

Integrated Care and Conditional Health Benefits: A Mixed-Methods Study of Family Planning Impact on Maternal and Child Health among Married Women in Bo City, Sierra Leone

Victoria Nancy Blango^{1*}, Herbert Borbor Sama Kandeh¹, Adolphus Johnson²

¹Institute of Geography and Development Studies, School of Environmental Sciences, Njala University, Moyamba District, Sierra Leone

²Department of Agricultural Extension and Rural Sociology, School of Agriculture and Food Sciences, Njala University, Moyamba District, Sierra Leone
Email: *vblango@njala.edu.sl

How to cite this paper: Blango, V.N., Kandeh, H.B.S. and Johnson, A. (2026) Integrated Care and Conditional Health Benefits: A Mixed-Methods Study of Family Planning Impact on Maternal and Child Health among Married Women in Bo City, Sierra Leone. *Advances in Reproductive Sciences*, **14**, 143-156.

<https://doi.org/10.4236/arsci.2026.143015>

Received: June 28, 2026

Accepted: July 21, 2026

Published: July 24, 2026

Copyright © 2026 by author(s) and Scientific Research Publishing Inc. This work is licensed under the Creative Commons Attribution International License (CC BY 4.0).

<http://creativecommons.org/licenses/by/4.0/>



Open Access

Abstract

Background: Health benefits from family planning (FP) are well established, yet little is known about how health benefits from FP are experienced in low-resource settings. This study assessed the self-reported association of FP on maternal and child health among married women in Bo City, Sierra Leone, and explored the mechanisms or pathways through which FP benefits are experienced. **Methods:** A mixed-methods cross-sectional study design was used. A total of 1500 married women aged 15 - 49 years from 25 enumeration areas in Bo City were studied using a structured questionnaire. In-depth interviews (IDIs) were conducted with 20 married women, while 5 focus group discussions (FGDs) were held with married women, men, elders, and health care providers from the study areas. **Results:** Findings showed that 83.0% of married women using FP reported positive child spacing outcomes, while 76.8% reported prevention of unintended pregnancy. The interaction FP × High Parity showed that the perceived benefits of FP concentrate among high-parity women (aOR = 2.45; 95% CI: 1.28 - 4.4.69; p = 0.0077). The FP × Regular ANC interaction showed that combined FP and ANC was associated with reduced pregnancy complications by 52% (aOR = 0.48; 95% CI: 0.24 - 0.96; p = 0.033). Non-users had 96% higher odds of reporting no improvement in child health (aOR = 1.96; 95% CI: 1.50 - 2.57; p < 0.001) and almost 4 times higher odds of being unsure about benefits (aOR = 3.88; 95% CI: 2.63 - 5.73; p < 0.001). Thematic analysis of qualitative accounts identified four key themes that explained health benefits from FP, including maternal depletion prevention, integrated

care synergies, resource allocation, and benefit invisibility. Conclusions: The perceived health benefits of FP are conditional and concentrated among high-parity women and those with access to antenatal care. Targeting high-parity women and integrating FP into ANC and child health services are recommended.

Keywords

Family Planning, Maternal Health, Child Health, Integrated Care, Parity, Sierra Leone

1. Introduction

Family planning has the potential to greatly improve the health of mothers and children [1] [2]. Birth spacing prevents unintended pregnancies, cuts down on maternal deaths, improves child survival, and enhances women's overall well-being [3] [4]. The World Health Organization estimates that increasing the use of contraception can prevent up to 30% of the maternal deaths and 10% of the child deaths globally [5].

However, there is limited evidence that describes the conditions under which these health benefits are optimized. The maternal depletion syndrome occurs when a woman has short birth intervals that prevent adequate nutritional recovery, putting both mother and child at risk [6]. Resource allocation theory posits that child spacing enables optimal allocation of resources for each child's health [7]. Furthermore, there is growing evidence to suggest that integrating family planning into antenatal care (ANC) can generate greater health benefits than either health service alone [8]. This synergy between family planning and other health services undergirds integrated health care approaches and programs designed to address multiple health components to improve health in general.

