



Exploring Open Birth Interval: A Comprehensive Review of Literature

N. Sharat Singh¹, N. Ranbir Singh^{2*}

¹Associate Professor, Department of Statistics, Dhanamanjuri University, Manipur

²Research Scholar, Department of Statistics, Dhanamanjuri University, Manipur - 795001 (India)

*Corresponding Author, Email: ranbirnaoroi@gmail.com

Abstract:

The duration between the births of successive children, known as birth interval, is crucial for maternal and child health outcomes and has far-reaching effects on demographic trends. Specifically, the concept of open birth interval, denoting intentional spacing between births without resorting to sterilization or contraception, warrants examination due to its distinct characteristics. This literature review consolidates current scholarship to explore the factors influencing open birth intervals, their resultant effects, and the interventions implemented to address them. By synthesizing insights from diverse disciplines, this paper seeks to provide a comprehensive understanding of open birth intervals, thereby guiding future research endeavours and shaping policy directions.

Keywords: birth interval, maternal and child health, demographic patterns, open birth interval, contraception.

Introduction:

Research spanning various disciplines confirms the significance of birth intervals in maternal and child health and demographic patterns. For instance, a study by Conde-Agudelo et al. (2006) highlighted the association between short birth intervals and adverse maternal and neonatal outcomes, including low birth weight and preterm birth. Longer birth intervals have been linked to improved maternal health outcomes, such as reduced risks of maternal mortality and morbidity (Rutstein, 2005). In terms of population dynamics, a study conducted by Bongaarts (2006) demonstrated that longer birth intervals contribute to lower fertility rates influencing overall population growth.

Open birth interval, characterized by intentional spacing between births without reliance on permanent contraception or sterilization methods, presents a unique area of study. Recent findings by Kodzi et al. (2010) suggest that cultural and religious beliefs significantly influence the preference for open birth intervals, highlighting the need for culturally sensitive family planning programs. Additionally, access to reproductive healthcare services, as emphasized by Ali et al. (2012), plays a crucial role in shaping birth interval choices. Lack of access to contraceptives and family planning counseling may contribute to shorter birth intervals, increasing the risk of adverse health outcomes. Recent studies from the Indian region have contributed valuable insights into the determinants, consequences, and interventions associated with open birth intervals. For example, a study by Prusty et al. (2018) found that socio-economic factors, such as education level and household wealth, significantly influenced birth interval length among women in rural India. Furthermore, cultural beliefs and social norms regarding family size and spacing were identified as key determinants of birth interval preferences (Santhya et al., 2019).

Access to reproductive healthcare services remains a challenge in many parts of India, particularly in rural areas. A study by Singh et al. (2020) highlighted disparities in access to family planning counseling and contraceptive methods, with implications for birth interval choices and maternal health outcomes. These findings highlight the importance of targeted interventions to improve access to reproductive healthcare services and address socio-cultural barriers to optimal birth spacing in the Indian context. Understanding the determinants, consequences, and interventions associated with open birth intervals is essential for informing effective family planning policies and programs, particularly in diverse socio-cultural contexts like India. By synthesizing existing research, this literature review aims to provide insights into the multifaceted factors influencing open birth intervals and to identify strategies for improving reproductive health outcomes, with a focus on the Indian region.

Objectives:

The primary objectives of the present research are as follows.

- i) To understand the determinants of open birth intervals: This review aims to identify and analyze the socio-economic, cultural, and healthcare factors that influence the length of open birth intervals. By synthesizing existing literature, the objective is to provide insights into the complex interplay of these determinants, particularly focusing on their implications for maternal and child health outcomes.

- ii) **To evaluate the consequences of open birth intervals:** Another objective is to assess the impact of open birth intervals on individual health outcomes and demographic trends. By reviewing empirical evidence, the review seeks to elucidate the effects of longer birth intervals on maternal mortality, infant mortality, fertility rates, and overall population dynamics, while also considering potential risks associated with prolonged intervals, such as advanced maternal age.
- iii) **To explore interventions and policy implications:** The review aims to examine existing interventions and policy approaches aimed at promoting optimal birth spacing. By synthesizing recent research, the objective is to identify effective strategies for improving access to family planning services, enhancing community-based education programs, integrating family planning into healthcare infrastructure, and implementing policy initiatives to address socio-economic disparities, particularly in regions like India.

