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Does Child Spacing Influence Nutritional Status of Children 6-59 Months?

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Abstract

Objectives: This study describes the relationship between child spacing and nutrition status of the index child in Kakuzi, Thika East Sub-County. The study covered 212 households with children 6-59 months in Kakuzi division.

Methods: The study employed a cross-sectional analytical study design. Cluster sampling was used for where the village constituted a cluster unit and the household constituted the unit of measurement. Data was collected using a researcher administered structured questionnaire and a focus group discussion to bring out other confounding factors on child's nutrition status and the attitudes towards child birth intervals. A Key Informant Interview (KII) was also used to validate data from both the questionnaire and the Focus Group Discussion (FGD). Data was analyzed using Statistical Packages for Social Sciences (SPSS) version 16 where descriptive statistics were analyzed using means and frequencies. Chi square test was used to test for any relationship between the variables. A p value of <0.05 was used to determine the level of significance.

Results: From the study indicate that 95.8% of the caregivers were the child's mothers. Study findings indicate that 58.5% of the caregivers were farmers earning less than a dollar a day (49.1%). The most common birth interval was 18-23 months with an almost equal number for 24-35 months with 34.9% and 33.5% respectively. However, 81.5% of the caregivers would prefer a birth interval of 24-60 months. 78.7% of the caregivers obtained information on child spacing from the hospital and this is reflected in the choices of the methods employed. From the focus group discussion the caregivers did not recognize breast feeding as an effective way of enhancing child birth interval. The prevalence of stunting was 28.3% with 60% of the stunted children being boys. There was a significant relationship between child spacing and nutritional status (p=0.001). More studies need to be carried out in the area of child spacing and to be broadened to cover family planning issues that contribute and influence child spacing.

Conclusion: Child birth interval influences the nutritional status of children 6-59 months. It is thus important to sensitize and educate caregivers on the need to space children and ensure children are able to thrive out of good care and eventually minimize the effects of poor nutritional status.

Keywords: Child birth interval; Nutritional status; Stunting

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Introduction

Background to the study

Child spacing is the time lapse between births or pregnancies. When assessing the relationship between child spacing and nutritional status it is important to distinguish amongst inter-pregnancy interval, birth to pregnancy and birth to birth interval. This study focused on birth to birth interval. When pregnancies are closely spaced, mothers do not have adequate time to replenish nutrition stores and lack time to recuperate [1,2].

Globally, child spacing intervals vary from country to country and region to region as reflected in the child outcomes. World Health Organization (WHO) recommends a birth spacing of 24 months before a new pregnancy is attempted. Studies by USAID however suggest a longer duration of spacing of between 3-5 years [3]. In sub-Saharan Africa women prefer a longer child spacing time than they actually have [4]. As a result of this the prevalence of child spacing (<24 months) and malnutrition vary similarly in the same countries. This idea is important in exploring the reason for the preference exhibited by women as revolving around child spacing and its impact on care

practices. Catalyst Consortium [5], in a meta-analysis found that the length of the preceding birth interval is highly related to the risk of dying in early childhood. There is a dose response to interval length, in that the shorter the interval, the higher the risk, and that the effect of birth interval on mortality is not limited to the neonatal period but applies to all age ranges. This is an area that needs further exploration to help form an understanding of the situation at hand.

In Kenya, the median birth interval has remained more or less the same, changing marginally from 32.9 months in the 1998 to 32.6 months in the 2003 and 33.1 months in 2008-09 [6]. However, the median birth interval is relatively shorter for children born to young women aged 15-29. Among children whose preceding sibling died and children in rural areas. Also among children born to women in North Eastern, Western, Nyanza, and Rift Valley provinces. Lastly, among children born to women with no education and those born to women from poorer households. The most common birth interval category is 24-35 months with 34.2%, while the least common category is 7-17 months with 9.1%, [6]. Over half (59.4%) of Kenyan children are born within less than 36 months after a previous birth. Child spacing is thus an issue that warrants attention to circumvent the negative effects of less than recommended child birth interval.

Children have a lower risk for stunting and being underweight when births are spaced between 3-5 years, [5,7]. This could be attributed to improved child care practices and better nutrition in children.