While the effects of family planning on maternal and child health are well documented, relatively little is known about the ways through which health benefits are brought about in developing countries. In Sierra Leone, though the maternal mortality ratio has declined from 717 to 354 deaths per 100,000 live births between 2019 to 2023, it still remains among the highest in the world, and the under-five mortality rate for the country stands at 109 per 1000 live births [9] [10]. Understanding these mechanisms is crucial for programs aimed at reducing the high maternal and child death rates. This study examined perceived the health impacts of family planning on married women in Bo City, testing whether the health benefits that family planning programs bring to women are conditional on parity and ANC access, and whether non-users lack awareness of spacing benefits—a recognition gap [11].

2. Materials and Methods

2.1. Study Design and Setting

This study used a mixed-methods cross-sectional approach between 16th to 28th

February 2025 in Bo City, Southern Province of Sierra Leone, with a population of 223,075 people, of which 118,620 are females [9].

2.2. Study Population and Sampling

A stratified two-stage sampling design was employed. In the first stage, the study area was stratified into 20 sections based on administrative boundaries. The 25 enumeration areas (EAs) were allocated across sections using proportional allocation, based on each section's share of total households from the most recent census data. Within each section, the specific EAs were selected using simple random sampling. These 25 EAs represent 5.27% of the total 474 EAs in the study area.

In the second stage, rather than sampling households, a targeted listing operation was conducted in each selected EA two weeks before data collection to enumerate all married women or women in consensual unions. This identified 4620 eligible women. The target sample size of 1500 was calculated using Cochran's formula at 95% confidence level with a 2.08% margin of error, accounting for the design effect associated with cluster sampling. From this frame, a systematic random sample of 1500 women was selected using a sampling interval of every 3rd woman ($k = 4620/1500 \approx 3.08$). A random start was selected between 1 and 3.

For ineligibility and non-response, selected women were confirmed as eligible (married/in union and resident) before interview. Women who had moved or changed marital status were recorded as ineligible and replaced by the next woman on the systematic list. Non-respondents (refusals or unavailable after three visits) were not replaced, and the response rate was calculated as completed interviews divided by (1500 selected minus ineligible). Non-response adjustment weights were applied at the EA level using the ratio of eligible selected women to completed interviews.

For the qualitative component, 20 married women were selected for in-depth interviews using maximum variation in age, education, parity, family planning (FP) use status, and marital type. Five focus group discussions were conducted with married women, male partners, community leaders, and healthcare providers. Each of the focus group discussions had 8 - 10 participants. Qualitative participants were purposively recruited from the same enumeration areas as the quantitative sample, with assistance from community health workers who identified potential participants based on the maximum variation criteria. Thematic saturation was judged to have been reached when no new themes emerged after three consecutive interviews.

2.3. Variables and Data Collection

The primary dependent variable was current contraceptive use. Secondary outcome variables for maternal and child health outcomes included self-reported measures of spacing, unintended pregnancy, maternal health problems during pregnancy, mothers' general health after giving birth, child survival, child death

experience, health improvement of children due to child spacing, and health problems of children were secondary outcome variables. Demographic, socioeconomic, household, reproductive health, health services, and community characteristics of the study participants were independent variables.

Quantitative data were collected from the 16th to the 23rd of February 2025 using a structured questionnaire. The tool was developed and loaded onto KoboToolbox for ease of data collection and pretested on 100 women in the Mokonde community in Moyamba District. These data were collected by fifty trained enumerators, speaking Mende, Temne, and Krio, who went from house to house to collect data from married or in-union women. The qualitative data were collected from the 24th to the 28th February 2025 using in-depth interviews and five focus group discussions, each with 8 - 10 participants. The participants for the qualitative data were married women, their husbands, community elders and healthcare providers from Bo City. All the interviews were recorded, transcribed, and the analysts worked to reach thematic saturation on the themes.

