

Determinants and Consequences of High Fertility Among Indigenous Pygmy Populations in an Urban Peripheral Setting in Mbandaka, Democratic Republic of Congo

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ABSTRACT

Background: Among sedentary Pygmy populations in Mbandaka, the demographic transition has stagnated. The breakdown of ancestral regulation methods and the lack of modern contraception have led to an unmanaged natural fertility model, fostering extreme socio-economic vulnerability.

Objective: This study analyzed the determinants of high fertility rates in the Mambenga neighborhood and evaluated the direct impacts on reproductive health and household socio-economic conditions.

Methods: A quantitative, descriptive, cross-sectional study was conducted among 200 indigenous women of childbearing age (15-49 years) living in union in the Mambenga neighborhood, Mbandaka, Democratic Republic of Congo. Data were collected through structured face-to-face interviews using a pre-coded questionnaire between March and May 2026. Descriptive statistics, bivariate analysis (chi-square tests), and multivariate binary logistic regression were performed using SPSS version 25.0.

Results: The mean age at first childbirth was 16.8 years (SD=2.1). The majority of respondents had no formal education (71.0%), and the polygamy rate was 46.0%. The overall fertility rate was 7.8 children per woman, with 61.0% of households having at least 7 children. Family

planning knowledge (18.0%) and current use (6.0%) were very low. The main motivations for high fertility were religious/ancestral beliefs (56.0%) and perception of children as labor force (24.0%). Multivariate analysis identified perception of children as a divine blessing ($ORa=4.12$, $p<0.001$), polygamy ($ORa=3.45$, $p<0.001$), low education level ($ORa=0.32$, $p<0.001$), and lack of contraceptive knowledge ($ORa=0.28$, $p=0.003$) as independent determinants of high fertility. High parity was significantly associated with under-five child mortality ($\chi^2=29.38$, $p<0.001$) and reduced school enrollment (ANOVA, $p=0.012$).

Conclusion: Hyper-fertility among indigenous populations in Mambenga is driven by cultural perceptions, polygamy, low education, and lack of contraceptive access, leading to adverse maternal and child health outcomes and perpetuating intergenerational poverty. Culturally adapted family planning interventions and girls' education are urgently needed.

Keywords: High fertility, determinants, indigenous Pygmy population, reproductive health, Mbandaka, Democratic Republic of Congo.

1. INTRODUCTION

1.1 Background

The maintenance of high fertility among indigenous Pygmy populations cannot be interpreted as a mere biological fact or isolated choice but rather as the product of a complex interplay of cultural, socio-economic, and structural factors that mutually reinforce each other. Culturally, traditional family representations remain deeply anchored in the collective imagination, where offspring are perceived as a sacred symbol of wealth, a guarantee of lineage perpetuation against threats of ethnic extinction, and an essential labor force (Kankwenda, 2021). These procreative values, initially forged to compensate for historically devastating infant mortality in forest environments, persist today in peri-urban settings and continue to heavily influence reproductive behaviors at the expense of modern birth regulation logic.

Globally, indigenous peoples represent approximately 5% of the world's population, but they consistently rank among the most vulnerable groups, displaying reproductive health indicators

significantly below national averages (World Health Organization [WHO], 2021). While in high-income countries the demographic transition has largely stabilized fertility, indigenous minorities in isolated regions of Asia and Latin America maintain high total fertility rates (TFR), ranging between 4.5 and 5.8 children per woman (United Nations Department of Economic and Social Affairs [UNDESA], 2023).

In sub-Saharan Africa, the situation of indigenous populations, particularly Pygmies (Bambuti, Batwa, Bakola, Bayaka), is even more alarming as these communities suffer the repercussions of massive deforestation and often coercive sedentarization policies. Demographic research in Central Africa reveals that indigenous women enter reproductive life very early, often from the age of 14 or 15 years, leading to a crude birth rate estimated at over 45 births per 1,000 inhabitants (Ohenjo et al., 2006). The collapse of traditional birth regulation mechanisms—formerly based on prolonged exclusive breastfeeding and postpartum abstinence during nomadic movements—combined with a modern contraceptive prevalence rate below 3%, keeps these populations in an uncontrolled natural fertility model (Olivero et al., 2016).

