period (19).

Table 3. Tendency Ratio (odds ratio) based on Binner Logistic Regression for the Effect of Observed Independent Variables on Birth Distance

Independent Variable	Birth Interval Status	
	OR	95% CI
Mother's Age		
20-35 years old	0.74**	0.63-0.88
<20 and >35 years old	1.00	
Previous Child's Gender		
Man	0.89*	0.78 - 1.01
Woman	1.00	
Breastfeeding Duration		
Not breastfed	1.34*	0.99 - 1.81
0-18 months	1.22**	1.06 - 1.41
> 18 months	1.00	
Number of Children Still Alive		
2 children	0.71**	0.62 - 0.81
> 2 children	1.00	
Ever Use Contraception		
Yes	0.50**	0.40 - 0.62
No	1.00	
Previous Child Survival Status		
Live	0.25**	0.20 - 0.31
Dead	1.00	
Mother's Education Level		
Unschooling	0.84	0.55 -1.30
Primary School	0.42**	0.34 -0.51
Middle School	0.59**	0.49 -0.67
College	1.00	
Residential Area		
Urban	0.94	0.82 - 1.08
Rural	1.00	

*)Significant at level = 0.10

**)Significant at level = 0.05

Source: IDHS 2017 data, processed

The Effect of Breastfeeding Duration on Birth Spacing

The duration of breastfeeding affects the birth spacing with $p=0.00$. Mothers who did not breastfeed experienced a short birth interval of 12.1%, the duration of breastfeeding 0-18 months experienced a short birth interval of 10.4%, and the duration of breastfeeding for more than 18 months experienced a short birth spacing of 8.4%. This proves that the duration of breastfeeding in the previous child shows a relationship with short birth spacing. Three studies found an association between shorter birth spacing and shorter breastfeeding duration.

Another research found shorter birth intervals without breastfeeding compared to exclusive or mixed breastfeeding (9). This is in line with research in Iran that the duration of breastfeeding is an independent factor of birth spacing. This matter shows that a breastfeeding duration of more than 2 years is more likely to have a longer birth interval than a breastfeeding duration of fewer than 6 months (20). From these reasons it can be concluded that the duration of breastfeeding can prolong the interval between births by slowing down female fertility.

Effect of Number of Children on Birth Distance

The results of this study indicate the value of $p=0.01$, which means that birth spacing is influenced by the number of children. The percentage of mothers who had at most two children experienced a shorter birth spacing of 9.1% than mothers who had more than two children of 10.5%. Short birth spacing is more likely to be experienced by mothers who have more children (>2 children). This is in line with research that states that increasing parity causes an increased risk of having a subsequent birth, which means that when parity increases, birth spacing decreases (21).

The Effect of Contraceptive Use on Birth Distance

Birth spacing is also influenced by contraceptive use with a p value of 0.00. The incidence of short birth spacing in women who do not use contraception is 18.2% and for women who use contraception is 9.2%. This is in line with a study in Ethiopia that stated the importance of contraceptive use factors in influencing birth spacing. Short birth spacing is still a concern for Ethiopian women due to factors such as religion, length of breastfeeding, unwanted pregnancies and not using contraception. Important strategies that need to be considered are the coverage of contraceptive use, increasing access, and involvement of religious leaders in family planning programs (13).

Besides that, the factor that most influences birth spacing is the use of contraceptive methods (15). The results of other studies also show that women who

do not use contraceptive methods are more likely to have shorter birth intervals than women who use all forms of contraception (1).

Effect of Child's Previous Survival Status on Birth Spacing

Birth spacing is also influenced by the survival status of children born previously with $p=0.00$. The percentage of infant mortality is more experienced by mothers with short birth intervals of 27.5% compared to infants who live by 9%. When a baby/child dies, the mother will stop breastfeeding (unless the children are twins), and the mother will be at risk of getting pregnant more quickly than if she still has babies (22). This is also under research which says that short birth spacing tends to occur in subsequent births in couples who experience child death. Spouses tend to want to make efforts to have children immediately to replace lost children (20).

The Influence of Mother's Education Level on Birth Distance

The results of the study prove that birth spacing can be influenced by the mother's level of education. Short birth spacing occurred in mothers who did not go to school by 17.6% and mothers who graduated from universities by 14.4%. This is in line with research related to women's education in Bangladesh which states that women without formal education tend to have shorter birth intervals with subsequent births (20). This is in line with research in Ethiopia which shows that education level affects short birth spacing. Short birth spacing is more likely to occur 3 times (AOR = 3.40, 95% CI: (1.80–6.43) in mothers who do not have formal education compared to mothers who have formal education (15).

