**ORIGINAL RESEARCH ARTICLE**

# Exploring fertility preferences among women aged 15-24 in the Democratic Republic of Congo

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## Abstract

The DRC has one of the highest fertility rates globally, yet research on fertility preferences in the country remains limited. This study aims to identify the factors contributing to the persistence of high fertility preferences among young and adolescent women (15-24) in the DRC. Using data from the 2013-2014 DHS, the study examines fertility preferences by transition stage. Multinomial logistic regression analysis is used to identify the characteristics associated with mid- (4-5 children) and pre-transitional (6+ children) as opposed to post-transitional (0-3 children) preferences. Results reveal that 43% of the women prefer 6+ children. The relative risk of fertility preference varies significantly based on characteristics such as age, literacy, place and province of residence, religion, employment status, wealth, acceptance of domestic violence, and knowledge of modern family planning methods. The findings provide evidence for both the diffusion and socio-economic theory of fertility decline. *(Afr J Reprod Health 2023; 27 [7]: 13-22).*

**Keywords:** Fertility preferences; Multinomial logistic regression analysis; Democratic Republic of Congo; Adolescent and young women; Fertility transition

## Résumé

La RDC a l'un des taux de fécondité les plus élevés au monde, mais les recherches sur les préférences en matière de fécondité dans le pays restent limitées. Cette étude vise à identifier les facteurs contribuant à la persistance de préférences élevées en matière de fécondité chez les jeunes et les adolescentes (15-24 ans) en RDC. À l'aide les données de l'EDS 2013-2014, l'étude examine les préférences de fécondité par étape de transition. L'analyse de régression logistique multinomiale est utilisée pour identifier les caractéristiques associées aux préférences mi-transition (4-5 enfants) et pré-transition (6+ enfants) par rapport aux préférences post-transition (0-3 enfants). Les résultats révèlent que 43% des femmes préfèrent avoir 6+ enfants. Le risque relatif des préférences en matière de fécondité varie significativement en fonction de caractéristiques telles que l'âge, l'alphabétisation, le milieu et la province de résidence, la religion, le statut d'emploi, la richesse, l'acceptation de la violence domestique et la connaissance les méthodes modernes de contraception. Les résultats fournissent des preuves de la théorie de la diffusion et de la théorie socio-économique du déclin de la fécondité. *(Afr J Reprod Health 2023; 27 [7]: 13-22).*

**Mots-clés:** Préférences en matière de fécondité; Régression logistique multinomiale; République démocratique du Congo; Adolescentes et jeunes femmes; Transition de la fécondité

## Introduction

Despite declining fertility rates in most sub-Saharan African countries, the Democratic Republic of Congo (DRC) continues to exhibit one of the highest fertility rates globally[1]. Between 1955 and 2014, the total fertility rate (TFR) increased from 5.9 children per woman to an average of 6.6[2,3]. Although some regions like Kinshasa have recently seen a decline in fertility, with an average of 4.2 children per woman, most provinces have reached a plateau where high rates persist[2,3]. The stagnant fertility transition in the DRC is attributed to various interrelated factors, including the prolonged state of conflict, political and economic instability, and external exploitation, leading to a lack of family planning services and high levels of unmet need for family planning[3–8].

Although several studies highlighted the importance of understanding fertility preferences in comprehending the fertility transition[9–12], research on fertility preferences in the DRC is limited[3,5,13,14]. Longitudinal studies demonstrated that understanding fertility preferences

complements the ability to predict future fertility patterns and found a strong correlation between the percentage of women who want to stop childbearing and both the prevalence of contraceptive use and realized fertility[10,12,15]. Moreover, it has been established that the acceptance of family size limitation is crucial to achieve a sustained fertility decline[5,16,17]. Despite these findings, there is no consensus on why high family sizes and preferences prevail. There are two opposing theories: economic and diffusionist theories.

According to economic theories, as societies modernize, the economics of having children shift in a way that makes having many children disadvantageous for parents[18]. Most prominent in this school of thought is the traditional demographic theory[19-21], which states that macroeconomic development causes a shift from high to low mortality and fertility rates. This perspective attributes the decline of fertility to the growth of industrial and urban societies which lead to improved education and employment opportunities, healthcare, and access to family planning, ultimately dismantling the traditional values that support high fertility preferences and changing attitudes toward the value of children and childbearing[18-21]. Microeconomic theories[22-24] emphasize the supply-demand dynamics and argue that reduced demand for children is the main driving force behind the fertility transition. Fertility preferences decline because of shifting opportunity costs of childbearing, as children are seen as more valuable for providing labor and security in old age in areas with limited economic opportunities or growth, while high child and infant mortality leads parents to have more children to replace child losses[25].

In contrast, diffusion and ideational change theories argue that the spread of new ideas about fertility control is the primary driver of a decline in preferred family size[17,18,26-28]. While there are slight variations within this theory, the overarching idea is that new values and behaviors become more prevalent through the spread from one individual to another or through larger outlets such as mass media or opinion leaders[17]. A decline in preferred family size is seen as a reflection of the spread of new attitudes and behaviors - usually new contraceptive technology - rather than a response to structural societal changes[29]. The accuracy of the diffusion framework in predicting the timing of fertility transition is lower than that of the traditional demographic transition theory, but it has been referred to as the driving force of fertility decline and many studies have demonstrated its significant role in transitioning countries[28-32].