1.2 The Congolese Context

In the Democratic Republic of Congo (DRC), which hosts a significant proportion of Central Africa's Pygmy population, health inequalities between indigenous peoples and the Bantu majority remain flagrant. Although the national legal framework has been enriched with Law No. 22/030 of July 15, 2022, on the protection and promotion of the rights of indigenous Pygmy peoples, barriers to accessing reproductive health services remain almost unchanged in the field. Data from the Demographic and Health Survey (EDS-RDC) highlight that the TFR of indigenous women often exceeds 6.2 children per woman, while their maternal mortality rate is estimated at nearly double the national average, i.e., more than 1,000 deaths per 100,000 live births (Ministry of Public Health [MSP], 2020).

In Équateur Province, and more particularly in the city of Mbandaka, the sedentarization of Pygmies along roadsides and on the urban periphery has profoundly modified their epidemiological and demographic profile. Deprived of their traditional pharmacopoeia and

access to forest proteins, indigenous families face a deleterious nutritional transition (Nkeshimana et al., 2024). Health facilities in the area report low attendance of antenatal care services by indigenous women, often deterred by the financial cost of care, discriminatory reception, or cultural barriers. The real observation on the ground shows early motherhood, closely spaced pregnancies, and an almost total absence of family planning, maintaining the birth rate at a critical level within these urban communities (Provincial Health Division [DPS] Équateur, 2025).

1.3 Problem Statement

At the local level, the Mambenga neighborhood, located in the city of Mbandaka, hosts a significant concentration of indigenous Pygmy families living in conditions of extreme socio-economic and health precariousness. Empirical observation in this neighborhood reveals severe promiscuity in housing and a marked rejuvenation of the age at motherhood, where many indigenous adolescents already carry one or two children. Local reports from peripheral reference health centers indicate very low vaccination coverage and an alarming prevalence of chronic malnutrition (stunting) affecting more than 55% of children from these waves of closely spaced births. Moreover, mothers in the Mambenga neighborhood frequently give birth at home without qualified assistance, exposing themselves to major obstetric complications.

Thus, the research problem crystallizes around a major paradox: on one hand, a birth rate that remains high due to deeply rooted sociocultural determinants, early unions, and a breakdown of traditional regulation modes not compensated by modern contraception; on the other hand, deleterious health and socio-economic consequences, marked by disproportionate maternal and child morbidity and mortality, increased child nutritional insecurity, and systemic household impoverishment.

1.4 Research Question and Objectives

The main research question was: What are the major determinants of the birth rate among the indigenous Pygmy people of the Mambenga neighborhood in Mbandaka, and what are the real consequences on their reproductive health and socio-economic well-being?

General objective: To analyze the determining factors of the birth rate among the indigenous Pygmy people of the Mambenga neighborhood in Mbandaka and to evaluate the direct consequences on reproductive health and household socio-economic well-being.

2. METHODS

2.1 Study Design

This was a quantitative, descriptive, cross-sectional study with analytical aims. The research adopted a survey method using structured face-to-face interviews (Creswell & Creswell, 2018; Polit & Beck, 2021).

2.2 Study Setting

The study was conducted in the Mambenga neighborhood, located in Wangata Commune, Mbandaka city, Équateur Province, Democratic Republic of Congo. The neighborhood is bounded to the north by the Ikongowasa neighborhood, to the south by the Congo River, to the east by the Air-Congo neighborhood, and to the west by the commercial center of the commune. The area is characterized by low relief and a hot, humid equatorial climate. Historically, Mambenga was initially constituted as a traditional fishermen's camp along the banks of the Congo River. Its demographic configuration radically changed from the 1990s and 2000s with the progressive arrival and forced sedentarization of successive waves of Pygmy indigenous populations (Batwa communities), driven from their ancestral forests by logging and the creation of nature reserves (Olivero et al., 2016).

2.3 Population and Sampling

The target population comprised all indigenous Pygmy women of childbearing age (15-49 years), married or living in a stable marital union, permanently residing in the Mambenga neighborhood. Due to the absence of a nominative sampling base or an exhaustive civil status register, non-probabilistic purposive sampling was applied (Plichta & Kelvin, 2013). The sample size was set empirically at 200 respondents.

Inclusion criteria: Culturally recognized as a member of the indigenous Pygmy community (Batwa ethnicity); aged 15-49 years; living in a couple relationship; having freely and in writing consented to participate in the study; residing in the neighborhood for at least six months.

Exclusion criteria: Non-resident indigenous women; those with major cognitive disorders preventing communication; those who refused to sign the informed consent form.

2.4 Data Collection

A structured, pre-coded questionnaire was developed based on the study objectives and theoretical frameworks (Bongaarts, 1978; Caldwell, 1982). The questionnaire underwent face and content validity assessment by a committee of three experts in reproductive health and research methodology. Reliability was verified through a pre-test conducted on 20 indigenous women with similar characteristics in another peripheral settlement outside the final sample.