Short birth spacing in college graduates may be due to delays in marriage. Women with higher education tend to marry late, limiting their reproductive years and the number of children (1).

Mothers who have low formal education will be at risk of experiencing short birth spacing. The low education of mothers is related to their lack of information and knowledge about various things including how to maintain reproductive health. This is in line with research that states low formal education

affects women's understanding and/or knowledge about contraception and birth spacing as well as behavior seeking information about reproductive health (18).

The Influence of the Child's Previous Place of Residence and Gender on Birth Distance

Similar research states that the female sex in the last child is likely to experience short birth spacing 2 times greater with an OR value of 2.03 (12). This is different from the results of research on patrilineal culture which is still dominant in North Sumatra. This study shows that there is a greater preference for men. This causes women who have not had sons to try to have more children (23).

The results of this study obtained a p value = 0.15 which means that there is no effect of the sex of the last child on birth spacing. In areas that adhere to a matrilineal/patrilineal culture, the sex preference of the child is very important. Patrilineal culture explains that the position of sons is important in the family as the successor of offspring, as well as the position of daughters in matrilineal society (23). One of the possible causes for the non-influence of the sex of the child on birth spacing is that this understanding/culture is not followed by all regions in Indonesia. This is in line with research on the DHS (Demographic Health Survey) in Ethiopia in 2011 which explained that there was no significant relationship between the sex of the child and birth spacing (15). Furthermore, for the factor of an area of residence, p value = 0.684, which means that there is no effect of area of residence on birth spacing.

Dominant Factors Affecting Short Birth Spacing

The results of this study indicate that the most dominant factor influencing the occurrence of short birth spacing after controlling for other variables is the survival status of the previous child. This is in line with research in Manipur, India which showed that the previous child's survival status was the most important in determining the pattern of child spacing for social and biological reasons. Socially, couples who have experienced the loss of a child as an infant avoid contraception with the motivation to have another child as a

substitute. Biologically, infant mortality interferes with breastfeeding, which contributes to the return of fertility, and the absence of contraception may increase the likelihood of subsequent early conception (21). This study also provides evidence that child mortality will have an impact on the shorter birth spacing of the next child.

Breastfeeding duration showed a consistently positive relationship with birth spacing. This is because lactational amenorrhea arising from breastfeeding can prolong the birth interval (21). Connections between child mortality and birth spacing are more related to maternal behavior, such as discontinuation of contraceptive use and cessation of breastfeeding. Mothers who stop breastfeeding result in mother's fertility returning quickly (22).

In general, the increase in infant mortality can be caused by babies born with short birth spacing, mothers who are too young or too old, or babies born to mothers with high parity (24). Maternal age and high parity are at risk of death in children. Because of the death of a previous child, couples tend to try to get pregnant again to replace immediately the child who has died. This results in a short birth interval with the occurrence of child deaths (20).

A mother's education affects the occurrence of short birth spacing. Mothers without formal education tend to have a short birth interval with the next birth (20). When a child of a mother without formal education dies, the mother will likely try as soon as possible to be able to obtain a substitute child. This incident can be caused by the lack of understanding of mothers about reproductive health. In contrast, mothers who are college graduates are likely to experience short birth intervals due to delays in marriage so that couples will shorten their reproductive period. This statement is in line with research that states that the study-oriented factor is one of the causes of women getting married late (25). When an infant/child death occurs, likely college graduate mothers will immediately plan to have children again due to

their limited reproductive age.

Research Limitations

This study uses secondary data from the 2017 IDHS with the limitation of the research being the possibility of errors in answering (response bias) because respondents have to remember to answer past questions. In addition, there may be an underrepresentation of birth spacing because this study did not consider abortion or miscarriage.

CONCLUSIONS AND SUGGESTIONS

Conclusion

The results of this study indicate that several factors that have a significant relationship with birth spacing include the duration of breastfeeding, maternal age, contraceptive use, number of children, mother's education level, and child status before the last child to the occurrence of short birth spacing. The most influential factor in the incidence of short birth spacing is the previous child's survival status.

Suggestion

One of the important factors for maternal and child health is optimal birth spacing. It is hoped that this birth spacing will become a basic priority for policymakers to improve maternal and child health. Child mortality is the most dominant factor influencing the occurrence of short birth spacing after controlling for other variables. The efforts that can be made in improving maternal and child health are making strategies to reduce the occurrence of neonatal, infant, child, and perinatal mortality.

ACKNOWLEDGMENT

The researcher would like to thank the Institute of Health and Technology PKP DKI Jakarta the and National Population and Family Planning Board of Indonesia for their support of this research.

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