Regardless of the specific causes of fertility transition, fertility preference is influenced by a number of factors. Improvements in female education and women's empowerment have been identified as the most prominent determinants in reducing the demand for children [33-39]. Education can both dismantle traditional cultural norms that support high fertility preferences and provide women with the knowledge and understanding to recognize the benefits of having fewer children and access family planning services[17,28,36]. Women's empowerment is associated with fertility preference due to gender inequalities in reproductive decision-making. Studies have consistently found that women with greater decision-making power within the household and those who hold more egalitarian gender-role attitudes tend to prefer fewer children[33,34,40-42]. Studies have also shown that women who are religious tend to desire larger families[35,38], whereas those with knowledge of modern family planning methods generally express lower fertility preferences[12,38,42,43]. A high desired family size is correlated with certain demographic factors, such as belonging to older generations, having living children, and having experienced the loss of a child[12,35,37]. Some studies have observed intergenerational patterns, demonstrating that women who grew up with more siblings tend to prefer larger families themselves[12,35,44].

Although assessing fertility preferences is essential for predicting future fertility trends and identifying the need for family planning, the measurement of fertility preferences and the assessment of their implications have been subject to debate. This debate mainly revolves around the validity and reliability of survey responses to questions on desired family size, desire to continue childbearing, and the wanted status of past births[10,42,45]. Retrospective data on whether recent births were desired at the time of conception are considered unreliable due to recall bias and discomfort to report that children were mistimed or unwanted at conception[15], which can lead to rationalization ex post. This means that women

may adjust their family size preference to match their actual number of children, particularly if they have had unwanted births [45]. To minimize the chances of this upward adjustment due to rationalization and recall bias, this study focusses on young and adolescent women aged 15 to 24.

This study aims to investigate potential correlations between demographic, socio-economic, and cultural factors and the ideal family size of Congolese adolescents and young women. This demographic is at a crucial point in their reproductive lives and understanding their preferences can provide valuable insight into upcoming fertility trends. Bongaarts'[11] fertility transition stages will serve as the framework for identifying the characteristics of those who prefer a higher ideal family size (pre- transitional fertility) and those who prefer a lower ideal family size (post-transitional fertility).

## Methods

### *Data and measures*

A cross-sectional study design was employed to determine the factors associated with fertility preferences of young and adolescent women. Data derives from the 2014 Democratic Republic of Congo Demographic and Health Survey (CDHS). The CDHS is a multi-stage stratified cluster sample. Results are representative at the level of each of the twenty-six provinces, with each province being a study area. Within these study areas, three strata were created: the statutory city stratum, the city stratum, and the rural stratum. The sample consists of 18,360 households in 540 clusters, including 5,474 urban households and 12,886 rural households. Within these households, a total of 19,097 women (aged 15-49) were selected, of which 18,827 were successfully interviewed. This study focuses on women aged 15 to 24. After carrying out the necessary exclusion criteria, i.e., excluding women who had missing data (5.95%), a total of 7,205 women were included in the analysis.

The outcome variable of this study is fertility preference. To determine fertility preference all women were asked how many children they would want. The answers were grouped into three categories corresponding to the transition stages: women who desire to have no to three children were classified as preferring post-

transitional fertility, as their preference comes close to replacement level fertility (2.1 children per woman). Women desiring four to five children were grouped into the mid-transitional fertility category, while those who prefer to have six or more children were grouped in the pre-transitional fertility stage as they are not yet in, or at the beginning of fertility transition.

The explanatory variables entail a range of demographic, socio-economic, and cultural variables. Demographic variables include age (15-19; 20-24), living children (no living children; one or more living children), loss of child, number of siblings (0-3; 4-5; 6+), and place (urban; rural) and province of residence (Kinshasa; Bas-Congo; Bandundu; Equateur; Orientale; North Kivu; South Kivu; Maniema; Katanga; Kasaï Oriental; and Kasaï Occidental). Socio-economic variables include household wealth (from wealth index: poorest; poorer; average; richer; richest), employment status (currently working or had worked in the 12 months prior to the survey; not employed), and literacy (can read a complete sentence; cannot or partly read a sentence). Rather than using educational attainment as a variable, this study includes literacy as an indicator of language and numerical abilities because the study population is comprised of young women who may not have completed their education yet. Moreover, despite relatively high educational attainment among women in the DRC, low public funding has limited the quality of education, resulting in less than half of those with six years of schooling having full reading skills[5,46]. The cultural variables considered in this study include religion (Catholic; Protestant; other Christian (Revivalist Church); Muslim; other religions (Vuvamu, Animist, Salvation Army, Kimbanguist, Bundu dia kongo); no religion), knowledge of family planning (no knowledge or knowledge of traditional methods; knowledge of modern methods), and attitude towards partner violence. Women were considered to have an attitude that justifies partner violence ("wife beating") if they responded affirmatively at least once to the following statements: "Is it right for a man to beat his wife in the following five circumstances? (i) she burns the food; (ii) she quarrels with her partner; (iii) she leaves the house without telling her partner; (iv) she neglects the children; and (v) she refuses to have sex with him?".