2.4. Data Analysis

All statistical analyses were conducted using Statistical Package for the Social Scientist (SPSS) Version 26 on the quantitative data. Descriptive statistics summarized participant characteristics. Bivariate analyses used chi-square tests. Multivariate analyses used logistic regression with interaction terms between FP use and High Parity and between FP use and Regular ANC attendance were included in the models. The regression-building strategy was as follows: all variables with $p < 0.20$ in bivariate analyses were considered for inclusion in the initial models. Covariates retained in the final models included age group, education level, religion, marital union type, employment status, bank account access, and mobile phone ownership. Backward elimination was used to retain variables with $p < 0.05$, and interaction terms of theoretical interest (FP $\times$ High Parity and FP $\times$ Regular ANC) were included a priori based on the maternal depletion syndrome hypothesis and integrated care framework. This approach was chosen to identify the most parsimonious set of predictors while testing specific theoretically-derived interaction effects. Model fit was assessed using the Hosmer-Lemeshow test and Nagelkerke R^2 .

For the clustered sampling design, standard errors were adjusted for enumeration-area clustering using robust cluster-robust standard errors to account for potential within-cluster correlation. This adjustment was applied in all logistic regression models.

The qualitative data from this study were analyzed using thematic analysis as described by [12]. The findings from the study were grouped into themes around parity, ANC access, maternal depletion prevention, integrated care synergy, resource allocation, and benefit invisibility. The qualitative findings were used to explain the quantitative interaction effects by examining how high-parity women and those with regular ANC access described their experiences of FP benefits, and

by exploring why non-users reported a recognition gap. This integration occurred through joint display analysis where quantitative interaction findings were directly compared with qualitative themes from corresponding participant sub-groups.

2.5. Ethical Considerations

The study adhered to the principles of the Declaration of Helsinki. Ethical clearance was obtained from the University's Research and Development Directorate and Postgraduate Review Board (NU/R&D/REC/25.01.25). Informed consent was obtained from all participants. All information was anonymized and de-identified. Participants were also made aware of their rights to withdraw from the study at any time without any reason or explanation.

3. Results

3.1. Sociodemographic Characteristics of Respondents

Table 1 presents the characteristics of 1500 married women who participated in the study. Their mean age was 28.7 years ($SD = 6.2$). The majority (46.6%) of the participants were aged 25 - 34 years. Most women had secondary or tertiary education (71.0%). About 69.7% of the participants were in monogamous marital unions, while 54.9% of the participants were Muslims, and 45.1% were Christians. The mean number of children ever born was 2.16 ($SD = 1.8$). Almost half of the women had access to bank accounts, and mobile phone ownership was high at 91.1%.

Table 1. Sociodemographic characteristics of respondents (N = 1500).

Characteristic	Category	n (%)
Age Group (years)	15 - 24	218 (14.5)
	25 - 34	699 (46.6)
	35 - 49	583 (38.9)
Education Level	No formal	282 (18.8)
	Primary	153 (10.2)
	Secondary	728 (48.5)
	Tertiary	337 (22.5)
Religion	Muslim	823 (54.9)
	Christian	677 (45.1)
Marital Union Type	Monogamy	1045 (69.7)
	Polygamy	215 (14.3)
	Cohabitation	240 (16.0)
Employment Status	Unemployed	576 (38.4)
	Self-employed	595 (39.7)

Continued

	Formally employed	329 (21.9)
Bank Account Access	Yes	745 (49.7)
	No	755 (50.3)
Mobile Phone Ownership	Yes	1367 (91.1)
	No	133 (8.9)
Children Ever Born	0	176 (11.7)
	1 - 2	796 (53.1)
	3 - 4	405 (27.0)
	5+	123 (8.2)

3.2. Family Planning Practices

The Contraceptive Prevalence Rate (CPR) was 61.6%, with 58.6% using modern methods and 3% using traditional methods. Among currently using women, the most commonly used methods were injectables (48.4%), followed by Oral Contraceptives (30%). Long-acting and natural methods were less used. Among non-users, 57.4% were intentional non-users because they wanted more children. The remaining 42.6% non-users, however, faced constraints for reasons such as fear of side effects (13.1%), partner opposition (11.5%), religious/cultural reasons (10.5%), etc. Consistency of use was challenging; 40.8% reported that they had ever missed a dose of their contraceptive method, and only 27.6% of current users always adhered to guidelines using their method as intended for childbearing purposes. Fear of side effects was the leading reason for inconsistent use (53.5%) (**Table 2**).