Compared to a 36-47 month birth interval, a birth interval of less than 18 months is associated with increased risk for Stunting-1.4 times and Underweight-1.46 times [5,7]. The Kenya Demographic Survey [8] agrees with this finding that a birth interval <2 years results in children with an elevated risk of dying. This would suggest that a longer birth interval would enhance a healthier child under-five years. However, too long a birth interval can also be detrimental to health [9]. In a meta-analysis, adverse peri-natal outcomes including preterm, low birth weight and small for gestational age were observed. This therefore begs the question, what is the ideal time to wait before attempting another pregnancy?

Child birth intervals warrant attention in poor households and in area where there is high incidence of teenage pregnancies [8]. Poor households have the highest burden of stunting with 44% and 39% being in the 1st and 2nd lowest wealth quintiles respectively [10]. Few studies have been done in Kenya in the area of child spacing and its relationship with nutrition status. It is against this background that this study will be carried out to assess the relationship between child spacing and nutritional status of under-fives in Kakuzi division.

Methodology

Research design and study area

The study employed a cross-sectional analytical design applying mixed methods i.e. qualitative and quantitative techniques in data collection. The design also allowed for the establishment of any relationship among the variables. The dependent variables were nutritional status while the independent variables were demographic characteristics, socio-economic characteristics and child spacing.

The study was carried out in Kakuzi ward of Thika East Sub-County and has a total of 13206 households. Kakuzi ward was selected as it had a mix of attributes associated with areas with challenges in child spacing; child birth interval are a problem in poor households, rural and an ASAL area [11].

Study population

The study focused on households with children 6-59 months in Kakuzi ward. The study aimed to collect data from household level. The researcher could interact with the caregivers at the household level and also be able to make observations especially with regard to socio-economic data. The study included mothers and caregivers with children 6-59 months and willing to participate were included in the survey. Caregivers who declined or failed to give consent for participation in the study were excluded from the study.

Sampling techniques and sample size

Thika East Sub-county and Kakuzi ward were purposively selected. Cluster sampling was used where the study area was divided into cluster. The village constituted the cluster unit. The entire Kakuzi ward has 132 villages with each village having 100±5 households therefore they were treated equally. 20 villages were randomly selected and a total of 11 households were selected within each village to constitute the sample size. Households' selection was done by gathering at the centre of the village. A pen was spun to determine the direction to follow and the households on the chosen direction were interviewed until the edge of the village. If the sample size for that cluster was not sufficient, the pen was spun again to take the next path.

The calculated sample size was 205 which were determined by using Cochran Formula (1963) as quoted by Israel (1992). This formula was adopted and was not corrected for finite sample since the area under study had a population >10,000. An additional 10% of the sample size was added to account for non-responsiveness bringing the sample size to 225.

$$n = Z^2pq/d^2$$

Research instruments

The data collection tools were a structured questionnaire, a Focus Group Discussion (FGD) guide and a key informant interview. The questionnaire was used to collect quantitative and qualitative information on demographic and socio-economic characteristics, care practices including breastfeeding and complementary feeding, anthropometric measurements and morbidity. Focus group discussion enabled collection of qualitative information on mothers and care-givers attitude and or perceptions towards child birth intervals and their influencers and their perceived impact on nutritional status of the child. A key informant interview was carried out with health workers to validate information on child birth intervals in Kakuzi. The tools were pre-tested in one of the villages in the sub-county and modified appropriately. Test-retest technique was used to determine reliability and the tools were observed to have reliability co-efficient of 0.8.

Data collection techniques

Data was collected using a structured questionnaire by researcher trained assistants. Two FGDs were held with the mothers and caregivers to determine their attitudes towards child spacing. Two key informant interviews were carried out with the health care workers in Kakuzi. The information from the FGD and KII was transcribed and used to validate information from the structured questionnaire.

Data analysis and presentation

Data analysis was done using Statistical Packages for Social Sciences (SPSS) to determine the quantitative variables and

their ranges. Chi square was used to determine any relationship between number of children, child spacing and nutritional status of children. This would also be used to test the hypothesis and the level of significance. Nutritional status was analyzed using ENA for SMART and cut offs below -2 S.D was deemed as undernourished. Care practices was assessed against the recommended duration of breast feeding for 6 months, age of introduction of complementary foods and on the basis of the primary care giver. The FGD and KII were transcribed, coded and the major themes identified out of the discussions with the mothers and caregivers to determine the community's attitude to child spacing. This would also help in assessing the effect of confounders.

