Rural-Urban Fertility Disparity in The Gambia: Standardized Rate, Decomposition, Parity Progression, and Determinants

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Abstract

This cross-sectional design study examined rural-urban fertility differences in The Gambia. We used the 2019-20 Gambia Demographic and Health Survey data. A multi-stage sampling technique was used to select women of reproductive age (8,747 urban & 3,119 rural). Data were analyzed using descriptive statistics, Kitagawa's Decomposition technique, and the negative binomial (NB) model, α = .05. The mean Children Ever Born (CEB) was higher in the rural (3.25 ± 3.02) than in the urban (2.19 ± 2.45) areas. In the urban and rural areas, 82.8% and 95.1% of women aged 45–49 years who had had three children progressed to fourth birth, respectively. The parity progression rate (λ) was lower in the urban (-0.0647) than in the rural (-0.051). The difference between the standardized fertility rates in rural and urban areas was 83.2 in The Gambia, and the effect of the age composition attributable to this difference was 8.11%. The fertility incidence rate ratio (IRR) was 44% (IRR = 1.440, 95% CI [1.371, 1.513], $p <$ .001) higher in the rural than the urban areas. A similar pattern of rural-urban differences in fertility was observed in the full model. Childbearing progression was higher in rural areas than urban areas and rural-urban differences exist in fertility determinants in The Gambia. Thus, rural-urban-specific fertility reduction programs may address the observed fertility differences in the rural and urban areas in The Gambia.

Keywords

Children ever born; fertility; rural women; The Gambia; urban women

Introduction

Fertility is a key component of population dynamics. Its index is among the parameters often used for the measurement of the health status of a nation, particularly the achievement in reproductive health outcomes (United Nations, 1975). Fertility, being a driver of population growth, is either directly or indirectly linked with some themes of Sustainable Development Goals (SDGs) (United Nations, 2015). Globally, a reduction in fertility has been achieved, reflecting the regional and sub-regional decline in the last few decades (Bongaarts & Hodgson, 2022). The total fertility rate (TFR) is the average number of children a woman will bear if the current age-specific fertility schedule is experienced throughout her reproductive years. The TFR is 2.3 worldwide, while the TFR is 1.5 and 4.0 in the more developed and least developed countries, respectively (United Nations, 2015). In North America, Latin America, Asia, and Europe, the TFR ranges from 1.5 to 1.9 and is lower than the level in sub-Saharan Africa (4.6) and West Africa (4.9) (Population Reference Bureau, 2022). These regional fertility estimates vary across the countries in each region and at the national level. The TFR in The Gambia, a country in West Africa, is 4.7 (Population Reference Bureau, 2022; United Nations, 2015).

Designing effective policies for economic advancement often involves the rural-urban classification of the population. Hitherto, there is no standard definition of an "urban or rural" area worldwide. Countries apply characteristics that incorporate settlement size, population density, economic development, and the transformation of the natural environment into a built environment. In The Gambia, an area is classified as urban or rural based on the population size or population density of the village, town, or city (Statista, 2024). Literature is consistent concerning the sociodemographic disparity in fertility and the difference in rural-urban fertility (Chatterjee, 2019; Forty et al., 2022; Lerch, 2019). Studies conducted in Latin America, Asia, Africa, and other world sub-regions have shown close similarities in fertility transitions in urban areas (Chatterjee, 2019; Klüsener et al., 2017; Lerch, 2019). The controversies regarding the reasons why the fertility level is often lower in the urban than rural communities persist, especially in Gambia, where a vast difference exists between the rural (5.9) and urban (3.9) areas (Gambia Bureau of Statistics [GBoS] & ICF, 2021). The fertility rate of Gambia fell gradually from 6.4 births per woman in 1973 to 4.6 births per woman in 2022, and it declined between 2013 and 2020 in both urban (from 4.7 to 3.9) and rural (from 6.8 to 5.9) areas (GBoS & ICF, 2021). Thus, this raises the question of why there is a vast rural-urban difference in fertility rate and transition in The Gambia, a low-income country with a population size of about 2.7 million (GBoS & ICF, 2021). Being one of the smallest countries in sub-Saharan Africa with a population density of 254.3 people per square kilometer and an Islamic nation, the fertility study in The Gambia is interesting. As a small country, an essential demographic index like fertility is expected to be uniquely maintained across its rural and urban locations.

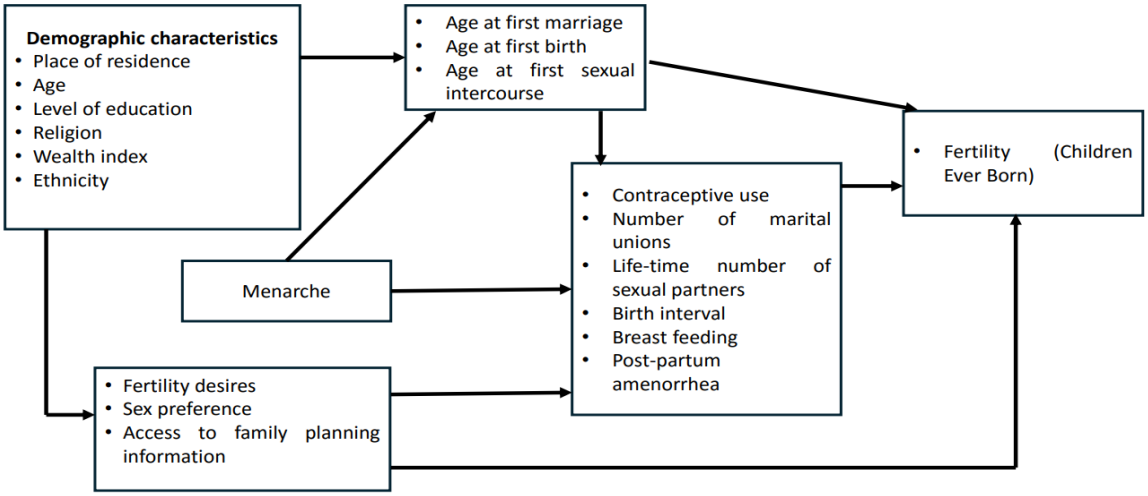
The rural-urban difference in fertility in The Gambia may be attributed to the rural-urban variations in fertility-related behavior. Postponing first births and extending the interval between births have played a role in reducing fertility levels in many countries (Pörtner, 2022; Roustaei et al., 2019). Gambia's data revealed that the age at first sex, the age at first marriage, the age at first birth, and the contraceptive prevalence rate are lower among women living in rural areas than in urban areas. In addition, a higher unmet need for family planning (FP) was found among rural women than among their urban counterparts (GBoS & ICF, 2021). Moreover, the socioeconomic conditions in urban areas tend to influence low fertility rates compared to rural settlements. Educational and employment opportunities that are pertinent to changes in lifestyle and cultural practices like son preference, early marriage, the stigma

attached to delayed childbearing in marriage, polygamy, etc., are often higher in urban areas than in rural areas (GBoS & ICF, 2021). Urban dwellers tend to have better exposure to FP information and access, thus creating more opportunities for modern contraceptive uptake (Oluwasanu et al., 2019; Ujah & Kirby, 2022; Yaya et al., 2021). There are several challenges facing the FP program in The Gambia, including the belief that FP is associated with promiscuity, leads to infertility, and against religious teachings. Others include strong opposition from men, a shortage of FP providers, and insufficient infrastructure and supplies, especially in rural areas (Yaya et al., 2021). Rural-urban differences in these attributes will likely direct fertility patterns in rural and urban areas.

The Government of The Gambia expressed concerns about addressing population and development issues in 1979. The first National Population Policy was formulated in 1992 and was revised in 1996 and 2006 (National Population Commission Secretariat, 2024). The country also endorsed the recommendations of the International Conference on Population and Development Programme of Action. Despite the compliance of the Gambian government with these local and international treaties, a wide gap still exists in the rural and urban areas (GBoS & ICF, 2021). This study was conducted against limited research evidence on the analysis of birth progression and socioeconomic features responsible for rural-urban fertility differences in The Gambia (GBoS & ICF, 2021; Kanteh & Palamuleni, 2019). These previous studies examined the determinants of fertility or fertility control measures without focusing on assessing rural-urban fertility disparity using the parity progression ratio, decomposition technique, and NB model, as demonstrated in the current study.