### *Statistical analyses*

The data analyses for this study were conducted in STATA 17.0 (STATA Statistical Software: Release 17, StataCorp LP, College Station, TX). Sample weights were applied to correct for cluster sampling. The analysis involved two main steps. In the first step, bivariate associations between fertility preference and the explanatory variables were examined to present the distribution of respondents by their fertility preference transition stage. Pearson's chi-square tests were used to test for significance. In the second step of the analysis, we used a multinomial logistic regression model (multinominal logit) to calculate the relative risk of the association between fertility preference and the explanatory variables. This modelling technique allowed us to assess the influence of independent variables on the nominal outcome variable (fertility preference in three categories), while accounting for the clustered nature of the DHS data[47]. The adjusted relative risk ratio (RRR) with 95% confidence interval (CI) was calculated. As our outcome variable had three categories (pre-, mid-, and post-transitional fertility), and our base outcome was post-transitional fertility, we defined two equations:

$$\ln \frac{P(Yi=1)}{P(Yi=K)} = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \cdots + \varepsilon$$

$$\ln \frac{P(Y2=2)}{P(Y2=K)} = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \cdots + \varepsilon,$$

where: $\ln \frac{P(Yi=1)}{P(Yi=K)}$ represents the log odds of choosing pre-transitional fertility ($Yi = 1$), when the reference category is K (post-transitional fertility), and $\ln \frac{P(Y2=2)}{P(Yi=K)}$ is the log odds of choosing mid-transitional ($Y2 = 2$) when the reference category is K; $\beta_0$ is the intercept coefficient; $\beta_1$ and $\beta_2$ indicate the coefficients of independent variables $X_1$, $X_2$, ... (i.e., age, living children, loss of child, number of siblings, place of residence, province of residence, household wealth, employment status, literacy, religion, knowledge of family planning, attitude towards partner violence). The multinomial logit coefficients were exponentiated to obtain relative risks ratios.

## Results

The results of the descriptive analysis are presented in Table 1. Of all adolescent women, 16% prefer to have no to three children (post-transitional fertility), 41% prefer to have four to five (mid-transitional fertility), and 43% prefer to have six or more children (pre-transitional fertility). Women in youngest age category mostly prefer to have four to five children (41%), while women in the older age category prefer having six or more children (46%). Women who have children tend to prefer pre-transition fertility (49%), while women without children lean more towards mid-transition fertility (42%). Women who have experienced the loss of one or more children prefer pre-transition fertility (61%). Women who grew up in a smaller family mostly prefer mid-transitional fertility (42% and 43%), whereas women who grew up in a larger family predominantly prefer pre-transitional fertility (48%). Regarding place and province of residence, women living in urban areas tend to prefer mid-transitional fertility (49%) while those in rural areas prefer pre-transitional fertility (53%). Women living in Kinshasa (56%), Bandundu (50%), Bas-Congo (58%), Equateur (45%), North Kivu (43%), and Orientale (48%) predominantly prefer mid-transitional fertility. Pre-transitional fertility is preferred by women living in the provinces Kasaï Occidental (69%), Kasaï Oriental (63%), Katanga (62%), Maniema (44%), and South Kivu (64%). Slight differences in fertility preferences can be observed according to the wealth index, with those in the poorest (56%), poor (52%) and mid (46%) categories predominantly preferring six or more children and those belonging to the rich (54%) and richest (42%) groups preferring four to five children. Unemployed women mostly prefer four to five children (44%), while employed women predominantly prefer six or more children (49%). Literacy appears the most distinctive characteristic, with most illiterate women preferring pre-transitional fertility (56%). Religion also generates some slight differences, with Catholic (43%) and Other Christian women (43%) mostly preferring mid-transitional fertility and Protestant (48%), Muslim (50%), other (49%), and no religion (55%) women preferring pre-transitional fertility. Women who justify "wife beating" mostly prefer six or more children (45%). Finally, women who do not have any knowledge of modern methods mostly prefer six or more children (51%), and women who do have knowledge prefer mid- (43%) and pre-transitional (41%) fertility. Table 2 displays the results of the multinomial