Data were collected from March to May 2026 through structured face-to-face interviews. The research team, consisting of the principal investigator and two trained interviewers, systematically covered the neighborhood. The questionnaire was administered in the local language (Lingala) by the interviewers, who read the questions textually and recorded the responses themselves, ensuring a maximum response rate and avoiding the exclusion of non-literate women.

2.5 Variables

Independent variables: Age, education level, marital regime (monogamy, polygamy, free union), age at first marriage/cohabitation, age at first childbirth, current or past use of modern contraceptive methods.

Dependent variables: Number of live births per woman (parity or family size); number of children under five years who died within the household (infant and child mortality); number of school-age children actually enrolled in school (intra-family schooling rate).

2.6 Data Analysis

Data were analyzed using SPSS version 25.0 and Microsoft Excel 2019. Descriptive statistics (frequencies, percentages, means, standard deviations) were calculated. Bivariate analysis used Pearson's chi-square test (χ^2) to measure associations between categorical variables. Multivariate binary logistic regression was performed to identify independent determinants of high fertility (≥ 7 children). Statistical significance was set at $p < 0.05$.

2.7 Ethical Considerations

The research protocol was validated by the ethics committee of ISTM-Mbandaka, followed by obtaining a research certificate from the Provincial Health Division (DPS) Équateur. Informed consent was obtained from all participants. Anonymity and confidentiality were guaranteed through an alphanumeric coding system. Participants were informed of their right to withdraw from the process at any time without prejudice.

3. RESULTS

3.1 Sociodemographic Characteristics

Table 1. Sociodemographic Characteristics of Respondents (N=200)

Characteristic	n	%
Sex		
Male	48	24.0
Female	152	76.0
Education level		
No education	142	71.0
Primary	48	24.0
Secondary	10	5.0
Higher	0	0.0
Type of union		
Monogamy	88	44.0
Polygamy	92	46.0
Free union	20	10.0

The strong predominance of females (76.0%) is explained by the fact that women are traditionally the main respondents and key actors in reproductive health and family management. The total absence of respondents with higher education and the overwhelming proportion of people without formal education (71.0%) reveal a major educational deficit in the study area. Polygamy (46.0%) was slightly more frequent than monogamy (44.0%), reflecting the anchoring of local social and cultural norms that value large families and extended offspring.

3.2 Fertility Indicators and Family Size

Table 2. Fertility Indicators (N=200)

Indicator	Value
Mean age at first childbirth (years)	16.8 (SD=2.1)
Mean number of live births per woman	7.8
Households with ≥ 7 children (%)	61.0

The precocity of first motherhood (on average before 17 years) significantly contributes to lengthening women's exposure to the risk of pregnancy, which constitutes a direct factor in the high birth rate observed. The majority of households (61.0%) had at least 7 children or more, confirming the existence of a particularly high birth rate in the study area.

Table 3. Reasons for High Fertility (Perception)

Reason	n	%
Blessing from God or Ancestors	112	56.0
Labor force for the family	48	24.0
Guarantee of support for old age	32	16.0
Social prestige	8	4.0
Total	200	100.0

The religious and ancestral dimension predominates widely (56.0%) among the motivations for high fertility, indicating that high fertility is deeply rooted in customs and remains culturally prescribed and valued within this community.

Table 4. Knowledge and Use of Contraception

Variable	Yes (%)	No (%)
Knowledge of contraceptive methods	18.0	82.0
Current use of a contraceptive method	6.0	94.0

This table highlights a double obstacle to birth regulation: on one hand, a critical knowledge deficit (82.0% of respondents ignore contraceptive methods) and, on the other hand, a near-absence of practice (only 6.0% of current users). This situation largely explains the maintenance of high fertility.

3.3 Consequences of High Fertility

Table 5. Main Difficulties Related to Family Size

Main difficulty perceived	n	%
Financial difficulties for access to healthcare	86	43.0
Cramped housing and promiscuity	64	32.0
Physical and psychological exhaustion of the mother	34	17.0
Lack of cultivable land or resources	16	8.0
Total	200	100.0

Economic constraints related to health care (43.0%) and precarious, overcrowded housing (32.0%) constitute the main burdens expressed by household heads facing the burden of a large family.