The current study aimed to determine the rural-urban differences in the mean fertility standardized by age, determine the contribution of age to the difference in the rural-urban difference in fertility rate, assess rural-urban birth progression, examine factors associated with fertility in the rural and urban areas, and identify the predictors of fertility in the rural and urban areas. The rural-urban difference in fertility can be influenced by numerous demographic and sociocultural factors (Figure 1). Understanding these associated factors is central to designing effective fertility programs and policies aimed at reducing the fertility rate in The Gambia. The information on the rural-urban difference in fertility can reflect the level of fertility transition in the rural and urban areas rather than relying on the national estimate, which hides the geographical difference in fertility within the country. The present study, therefore, articulates the direction, scope, and operational modalities for the effective implementation and development of fertility reduction-related policies in the Gambia. The outcome of this study will assist policymakers and program managers in designing rural-urban-specific strategies to reduce the fertility rate and close the rural-urban fertility gap in The Gambia.

Figure 1: Conceptual Framework on Determinants of Fertility

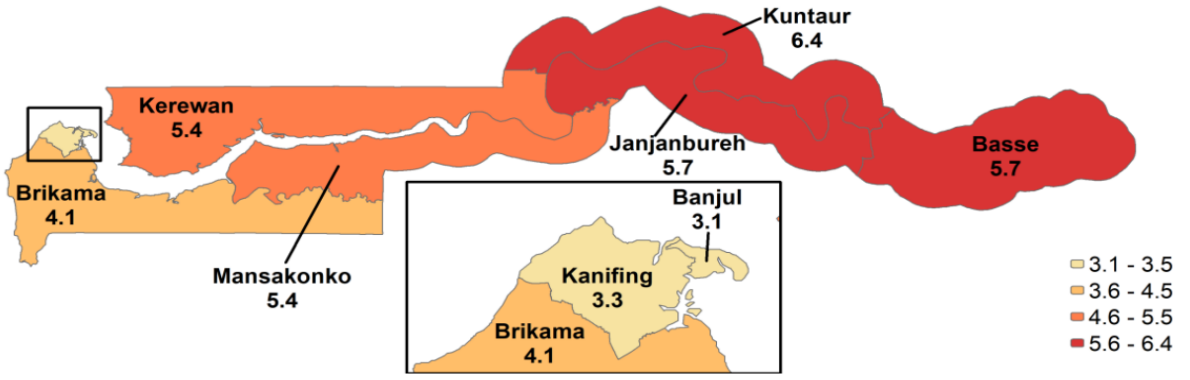


Data and methods

Study area

The study was conducted in The Gambia, a country in West Africa with a population figure of about 2.7 million, a birth rate of 33 births per 1,000 population, and a population growth rate of 2.6%. The urban population constitutes 63.9% of the total population of Gambia (United Nations, 2022). The TFR in The Gambia is 4.4 children per woman, which varies among the LGAs across the country (Figure 2). Currently, women of reproductive age account for about 20.6% of the country's population of approximately 2.78 million (United Nations, 2022). The median age at first birth among women aged 25–49 is 20.7 years, and about 14.0% of adolescents have begun childbearing. Teenage childbearing is higher in rural areas (20%) than in urban areas. The median birth interval in The Gambia (35.3 months) exceeded the WHO–recommended 24 months after the preceding birth but longer in the urban areas (36.1 months) than in rural areas (33.7 months). In The Gambia, men desire more children than women (7.6 children versus 5.8 children). The modern contraceptive prevalence rate is 17%, and 40% of the demand for modern contraceptives is satisfied by modern methods (GBoS & ICF, 2021).

Figure 2: Fertility Rate by Local Government Area in Gambia



Note: GBoS & ICF (2021)

Study design and population

The 2019-20 Gambia Demographic and Health Survey data was used (Gambia Bureau of Statistics [GBoS] & ICF, 2021). This cross-sectional design survey provides up-to-date estimates of fundamental demographic and health indicators for planning, implementing, monitoring, and evaluating national health programs. Data collection occurred from November 21, 2019, to March 30, 2020.

Sampling technique

The sampling frame leveraged the updated version of the 2013 Gambia Population and Housing Census. Administratively, The Gambia is divided into eight local government areas (LGAs). Each LGA is subdivided into districts, which are subdivided into settlements. A settlement, a group of small settlements, or a part of a large settlement was used as an enumeration area (EA), otherwise known as a cluster, each with an urban or rural designation. The Gambia has 48 districts, 120 wards, and 4,098 EAs; each EA has an average size of 68 households. A stratified sample was used to select households in two stages. In the first stage, EAs were selected with a probability proportional to their size within each sampling stratum, and 281 EAs were selected. In the second stage, the households were selected using a systematic sampling technique. A household listing operation was undertaken in all of the selected clusters. The resulting lists of households served as the sampling frame from which a fixed number of 25 households were systematically selected per cluster, resulting in a total sample size of 7,025 chosen households. All women aged 15–49 years in the selected households were listed in the study. Because a two-stage stratified cluster sample was used for the sample selection, sampling weights were calculated based on sampling probabilities separately for each sampling stage and each cluster (GBoS & ICF, 2021). With sampling and weighting, it was possible to interview enough women to provide reliable statistics at national and LGA levels. This study analyzed 8,747 urban and 3,119 rural women of reproductive age.

Variable description

The outcome variable was fertility measured by children ever born (CEB). The independent variables included age, level of education, age at first marriage, wealth index, ever use of modern contraceptive methods, marital status, number of marital unions, age at first sexual intercourse, gender preference, and ethnicity. The age at first birth was excluded from the analysis because multicollinearity was established between this variable and age at first marriage.

Data collection

Data for this study were collected electronically using a Computer Assisted Personal Interview device configured with a pre-tested questionnaire. All electronic data files were transferred via the Internet File Streaming System to the Gambia Bureau of Statistics (GBoS) central office for editing and further processing during the fieldwork.

Data analysis and management

Data were weighted to ensure the representativeness of the survey results at the national and domain levels. Descriptive analysis was conducted to examine the pattern of childbearing standardized by age.

We assessed birth progression using the parity progression ratio (PPR) and parity progression rate (λ). The PPR is the proportion of women progressing from one parity to the next. The PPR was estimated from the parity distribution of women according to their age cohort. The Parity Progression Ratio (PPR) between parity i and i+1 was represented as PPR = ${}_5M_x(i+1)/{}_5M_x(i)$. Where ${}_5M_x(i)$ was the proportion of all women in a particular age group who have had i or more births ${}_5M_x(i) = \frac{1}{{}_5N_x} \times \sum_{j=1}^{\pi} {}_5N_x(j)$ and ${}_5W_x(i)$ was the number of women in a specific age group who have given birth to ≥i children ${}_5W_x(i) = \sum_{j=1}^{\pi} {}_5N_x(j)$. Detailed information about this procedure can be found in the Tool for Demographic Estimation (Moultrie et al., 2013).

Standardization of the current fertility rate

The direct method was used to standardize the CFR by urban-rural distribution. Births in the past year before the survey and the age distribution of women were used to estimate the age-specific fertility rate. This was standardized using the age distribution of Nigerian women of reproductive age obtained from a survey similar to that of Gambia. The direct method involves calculating the age-specific rates in the rural and urban data. Using this method, we computed the expected number of births in a standard population, that is, one with a fixed or defined age distribution, if these rates are applied. Thus, the standard population was used to derive all the age-adjusted rates in the rural and urban areas in The Gambia.

Decomposition

Kitagawa's decomposition method (Equation 1) was used to establish how much of the difference (Δ) between the fertility rate in the rural and urban areas is attributable to differences in their age composition (Kitagawa, 1955).

$$\Delta = \sum_i \left(C_i^R - C_i^U\right)\left\{\frac{F_i^R + F_i^U}{2}\right\} + \sum_i \left(F_i^R - F_i^U\right)\left\{\frac{C_i^R + C_i^U}{2}\right\} \quad \text{(Equation 1)}$$

Where; F_i^R is the fertility rate in rural areas; F_i^U is the fertility rate in urban areas; C_i^R is the proportion of women in rural; C_i^U is the proportion of women in urban.