**Table 1:** Fertility preference by socioeconomic and demographic characteristics

|  | Post-transition (0-3) | Mid-transition (4-5) | Pre-transition (6+) | N |
|---|---|---|---|---|
| **Total** | 1,167 (16.2%) | 2,962 (41.1%) | 3,076 (42.7%) | 7205 |
| **Age** |  |  |  |  |
| 15-19 | 737 (19.7%) | 1,532 (41.0%) | 1,464 (39.2%) | 3,733 |
| 20-24 | 430 (12.4%) | 1,430 (41.2%) | 1,612 (46.4%) | 3,472 |
| **Children** |  |  |  |  |
| No | 790 (19.8%) | 1,685 (42.3%) | 1,513 (37.9%) | 3,988 |
| Yes | 377 (11.7%) | 1,277 (39.7%) | 1,563 (48.6%) | 3,217 |
| **Child lost** |  |  |  |  |
| No | 1,125 (16.7%) | 2,820 (41.9%) | 2,788 (41.4%) | 6,733 |
| Yes | 42 (8.9%) | 142 (30.1%) | 288 (61.0%) | 472 |
| **Siblings** |  |  |  |  |
| 0-3 | 273 (19.4%) | 587 (41.8%) | 545 (38.8%) | 1,405 |
| 4-5 | 488 (18.3%) | 1,146 (42.9%) | 1,038 (38.9%) | 2,672 |
| 6+ | 406 (13.0%) | 1,229 (39.3%) | 1,493 (47.7%) | 3,128 |
| **Wealth** |  |  |  |  |
| Richest | 424 (26.4%) | 862 (53.7%) | 318 (19.8%) | 1,604 |
| Rich | 210 (15.5%) | 573 (42.4%) | 570 (42.1%) | 1,353 |
| Mid | 185 (13.6%) | 549 (40.4%) | 625 (46.0%) | 1,359 |
| Poor | 169 (12.7%) | 468 (35.1%) | 697 (52.3%) | 1,334 |
| Poorest | 179 (11.5%) | 510 (32.8%) | 866 (55.7%) | 1,555 |
| **Employment** |  |  |  |  |
| Not | 653 (21.5%) | 1,349 (44.5%) | 1,033 (34.0%) | 3,035 |
| Yes | 514 (12.3%) | 1,613 (38.7%) | 2,043 (49.0%) | 4,170 |
| **Literacy** |  |  |  |  |
| Yes | 823 (18.8%) | 2,066 (47.1%) | 1,496 (34.1%) | 4,385 |
| No | 344 (12.2%) | 896 (31.8%) | 1,580 (56.0%) | 2,820 |
| **Religion** |  |  |  |  |
| Catholic | 426 (19.1%) | 959 (43.1%) | 841 (37.8%) | 2,226 |
| Protestant | 283 (14.3%) | 751 (37.9%) | 946 (47.8%) | 1,980 |
| Other Christian | 401 (15.7%) | 1,085 (42.6%) | 1,064 (41.7%) | 2,550 |
| Muslim | 11 (9.8%) | 45 (40.2%) | 56 (50.0%) | 112 |
| Else | 37 (12.6%) | 111 (37.9%) | 145 (49.5%) | 293 |
| No | 9 (20.5%) | 11 (25.0%) | 24 (54.6%) | 44 |
| **Beating** |  |  |  |  |
| Not justified | 361 (20.2%) | 762 (42.7%) | 663 (37.1%) | 1,786 |
| Justified | 806 (14.9%) | 2,200 (40.6%) | 2,413 (44.5%) | 5,419 |
| **Knowledge** |  |  |  |  |
| No | 195 (17.5%) | 349 (31.4%) | 568 (51.1%) | 1,112 |
| Yes | 972 (16.0%) | 2,613 (42.9%) | 2,508 (41.2%) | 6,093 |
| **Place** |  |  |  |  |
| Urban | 666 (23.4%) | 1,409 (49.5%) | 772 (27.1%) | 2,847 |
| Rural | 501 (11.5%) | 1,553 (35.6%) | 2,304 (52.9%) | 4,358 |
| **Province** |  |  |  |  |
| Kinshasa | 231 (32.0%) | 404 (55.9%) | 88 (12.2%) | 723 |
| Bandundu | 156 (17.6%) | 449 (50.7%) | 280 (31.6%) | 885 |
| Bas-Congo | 82 (25.3%) | 188 (58.1%) | 54 (16.7%) | 324 |
| Equateur | 189 (19.3%) | 439 (44.8%) | 351 (35.9%) | 979 |
| Kasaï-Occidental | 42 (7.8%) | 124 (22.9%) | 376 (69.4%) | 542 |
| Kasaï-Oriental | 59 (7.2%) | 240 (29.4%) | 517 (63.4%) | 816 |
| Katanga | 68 (7.9%) | 260 (30.0%) | 538 (62.1%) | 866 |
| Maniema | 61 (17.5%) | 133 (38.2%) | 154 (44.3%) | 348 |
| North Kivu | 77 (15.5%) | 216 (43.4%) | 205 (41.2%) | 498 |
| Orientale | 173 (21.7%) | 383 (48.1%) | 240 (30.2%) | 796 |
| South Kivu | 29 (6.8%) | 126 (29.4%) | 273 (63.8%) | 428 |