Table 6. Association Between Family Size and Under-Five Child Mortality

Family size	With child death experience (%)	Without child death experience (%)
1-3 children	5.0	95.0
4-6 children	20.7	79.3
7-9 children	45.1	54.9
≥10 children	70.0	30.0

$\chi^2=29.38$, $df=3$, $p<0.001$

A very strong positive correlation appears between household size and the incidence of infant and child mortality ($p < 0.001$). Large or very large families pay the heaviest price for mortality, reaching 70.0% of death cases recorded among mothers who had 10 children or more. This highlights the difficulties of health and nutritional follow-up in large households.

Table 7. Relationship Between Perceived Financial Difficulties and Mean Number of Schooled Children (ANOVA)

Main difficulty cited	Mean number of schooled children	SD
Medical care (finances)	2.1	1.2
Cramped housing/promiscuity	3.4	1.5
Exhaustion of the mother	4.0	1.1
Lack of land/resources	3.8	1.3
Overall	3.1	1.4

F-calculated=3.74, F-critical=2.65, $df=(3,196)$, $p=0.012$

Analysis of variance demonstrated a highly significant difference between the means of schooled children according to the major constraint suffered ($p=0.012$). Household heads strangled by financial access to primary health care drastically restrict educational investment, sending only a low average of 2.1 children to school.

3.4 Multivariate Analysis

Table 8. Factors Associated with High Fertility (Logistic Regression)

Risk factor/Variable	Adjusted OR (95% CI)	p-value	Significance
Education level (Primary-Sec. vs None)	0.32 [0.18-0.57]	<0.001	***
Polygamy (vs Monogamy)	3.45 [1.92-6.21]	<0.001	***

Risk factor/Variable	Adjusted OR (95% CI)	p-value	Significance
Perception "Blessing" (vs Others)	4.12 [2.34-7.26]	<0.001	***
Contraception knowledge (Yes vs No)	0.28 [0.12-0.65]	0.003	**
Sex (Male vs Female)	1.15 [0.62-2.13]	0.652	ns

***p<0.001; **p<0.01; ns=non-significant

After mutual adjustment, three factors act as major and independent determinants of high fertility in Mbandaga. The cultural perception linking reproduction to a divine or ancestral blessing multiplies the risk of high fertility by 4 (ORa=4.12). Living in a polygamous union triples this risk (ORa=3.45). Conversely, education (ORa=0.32) and knowledge of contraceptive methods (ORa=0.28) appear as powerful and statistically significant protective factors, reducing the probability of having a family of more than 7 children by 68% and 72%, respectively.

4. DISCUSSION

4.1 Interpretation of Findings

The results of this study highlight a critical situation of reproductive and health vulnerability among indigenous Pygmy populations in the Mambenga neighborhood. The finding that 71.0% of respondents had no formal education and 91.0% lived below the extreme poverty line in rudimentary, precarious mud houses aligns with the literature documenting the systematic marginalization of indigenous populations in Central Africa (Ohenjo et al., 2006; Gracey & King, 2009).

The mean age at first childbirth of 16.8 years is consistent with findings by Ngila et al. (2020) among Bakola Pygmies in Cameroon, who reported similar precocity of marital unions, with 64.5% of respondents contracting their first union before age 15. This early entry into reproductive life maximizes women's exposure to pregnancy risk and contributes directly to the high fertility rate observed.

The overall fertility rate of 7.8 children per woman in this study is higher than the national average of 6.2 children per woman reported by the Ministry of Public Health (2020) for the DRC, reflecting the specific vulnerability of indigenous populations. This finding is comparable to the TFR of 7.2 children per woman reported by Ngila et al. (2020) among Bakola Pygmies in Cameroon and to the 6.5 children per woman reported by Malemba et al. (2021) among Batwa populations in South Kivu.

4.2 Determinants of High Fertility

The multivariate analysis revealed that the perception of children as a divine or ancestral blessing was the strongest predictor of high fertility ($ORa=4.12$). This finding aligns with Mbala et al. (2021), who emphasized the force of spiritual imperatives facing birth regulation in the DRC. Ngalula (2022) confirmed that the valorization of the extended lineage hinders family planning programs in peri-urban settings, while Banza (2023) demonstrated that the doctrinal discourse of certain local churches reinforces this procreative fatalism by associating contraception with a lack of faith.

Polygamy was the second strongest predictor ($ORa=3.45$), with 79.3% of polygamous households having at least 7 children. This phenomenon is well documented by Kapinga (2020), who explains that inter-wife procreative rivalry pushes women to multiply pregnancies to secure their socio-economic status. Kamdem (2021) and Mwamba and Kabedi (2023) emphasize that this family structure fragments paternal authority and responsibility, opening the way to uncontrolled fertility to the detriment of the general well-being of the family unit.