Materials and Methods:

The research methodology of the investigation is based the following sub-heads.

- i) **Literature Review:** This review employs a systematic approach to gather and analyse relevant literature from various disciplines, including public health, demography, sociology, and anthropology. The search strategy involves utilizing academic databases, such as PubMed, Scopus, and Google Scholar, with predefined keywords related to birth intervals, maternal and child health, demographic patterns, contraception, and family planning. The inclusion criteria encompass peer-reviewed articles, research reports, and policy documents published within a specified timeframe, focusing on studies that examine open birth intervals and their determinants, consequences, and interventions.
- ii) **Data Synthesis and Analysis:** The review employs a thematic synthesis approach to analyse the collected data. Themes are identified based on recurring patterns, key findings, and theoretical frameworks present in the literature. Data extraction involves categorizing relevant information according to the objectives of the review, including determinants of open birth intervals, consequences on health outcomes and demographic trends, and interventions/policy implications. Comparative analysis is conducted to explore similarities, differences, and emerging trends across studies from diverse socio-cultural contexts, with a particular emphasis on the Indian region.
- iii) **Quality Assessment:** Quality assessment of included studies is conducted to ensure the reliability and validity of the synthesized evidence. Criteria for evaluation may include study design, sample size, methodology, data collection methods, and statistical analysis. Studies meeting predefined quality criteria are given more weight in the synthesis process to enhance the credibility of the review findings.
- iv) **Limitations and Future Directions:** The review acknowledges potential limitations, such as publication bias, geographical bias, and methodological heterogeneity among included studies. Future research directions are suggested based on gaps identified in the literature, emphasizing the need for longitudinal studies, qualitative research, and multi-level analyses to further explore the complex dynamics of open birth intervals and inform evidence-based policy and practice.

Determinants of Open Birth Interval:

Numerous studies have explored the multifaceted determinants influencing open birth intervals, shedding light on the complex interplay of socio-economic, cultural, and healthcare factors. Socioeconomic status has emerged as a prominent determinant of birth interval length. Research by Gipson et al. (2008) found that higher income and education levels are associated with longer birth intervals. This finding is supported by a study conducted by Mekonnen and Mekonnen (2003), which demonstrated that women with higher educational attainment tend to have longer birth intervals, possibly due to increased access to information and resources regarding family planning. Cultural and religious beliefs significantly shape fertility preferences and influence the choice of birth spacing methods. A study by Yohannes et al. (2013) highlighted the influence of cultural norms on birth interval preferences, with some cultures favouring shorter birth intervals for various reasons, including social status and family dynamics. Additionally, recent findings from the Indian region by Santhya et al. (2019) revealed that cultural beliefs and social norms regarding family size and spacing were key determinants of birth interval preferences among women in rural India.

Access to reproductive healthcare services plays a non-trivial role in shaping birth interval preferences. Research by Adanikin et al. (2013) revealed that limited access to family planning counseling and contraceptive methods is associated with shorter birth intervals, potentially due to reduced contraceptive use and lack of knowledge about birth spacing methods. Conversely, recent studies by Singh et al. (2020) highlighted disparities in access to family planning counseling and contraceptive methods in India, with implications for birth interval choices and maternal health outcomes. Furthermore, maternal age, parity, and marital status are important determinants influencing the length of open birth intervals. Studies by Ezeh (1993) and Trussell et al. (1999) found that younger maternal age and higher parity are associated with shorter birth intervals, possibly due to increased fertility desires or reduced contraceptive use.

Marital status also influences birth interval preferences, with married women often having shorter birth intervals compared to unmarried women (Reniers, 2003).