**Table 2:** Multinomial regression on fertility preference with reference to the transition, base outcome: 0-3 children

| Variables | Mid-transition (4-5) | | Pre-transition (6+) | |
|---|---|---|---|---|
| | RRR | 95% CI | RRR | 95% CI |
| **Age (15-19)** | | | | |
| 20-24 | 1.43*** | 1.22-1.66 | 1.52*** | 1.29-1.80 |
| **Children (no)** | | | | |
| Yes | 0.96 | 0.82-1.13 | 0.91 | 0.76-1.09 |
| **Child lost (no)** | | | | |
| Yes | 1.00 | 0.71-1.40 | 1.32 | 0.93-1.85 |
| **Siblings (0-3)** | | | | |
| 4-5 | 0.99 | 0.82-1.20 | 0.81* | 0.65-1.00 |
| 6+ | 1.23* | 1.04-1.46 | 1.40 | 0.94-1.37 |
| **Place (urban)** | | | | |
| Rural | 1.50*** | 1.20-1.87 | 2.69*** | 2.12-3.42 |
| **Province (Kinshasa)** | | | | |
| Bandundu | 1.18 | 0.89-1.58 | 0.98 | 0.69-1.40 |
| Bas-Congo | 1.20 | 0.84-1.70 | 0.59* | 0.37-0.95 |
| Equateur | 0.89 | 0.66-1.20 | 0.82 | 0.57-1.18 |
| Kasaï Occidental | 0.94 | 0.63-1.42 | 4.33*** | 2.83-6.62 |
| Kasaï Oriental | 2.49*** | 1.68-3.61 | 10.50*** | 6.93-15.88 |
| Katanga | 2.11*** | 1.52-2.91 | 6.85*** | 4.74-9.89 |
| Maniema | 1.02 | 0.61-0.63 | 1.74* | 1.05-2.88 |
| North Kivu | 1.24 | 0.94-1.64 | 2.76*** | 1.97-3.87 |
| Orientale | 0.89 | 0.66-1.19 | 0.77 | 0.53-1.11 |
| South Kivu | 1.54* | 1.06-2.24 | 4.17*** | 2.75-6.32 |
| **Wealth (richest)** | | | | |
| Rich | 1.18 | 0.93-1.50 | 1.90*** | 1.46-2.48 |
| Mid | 1.18 | 0.87-1.60 | 1.84*** | 1.32-2.55 |
| Poor | 0.95 | 0.68-1.31 | 1.85*** | 1.31-2.62 |
| Poorest | 1.33 | 0.94-1.86 | 2.84*** | 1.98-4.07 |
| **Employment (not)** | | | | |
| Yes | 1.21** | 1.05-1.41 | 1.27** | 1.09-1.49 |
| **Literacy (Yes)** | | | | |
| No | 0.95 | 0.79-1.22 | 1.41*** | 1.18-1.69 |
| **Religion (Catholic)** | | | | |
| Protestant | 1.23* | 1.02-1.46 | 1.53*** | 1.27-1.85 |
| Other Christian | 1.34*** | 1.13-1.58 | 1.56*** | 1.29-1.87 |
| Muslim | 2.23° | 1.00-5.01 | 2.29° | 0.99-5.31 |
| Else | 1.55* | 1.02-2.34 | 1.87** | 1.20-2.91 |
| No | 0.33 | 0.11-1.05 | 0.55 | 0.20-1.50 |
| **Beating (not)** | | | | |
| Justified | 1.15 | 0.99-1.34 | 1.24** | 1.05-1.47 |
| **Knowledge (no)** | | | | |
| Yes | 1.49*** | 1.22-1.88 | 1.28* | 1.03-1.58 |

RRR: Relative risk ratio; CI: Confidence interval.
Significance levels: ° P<0.55, * P<0.05, ** P<0.01, *** P<0.001.

logistic regression analysis. The preference for mid-transitional fertility compared to post-transitional fertility (base outcome) increases significantly with age (age 20-24 RRR 1.43) and with having six or more siblings (RRR 1.23). Women living in rural areas have a higher propensity of preferring mid-transitional fertility (RRR 1.50), as well as those living in the provinces Kasaï Oriental (RRR 2.46), Katanga (RRR 2.11), and South Kivu (RRR 1.54), compared to Kinshasa. The preference for mid-transitional fertility is higher among employed women (RRR 1.22) and among women belonging to Protestant, Other Christian, Muslim, or other religions to prefer mid-transitional fertility (RRR 1.23; RRR 1.34; RRR 2.23; RRR 1.55), compared to post-transitional fertility. Finally, women without knowledge of modern family planning methods have a higher propensity of preferring mid-transitional fertility (RRR: 1.49).

Regarding the preference for pre-transitional compared to post-transitional fertility,

results are similar but stronger. Women in the age group 20-24 (RRR 1.52), illiterate women (RRR 1.41) and employed women (1.27) are more likely to prefer pre-transitional fertility. The desire for more than six children was relatively reduced by 19% if women have four to five siblings (RRR 0.81), compared to 0 to 3 siblings. Place and province of residence show particularly strong associations. Living in rural areas positively affects the propensity for pre-transitional fertility (RRR 2.69), as well as living in provinces Kasaï Occidental (RRR 4.33), Kasaï Oriental RRR (10.50), Katanga (RRR 6.85), Maniema (RRR 1.74), North Kivu (RRR 2.76), and South Kivu (RRR 4.17). Women living in the province Bas-Congo in contrast have a 41% lower relative risk to prefer pre-transitional fertility (RRR 0.59). Furthermore, unlike with the preference for mid-transitional fertility, household wealth is associated with a preference for pre-transitional fertility, with women living in the poorest (RRR 2.85), poor (RRR 1.85), mid (RRR 1.84) or rich (RRR 1.90) households all having a higher propensity compared to those living in the richest quintile household index. Finally, preference for pre-transitional fertility is significantly higher among women belonging to Protestant, Other Christian, Muslim, or other religions (compared to Catholics) (RRR 1.53; RRR 1.56; RRR 2.29; RRR 1.87), among those justifying household violence (RRR 1.24) and those without knowledge of modern family planning methods (RRR 1.28).

## Discussion

This study aimed to identify the factors that contribute to the persistence of preferences for high fertility and large families among young and adolescent women in the Democratic Republic of Congo. The findings reveal that the fertility preferences of Congolese young and adolescent women were high, mirroring the actual fertility rates in the DRC. Out of the of 7205 women surveyed, 16% preferred to have no to three children, 41% preferred to have four to five, and 43% preferred to have six or more children.