Bivariate and Multivariate analysis

A chi-square test was used to examine an association between CEB grouped as 0, 1–2, 3–4, 5+, and each independent variable. A class of generalized linear model (GLM) was used at the level of multivariate analysis. The GLM is an expansion of the general linear model to ensure that the dependent variable is linearly related to the factors and covariates via a specified link function. Due to too many zero (zero-inflated) and skewness nature of CEB as presented by the histogram and Q–Q plot, respectively, in Figure 3, the conventional Poisson regression for modeling count data could not be applied to the outcome variable. Consequently, Bayesian

information criteria (BIC) and Akaike information criteria (AIC) were used to identify the NB model among the class of GLM as the model of best fit for fertility in The Gambia, being the model with the least AIC and BIC. The model permits the dependent variable to have a non-normal distribution. The expressions used for the computation of AIC and BIC are presented in Equations (2) and (3), respectively:

$$\text{AIC} = -2\text{ll} + 2\xi \text{ (Equation 2)}; \text{BIC} = -2\text{ll} + \xi\big(\ln(n)\big) \text{ (Equation 3)}$$

After that, the NBM was used to identify factors related to CEB in rural and urban areas. The model was also used to examine the incidence rate ratio (IRR) difference in fertility in urban areas compared to rural areas, among other factors. All analyses were conducted at a 5% level of significance. The NB regression is a generalization of Poisson regression because its mean (λ) structure is similar to Poisson's. It has an extra parameter to account for over-dispersion, often resulting when the conditional variance exceeds the conditional mean. In this study, the conditional distribution of fertility measured by CEB is over-dispersed ($\sigma^2 > \lambda$). The NB regression relaxes the restrictive assumption of the equality of the mean and variance. The distribution of NB is a function of its mean and dispersion parameter, θ. Then fertility is a random variable Y from an NB distribution with variance being, $var(Y) = \lambda + (\lambda^2/\theta)$.

The NBM was based on the Poisson-Gamma mixture distribution with the probability density function

$$P(X = k) = \left(\frac{(k+r-1)(k+r-2)\dots(r)}{k!}\right)(1-p)^k p^r$$
$$= \left(\frac{\Gamma(k+r)}{k!\,\Gamma(r)}\right)(1-p)^k p^r, k = 0, 1, 2, \dots \text{ (Equation 4)}$$

Where r, k, and p are the number of successes, failures, and probability of success on each trial, respectively. Since the distribution of an NB is specified by its mean λ, then, $\lambda = \frac{r(1-p)}{p} \Rightarrow p = \frac{r}{\lambda+r}$ thus, Equation (3) becomes $P(X = k) = \left(\frac{\Gamma(k+r)}{k!\Gamma(r)}\right)\left(\frac{r}{\lambda+r}\right)^r\left(\frac{\lambda}{\lambda+r}\right)^k, k = 0, 1, 2, \dots$ The probability of giving birth to k children is given by Equation 4 above.

Figure 3: Q–Q Plot and Histogram of Fertility by Place of Residence

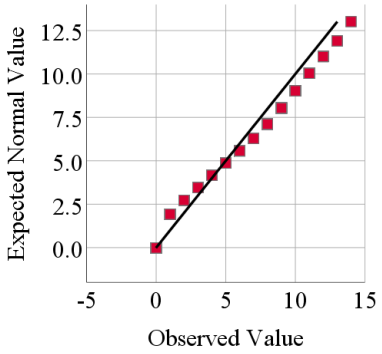


Figure 2a: Q–Q plot Gambia

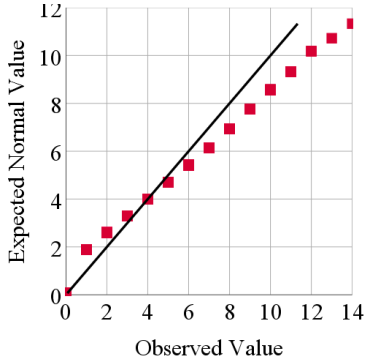


Figure 2b: Q–Q plot Urban

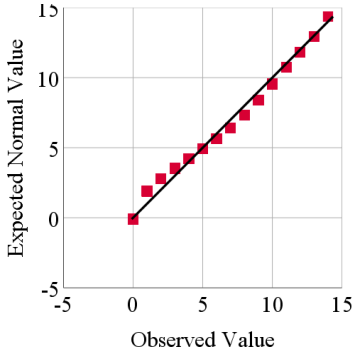


Figure 2c: Q–Q plot Rural

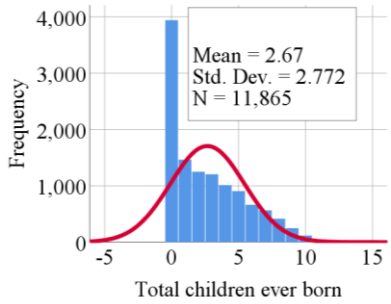


Figure 2d: Histogram Gambia

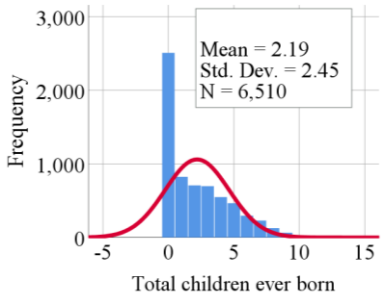


Figure 2e: Histogram Urban

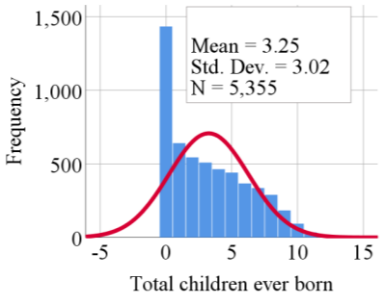


Figure 2f: Histogram Rural

Ethical consideration

Secondary data was used for this study, and the data originator sought and granted permission to use the data. However, the data originator obtained ethical approval from the Scientific Coordinating Committee, The Gambia, to conduct the survey. At the data collection point, informed consent was obtained from the respondents before the interview. The respondents were assured of the anonymity of the information they provided. The possible identifier that could be used to track each respondent to the information they provided was removed from the original data.

Results

There was no significant difference between the age of women in the urban area (28.1 ± 9.2 years) and rural area (28.3 ± 9.4 years). The age-specific standardized percentage distribution of women according to CEB by place of residence was presented in Figure 4. In the age group 15–19 years, the childbearing pattern was similar in both the rural and urban areas, and above 80% of the women had not given birth to any children. However, in this age group, the distribution suggests that the proportion of women that had given birth to 1–2 children was higher in the rural area than the urban area. In the age group 20–24 years (older youths), about 60% of women in the urban area had no children, while 25% of such women were found in the rural areas. A higher proportion of women in rural areas gave birth to 1–3 children than in urban areas. The data further showed that about 25% and 10% of women in the age group 25–29 years had no children in the urban and rural areas, respectively. The proportion of women in the age group 25–29 years who have had 1–2 births was lower in the rural areas than the urban areas, but the converse situation was shown for higher order parities (≥ 3 births). A similar childbearing pattern was observed in women in the age group 25–29 years, where a higher proportion of urban women were of lower parity than rural women was found across the older age cohorts.

Figure 4: Percentage Distribution of Women by Fertility (Children Ever Born) according to Place of Residence in The Gambia