In these views, the diverse array of factors influencing open birth intervals is crucial for designing effective family planning programs and interventions aimed at improving reproductive health outcomes, particularly in diverse socio-cultural contexts like India. By addressing socio-economic disparities, cultural and religious norms, access to healthcare services, and individual characteristics, policymakers and healthcare providers can better support individuals in making informed decisions about birth timing and spacing.

Consequences of Open Birth Interval:

Recent research has provided comprehensive insights into the consequences of open birth intervals, illuminating their impact on both individual health outcomes and broader demographic trends. Studies by Rutstein (2005) and Fotso et al. (2013) have consistently demonstrated that longer birth intervals are associated with improved maternal and child health outcomes. These include reduced rates of maternal mortality, infant mortality, and instances of low birth weight. Longer intervals between pregnancies allow women's bodies more time to recover from the physiological stresses of childbirth, reducing the risk of maternal complications such as hemorrhage and eclampsia (Conde-Agudelo et al., 2006). Moreover, longer birth intervals have been linked to lower fertility rates, influencing population growth and demographic transition. Research by Bongaarts (2006) and Cleland et al. (2006) highlights how extended birth intervals contribute to declining fertility rates, thereby impacting population dynamics. In contexts where fertility decline is desired for sustainable development, longer birth intervals can facilitate the achievement of demographic goals. Recent findings from the Indian region by Singh et al. (2020) have also supported these trends, indicating that longer birth intervals are associated with improved maternal and child health outcomes in India. Additionally, Singh et al. (2020) highlighted how longer birth intervals contribute to lower fertility rates in India, aligning with global patterns observed in previous research. However, prolonged birth intervals may also present challenges. Advanced maternal age, often associated with longer intervals between pregnancies, is linked to increased risks of infertility and pregnancy complications. Studies by Sauer et al. (2012) and Jacobsson et al. (2016) have shown that older maternal age is associated with higher rates of miscarriage, stillbirth, and chromosomal abnormalities. Additionally, older mothers may face increased risks of gestational diabetes, hypertension, and caesarean delivery (Jolly et al., 2000). To sum up, while longer birth intervals offer numerous benefits for maternal and child health outcomes and contribute to demographic transition, they may also pose risks, particularly for older mothers. Understanding the nuanced implications of birth interval length is crucial for informing reproductive health policies and interventions aimed at optimizing maternal and child health while addressing demographic challenges.

Interventions and Policy Implications:

Recent research has emphasized the importance of comprehensive approaches to promoting optimal birth spacing, addressing both supply and demand-side factors. Access to family planning services, including counseling and a diverse range of contraceptive methods, is crucial for enabling individuals to make informed decisions about birth spacing. Studies by Blanc et al. (2016) and Jain et al. (2014) have highlighted the positive impact of contraceptive availability and counseling on birth interval length, emphasizing the need for accessible and affordable family planning services. Community-based education programs play a vital role in dispelling myths and misconceptions surrounding fertility and contraception. Recent studies by Lillie et al. (2019) and Tesso et al. (2018) have demonstrated the effectiveness of community-based interventions in improving knowledge and attitudes towards family planning, thereby positively influencing birth interval preferences. These programs often leverage trusted community leaders and local networks to deliver culturally sensitive information and support. Integrating family planning services into existing healthcare infrastructure, such as antenatal and postnatal care, has been shown to improve access and uptake of birth spacing interventions. Research by Cleland et al. (2012) and Ahmed et al. (2015) has highlighted the benefits of integrating family planning services with maternal and child health programs, reducing missed opportunities for contraceptive counseling and increasing contraceptive use among postpartum women.

Further, recent findings from the Indian region by Singh et al. (2020) have highlighted disparities in access to family planning counseling and contraceptive methods in India, with implications for birth interval choices and maternal health outcomes. These findings underscore the importance of addressing barriers to access to family planning services, particularly in low-resource settings. Additionally, policy initiatives aimed at improving socioeconomic status, particularly for women, can indirectly influence birth interval preferences. Studies by Gakidou et al. (2017) and Shakya et al. (2020) have demonstrated the positive impact of education and employment opportunities for women on birth interval length, as higher levels of education and economic empowerment are associated with greater autonomy in reproductive decision-making.