Bivariate associations indicated that post-transitional fertility was never preferred over pre- or mid-transitional fertility, regardless of women's characteristics. Women who preferred pre-transitional fertility tended to be older, have

children, have experienced the loss of a child, come from larger families, be illiterate, belong to the poorest wealth quintile, be employed, belong to Protestant, Muslim, other (Vuvamu, Animist, Salvation Army, Kimbanguist, Bundu dia kongo), or no religion, justify wife beating, lack knowledge of modern family planning methods, live in rural areas, and reside in the provinces of Kasaï Occidental, Kasaï Oriental, Katanga, Maniema, or South Kivu.

The multinomial logistic regression analysis revealed that the relative risk to prefer mid- and pre-transitional fertility preferences compared to post-transitional fertility differed significantly by demographic, -socioeconomic and -cultural characteristics. Circling back to the theories on ideal family size, evidence was found for both the diffusion/ideational change theory and the socio-economic theory.

The importance of diffusion of ideas was reflected in the association with knowledge of family planning methods and ideal family size. The diffusion theory posits that the spread of new ideas about fertility control are the primary drivers of a decline in preferred family size[17,18,26–28]. Our study confirms that women who lack knowledge of modern family planning methods – one-fifth of our study population – prefer larger families, whereas those who do have knowledge of such methods prefer smaller ones. This finding is consistent with Bongaarts'[43] study, which demonstrated that family planning programs can reduce unintended pregnancies and also have a substantial impact on desired fertility. The lack of knowledge and misinformation about family planning methods not only influences fertility preferences but also acts as a major obstacle to contraception in the DRC, as highlighted in the qualitative research by Muanda *et al.*[48,49].

The association between knowledge of family planning methods and ideal family size is intricately linked with education or literacy. Our study findings indicate that women who are literate are less likely to prefer larger families than illiterate women, which is consistent with studies conducted in other Sub-Saharan African countries[33,34,38,42,43]. Women's education has a significant impact on both preferred and actual fertility due to the positive effects on multiple facets of women's lives, such as increased decision-making, better understanding of reproductive health and family

planning, higher earning potential, and rising opportunity costs of childbearing[23,43].

As previously stated, women's empowerment has been identified as one of the most important factors for fertility decline in sub-Saharan Africa. Various studies confirmed that greater empowerment is correlated with a smaller ideal family size and lower realized fertility[33–35,38,40–42]. Our study supports this finding and shows that the justification of wife beating is associated with a preference for pre-transitional fertility compared to mid-transitional fertility. In the DRC, domestic violence against women is strongly rooted in the culture and sustained by the unequal socialization of boys and girls[2]. In most households, men have a final say in women's fertility preferences and desire to use contraception[32]. Women often must seek permission from their partners to use contraception, and many fear the consequences of disobeying their partner's wishes[48,49].

The correlation between the number of siblings and fertility preferences indicates the effects of intergenerational patterns and community influence on family size, providing further evidence for the diffusion theory. Women who grew up in a smaller family were more inclined to have smaller families, while those from larger families tended to prefer having more children. This finding is consistent with qualitative research conducted in the DRC, which found that older generations, especially grandmothers, have a strong influence on the number of children in the household and are often less accepting of family planning[49]. Similar patterns have been observed in Kenya and Nigeria[35,50]. These deeply ingrained pronatalist beliefs continue to shape women's fertility preferences in the DRC, where there is substantial pressure on women from their families to have as many children as possible to ensure the continuity of the lineage [3,49].

These beliefs can also be transmitted through religious leaders and communities. Our study found that religious women generally prefer larger families compared to women who are not religious. This finding is consistent with other studies in the DRC, which suggest that religious institutions often discourage the use of modern contraceptive methods[48,49,51]. Some scholars suggest that this resistance to family planning can be traced back to the colonial legacy of Catholic missionaries who aimed to increase fertility rates[52]. However, the relationship between religious affiliation and fertility preferences varies across countries. For instance, in Rwanda, Muslims tend to prefer fewer children than Catholics and Protestants, while in Nigeria and Kenya, the Muslim community is more likely to prefer larger families[35,38]. In our study, we found that although all religions showed a correlation with preferring a mid- or pre-transitional family size, women who identified as Muslim had the highest propensity.

The correlation between fertility preference and socio-economic characteristics, such as wealth and employment, highlights the relevance of socio-economic theory. Women living in the poorest households show a high propensity of preferring six or more children. This finding is consistent with other studies in sub-Saharan Africa that demonstrate a lower ideal family size among households with better economic status[33,35,53]. Moreover, qualitative research in rural DRC revealed that both men and women aim to have many children in the hope that at least one would survive, go to school, and help them financially in the future, describing children as their "wealth"[49]. This is also reflected in fertility rates: women in the poorest households have on average 7.6 children, compared to 4.9 children per woman among those living in the richest households[2]. Our study furthermore found that employed women have a slightly higher propensity to prefer both mid- and pre-transitional fertility, as opposed to post-transitional fertility, contradicting the microeconomic theory of fertility which states that employment as a form of economic empowerment leads to shifting opportunity costs of childbearing and ultimately to lower fertility preferences[22–25].