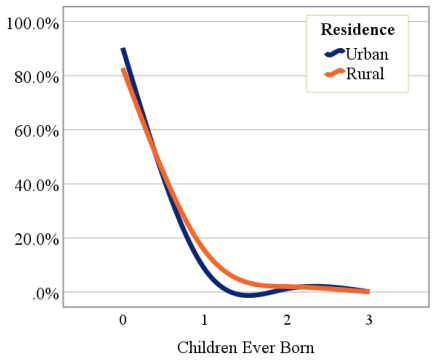


Figure 4A: Women Aged 15–19 Years

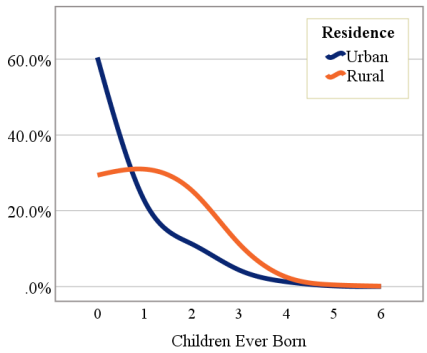


Figure 4B: Women Aged 20–24 Years

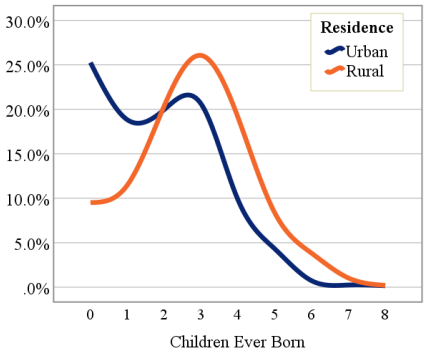


Figure 4C: Women Aged 25–29 Years

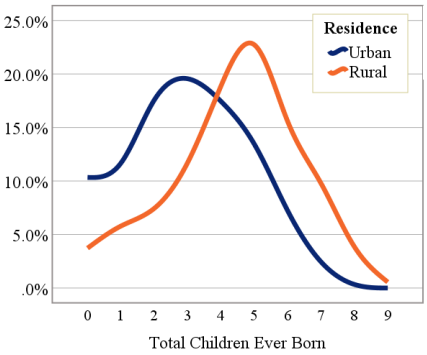


Figure 4D: Women Aged 30–34 Years

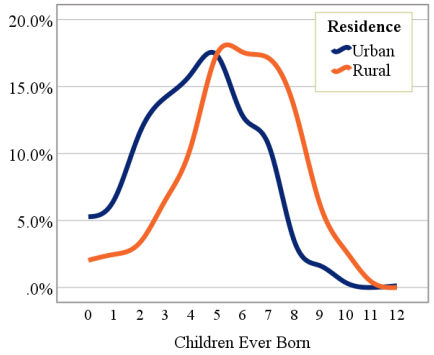


Figure 4E: Women Aged 35–39 Years

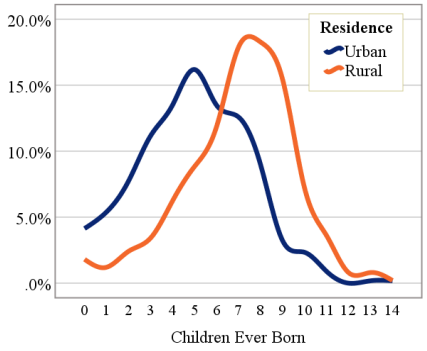


Figure 4F: Women Aged 40–45 Years

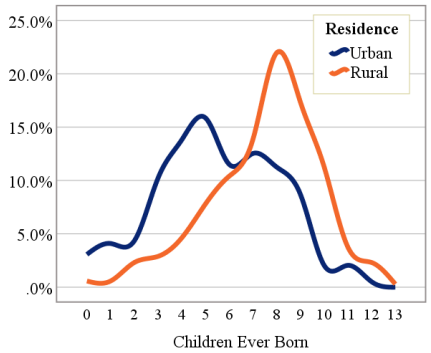


Figure 4G: Women Aged 45–49 Years

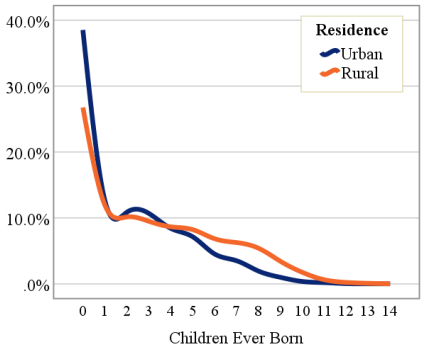


Figure 4H: Women Aged 15–49 Years

The mean CEB was higher in rural areas (3.25 ± 3.02) than in urban areas (2.19 ± 2.45). Across the age cohorts of women, a higher mean CEB was found in rural areas than urban areas. Among the women aged 15–19, the mean CEB was 0.19 ± 0.44 in the rural area and 0.11 ± 0.36 in the urban area. For women in the age cohort 25–29 years, the mean CEB was 1.28 ± 1.12 in the rural area compared to 0.64 ± 0.95 in the urban area. In the age group 45–49 years, where completed fertility was anticipated, the mean CEB was 5.52 ± 2.57 in the urban and 7.48 ± 2.32 in the rural area (Figure 5).

Figure 5: Mean Fertility by Place of Residence According to Age Cohorts in The Gambia

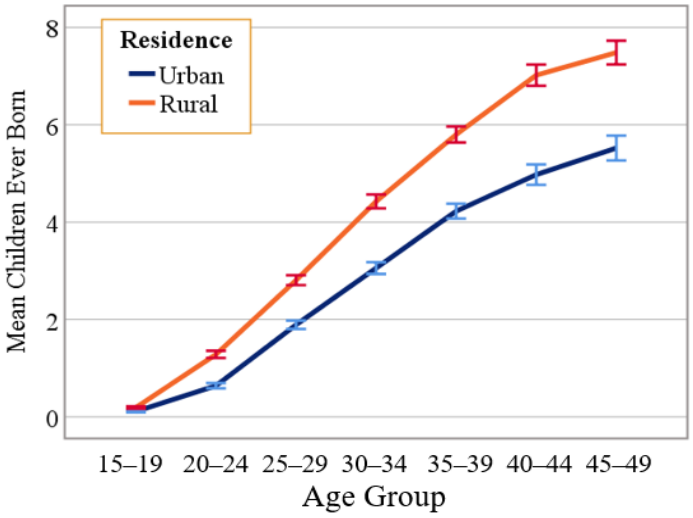


Figure 6 shows the mean CEB by place of residence according to age at first birth among women aged 15–49 years and 45–49 years. For women in the age group 15–49 years, the mean CEB was higher among women in rural areas than their counterparts in urban areas across the first birth age cohorts. The mean CEB declined from 4.85 ± 2.34 to 2.33 ± 1.42 among the urban women who gave birth at 10–14 years and those who had their first at ages 25 years and above, while in the rural areas, the decline was from 6.00 ± 2.62 to 3.08 ± 1.94. The same pattern as that of women aged 15–49 years, but with higher mean CEB across the age at first birth cohorts, was observed for women aged 45–49. In this age group, the mean CEB among women who had their first birth at ages 10–14 years was higher in the rural (8.32 ± 2.29) than urban (6.24 ± 3.01) and for those who began childbearing at ages 20–24 years (rural = 7.38 ± 2.00, urban = 5.56 ± 2.27) and at least 25 years (rural = 5.10 ± 2.38, urban = 3.55 ± 1.93).

Figure 6: Mean Fertility (Children Ever Born) by Place of Residence According to Age at First Birth among Women Aged 15–49 years and 45–49 years in The Gambia

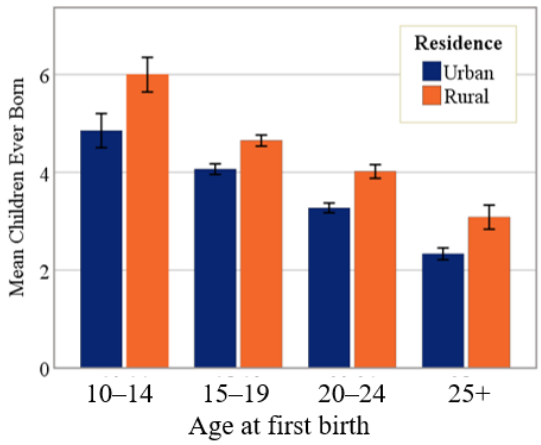


Figure 6A: Among women aged 15–49 years

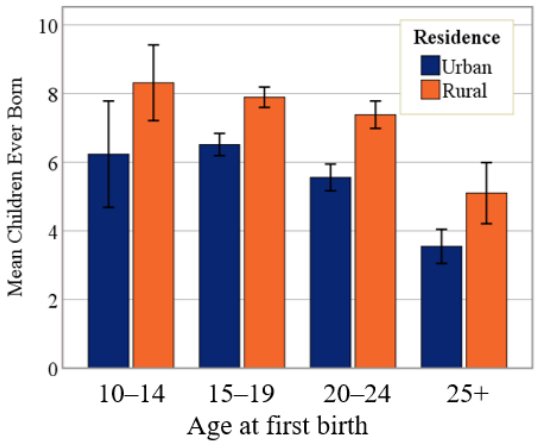
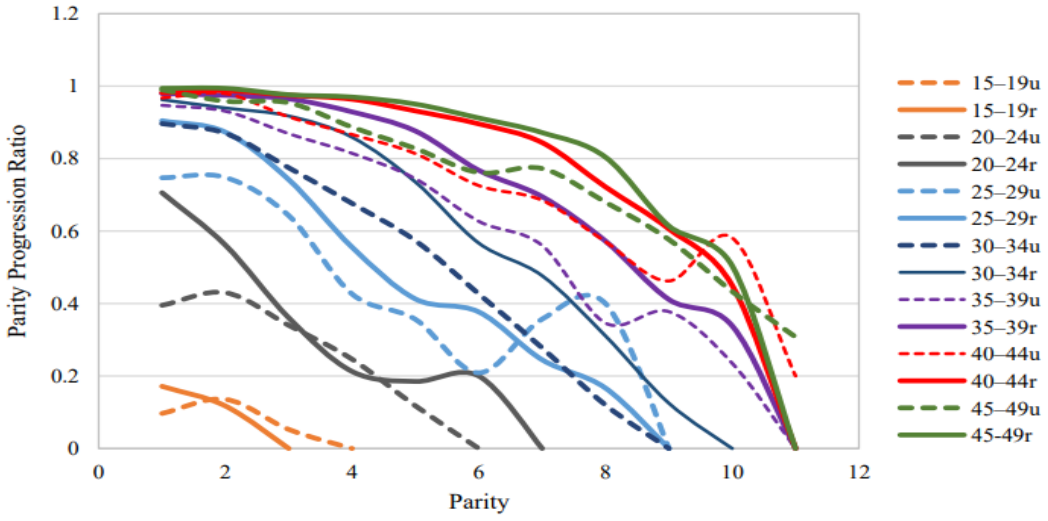


Figure 6B: Among women aged 45–49 years

The parity progression ratios are shown in Figure 7. In the urban area, the ratios suggest that about 95.9% of women aged 45–49 years have had at least one child, while 82.8% of women in this age group who had had three children proceeded to have a fourth child. In rural areas, 99.4% of women aged 45–49 years have had at least one child, while 95.1% of women who had had three births proceeded to have a fourth child. Among women aged 45–49, 68.0% and 80.4% who have had six births progressed to higher-order births in the urban and rural areas, respectively. Across all the age groups, the parity progression ratio from lower to higher-order births was higher in the rural areas than in the urban. For the women aged 15–49, the parity progression rate was lower in the urban (-0.0647) than in the rural (-0.051) area.