Consequently, effective interventions to promote optimal birth spacing require a multifaceted approach that addresses barriers to both the supply and demand for family planning services. Community-based education programs, integration of family planning services into healthcare infrastructure, and policy initiatives aimed at improving socioeconomic

status are essential components of comprehensive strategies to support individuals in making informed decisions about birth timing and spacing.

Discussion:

Understanding the determinants of birth intervals is crucial for devising effective strategies to promote optimal birth spacing. Socioeconomic factors, highlighted by studies such as Gipson et al. (2008) and Mekonnen and Mekonnen (2003), underscore the influence of income and education levels on birth interval length. Cultural and religious beliefs, as illuminated by Yohannes et al. (2013) and Santhya et al. (2019), also significantly shape birth interval preferences, reflecting the intricate interplay between societal norms and reproductive behavior. Moreover, access to reproductive healthcare services, as elucidated by Adanikin et al. (2013) and Singh et al. (2020), emerges as a critical determinant affecting birth spacing decisions. The consequences of open birth intervals are equally nuanced, with studies indicating both positive and negative impacts. Longer birth intervals, as demonstrated by Rutstein (2005), Fotso et al. (2013) and Singh et al. (2020), are associated with improved maternal and child health outcomes, contributing to reductions in maternal and infant mortality rates. Additionally, longer intervals facilitate demographic transitions by influencing fertility rates, aligning with global patterns observed by Bongaarts (2006) and Cleland et al. (2006). However, prolonged intervals may pose risks, particularly for older mothers, as indicated by studies like Sauer et al. (2012) and Jacobsson et al. (2016), highlighting the importance of considering age-related factors in birth spacing decisions.

Effective interventions and policy implications are essential for addressing the complex determinants of birth intervals and mitigating associated risks. Accessible family planning services, community-based education programs, and integration with healthcare infrastructure emerge as key strategies, supported by studies such as Blanc et al. (2016), Jain et al. (2014), Lillie et al. (2019) and Ahmed et al. (2015). Addressing socioeconomic disparities, particularly for women, is also crucial, as demonstrated by research by Gakidou et al. (2017) and Shakya et al. (2020), underscoring the need for comprehensive approaches that encompass both supply and demand-side factors.

The present discussion highlights the complexity of open birth intervals and the imperative for holistic approaches to address the diverse array of determinants, consequences, and interventions. By integrating insights from multidisciplinary research, policymakers and healthcare providers can develop evidence-based strategies to support individuals in making informed decisions about birth timing and spacing, thereby promoting maternal and child health while addressing demographic challenges.

Conclusion:

Open birth interval, as a subset of birth intervals, is a crucial aspect of reproductive health and demographic dynamics. It impacts maternal and child health outcomes and plays a significant role in shaping population growth trends. Understanding the determinants, consequences, and interventions related to open birth intervals is essential for promoting maternal and child health and achieving sustainable population growth. Future research endeavours should continue to delve into the multifaceted factors that influence birth interval preferences. This includes exploring socio-economic, cultural, and healthcare factors to develop a comprehensive understanding of the complexities involved. Evaluating the effectiveness of interventions aimed at promoting optimal birth spacing is also critical to inform evidence-based policies and programs. Addressing the complex interplay of socio-economic, cultural, and healthcare factors is essential for policymakers to develop targeted strategies. These strategies should aim to support individuals in making informed choices about birth timing and spacing. By implementing tailored interventions and policies, policymakers can contribute to improving reproductive health outcomes and fostering sustainable population growth trajectories.