Results

Characteristics of the study population

The sample size was 225 but only 212 participated in the study with 46.2% of the children being males and 53.8% being female. Majority of the children (95.8%) were cared for by their mothers with fathers representing only 0.9% of the primary caregivers. Majority of these caregivers were married (81.6%) with single women constituting 15.6%. Two thirds of the caregivers were Protestants (65.6%) with 32.1% being Catholics. 2.3% claimed to profess no association to any faith. 64.2% had primary level of education while 29.7% had secondary education (Table 1).

Socio-economic characteristics

The main source of income for the caregivers is crop farming accounting for 58.5% with livestock keeping being the lowest at 0.5%. Almost a third of the caregivers (28.8%) engage in small businesses as a source of income. The caregivers' average income was less than a dollar a day with 49.1% having a monthly income of zero to Ksh 3,000/. This validates the classification of Kakuzi as a generally poor region. An equal number of respondents (22.2%) indicated an average income of between Ksh 3,001-Ksh 5,000/ and Ksh 5,001-Ksh 10,000/. Only 1.9% indicated an income of Ksh 15,001-20,000 (Table 2).

Child birth intervals

The most common interval for mothers in Kakuzi was 18-23 months at 34.90%. An almost equal number 33.49% opted for a birth interval of 24-35 months. Another 23.11% of the caregivers reported a birth interval of >36 months. The interval 0-17 months was the least common at 8.49%. Majority of the caregivers, 81.5% would prefer a birth interval of 2-5 years, while 8.5% of the caregivers would prefer a birth interval of less than 24 months and 9.9% opting for a period greater than five years (Table 3).

During the FGD, it emerged that while mothers may have an ideal waiting time before attempting another pregnancy, it was not always realized. It also emerged that the health workers try to encourage the mothers to make use of family planning service to enhance and encourage child spacing. This was evidenced by the fact that health facilities were the highest source of information on child spacing at 78.7%.

Methods of child spacing and Source of birth spacing information in Kakuzi

Injectables were the main method through which the caregivers spaced their children at 39.7% with pills being the second major method with 35.2%. Only 2.8% of the respondents acknowledged familiarity with lactation as a method of spacing. Another 3.9% of the respondents acknowledged awareness to natural rhythm method as a method of spacing.

Table 1: Child and caregiver characteristics.

	N=212	
	n	%
Child's gender		
Male	98	46.2
Female	114	53.8
Relationship of child to caregiver		
Mother	203	95.8
Grandmother	7	3.3
Father	2	0.9
Marital status of caregiver		
Single	33	15.6
Married	173	81.6
Separated	5	2.4
Widowed	1	0.5
Religion of the caregiver		
Catholic	68	32.1
Protestants	139	65.6
None	5	2.3
Education level		
None	7	3.3
Primary	136	64.2
Secondary	63	29.7
College/university	6	2.8

Table 2: Summary income sources and average income.

Socio-economic characteristics	N=212	
	n	%
Sources of income		
Business	61	28.8
Crop farming	124	58.5
Livestock keeping	1	0.5
Salaried employment	9	4.2
Casual laborer	17	8.0
Average income per month		
0-3000	104	49.1
3001-5000	47	22.2
5001-10,000	47	22.2
10,001-15,000	10	4.7
15,001-20,000	4	1.9

Table 3: Summary of birth intervals.

Birth intervals	N=212	
	n	%
Birth interval categories (Months)		
0-17	18	8.49
18- 23	74	34.90
24-35	71	33.49
≥ 36	49	23.11
Ideal birth intervals (preferred)		
0-24 months	18	8.5
2-5 years	172	81.5
>5 years	21	9.9
Not sure	1	0.5

Majority of the care-givers obtain information on birth spacing from the health facilities (78.7%). The mother in-laws were the least sources of information on birth spacing. From the focus group discussion, lactational amenorrhoea did not emerge as a common method of spacing children. What emerged was that the caregivers did not seem to understand this as an approach to space children. The mothers felt they were just playing their maternal responsibilities in exclusively breastfeeding their children (Table 4).

Nutrition status among children 6-59 months

This study used the height for age Z-scores as the parameter for assessing the nutritional status of the children 6-59 months. From the

Table 4: Methods of child spacing and sources of information.