Table 2. Contraceptive practices and reasons for non-use.

Variable	Category	n (%)
Contraceptive Use (N = 1500)	Currently using any method	924 (61.6)
	Modern methods	879 (58.6)
	Not using	576 (38.4)
Method Mix (n = 910 current users) ^a	Injectables	440 (48.4)
	Oral pills	273 (30.0)
	Condoms	71 (7.8)
	Implants	46 (5.1)
	IUD/Permanent/Natural	80 (8.8)
Reasons for Non-Use (n = 576 non-users)	Want to have children	331 (57.4)
	Fear of side effects	76 (13.2)
	Partner opposition	66 (11.5)

Continued

	Religious/cultural barriers	60 (10.4)
	Cost/transport barriers	43 (7.5)
Consistency of Use (n = 910 current users)	Never skipped	539 (59.2)
	Ever skipped	371 (40.8)
Adherence to Guidelines (n = 910 current users)	Always adhere	251 (27.6)
	Most of the time	396 (43.5)
	Sometimes adhere	263 (28.9)
Reasons for Inconsistent Use (n = 371 ever skipped) ^b	Fear of side effects	199 (53.4)
	Desire to conceive	165 (44.5)
	Partner influence	65 (17.5)

^an = 910 excludes 14 traditional method users who were not asked detailed adherence questions. ^bPercentages sum to >100% because respondents could select multiple reasons.

3.3. Maternal Health Outcomes

Table 3 describes maternal and child health outcomes. Family planning improved child spacing for 83.0% of women (95% CI: 81.0 - 85.0) and prevented unintended

Table 3. Maternal and child health outcomes.

Outcome	Category	n (%)
MATERNAL HEALTH		
Child Spacing	Improved	1245 (83.0)
Prevention of Unintended Pregnancy	Prevented	1152 (76.8)
Pregnancies Since FP Initiation (n = 1478)	No pregnancies	528 (35.7)
	One or more	950 (64.3)
Births in Last 12 Months	No births	960 (64.2)
	One or more	535 (35.8)
Pregnancy Complications	Experienced	278 (18.6)
Overall Health Status	Good	958 (63.9)
CHILD HEALTH		
Child Death Experience (n = 1322)	No child deaths	1047 (79.2)
	At least one child death	275 (20.8)
Perceived Child Health Improvement (N = 1500)	Yes	970 (64.7)
	No	371 (24.7)
	Not sure	159 (10.6)
Children's Health Issues	Have health issues	262 (17.4)
Children's Overall Health	Good	1050 (70.0)

pregnancy for 76.8% (95% CI: 74.5 - 79.0). Among the women who had become pregnant since FP initiation, 35.7% reported no pregnancies, 33.3% reported one pregnancy, and 8.7% reported three or more. The majority (64.2%) of the women reported that they had no births in the last 12 months. In terms of health outcomes, 18.6% of women reported experiencing pregnancy complications, with the most common complication being bleeding (22.2%). As for their overall health, 63.9% of women reported good health.

3.4. Child Health Outcomes

The vast majority of women who have children (97.8%, $n = 1322$) have at least one surviving child, with only 5.4% who experienced 2 or more child deaths. Perceived improvement in child health from spacing was reported by 64.7%, while 24.7% reported no improvement, and 10.6% were unsure. The majority of children (82.6%) had no health issues; among those with health issues, malaria was the most common (43.5%), followed by fever (19.1%). Overall, 70% rated their children's health as good (Table 3).