Figure 7: Rural (r) Urban (u) Observed Parity Progression Ratios by Mother's Age Group and Parity in The Gambia



The standardized current fertility rate per 1,000 women of reproductive age in the urban (131.6) was lower than in the rural area (214.8) (Table 1).

Table 1: Standardized Current Fertility Rate (SCFR) in Rural and Urban Gambia

Age group	Urban ASFR*	Rural ASFR*	Standard population	Expected no of births Urban	Rural
15–19	0.0560	0.1072	8,423	472	903
20–24	0.1424	0.3164	6,844	975	2,165
25–29	0.2388	0.3071	7,203	1720	2,212
30–34	0.2067	0.2948	5,997	1,240	1,768
35–39	0.1495	0.2264	5,406	808	1,224
40–44	0.0594	0.1446	4,057	241	587
45–49	0.0128	0.0318	3,891	50	124
CFR	**0.1363**	**0.2174**	4,1821	5,505	8,983
			SCFR	**0.1316**	**0.2148**

*Note: *Age-specific fertility rate*

The percentage distribution of CEB by sociodemographic characteristics of women according to place of residence is presented in Table 2. There was a significant association between fertility and each of the independent variables (age, level of education, age at first marriage, wealth index, ever use of the modern contraceptive method, marital status, number of marital unions, age at first sexual intercourse, gender preference, and ethnicity) included in the analysis ($p < .001$). The data show that high fertility (CEB ≥ 5) is more common among rural women (32.3%) than their counterparts in the urban (19%). High fertility in rural and urban areas increases consistently with age. Although young women (15–24 years) in both rural and urban areas barely bear at least 5 children, 12.7% and 29.8% of women aged 25–34 years in the urban and rural areas have had high fertility, respectively. Among the women in the age group 35–49 years, the level of high fertility was higher in the rural (80.9%) than in the urban area (56.1%) ($p < .001$). The level of high fertility reduces consistently as the level of education increases in both the rural and urban areas. In the urban area, the high fertility level was 40.6% among women with no formal education compared to 4.1% observed among their counterparts who had higher education. The high fertility pattern displayed by the education level was the same as that exhibited by the wealth index in both the rural and urban areas.

High fertility was more prominent among women who had married more than once than those who married once in both the rural (38.2% vs 53.9%) and urban (26.7% vs 40.3%) areas. In the urban area, the percentage of women with high fertility was 40.1% and 18.0% among women who had their sexual debut at ages below 18 years and at least 18 years, respectively. While in the rural area, 48.1% of women who had their sexual debut at ages below 18 years have high fertility, 28.1% were found among their counterparts who experienced their sexual debut at later ages. The proportion of women with high fertility was higher among women who have a preference for the female gender in both the rural (32.2%) and urban (20.5%) areas than preference for males (rural = 28.9%, urban = 16.1%). The fertility pattern was similar across the major ethnic groups in The Gambia, and this similarity is reflected in both the rural and urban areas. However, in each ethnic group, a higher proportion of women in rural areas have higher fertility rates than those in urban areas. The data further showed that women who belonged to other ethnic groups different from the major ethnic groups in The Gambia (14.3%) had the lowest percentage of women with high fertility in the urban areas; in the rural areas, the least was found among the Jola/Karoninka (20.5%) ethnic group.

Table 2: Percentage Distribution of Fertility (Children Ever Born) by Sociodemographic Characteristics of Women According to Place of Residence

Background Characteristics	Urban		Total No. of Women	Rural		Total No. of Women
	Children Ever Born			Children Ever Born		
	3–4	5 +		3–4	5 +	
Total	18.4 (1,611)	19.0 (1,660)	8,747	18.2 (568)	32.3 (1,008)	3,119
Age			**5,755.6***			**2,477.1***
15–24	3.0 (105)	0.0 (1)	3,557	5.6 (71)	0.2 (3)	1,257
25–34	32.2 (930)	12.7 (366)	2,887	38.8 (381)	29.8 (292)	981
35–49	25.0 (576)	56.1 (1,293)	2,303	13.2 (116)	80.9 (713)	881
Education			**1,839.2***			**626.7***
None	24.9 (600)	40.6 (980)	2,413	18.6 (318)	47.9 (817)	1,706
Primary	23.2 (299)	23.7 (305)	1,289	20.7 (117)	23.0 (130)	564
Secondary	14.3 (603)	8.1 (341)	4,224	15.4 (123)	7.2 (57)	797
Higher	13.3 (109)	4.1 (34)	822	20.4 (10)	4.1 (2)	49
Age at First Marriage			**9,458.4***			**3,258.6***
< 18	29.5 (407)	47.8 (660)	1,381	22.0 (177)	56.6 (456)	806
18–24	31.3 (997)	29.2 (931)	3,185	26.4 (344)	40.2 (524)	1,303
25 +	28.6 (207)	9.5 (69)	724	33.1 (48)	18.6 (27)	145
Wealth Index			**278.5***			**10.8**
Poor	18.6 (259)	30.3 (421)	1,389	18.0 (462)	33.5 (859)	2,568
Middle	19.7 (672)	21.6 (739)	3,414	19.3 (104)	27.3 (147)	538
Rich	17.3 (681)	12.7 (500)	3,946	27.3 (3)	9.1 (1)	11
Ever used Contraceptive Method			**509.9***			**240.3***
No	22.6 (723)	20.9 (667)	3,198	21.8 (332)	31.5 (479)	1,520
Yes	31.8 (888)	35.5 (993)	2,796	24.9 (237)	55.4 (528)	953
Marital Status			**5,155.7***			**1,686.6***
Never Married	0.4 (13)	0.2 (6)	3,059	0.3 (2)	0.6 (4)	645
Ever Married	28.1 (1,598)	29.1 (1,654)	5,687	22.9 (567)	40.6 (1,003)	2,473
Number of Marital Union			**5,286.9***			**173.1***
One	27.3 (1,283)	26.7 (1,255)	4,697	22.6 (477)	38.2 (808)	2,113
More than one	31.7 (314)	40.3 (399)	990	24.9 (90)	53.9 (195)	362
Age at First Sex			**669.0***			**222.6***
< 18	27.7 (726)	40.1 (1,052)	2,623	21.6 (336)	48.1 (749)	1,556
18 +	26.3 (885)	18.0 (607)	3,371	25.4 (233)	28.1 (258)	918
Gender Preference			**34.3***			**20.9****
No preference	18.5 (883)	20.5 (978)	4,781	18.4 (301)	34.9 (571)	1,637
Female	16.0 (158)	20.5 (203)	990	19.5 (46)	32.2 (76)	236
Male	19.2 (570)	16.1 (479)	2,976	17.9 (222)	28.9 (359)	1,243
Ethnicity			**164.8***			**38.6***
Mandinka/Mandé	18.4 (578)	19.5 (613)	3,139	16.3 (134)	31.7 (261)	823
Wolof	18.5 (173)	18.4 (172)	935	19.0 (105)	33.3 (184)	552
Jola/Karoninka	13.8 (163)	19.9 (235)	1,179	19.7 (26)	20.5 (27)	132
Fulani/Fula/Peulh	18.4 (238)	19.1 (247)	1,291	17.9 (155)	34.3 (297)	865
Serahule	17.2 (91)	17.7 (94)	530	21.8 (74)	31.3 (106)	339
Other tribes	17.7 (127)	14.3 (103)	719	13.1 (21)	31.3 (50)	160
Non-Gambians	25.4 (242)	20.5 (195)	953	21.9 (54)	33.2 (82)	247