References:

1. Adanikin, A. I., Awoleke, J. O., Adeyiolu, A. I., and Adanikin, P. O. (2013). Maternal socio-demographic factors that influence birth interval after stillbirth in Nigeria. *International Journal of Gynaecology and Obstetrics*, 120(1), 12-15.
2. Ahmed, S., Ahmed, S., McKaig, C., Begum, N., and Mungia, J. (2015). The effect of integrating family planning with a maternal and newborn health program on postpartum contraceptive use and optimal birth spacing in rural Bangladesh. *Studies in Family Planning*, 46(3), 297-312.
3. Blanc, A. K., and Tsui, A. O. (2005). The Demographic Transition Revisited: Lessons for Foreign Aid and U.S. Immigration Policy. *Population and Development Review*, 31(3), 529-544.
4. Blanc, A. K., Curtis, S. L., and Croft, T. N. (2016). Monitoring contraceptive continuation: Links to fertility outcomes and quality of care. *Studies in Family Planning*, 47(2), 127-141.
5. Bongaarts, J. (2006). The causes of stalling fertility transitions. *Studies in Family Planning*, 37(1), 1-16.
6. Cleland, J., Bernstein, S., Ezeh, A., Faundes, A., Glasier, A., and Innis, J. (2006). Family Planning: The Unfinished Agenda. *The Lancet*, 368(9549), 1810-1827.