3.5. Multivariate Analysis: Conditional Benefits and Interaction Effects

Table 4 presents the results of the logistic regression for all interaction terms.

FP × High Parity Interaction: The effect of FP benefits concentrates on high-parity women. Women with four or more children who used family planning had 2.45 times higher odds of improved health outcomes compared with other FP users (aOR = 2.45, 95% CI: 1.28 - 4.69, $p = 0.007$).

FP × Regular ANC: Women who used both FP and attended regular ANC had 52% decreased odds of having any pregnancy complications (aOR: 0.48, 95% CI: 0.24 - 0.96, p -value = 0.038).

Benefit Recognition Gap: Non-users of family planning had 96% higher odds of reporting no improvement in child health compared to users of family planning (aOR = 1.96, 95% CI: 1.50 - 2.57, $p < 0.001$) and 288% higher odds of being unsure about child health benefits compared to users of family planning (aOR = 3.88, 95% CI: 2.63 - 5.73, $p < 0.001$).

Table 4. Multivariate analysis: interaction effects.

Interaction	Adjusted OR	95% CI	p-value
FP × High Parity (4+ children)	2.45	1.28 - 4.69	0.007
FP × Regular ANC Access	0.48	0.24 - 0.96	0.038
Non-users: No Improvement in Child Health	1.96	1.50 - 2.57	<0.001
Non-users: Not Sure About Child Health Benefits	3.88	2.63 - 5.73	<0.001

^aModel 1 (FP × Parity): $\chi^2 (25) = 142.58$, $p < 0.001$, Nagelkerke $R^2 = 0.205$. ^bModel 2 (FP × ANC): $\chi^2 (30) = 253.98$, $p < 0.001$, Nagelkerke $R^2 = 0.192$. ^cOR = Odds ratio; CI = Confidence interval; FP = Family planning; ANC = Antenatal care.

3.6. Qualitative Findings

3.6.1. Mechanism 1: Maternal Depletion Prevention

Women who practiced family planning described how spacing protected their health by allowing time for physical recovery between pregnancies:

“I have been using family planning in all my pregnancies to space my children. The spacing gave my body time to recover and reduce the risks and dangers associated with pregnancy and childbirth.” (IDI, age 32)

“In my opinion, child spacing does have a relation to maternal health during pregnancy and at the time of delivery. Because if the children are not spaced out well enough, the mother’s body may not regain its strength fully and may not have sufficient nutrition to be passed on to the unborn child.” (IDI, age 41)

A high-parity woman explained the cumulative depletion she experienced:

“I was very tired after having my fourth child. My body needed rest. I started to use the injections. So, I had a two-year space before I got pregnant with my next baby.” (Woman, 38 years, 5 children)

3.6.2. Mechanism 2: Integrated Care Synergy

Women who accessed both family planning and antenatal care described how the combination enhanced health outcomes:

“When I go to the clinic for my child’s vaccinations, I ask the nurse to explain more about family planning. She is always willing to help. I trust her because I see her regularly.” (IDI, age 28)

“The health staff tell us about the advantages of family planning, and we get the privacy we need.” (IDI, age 26)

3.6.3. Mechanism 3: Resource Allocation per Child

Women described how spacing enabled them to allocate resources more effectively to each child:

“A longer space between giving birth to children means that it is easier to be able to meet the needs of the children, have quality time with one child before the arrival of the other, and be able to feed them well.” (IDI, age 29)

“Spacing the children helps them with healthy growth and prevents them from illness. When births are too close together, it disturbs the mother’s health and the children’s as well.” (IDI, age 36)

3.6.4. Mechanism 4: Benefit Invisibility

Women who had not experienced spacing described difficulty recognizing its benefits:

“I have not experienced any improvement in the health of my children as a result of family planning. The children are the same as they were; it depends on whether we feed them well.” (IDI, age 19)

“I have been using family planning for three years, but I haven’t noticed any difference in my children’s health. They still get sick sometimes.” (IDI, age 27)

4. Discussion

The study sought to explore the perceived effects of family planning on maternal and child health among married women living in Bo City, Sierra Leone. Specifically, the study examined the conditions under which family planning programs yield health benefits and how these benefits could be amplified when integrated with other maternal and child health services. Three main points emerged from the study. Firstly, perceived health benefits from family planning programs conditionally focus on high-parity women. Secondly, the study found that integration of family planning programs with antenatal care programs could yield additional synergistic perceived health benefits. Finally, non-users of family planning reported a lack of recognition of the benefits of child health spacing.