*Note: *p < .001; **p < .01; Figures in Bold: Chi-square value*

The factors related to fertility in the urban and rural areas are shown in Table 3. The data show that in the urban area, the unadjusted fertility incident rate ratio (uIRR) for women who have no formal education, primary education, and secondary education was 3.587 (95% CI [3.227, 3.986], $p < .001$), 2.412 (95% CI [2.149, 2.707], $p < .001$), and 1.214 (95% CI [1.095, 1.346], $p <$

.001) times higher than the uIRR for women who had higher education respectively. The fertility uIRR was lower among the middle (uIRR = 0.813, 95% CI [0.755, 0.876], $p < .001$) and rich (uIRR = 0.588, 95% CI [0.547, 0.633], $p < .001$) compared to women in the poor wealth index category in the urban area. In the urban (uIRR = 2.737, 95% CI [2.592, 2.889], $p < .001$) area, the uIRR of fertility was higher among women who ever used contraceptives than those who never used any contraceptive method. Women in the urban areas who had no gender preference (uIRR = 1.160, 95% CI [1.096, 1.228], $p < .001$) or preferred female (uIRR = 1.095, 95% CI = 1.003, 1.197, $p < .05$) children had higher uIRR of fertility compared to those who preferred males. The pattern of uIRR of fertility exhibited in the urban area was observed in the rural area.

The pattern of incident rate ratio of fertility exhibited in the unadjusted model was observed for the adjusted model across the identified fertility predictors in urban and rural areas. In the urban areas, the identified fertility predictors were age, education, age at first marriage, marital status, and age at first sex, whereas the identified predictors of fertility were age, age at first marriage, and ever used of contraceptive method in the rural area.

Table 3: Negative Binomial Regression Model for Examining the Determinants of Fertility Among Women Living In The Urban And Rural Areas In The Gambia

Background Characteristics	Urban		Rural	
	Unadjusted model	Adjusted model	Unadjusted model	Adjusted model
	uIRR [95% CI]	aIRR [95% CI]	uIRR [95% CI]	aIRR [95% CI]
Age				
15–24	0.070 [0.065, 0.076]*	0.308 [0.275, 0.345]*	0.096 [0.085, 0.108]*	0.255 [0.219, 0.298]*
25–34	0.473 [0.443, 0.504]*	0.605 [0.563, 0.650]*	0.527 [0.474, 0.585]*	0.590 [0.527, 0.660]*
35–49	1.000	1.000	1.000	1.000
Education				
None	3.587 [3.227, 3.986]*	1.333 [1.152, 1.541]*	3.554 [2.384, 5.299]*	1.565 [0.930, 2.635]
Primary	2.412 [2.149, 2.707]*	1.242 [1.066, 1.447]**	2.016 [1.341, 3.032]**	1.420 [0.837, 2.409]
Secondary	1.214 [1.095, 1.346]*	1.149 [1.001, 1.318]***	1.089 [0.724, 1.637]	1.284 [0.760, 2.169]
Higher	1.000	1.000	1.000	1.000
Age at FM				
< 18	1.000	1.000	1.000	1.000
18–24	0.764 [0.711, 0.820]*	0.954 [0.860, 1.058]	0.793 [0.716, 0.878]*	0.813 [0.719, 0.920]**
25 +	0.519 [0.467, 0.577]*	0.845 [0.719, 0.991]***	0.548 [0.442, 0.680]*	0.484 [0.379, 0.618]*
Wealth Index				
Poor	1.000	1.000	1.000	1.000
Middle	0.813 [0.755, 0.876]*	0.974 [0.879, 1.080]	0.831 [0.741, 0.932]**	0.931 [0.807, 1.075]
Rich	0.588 [0.547, 0.633]*	0.953 [0.851, 1.069]	0.582 [0.246, 1.374]	0.611 [0.230, 1.623]
Ever used Contraceptive Method				
No	1.000	1.000	1.000	1.000
Yes	2.737 [2.592, 2.889]*	1.040 [0.964, 1.122]	2.105 [1.924, 2.304]*	1.146 [1.032, 1.273]***
Marital Status				
Never Married	0.042 [0.038, 0.047]*	0.673 [0.561, 0.806]*	0.034 [0.026, 0.043]*	0.779 [0.516, 1.177]
Ever Married	1.000	1.000	1.000	1.000
Number of Marital Union				
Once	1.000	1.000	1.000	1.000
More than once	0.044 [0.039, 0.050]*	0.987 [0.896, 1.086]	0.029 [0.024, 0.036]*	0.931 [0.809, 1.070]
Age at First Sex				
< 18	1.543 [1.454, 1.638]*	1.114 [1.022, 1.214]***	1.372 [1.247, 1.511]	1.061 [0.933, 1.208]
18 +	1.000	1.000	1.000	1.000

Background Characteristics	Urban		Rural	
	Unadjusted model	Adjusted model	Unadjusted model	Adjusted model
	uIRR [95% CI]	aIRR [95% CI]	uIRR [95% CI]	aIRR [95% CI]
Gender Preference				
No Preference	1.160 [1.096, 1.228]*	1.031 [0.961, 1.107]	1.141 [1.045, 1.246]**	1.036 [0.933, 1.149]
Female	1.095 [1.003, 1.197]***	1.054 [0.942, 1.179]	1.049 [0.879, 1.253]	0.993 [0.806, 1.223]
Male	1.000	1.000	1.000	1.000
Ethnicity				
Mandinka/Mandé	2.556 [2.368, 2.758]*	1.098 [0.990, 1.218]	0.874 [0.735, 1.038]	1.017 [0.831, 1.244]
Wolof	0.865 [0.793, 0.944]**	1.071 [0.937, 1.225]	1.011 [0.846, 1.210]	0.993 [0.810, 1.219]
Jola/Karoninka	0.847 [0.758, 0.946]**	1.056 [0.931, 1.198]	0.684 [0.528, 0.887]**	0.969 [0.697, 1.348]
Fulani/Fula/Peulh	0.812 [0.733, 0.900]*	1.019 [0.904, 1.149]	0.976 [0.823, 1.158]	1.030 [0.846, 1.254]
Serahule	0.856 [0.773, 0.947]**	1.052 [0.882, 1.254]	0.896 [0.735, 1.093]	0.983 [0.780, 1.239]
Other tribes	0.735 [0.638, 0.846]*	1.007 [0.867, 1.169]	0.877 [0.700, 1.098]	1.033 [0.789, 1.352]
Non-Gambians	1.000	1.000	1.000	1.000

*Note: *p < .001; **p < .01; ***p < .05; IRR: Incidence Rate Ratio*

The results of the unadjusted NB regression model for examining the relationship between rural and urban differences in fertility among women in The Gambia are presented in Table 4. The unadjusted model was presented by Model 1, while Model 2 was the adjusted model for demographic characteristics, and Model 3 was the full model. The data show that the uIRR was 1.440 (95% CI [1.371, 1.513], $p < .001$) times higher in the rural areas than the urban areas. A similar fertility pattern, but with reduced IRR, was observed in the adjusted models. In Model 2, all the demographic variables (residence, age, age at first marriage, marital status, and age at first sex) included in the model were fertility predictors. In the full model, the fertility predictors were age, education, wealth index, age at first marriage, marital status, ever use of contraceptive, and age at first sex. Although, in this model, there was no significant difference in fertility between the rural and urban areas; the fertility IRR was found to be 6.3% (95% CI [0.979, 1.155], $p > .05$) higher in the rural than in urban areas.