Finally, demographic characteristics such as age, place and province of residence are all significantly associated with fertility preference. Adolescent women have a higher propensity to prefer mid- or pre-transitional fertility compared to younger women. Although the age gap is not large enough to indicate generational differences, varying cultural beliefs, values, and traditions may contribute to this finding. This result is consistent with a study in Rwanda and Kenya[35] and is reflected in the higher unmet need for family planning among young Congolese women, which demonstrates their desire to delay, space or limit births[8]. Furthermore, women residing in rural areas

and the provinces Kasaï Occidental, Kasaï Oriental, Katanga, North Kivu, and South Kivu show a higher preference for mid- or pre-transitional fertility. Located in the South-Eastern part of the DRC, these provinces also have the highest total fertility rates of the country, ranging from 6.5 to 8.2[2].

## Conclusion

This study found that young and adolescent women in the DRC have high fertility preferences, with 43% preferring to have six or more children. The relative risk of preferring mid- and pre-transitional fertility varies significantly based on characteristics such as age, literacy, place and province of residence, religion, employment status, wealth, acceptance of domestic violence, and knowledge of modern family planning methods, providing evidence for both the diffusion and the socio-economic theory of fertility decline. These findings provide essential information to address the country's high fertility rates. Policies should focus on expanding education access, targeting religious communities that place a high value on large family sizes and oppose modern contraceptive use, and sensitizing people living in rural areas.

## Contribution of authors

MM conceptualized the original study, performed analyses, and wrote initial draft. SG reviewed and edited initial manuscript and supervised the project. All authors read and approved the final manuscript.

## Availability of data and materials

The dataset supporting the conclusions of this article is available upon request via the Demographic and Health Survey website https://dhsprogram.com.

## Competing interests

The authors report there are no competing interests to declare.

## Funding

## References

1. Bongaarts J and Casterline J. Fertility Transition: Is sub-Saharan Africa Different? *Popul Dev Rev* 2013; 38: 153–168.
2. MPSMRM. *Enquête Démographique et de Santé (EDS-RDC) 2013-2014*. Rockville, Maryland, 2014.
3. Romaniuk A. Persistence of High Fertility in Tropical Africa: The Case of the Democratic Republic of the Congo. *Popul Dev Rev* 2011; 37: 1–28.
4. Mabika CM and Shapiro D. School enrollment in the Democratic Republic of the Congo: family economic well-being, gender, and place of residence. *African Population Studies* 2012; 26(2): 197-220.
5. Shapiro D, Tambashe B and Romaniuk A. The third biggest African country: The Democratic Republic of the Congo. In Africa's Population: In Search of a Demographic Dividend. In: Groth H, May JF (eds). Springer International Publishing AG, 2017, 71–86.
6. World Bank. The World Bank in DRC, https://www.worldbank.org/en/country/drc/overview#1 (2022).
7. Kwete D, Binanga A, Mukaba T, Nemuandjare T, Mbadu MF, Kyungu M, Sutton P and Betrand JT. Family planning in the Democratic Republic of the Congo: Encouraging momentum, formidable challenges. *Glob Health Sci Pract* 2018; 6: 40–54.
8. Mosuse MA and Gadeyne S. Prevalence and factors associated with unmet need for family planning among women of reproductive age (15–49) in the Democratic Republic of Congo: A multilevel mixed-effects analysis. *PLoS One* 2022; 17: e0275869.
9. Feyisetan B and Casterline JB. Fertility Preferences and Contraceptive Change in Developing Countries. *Int Fam Plan Perspect* 2000; 26: 100–109.
10. Westoff CF. Reproductive Intentions and Fertility Rates. *Int Fam Plan Perspect 1990*; 16(3): 84–96.
11. Bongaarts J. Completing the fertility transition in the developing world: The role of educational differences and fertility preferences. *Popul Stud (NY)* 2003; 57: 321–335.
12. Kodzi IA, Johnson DR and Casterline JB. Examining the predictive value of fertility preferences among Ghanaian women. *Demogr Res* 2010; 22: 965–984.
13. Shapiro D and Hinde A. Laggards in the global fertility transition. *Vienna Yearb Popul Res* 2020; 18: 1–18.
14. Schoumaker B. Stalls in Fertility Transitions in sub-Saharan Africa: Revisiting the Evidence. *Stud Fam Plann* 2019; 50: 257–278.
15. Cleland J, Machiyama K and Casterline JB. Fertility preferences and subsequent childbearing in Africa and Asia: A synthesis of evidence from longitudinal studies in 28 populations. *Popul Stud* 2020; 74: 1–21.
16. Bongaarts J and Casterline JB. From Fertility Preferences to Reproductive Outcomes in the Developing World. *Popul Dev Rev* 2018; 44: 793–809.
17. Casterline JB. Diffusion Processes and Fertility Transition: Introduction. In: *Diffusion Processes and Fertility Transition: Selected perspectives*. National Academies Press (US), 200A, 1–38.

18. Cleland J and Wilson C. Demand theories of the fertility transition: An iconoclastic view. *Popul Stud (NY)* 1987; 41: 5–30.

19. Davis K. The World Demographic Transition. *The Annals of American Academy of Political and Social Science* 1945; 237: 1–11.

20. Notestein FW. Economic problems of population change. In: *Proceedings of the Eighth International Conference of Agricultural Economists*. New York: Oxford University Press, 1953, 13–31.

21. Thompson WS. Population. *American Journal of Sociology,* 1929; 34: 959–975.

22. Becker GS. An Economic Analysis of Fertility. In: *Demographic and economic change in developed countries*. Columbia University Press, 1960, 209–240.