The study found that family planning use was associated with substantial self-reported improvements in maternal and child health outcomes. The percentage of women who reported improved child spacing as a result of the health benefits of FP use was 83.0% in this study, compared to 71% reported in Nigeria recently [13]. Similarly, 76.8% of women reported that FP helped them to prevent an unwanted pregnancy, compared to 75% of sub-Saharan African women users of contraceptive methods reported to use FP to prevent an unwanted pregnancy [14]. The percentage of FP users who reported continued use of FP methods for 12 months or more was 64.8% in this study compared to 60% in Kenya and 58% in Nigeria [14] [15]. However, the percentage of women who reported that they had ever skipped a dose of any FP methods was 40.8% in this study compared to 28% in Thailand [16] and other African countries.

The first key finding concerns the role of parity as a modifier of health benefits. FP $\times$ high parity interaction (aOR = 2.45; 95% CI: 1.28 - 4.69; $p = 0.007$) revealed that family planning health benefits concentrate on the health of the children of women of high parity (four or more children). This finding supports the maternal depletion syndrome hypothesis [6]. High parity women experience physical maternal depletion from previous childbearing. To recover from such depletion and ensure the health of their children, family planning interventions that promote child spacing are critical for these women. These findings are consistent with those of studies [17] [18] that reported maternal depletion increases with increasing parity. Based on the findings of this study, maternal health programs targeting women of reproductive age must focus on high-parity women. Their experiences will bring to the forefront the health benefits that women experience when they space their children. These women can detail the many negative effects that they feel with each pregnancy. Some of these symptoms are physical exhaustion and the need to rest after childbirth, which are manifestations of the maternal depletion syndrome.

Building on this understanding of how parity modifies health benefits, the study

also examined the synergistic potential of integrated care. The interaction between FP and regular ANC (aOR 0.48; 95% CI 0.24 to 0.96; $p = 0.038$) indicated that combining family planning with regular antenatal care for the index pregnancy was associated with a 52% reduction in risk of complications. This integrated service delivery approach has been shown in Pakistan to improve pregnancy outcomes and increase use of family planning [8]. It can also help women who have recently given birth to space their next birth, for example, by increasing the use of postpartum family planning [19]. Women reported using the opportunity of their children's vaccination to receive advice on family planning from health staff. Some of the women reported having confidence and trust in the health staff providing vaccination to their children and, therefore, were more likely to receive advice on family planning when it was provided in the same setting as maternal health services. Integrating family planning into maternal health services increases the chance of women accessing and using family planning as well as their maternal health care.

While integrated care enhances health benefits for users, a critical barrier emerged among non-users of family planning. As shown in the result, non-users of family planning reported 96% higher odds of stating "No improvement" (aOR = 1.96, 95% CI 1.50 - 2.57) and almost four times higher odds of being "Not sure" (aOR = 3.88, 95% CI 1.63 - 5.73) of child health benefits than users of family planning. The findings for the benefit recognition gap of spacing for non-users of family planning among this study's participants are comparable to a global study done [20]. Qualitative data from this study were used to support the concept of the benefit invisibility experienced by non-users of family planning of reproductive age. It appears that, even though the benefits of child health are well explained to women of reproductive age, those who are users of family planning report that they have experienced improvements in the health of their children. As indicated by the following testimonial from a young married woman of reproductive age: "I have not experienced any improvement in the health of my children as a result of family planning. The children are the same as they were; it depends on whether we feed them well." As can be deduced from this quote, health education messages regarding child health benefits of family planning could be more concrete, and even having users' testimonials on child health benefits could be more effective than messages from health workers on the benefits of child health of family planning.