Source of birth spacing information	N=212	
	n	%
Methods of child spacing		
Natural/ rhythm	18	3.9
Withdrawal	2	0.4
Lactation	13	2.8
Pills	164	35.2
Injectables	185	39.7
Condoms (male/ female)	84	18.0
Source of information on child spacing		
Mother in law	3	1.2
Women chama	36	14.8
Health facility	192	78.7
Community health worker	13	5.3

Table 5: Nutrition status of children 6-59 months in Kakuzi.

Description of levels of stunting in Kakuzi	N=212	
	n	%
Overall levels of stunting		
Prevalence of stunting (<-2 z-score)	60	28.3
Moderate stunting (<-2 z-score and >=-3 z-score)	35	16.5
Severe stunting (<-3 z-score)	25	11.8
Prevalence of stunting by gender (boys)		
Prevalence of stunting (<-2 z-score)	36	36.7
Moderate stunting (<-2 z-score and >=-3 z-score)	18	18.4
Severe stunting (<-3 z-score)	18	18.4
Prevalence of stunting by gender (girls)		
Prevalence of stunting (<-2 z-score)	24	21.1
Moderate stunting (<-2 z-score and >=-3 z-score)	17	14.9
Severe stunting (<-3 z-score)	7	6.1

study, the prevalence of stunting was 28.3% which is slightly higher than the national average at 26%. The prevalence of moderately stunted was 16.5% and 11.8% for the severely stunted cases. More boys were stunted than girls with 60% of the stunted children being boys. The stunting levels in boys were evenly balanced between the severely stunted and the moderately stunted. There was twice moderately stunted girls to the severely stunted (Table 5).

Relationship between child birth intervals and various variables

This section explores the relationship between the independent and dependent variables in the study.

Relationship between birth interval and nutritional status

From this study the prevalence of stunting was 28.3% which is slightly higher than the national average at 26%. For the normally nourished children, 35.52% and 37.5% of the children were distributed in the birth intervals of 18-23 months and 24-35 months respectively. Most of the moderately stunted children, 45.71% were in the interval of 18- 23 months. Children >36 months were more severely stunted at 36% of the children. The birth interval of 0-17 months had only 16% stunted children. There is a significant relationship between child spacing and nutrition status p-value = 0.001 (likelihood ratio).

The results suggest that child birth interval is a problem in Kakuzi. From the focus group discussion, the mothers did not think there may be a problem with their birth intervals. "I don't think mothers in this area have a problem with spacing. One should have children as they think they are able to care for" (Table 6).

Table 6: Relationship between birth interval and nutritional status.

Nutrition status	N=212		
	n	%	X^2 P value Likelihood ratio
Nutrition Status			
Normal	152	71.69	
Moderate	35	16.51	
Severe	25	11.79	
Normal			
0-17 months	6	3.94	
18-23 months	54	35.52	
24-35 months	57	37.5	
>36 months	35	23.03	
Moderately stunted			
0-17 months	8	22.86	0.001
18- 23 months	16	45.71	
24-35 months	6	17.14	
>36 months	5	14.29	
Severely stunted			
0-17 months	4	16	
18-23 months	4	16	
24-35 months	8	32	
>36 months	9	36	

Discussion

Socio-demographic characteristics and child spacing

Socio-economic factors have been shown to have an influence on the child birth intervals. This could be attributed to the interplay of the various variables under socio-economic factors leading to different views and perceptions on the child birth interval. Zinab and Agha [12] were able to demonstrate the interplay of these factors in influencing the time at which mothers choose to bear children. Society puts a lot of pressure on women once they marry since they are expected to start having children soonest possible.

From the same study, it was shown that maternal education, age at marriage, knowledge, access to contraception, family size; all have considerable effect on the birth interval. This reflects what other studies have shown, more so with regard to age at marriage. Younger women tend to have a longer birth interval as compared to the older women who have a need to compensate for getting into child birth 'late in life'.

Begna *et al.,* [13] found that women with no formal education were more likely (1.9 times) to have short birth intervals than those with education. KNBS and ICF Macro, [8] present the same findings. Formal education seems to be an attribute that exposes the mothers to ways of spacing her children and also increases her health seeking behavior.