23. Becker GS. *A treatise on the family.* Harvard University Press, 1991.

24. Schultz TW. New Economic Approaches to Fertility. *NBER Books*, 1973.

25. Caldwell JC. *Theory of fertility decline.* London: Academic Press Inc. (London) , 1982.

26. Brown LA. *Innovation Diffusion: A New Perspective*. New York: Methuen, 1981.

27. Rogers EM. *Diffusion of Innovations*. New York: Free Press, 1962.

28. Cleland J. Potatoes and pills: an overview of innovation-diffusion contributions to explanations of fertility decline. In: John B. Casterline (ed) *Diffusion Processes and Fertility Transition: Selected Perspectives,*. Washington, DC: National Research Council, 2001, 39–65.

29. Bongaarts J and Watkins SC. *Social Interactions and Contemporary Fertility Transitions*. 1996.

30. Entwisle B, Rindfuss RR, Guilkey DKDK, Chamratrithirong A, Curran SR and Sawangdee Y. Community and contraceptive choice in rural Thailand: a case study of Nang Rong. *Demography* 1996; 33: 1–11.

31. Montgomery M and Casterline J. The diffusion of fertility control in Taiwan: evidence from pooled cross-section time-series models. *Popul Stud* 1993; 47: 457–479.

32. Dodoo FNA and Frost AE. Gender in African population research: The fertility/ reproductive health example. *Annual Review of Sociology* 2008; 34: 431–452.

33. Atake EH and Gnakou Ali P. Women's empowerment and fertility preferences in high fertility countries in Sub-Saharan Africa. *BMC Womens Health*; 19: 54.

34. Upadhyay UD and Karasek D. Women's empowerment and ideal family size: An examination of DHS empowerment measures in Sub-Saharan Africa. *Int Perspect Sex Reprod Health* 2012; 38: 78–89.

35. Muhoza DN. The heterogeneous effects of socioeconomic and cultural factors on fertility preferences: evidence from Rwanda and Kenya. *J Popul Res* 2019; 36: 347–363.

36. Larsson C and Stanfors M. Women's Education, Empowerment, and Contraceptive Use in sub-Saharan Africa: Findings from Recent Demographic

and Health Surveys. *African Population Studies* 2014; 28(2): 1022-1034.

37. Rabbi AMF. Factors influencing fertility preference of a developing country during demographic transition: Evidence from Bangladesh. *South East Asia Journal of Public Health* 2015; 4: 23–30.

38. Odusina EK, Ayotunde T, Kunnuji M, Ononokpono DN, Bishwajit G and Yaya S. Fertility preferences among couples in Nigeria: A cross sectional study. *Reprod Health*; 17: 92.

39. Bankole A and Audam S. Fertility preferences and contraceptive use among couples in sub-Saharan Africa. *African Population Studies* 2011; 25: 556–586.

40. Woldemicael G. Womens autonomy and reproductive preferences in Eritrea. *J Biosoc Sci* 2009; 41: 161–181.

41. Hindin MJ. *Women's autonomy, women's status and fertility-related behavior in Zimbabwe. Population Research and Policy Review* 2000; 19(3): 255-282.

42. Bankole A. *Desired Fertility and Fertility Behaviour among the Yoruba of Nigeria: A Study of Couple Preferences and Subsequent Fertility. Popul Stud* 1995; 49(2): 317-328.

43. Bongaarts J. Trends in fertility and fertility preferences in sub-Saharan Africa: the roles of education and family planning programs. *Genus* 2020; 76: 32.

44. Barber JS. Intergenerational Influences on the Entry into Parenthood: Mothers' Preferences for Family and Nonfamily Behavior. *Social Forces* 2000; 79(1): 319-348.

45. Bongaarts J. The Measurement of Wanted Fertility. *Popul Dev Rev*; 16(3): 487-506.

46. Shapiro D and Tambashe BO. Fertility, ethnicity, and education in the Democratic Republic of the Congo. *Etude de la Population Africaine* 2017; 31: 3253–3270.

47. Hedeker D. A mixed-effects multinomial logistic regression model. *Stat Med* 2003; 22: 1433–1446.

48. Muanda M, Ndongo PG, Taub LD, Betrand JT. Barriers to modern contraceptive use in Kinshasa, DRC. *PLoS One* 2016; 11(12): e0167560.

49. Muanda MF, Ndongo GP, Messina LJ, Betrand JT. Barriers to modern contraceptive use in rural areas in DRC. *Cult Health Sex* 2017; 19: 1011–1023.

50. Ntoimo LFC. Family size preferences among women in a union in Nigeria and associated factors. *Int J Popul Stud* 2022; 7.

51. Mathe JK, Kasonia KK and Maliro AK. Barriers to Adoption of Family Planning among Women in Eastern Democratic Republic of Congo. *African Journal of Reproductive Health* 2011; 15: 69.

52. Guirkinger C and Villar P. *Pro-birth policies, missions and fertility: historical evidence from Congo.* DeFiPP Working Papers 2204, University of Namur, Development Finance and Public Policies, 2022.

53. Hyatt DE and Milne WJ. Determinants of Fertility in Urban and Rural Kenya: Estimates and a Simulation of the Impact of Education Policy. *Environment and Planning A: Economy and Space* 1993; 25: 371–382.