5. Limitations

There are several limitations to the study. First, the cross-sectional design of the study does not allow for the establishment of causality, and, therefore, a longitudinal study is required to assess change over time. In addition, the self-reported nature of the data has the potential for recall and social desirability bias. Second, the clustered sampling design may affect precision estimates; however, standard errors were adjusted for enumeration-area clustering in the regression analyses. Third, the study was conducted in an urban setting in Bo City, and therefore, find-

ings may not be generalizable to rural settings in Sierra Leone. In addition, the study does not have access to clinical data on maternal and child health, and therefore, all data are based on women's own assessment of their health status.

6. Implications for Policy and Practice

The findings of this study can be applied to develop family planning interventions worldwide to improve the health of women and children. These interventions should focus on the health benefits of child spacing for high-parity women. They can be delivered through integrated health services provided during antenatal care, childbirth, and postpartum care, and through child health services. Health education messages regarding the benefits of child spacing should be reinforced through various formats. Women's testimonial accounts of how child spacing has improved their health and that of their children can be particularly effective in conveying these messages. In addition, strengthening of counseling as well as follow-up contact with clients is required. This is because 40.8% of current users of family planning methods ever skipped use of a method at some point.

7. Conclusion

Health benefits of family planning accrue to high-parity women who have childbearing space as a result of accessing antenatal care. There are synergistic perceived health benefits of family planning integrated with antenatal care services, with a reported 52% reduction in maternal and child health complications in this study. Therefore, family planning interventions should be targeted at high-parity women and delivered through an integrated service delivery approach that links family planning with antenatal care, postpartum care, and child health services. Health education messages need to clearly demonstrate childbearing space benefits through the testimonials of women who have experienced spacing benefits. In addition, strengthen counseling skills of family planning providers and improve consistency of method use among current family planning users (40.8% have ever skipped doses).

Acknowledgements

The authors thank the women who participated in this study, the field staff who assisted with data collection, and the District Health Management Team of Bo City for their support.

Ethics Statement

The study adhered to the principles of the Declaration of Helsinki. Ethical clearance was obtained from the University's Research and Development Directorate and Postgraduate Review Board.

Authors' Contributions

VNB: Conceptualization, methodology, data collection, analysis, writing-original

draft. HBSK: Supervision, methodology, review-editing. AJ: Supervision, methodology, review-editing. We want to acknowledge the guidance provided by Prof. Paul Richards. All authors read.

Availability of Data and Materials

The datasets generated and analyzed during the current study are not publicly available due to confidentiality agreements with study participants but are available from the corresponding author on reasonable request.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

References

- [1] Cleland, J., Conde-Agudelo, A., Peterson, H., Ross, J. and Tsui, A. (2012) Contraception and Health. *The Lancet*, **380**, 149-156.
[https://doi.org/10.1016/s0140-6736\(12\)60609-6](https://doi.org/10.1016/s0140-6736(12)60609-6)
- [2] World Health Organization Department of Sexual and Reproductive Health and Research (WHO/SRH) and Johns Hopkins Bloomberg School of Public Health/Center for Communication Programs (CCP) (2022) Knowledge SUCCESS. Family Planning: A Global Handbook for Providers (2022 Update). CCP and WHO.
- [3] Sedgh, G., Ashford, L.S. and Hussain, R. (2016) Unmet Need for Contraception in Developing Countries: Examining Women's Reasons for Not Using a Method. New York: Guttmacher Institute.
<https://www.guttmacher.org/report/unmet-need-for-contraception-in-developing-countries>
- [4] Guttmacher Institute (2022) Adding It up: Investing in Sexual and Reproductive Health. Guttmacher Institute.
<https://www.guttmacher.org/report/adding-it-up-investing-in-sexual-reproductive-health-2022>
- [5] World Health Organization (2023) Family Planning Fact Sheet. WHO.
<https://www.who.int/news-room/fact-sheets/detail/family-planning-contraception>
- [6] Winkvist, A., Rasmussen, K.M. and Habicht, J.P. (1992) A New Definition of Maternal Depletion Syndrome. *American Journal of Public Health*, **82**, 691-694.
<https://doi.org/10.2105/ajph.82.5.691>
- [7] 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**, S7-S24. <https://doi.org/10.1016/j.ijgo.2004.11.012>
- [8] Memon, Z., Khan, A. and Ali, M. (2022) Integration of Family Planning with Maternal and Child Health Services in Pakistan: A Realist Evaluation. *Health Policy Plan*, **37**, 312-325.
- [9] Statistics Sierra Leone (2020) Demographic and Health Survey 2019. Statistics Sierra Leone. <https://www.dhsprogram.com/pubs/pdf/FR365/FR365.pdf>
- [10] UNFPA Sierra Leone (2025) Sierra Leone's Maternal Mortality Ratio Declines as UNFPA Launches Midwifery Accelerator to Tackle Ongoing Crisis.
<https://sierraleone.unfpa.org/en/news/sierra-leones-maternal-mortality-ratio->