Table 4: Negative Binomial Regression Model for Examining the Determinants of Fertility among Women Living in The Gambia

Background Characteristics	Model 1	Model 2	Model 3 (Full Model)
	uIRR [95% CI]	aIRR [95% CI]	aIRR [95% CI]
Residence			
Urban	1.000	1.000	1.000
Rural	1.440 [1.371, 1.513]*	1.183 [1.123, 1.245]*	1.063 [0.979, 1.155]
Age			
15–24	0.078 [0.073, 0.084]*	0.257 [0.238, 0.278]*	0.287 [0.262, 0.314]*
25–34	0.487 [0.461, 0.514]*	0.575 [0.545, 0.608]*	0.599 [0.565, 0.636]*
35–49	1.000	1.000	1.000
Education			
None	3.711 [3.362, 4.097]*		1.357 [1.182, 1.557]
Primary	2.346 [2.107, 2.612]*		1.248 [1.081, 1.440]**
Secondary	1.206 [1.092, 1.333]*		1.151 [1.008, 1.313]***
Higher	1.000		1.000
Age at First Marriage			
< 18	1.000	1.000	1.000
18–24	0.766 [0.723, 0.812]*	0.819 [0.767, 0.875]*	0.848 [0.787, 0.913]*
25 +	0.512 [0.466, 0.562]*	0.495 [0.443, 0.553]*	0.540 [0.481, 0.607]*
Wealth Index			
Poor	1.000		1.000
Middle	0.778 [0.737, 0.820]*		0.910 [0.852, 0.973]**

Background Characteristics	Model 1 uIRR [95% CI]	Model 2 aIRR [95% CI]	Model 3 (Full Model) aIRR [95% CI]
Rich	0.554 [0.525, 0.585]*		0.833 [0.773, 0.898]*
Ever used Contraceptive Method			
No	1.000		1.000
Yes	2.489 [2.377, 2.607]*		1.150 [1.089, 1.215]*
Marital Status			
Never Married	0.039 [0.036, 0.043]*	0.616 [0.525, 0.724]*	0.700 [0.594, 0.825]*
Ever Married	1.000	1.000	1.000
Number of Marital Union			
Once	1.000		1.000
More than once	0.972 [0.831, 1.238]		0.939 [0.874, 1.009]
Age at First Sex			
< 18	1.524 [1.450, 1.602]*	1.136 [1.065, 1.212]*	1.099 [1.023, 1.180]***
18 +	1.000	1.000	1.000
Gender Preference			
No Preference	1.131 [1.079, 1.186]*		1.032 [0.974, 1.094]
Female	1.028 [0.950, 1.112]		1.039 [0.941, 1.146]
Male	1.000		1.000
Ethnicity			
Mandinka/Mandé	0.865 [0.801, 0.935]*		1.084 [0.989, 1.188]
Wolof	0.972 [0.886, 1.065]		1.056 [0.948, 1.176]
Jola/Karoninka	0.773 [0.704, 0.850]*		1.039 [0.925, 1.167]
Fulani/Fula/Peulh	0.963 [0.884, 1.048]		1.040 [0.942, 1.149]
Serahule	0.869 [0.779, 0.971]***		1.042 [0.913, 1.188]
Other tribes	0.759 [0.682, 0.843]*		1.017 [0.893, 1.158]
Non-Gambians	1.000		1.000

*Note: *p < .001; **p < .01; ***p < .05; IRR: Incidence Rate Ratio; aIRR: adjusted Incidence Rate Ratio*

Table 5 shows the decomposition of factors responsible for the rural-urban difference in fertility in The Gambia. The essence of decomposition is to ascertain the contribution of each factor to the difference observed in the rural-urban fertility in The Gambia. The standardized crude fertility rate was higher in the rural (214.8 per 1,000 women of reproductive age) than in urban (131.6 per 1,000 women of reproductive age) areas. The difference between the standardized crude fertility rates in rural and urban areas was 83.2 births per 1,000 women of reproductive age, and the age composition contributed 8.11% to this difference. However, across all the age groups, the age group 20–24 years contributed the highest percentage to this difference (2.63%), while the age group 15–19 years contributed 1.24%. Education contributed 11.5% to the fertility difference in the urban and rural areas. The contribution to the difference in fertility rate between the urban and rural areas is consistently reduced as the level of education increases (Table 5).

Table 5: Decomposition of Factors Attributable to Rural-Urban Difference in Fertility

Background Variables	Urban ASFR	C^U	Rural ASFR	C^R	$F_i^R - F_i^U$	$\frac{F_i^R + F_i^U}{2}$	$C_i^R - C_i^U$	$\frac{C_i^R + C_i^U}{2}$	AI
Age									**0.0811**
15–19	0.0560	0.2221	0.1072	0.2317	0.0512	0.0816	0.0096	0.2269	0.0124
20–24	0.1424	0.1834	0.3164	0.1658	0.174	0.2294	-0.0176	0.1746	0.0263
25–29	0.2388	0.1885	0.3071	0.1806	0.0683	0.27295	-0.0079	0.1845	0.0104
30–34	0.2067	0.1382	0.2948	0.1356	0.0881	0.25075	-0.0027	0.1369	0.0114
35–39	0.1495	0.1223	0.2264	0.1287	0.0769	0.18795	0.0064	0.1255	0.0108
40–44	0.0594	0.0854	0.1446	0.093	0.0852	0.102	0.0076	0.0892	0.0084
45–49	0.0128	0.0601	0.0318	0.0646	0.0190	0.0223	0.0046	0.0623	0.0013

Background Variables	Urban ASFR	C^U	Rural ASFR	C^R	$F_i^R - F_i^U$	$\frac{F_i^R + F_i^U}{2}$	$C_i^R - C_i^U$	$\frac{C_i^R + C_i^U}{2}$	AI
Education									**0.1146**
None	0.1756	0.2966	0.2355	0.5662	0.0599	0.2056	0.2696	0.4314	0.0813
Primary	0.1680	0.1490	0.2226	0.1871	0.0546	0.1953	0.0381	0.1681	0.0166
Secondary	0.1113	0.4707	0.1727	0.2336	0.0614	0.1420	-0.2370	0.3521	0.0120
Higher	0.0807	0.0837	0.1571	0.5662	0.0764	0.1189	-0.0706	0.0484	0.0047
Age at First Marriage									**0.0926**
< 18	0.1729	0.1653	0.2768	0.2665	0.1039	0.2249	0.1012	0.2159	0.0452
18–24	0.2423	0.3671	0.3106	0.4215	0.0683	0.2765	0.0543	0.3943	0.0420
25 +	0.2276	0.0823	0.2971	0.0446	0.0695	0.2624	-0.0377	0.0635	0.0055
Wealth Index									**0.2317**
Poor	0.1825	0.1490	0.2206	0.8321	0.0381	0.2016	0.6831	0.4906	0.1564
Middle	0.1514	0.4283	0.2043	0.1645	0.0529	0.1779	-0.2637	0.2964	0.0312
Rich	0.1047	0.4227	0.0556	0.0034	-0.0491	0.0802	-0.4194	0.2130	0.0441
Ever used Contraceptive Method									**0.0811**
No	0.1134	0.6813	0.1983	0.7044	0.0849	0.1559	0.0231	0.6928	0.0624
Yes	0.1851	0.3187	0.2628	0.2956	0.0777	0.2240	-0.0231	0.3072	0.0187
Marital Status									**0.0811**
Never Married	0.0177	0.3381	0.0312	0.1914	0.0135	0.0245	-0.1467	0.2648	0.0000
Ever Married	0.1968	0.6619	0.2614	0.8086	0.0646	0.2291	0.1467	0.7352	0.0811
Age at First Sex									**0.0811**
No Sex	0	0.3069	0.0000	0.1948	0.0000	0.0000	-0.1121	0.2508	0.0000
< 18	0.187	0.3181	0.2663	0.5154	0.0794	0.2266	0.1973	0.4168	0.0778
18 +	0.205	0.3750	0.2764	0.2898	0.0716	0.2406	-0.0851	0.3324	0.0033
SCFR	**0.1316**		**0.2148**						

Note: F_i^R is the fertility rate in the rural; F_i^U is the fertility rate in the urban; C_i^R is the proportion of women in the rural; C_i^U is the proportion of women in the urban; AI: Attributable Index; SCFR: Standardized crude fertility rate.

Discussion

The recent reduction in the fertility rate in The Gambia indicates that fertility transition has commenced in the country. The fertility level in the urban and rural areas was 3.9 and 5.9 per woman, respectively, if the current age-specific fertility schedule is sustained throughout her reproductive years. The vast rural-urban difference in the fertility level in the country raised the question of why such striking disparity exists in such a small country. This study found that age composition contributed about 8% to this difference. However, women in the 20–24 age group mainly contributed to this difference in fertility, followed by those in the age group 15–19 years. The pattern observed in the current study was similar to that of a study conducted in Uganda (Ariho et al., 2018). Our finding may result from low age at first marriage in The Gambia. Also, women in the age group 15–24 years are most likely to be more active in childbearing than other age groups in the reproductive age years.

Higher literacy levels, proximity to fertility control measures, and better access to FP information in urban areas than rural areas are other possible reasons for the wide gap in rural-urban fertility in The Gambia. Cultural norms that disallow fertility preventive practices might be more prominent in the rural areas of The Gambia than in the urban areas. Some women in The Gambians believe that the use of contraceptives is sinful, and pregnancy prevention is often likened to manslaughter. In The Gambia, rural dwellers consider

childbirth a vital source of social value and a means of securing future protection against community assailants. Preference for male children is still more dominant in rural areas than in urban areas. Therefore, health education programs that could erode these cultural instincts among others, particularly in the rural communities, might bridge the rural-urban fertility gap in The Gambia. Although, to the best of our knowledge, The Gambian government does not have official policies on fertility, improving access to family planning and reproductive health services in rural areas can reduce unwanted pregnancies and subsequently reduce fertility in the country.