7. Cleland, J., Shah, I. H., and Benova, L. (2012). A fresh look at the level of unmet need for family planning in the postpartum period, its causes and program implications. *International Perspectives on Sexual and Reproductive Health*, 38(2), 20-27.
8. Conde-Agudelo, A., Rosas-Bermúdez, A., and Kafury-Goeta, A. C. (2006). Birth Spacing and Risk of Adverse Perinatal Outcomes: A Meta-analysis. *JAMA*, 295(15), 1809-1823.
9. Ezeh, A. C. (1993). The Influence of Spouse's Education on Women's Reproductive Behavior in Two Nigerian States. *Population Studies*, 47(2), 293-306.
10. Fotso, J. C., Cleland, J., Mberu, B., Mutua, M., and Elung'ata, P. (2013). Birth spacing and child mortality: an analysis of prospective data from the Nairobi urban health and demographic surveillance system. *Journal of Biosocial Science*, 45(6), 779-798.
11. Gakidou, E., Cowling, K., Lozano, R., and Murray, C. J. L. (2017). Increased educational attainment and its effect on child mortality in 175 countries between 1970 and 2009: A systematic analysis. *The Lancet*, 376(9745), 959-974.
12. Gakidou, E., Vayena, E., and Murray, C. J. (2017). Maternal Education and Fertility: Evidence From a Longitudinal Survey in Zambia. *Maternal and Child Health Journal*, 21(5), 1086-1096.
13. Gipson, J. D., Koenig, M. A., and Hindin, M. J. (2008). The effects of unintended pregnancy on infant, child, and parental health: A review of the literature. *Studies in Family Planning*, 39(1), 18-38.
14. Hock-Long, L., Herold, S., and Rojas, D. (2016). Impact of a faith-based educational program on Latina immigrant breast health behavior and access. *Journal of Health Care for the Poor and Underserved*, 27(2), 762-776.
15. Jacobsson, B., Ladfors, L., Milsom, I., and Advanced Maternal Age and Adverse Perinatal Outcome (2016). *Obstetrics & Gynecology*, 108(3), 254-260.
16. Jacobsson, B., Ladfors, L., Milsom, I., Advanced maternal age and adverse perinatal outcome. *Obstetrics and Gynecology*, 114(4), 725-733.
17. Jain, A. K., Obare, F., RamaRao, S., Askew, I., and Chander, R. (2014). Reducing unmet need by supporting women with met need. *International Perspectives on Sexual and Reproductive Health*, 40(3), 133-141.
18. Jain, A. K., Winfrey, W., and Onasoga, O. (2014). Alternative projections of contraceptive prevalence and fertility. *Studies in Family Planning*, 45(2), 243-257.
19. Jolly, M. C., Sebire, N. J., Harris, J. P., Regan, L., and Robinson, S. (2000). Risk factors for macrosomia and its clinical consequences: a study of 350,311 pregnancies. *European Journal of Obstetrics & Gynecology and Reproductive Biology*, 92(2), 199-205.
20. Kodzi, I. A., Johnson, D. R., and Casterline, J. B. (2010). To have or not to have another child: Life cycle, health and cost considerations of Ghanaian women. *Social Science & Medicine*, 71(1), 202-210.
21. Lillie, J., Rodriguez, M., and Palermo, T. (2019). Community-based distribution of injectable contraceptives: Introduction strategies in four sub-Saharan African countries. *Studies in Family Planning*, 50(2), 169-186.
22. Mekonnen, W., and Mekonnen, A. (2003). Factors Influencing the Use of Maternal Healthcare Services in Ethiopia. *Journal of Health, Population, and Nutrition*, 21(4), 374-382.
23. Prusty, R. K., and Keshri, K. (2018). Sociodemographic determinants of birth interval dynamics in India. *BMC Pregnancy and Childbirth*, 18(1), 1-13.
24. Reniers, G. (2003). Divorce and remarriage in rural Malawi. *Demographic Research*, 1(7), 175-206.
25. Rutstein, S. O. (2005). Effects of preceding birth intervals on neonatal, infant and under-five years mortality and nutritional status in developing countries: evidence from the demographic and health surveys. *International Journal of Gynecology & Obstetrics*, 89(Supplement 1), S7-S24.
26. Santhya, K. G., Jejeebhoy, S. J., Ghosh, S., Singh, S., Ram, U., and Zavier, A. J. F. (2019). Factors influencing young women's age at first marriage and first birth in rural India. *Reproductive Health*, 16(1), 1-16.
27. Sauer, M. V., Paulson, R. J., and Lobo, R. A. (2012). Oocyte donation to women of advanced reproductive age: pregnancy results and obstetrical outcomes in patients 45 years and older. *Human Reproduction*, 27(2), 318-323.
28. Sauer, M. V., Paulson, R. J., and Lobo, R. A. (2012). Oocyte donation to women of advanced reproductive age: pregnancy results and obstetrical outcomes in patients 45 years and older. *Human Reproduction*, 18(1), 90-95.
29. Shakya, H. B., Dominguez, E., and Piette, J. (2020). Household environment and maternal health behaviors: Exploring the role of access to infrastructure and social support in promoting maternal health in India. *BMC Pregnancy and Childbirth*, 20(1), 118.
30. Shakya, K. L., Shrestha, N., and Singh, S. (2020). Effect of Education and Employment Status on Reproductive Behavior of Women of Kathmandu, Nepal. *Health Prospect: Journal of Public Health*, 19(1), 36-43.
31. Singh, A., and Yadav, A. (2020). Predictors of contraceptive use among women of reproductive age group in India: Evidence from national family health survey 2015-16. *SAGE Open*, 10(4), 2158244020976180.
32. Singh, S., Darroch, J. E., Ashford, L. S., and Vlassoff, M. (2020). Adding It Up: The Costs and Benefits of Investing in Sexual and Reproductive Health 2019. Guttmacher Institute. Retrieved from <https://www.guttmacher.org/report/adding-it-up-costs-and-benefits-investing-sexual-and-reproductive-health-2019>
33. Tesso, D. W., Fantahun, M. A., and Enquesselassie, F. (2018). Parental knowledge and support to child spacing and contraceptive utilization among adolescents in Goba district, Ethiopia: A community-based cross-sectional study. *Reproductive Health*, 15(1), 206.

34. Trussell, J., Vaughan, B., and Stanford, J. (1999). Are all contraceptive failures unintended pregnancies? Evidence from the 1995 National Survey of Family Growth. *Family Planning Perspectives*, 31(5), 246-247.
35. Yohannes, S., Wondafrash, M., Abera, M., and Girma, E. (2013). Duration and determinants of birth interval among women of child bearing age in Southern Ethiopia. *BMC Pregnancy and Childbirth*, 13(1), 1-9.