[declines-unfpa-launches-midwifery-accelerator-tackle](#)

- [11] Statistics Sierra Leone (2022) 2021 Mid-Term Census Report. Statistics Sierra Leone; 2022.
https://www.statistics.sl/images/StatisticsSL/Documents/Census/MTPHC_Preliminary_Report/Final_Preliminary_Report_2021_MTPHC.pdf
- [12] Braun, V. and Clarke, V. (2006) Using Thematic Analysis in Psychology. *Qualitative Research in Psychology*, **3**, 77-101. <https://doi.org/10.1191/1478088706qp063oa>
- [13] Biswas, A., Abdullah, A.S. and Dalal, K. (2025) Birth Spacing and Maternal Health Outcomes: A Systematic Review. *The Journal of Public Health*, **47**, 112-125.
- [14] Marston, C., Castle, S. and Askew, I. (2022) Short Birth Intervals and Maternal Health: A Systematic Review. *Journal of Global Health*, **12**, 1-12.
- [15] Dev, R., Kohler, P., Feder, M., Unger, J.A., Woods, N.F. and Drake, A.L. (2019) A Systematic Review and Meta-Analysis of Postpartum Contraceptive Use among Women in Low- and Middle-Income Countries. *Reproductive Health*, **16**, Article No. 154. <https://doi.org/10.1186/s12978-019-0824-4>
- [16] Bearak, J., Popinchalk, A., Alkema, L. and Sedgh, G. (2018) Global, Regional, and Subregional Trends in Unintended Pregnancy and Its Outcomes from 1990 to 2014: Estimates from a Bayesian Hierarchical Model. *The Lancet Global Health*, **6**, E380-E389.
- [17] Smith-Greenaway, E. and Weitzman, A. (2023) Child Survival and Birth Spacing in Nigeria. *Demography*, **60**, 745-768.
- [18] Ochako, R., Mbondo, M., Aloo, S., Kaimenyi, S., Thompson, R., Temmerman, M., *et al.* (2015) Barriers to Modern Contraceptive Methods Uptake among Young Women in Kenya: A Qualitative Study. *BMC Public Health*, **15**, Article No. 118. <https://doi.org/10.1186/s12889-015-1483-1>
- [19] Alo, O.D., Daini, B.O., Omisile, O.K., Ubah, E.J., Adelusi, O.E. and Idoko-Asuelimhen, O. (2020) Factors Influencing the Use of Modern Contraceptive in Nigeria: A Multilevel Logistic Analysis Using Linked Data from Performance Monitoring and Accountability 2020. *BMC Women's Health*, **20**, Article No. 191. <https://doi.org/10.1186/s12905-020-01059-6>
- [20] Thananchai, C., Wongkum, J. and Srichan, P. (2025) Active Knowledge Construction and Family Planning Uptake in Thailand. *Reproductive Health*, **22**, 1-15.