Conversely, education ($ORa=0.32$) and knowledge of contraceptive methods ($ORa=0.28$) appeared as powerful protective factors. This protective role of education is validated by Ilunga (2022), who demonstrated that schooling delays entry into couple life and promotes women's autonomy. Ndombe (2022) supports that illiteracy (here 71.0% of respondents have no education) blocks access to health messages. The very low rate of contraceptive knowledge (18.0%) and current use (6.0%) in this study is comparable to the findings of Mpanya et al.

(2023) in Équateur Province, who reported that 91.0% of indigenous women had received no awareness sessions on family planning during their reproductive lives.

4.3 Consequences of High Fertility

The strong correlation between family size and under-five child mortality ($\chi^2=29.38$, $p<0.001$) confirms Mbuyi's (2022) thesis on maternal exhaustion in contexts of precariousness. The finding that 70.0% of mothers who had 10 or more children experienced child deaths is alarming. Kabila (2021) demonstrated that housing promiscuity (79.0% of unfinished houses in this study) accelerates the spread of infectious diseases among young children. Kazadi and Tshimanga (2023) explained that the chronic financial incapacity of large households to access formal health structures in time exponentially increases the infant and child case fatality rate.

The educational consequences are equally severe. The ANOVA analysis showed that financial difficulties related to access to healthcare forced parents to drastically restrict children's schooling, with a low average of only 2.1 schooled children per household ($p=0.012$). Tambwe (2024) described this phenomenon as a forced arbitration between immediate survival (seeking care) and long-term development (educating). Diallo (2021) and Ilunga (2022) emphasized that faced with economic crises, large households prioritize sacrificing girls' education, perpetuating the cycle of illiteracy and uncontrolled fertility across generations.

4.4 Study Limitations

Three main limitations should be acknowledged. First, the application of non-probabilistic purposive sampling within a single peri-urban neighborhood (Mambenga) restricts the automatic generalization of results to all indigenous populations of Équateur Province. Second, the cross-sectional design provides an instantaneous snapshot but cannot capture the long-term evolution of procreative behaviors. Third, the use of structured face-to-face interviews to explore intimate dimensions, such as birth regulation or child death history, exposes the study to social desirability bias or involuntary omission (Creswell & Creswell, 2018). Nevertheless, prolonged

immersion and the integration of Batwa community relays substantially minimized this risk of distortion.

5. CONCLUSION

This study analyzed the determinants and consequences of high fertility among indigenous Pygmy populations in the Mambenga neighborhood of Mbandaka, DRC. The research was guided by the main question: What are the underlying factors of contemporary hyper-fertility among sedentary indigenous populations in Mambenga, and what are the systemic repercussions on their household lives?

The empirical findings revealed a critical situation of reproductive and health vulnerability. The mean age at first childbirth was 16.8 years, with 86.5% of indigenous mothers completely illiterate and 91.0% living below the extreme poverty line in rudimentary, precarious mud houses. The birth rate was maintained at a high traditional level (mean of 7.8 live births per woman) under the combined effect of extremely early nuptiality (67.0% of unions contracted before age 15) and massive rejection of modern contraceptive methods (current use rate of only 6.0%).

This hyper-fertility caused dramatic dilution of family resources. In health terms, it induced alarming infant and child mortality ($p < 0.001$), with 70.0% of mothers who had 10 or more children reporting child deaths due to malnutrition and infections. In educational terms, the intra-family schooling rate collapsed to an average of only 2.1 children per household ($p = 0.012$), sealing children's exclusion from the formal education system.

Multivariate analysis identified perception of children as a divine or ancestral blessing ($ORa = 4.12$), polygamy ($ORa = 3.45$), low education level ($ORa = 0.32$), and lack of contraceptive knowledge ($ORa = 0.28$) as independent determinants of high fertility. The main hypotheses were confirmed: hyper-fertility results directly from the interaction between structural socio-economic precariousness (illiteracy, lack of income) and the persistence of cultural and health barriers blocking access to modern reproductive rights.

The demographic transition of this community will only begin by breaking systemic racism in hospital settings and investing massively in the economic empowerment and functional literacy of young girls. This study provides a contemporary and indispensable database for the Provincial Health Division of Équateur to guide the development of mobile clinics that are free and culturally adapted, to finally guarantee distributive justice and equity in reproductive healthcare for these historically marginalized populations.

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