In a study by Mulwa [14] it was found that the type of residence, region of residence, level of education have an influence on the child birth interval. This agrees with a study done by Eini-Zinab and Agha [12] in Pakistan that showed that maternal education, age at marriage, family and household size have considerable effect on the child birth interval. These studies suggest that socio-demographic and socio-economic characteristics have a strong association with child birth interval. This study explored these characteristics but did not look at associations between the socio economic characteristics and child birth interval.

Singh *et al.,* [15] found that age at marriage and parity are negatively associated with the length of birth interval. In the same study, it was found that there is a positive association between duration of breastfeeding and length of birth interval. The longer birth interval allows the mother to care for the child and also breastfeed. During the present study, mothers were also in agreement that when they are able to space their children, then caring for them and also breastfeeding for longer duration is also possible.

Cultural religious factors and child spacing

Cultural religious factors influence child birth interval in that

they determine the time to bear a child or the method to use to space children. Catalyst consortium [16] in a study in Pakistan found that a majority of spacers believed that Islam does not permit the use of contraceptives. This belief was somewhat consistent across all groups of women. Use of contraceptives was seen as a sin because it is considered to interfere in God's system. In the same study it was viewed as wrong to practice child spacing if one had not given birth to a male child. Boys are held in high esteem than girls.

The present study was done in an area that is primarily rural and in African context just like in Pakistan, boys are held in high value. This study therefore explored whether religious and cultural influences had bearing on child spacing practices. In Africa, most communities have practiced long duration of breastfeeding and post-partum abstinence. In some studies done in West Africa, it was revealed that women felt guilty engaging in sex a short while after giving birth [17]. These practices in a way ensures that the duration between one pregnancy and the other is long enough to facilitate care for the new born infant and enhance child spacing practices. These are cultural issues and as such cannot be ignored when looking at child spacing.

Child birth interval and morbidity status

In Kenya an estimated 414 women per 100,000 live births die as a result of pregnancy related complications, childbirth and sequel in the postnatal period, making maternal death the leading (27 percent) cause of death among women of the reproductive age [18]. Hospital visits during the pregnancy period has been shown to have a positive impact on maternal outcomes and child survival. The conventional approach of monthly visit has not been shown to have a positive outcome since mothers who are at risk may not visit the hospital and those with minimal risk will, [18].

The government of Kenya in trying to overcome the challenges with the monthly visit has adopted the WHO's focused ante-natal care which aims to decrease the contacts a mother has in the hospital and also enrich the value of the contact [18]. Women reporting four or more antenatal visits are far more likely to have given birth with professional assistance than women reporting fewer visits. This is particularly the case in countries where the overall level of antenatal care use is low (WHO, 2009). ANC improves the survival and health of babies directly by reducing stillbirths and neonatal deaths and indirectly by providing an entry point for health contacts with the woman at a key point in the continuum of care [19].

The nutritional status of children is influenced by among others, the morbidity patterns. Children who are sickly most of the time are at risk of having an impaired nutritional status due to the synergistic relationship between nutrition and health. The most contributing factors of a disease are the frequency, duration and severity. Child's illnesses contribute to the burden of disease upon the household. Children illnesses especially diarrhea influence the nutrition status.

According to world health organization [20] diarrhea tends to peak during the second half of the year when complementary feeding is introduced. This implies that poor introduction or early introduction of complementary foods would exacerbate the situation. Complementary feeding is however influenced by other factors other than the child birth interval. Maternal education and low household wealth, access to ante-natal and post-natal services are some of the predictors of poor complementary feeding.

Morbidity status of a child is one of the contributors to the child's nutritional status. Birth interval has an indirect role in influencing the morbidity status of a child. A comprehensive review of demographic health surveys in developing countries [21] observed that infant mortality decreases with increasing birth interval. This is associated with the increased burden of care and competing needs of children when birth intervals are short resulting in a high incidence of malnutrition and diseases resulting in death. From the same study, a birth interval of >36 months is recommended for optimal maternal and child outcomes.

It would be paramount to acknowledge that the burden to the mother also contributes to increased mortality on the infant [22]. The reduced time for maternal recuperation results in short for gestational age or underweight children who are more prone to infections. Selina and Khatun [23] also recognize the role of socio-economic factors in influencing the morbidity patterns of the child. Maternal education, age and economic status influence the maternal health seeking behavior which contributes in worsening the health status of the child or improving it.