Age is an important demographic factor associated with fertility. Older women have a longer duration of exposure to the risk of pregnancy compared to younger women if they begin childbearing comparatively at the same time. We found higher mean fertility in rural areas than urban areas across all age cohorts of women of reproductive age in the Gambia. Thus, the standardized fertility rate at the aggregate level for all women aged 15–49 years was higher in the rural than the urban. This finding is consistent with the outcome of similar studies conducted in West Africa and other parts of sub-Saharan Africa (Adebowale, 2019; Lerch, 2019). Higher fertility in rural than urban areas across age cohorts may be connected with a higher proportion of girls enrolled in formal education and more literate women in the urban area (Ministry of Basic and Secondary Education & UNICEF The Gambia, 2017). Pursuing professional and career goals may postpone marriage and childbearing among urban women, and such professional aspirations keep women focused on learning. These attributes reduce the years of exposure to the risk of childbearing among women. This does not suggest that women living in urban areas do not engage in sexual intercourse; however, this population has better awareness and access to contraceptive services compared to their counterparts living in rural areas (GBoS & ICF, 2021).

This study found that a higher proportion of women living in rural areas had their first birth at ages 10–14 years compared to urban dwellers. This pattern remains consistent across all age cohorts of women in their reproductive years in The Gambia. A similar pattern has been established by earlier studies conducted in West Africa and elsewhere worldwide (Bolarinwa et al., 2023; Fagbamigbe & Idemudia, 2016; Negash & Asmamaw, 2022). Rural Gambia is characterized by low literacy levels, food insecurity, poor access to healthcare, and lack of economic diversity, all culminating in multidimensional poverty. The United Nations Development Program's human development index ranked Gambia as the 174th poorest country out of 193 worldwide (United Nations Development Programme [UNDP], 2024). The fact that three-fifths of women in the country are uneducated highlights the extent of women's vulnerability to the risk of early childbearing. It is also clear that low levels of education continue to be a major problem, with slight improvement nationwide, particularly among rural women. Due to the multi-phased vulnerability and minimal employment and educational opportunities in rural areas, rural women are more frequently exposed to sex and have higher chances of an unintended pregnancy compared to urban women. Rural women are also at a higher risk of early sexual debut, early marriage, and early childbearing compared to urban women (Adebowale, 2018; Fagbamigbe & Idemudia, 2016).

Demographically, it is expected that most women in the age group 45–49 years have completed childbearing, and a considerable proportion of such women are menopausal (Agaba et al., 2017); this study revealed an interesting finding concerning how women progress from one parity to the other. While 67% of women who have had four births progressed to have their fifth birth in the urban area, 91% of such women were found in the rural area. Across all the age groups, the parity progression ratio from lower to higher order birth was higher in the rural areas than in the urban. In summary, urban women had a slower

parity progression rate than their counterparts in rural areas. These findings agree with the outcome of a previous study conducted in Nigeria (Adebowale & Palamuleni, 2014). Higher progression in childbearing observed in the rural than urban Gambia could be attributed to poor access to healthcare services and reproductive health information, particularly those that are relevant to birth control. A previous study has shown that rural women in The Gambia do not understand reproductive life planning and have higher unmet needs for FP (Yaya et al., 2021). The passive tendency of government policies on sexual and reproductive health rights of women and girls is an essential factor to consider in the parity progression difference in The Gambia (Yaya et al., 2021). Thus, more women in rural areas are likely to be at risk of sexual and unwanted pregnancy compared to women in urban Gambia.

Contraception helps the family to achieve their desired family size and reduces the risks of unintended pregnancy. There are many barriers to contraceptive uptake, particularly among rural women in The Gambia, including financial constraints, stigma, and misconceptions, and such barriers have been reported among women in Kenya and Uganda (Ochako et al., 2015; Potasse & Yaya, 2021). Awareness and access to contraceptive services can improve child spacing and help women retain their professional relevance (Ezenwaka et al., 2020). Although the contraceptive prevalence rate is low in The Gambia, the lifetime prevalence is lower in rural areas than in urban areas. However, the finding from this study deviates from what is expected as a higher incidence of fertility was found among women who had ever used contraceptives in their lifetime than those with no history of contraceptive use. This pattern was observed in both the rural and urban areas. There is no doubt that more women who have attained their desired fertility or already had high fertility might have resorted to using contraceptives to halt or space childbearing. Therefore, the women may have had many childbirths before they opted for a contraceptive method. The observed relationship between fertility and ever use of contraceptives found in this study has been established in the literature (Adebowale et al., 2020; Ariho et al., 2018). There are rumors that women on contraceptives may be unable to get pregnant when they desire. Thus, women in The Gambia, most especially those living in rural areas, might wish to postpone contraceptive uptake until they have achieved their desired number of children. It is, therefore, essential to conduct focused social interventions to address these misconceptions and promote early uptake of contraceptives in The Gambia.

The determinants of fertility in the urban area included age, education, age at first marriage, marital status, and age at first sex, whereas, in the rural area, they are age, age at first marriage, and ever use of contraceptive methods. The fertility predictors in the rural and urban Gambia corroborate earlier findings in many settings (Adebowale, 2019; Bongaarts & Hodgson, 2022). Among urban women in The Gambia, older age (≥ 25 years) was a significant predictor of fertility. This alludes to the fact that only very few urban women give birth below the age of 25 compared to their counterparts in the rural areas, who predominantly had their first birth by age 25. As revealed by the parity progression analysis, many women in rural areas began childbearing as adolescents and continued until they were in their late thirties or early forties. At this stage, children born to these women become sexually mature and start getting pregnant. Often, mothers of these children prevent sexual relationships with their husbands to avoid getting pregnant and to be available to provide motherly care to their expectant children. In both urban and rural areas of The Gambia, the incidence risk ratio of fertility among women reduces as the level of education of women increases. This is the dominant relationship pattern between fertility and education in the literature (Adebowale, 2019; Adebowale & Palamuleni, 2014; Kim, 2010; Liu & Raftery, 2020). Better job opportunities, marriage postponement, empowerment, and financial autonomy among the more educated women are the crucial factors often responsible for the observed pattern.

The Gambian Government instituted a National Reproductive Health policy to address, among others, the increasing high-risk behavior leading to premarital sexual encounters, early marriage, unintended/unwanted pregnancies, health and social consequences of school dropout, and low level of utilization of contraceptives (Department of State for Health [The Gambia], 2007). This policy emphasized that health resources should be equitably distributed, giving preference to those at greater health risk and the underserved communities as a means of social justice and concern. Revising this policy might include improving socioeconomic outcomes by focusing on women's empowerment, improving females' education, and providing access to reproductive health services, particularly in rural areas, to reduce fertility. Ensuring the age at marriage and birth spacing of at least 18 years and 24 months, respectively, for women, increasing family planning information, and making contraceptive supplies available are possible strategies for fertility reduction in The Gambia.

Aside from the cross-sectional design approach used for data collection, this study cannot be isolated from the common limitation of using secondary data because the data used was not primarily designed to be gathered for the study. The recommendation by the data originator that the data can be used for fertility analysis and the use of a nationally representative sample remains the strength of this study (GBoS & ICF, 2021). Qualitative research that focuses mainly on exploring the contextual factors influencing fertility in both rural and urban areas is thus recommended.

Conclusion and recommendation

Fertility and childbearing progression were higher in rural areas than in urban areas, and rural-urban differences exist in the determinants of fertility in The Gambia. Age composition contributed hugely to the difference in the observed fertility rate in the rural and urban areas. Early marriage, early childbearing, and contraceptive use were drivers of fertility among women in rural areas, whereas, in the urban areas, low educational attainment, early marriage, being married, and early sexual debut are the predictors. However, at the national level, the determinants of fertility in The Gambia are age, education, age at first marriage, wealth index, ever-used contraceptive, marital status, and age at first sex. While literacy intervention and school enrolment programs among girls should be improved in The Gambia, priority should be given to rural girls. The government should devise mechanisms that promote marriage postponement and discourage child marriage in rural areas. Education and cultural strategies should be implemented to correct misconceptions about contraceptive use to facilitate early adoption and use. Overall, rural-urban-specific fertility reduction programs should be implemented to address the observed fertility difference in the country.

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