The morbidity status of children also contributes significantly to the nutrition status of children. In the present study, short term malnutrition in the form of wasting was not being considered but rather nutrition status as a result of long term impairment in the form of stunting was assessed.

Child birth interval and nutrition status

A birth interval of 2 years or more improves the chance of survival of infants and children [24]. Nutritional status is one of the important attributes to child survival. From this same study, children born with an interval less than 2 years are 3 times more likely to suffer from malnutrition than a child born after 2 years. This was also evident in this current study where those children with short birth intervals were more likely to be stunted.

In a study in Nigeria, the risk of underweight is lower in women whose previous birth interval of 24-35 months as compared to those with less than 24 months [25]. In a study by Sonkaria *et al.,* [26] under nutrition was found maximum in children having 1-2 years of spacing and minimum in children with >3 years of spacing.

In a study by Basit *et al.,* [27,28] on children 1-5 years, under nutrition was associated with more than two children with a birth interval ≤2 years. Most of the studies agree that birth interval will have a bearing of the child's nutritional status. This is associated either with competition among siblings where the mother has many children or the increased burden of care. Studies have also shown that economic empowerment seem to mitigate against competition among siblings.

Nutrition status is determined by assessing the individual's weight, height and age to generate indices that can be compared to international reference standards. This study used height for age index as the indicator for nutritional status. This indicator was chosen since it reflects long term malnutrition and can easily reflect when care practices hamper effective nourishment. This study assessed how birth interval influences the nutritional status as a result of influence on the care practices of the child.

A study in Saudi Arabia [24] found that there is a relationship between nutritional status and the child birth interval. Children that were born < 2 years were 3 times more likely to suffer from malnutrition that those born after 2 years. This was attributed to competing needs, burden of care upon the mother which worked

against effective care resulting in compromised nutrition status.

Stunting has been found to be the most likely indicator that can be associated with birth interval [24]. This study is significant as it analyzed multiple Demographic Health Surveys (DHS) from developing countries including Kenya. It is significant since the present study was carried out in one of the sub-counties in Kenya and thus it is critical to see whether the same trend would be replicated in other areas. In this study, the assessment of nutrition status focused on stunting. Stunting is a more long term assessment of nutrition status and reflects long term changes in the nutrition status. Child birth interval as a predictor of nutritional status can only be reflected through stunting as opposed to wasting or underweight which tend to measure the short term malnutrition and composite indicator of nutritional status respectively. This study showed a significant relationship between child birth interval and nutritional status.

In another study in India [26] it was observed that under-nutrition was highest in children with 1 to 2 year of spacing (28 out of 37 i.e., 75.66%) and minimum in children with >3 year of spacing (1 out of 37 i.e., 2.70%). Under nutrition in children was about 20 times more in mothers with spacing less than 2 years than those with spacing of more than 2 years (OR=19.88 with CL 0.074-0.378). The study found a direct link between short birth intervals and child's nutrition status. However, the study was broader in its context as it explored maternal factors that contribute to nutrition status.

A DHS analysis [21] showed that there is an almost linear decline in stunting as birth interval increases (p=0.004). This is however not the case with underweight (p=0.012) and wasting (p=0.532). This in essence indicates that with underweight the relationship is less linear and wasting showing no relationship at all. This study seems to reflect the results of the current study where it showed a very strong association between stunting and child birth interval (p=0.001).

Summary of the Findings

The study was conducted in a rural sub-county with majority residing in their own homes or living with the extended families. A majority of the children were being cared for by their mothers. The mothers opted to carry their children or leave with close family members in instances where they could be available. Child birth interval is not a cause of concern for most mothers and as indicated, the most prevalence child birth interval was the 18-23 months. Child birth interval when assessed against nutritional status showed there were a relationship and therefore a need to sensitize the community on the impact of this to minimize the adverse outcome.

Recommendations for Further Research

More studies also need to be conducted to explore the implication of child birth interval on maternal outcomes including the neonates, maternal recuperation and child survival. This can also focus on assessing the nutritional status between the two children who lie within the interval. Studies also need to explore the source of information and utilization of child spacing methods to support the improved child birth interval. This would determine whether mothers have a better understanding of the methods at their disposal and decision processes to determine the correct methods of spacing children.

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