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Urbanization, contraceptive uptake and childbearing patterns in selected African countries

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Abstract

Using a qualitative interpretive descriptive–analytical approach, this study analysed harmonised secondary data from the World Bank World Development Indicators covering six countries between 2000 and 2024. Longitudinal trend assessment and cross-country comparisons were employed to examine urban population, modern contraceptive prevalence, and total fertility rates. The findings indicate sustained urban expansion across all countries, accompanied by gradual increases in contraceptive uptake and fertility decline. However, these patterns remain uneven across national contexts. Ghana and Sierra Leone combine relatively high urbanisation with stronger improvements in contraceptive prevalence and faster fertility decline. In contrast, Nigeria and Guinea maintain comparatively high fertility levels despite substantial urban growth and weaker contraceptive uptake. The Gambia and Liberia display intermediate trajectories characterised by moderate urbanisation, rising contraceptive use, and gradual fertility reduction. The results indicate that urbanisation alone does not generate uniform reproductive outcomes; rather, fertility transitions are mediated by contraceptive access and the effectiveness of urban health service. The study recommends integrating family planning into urban development strategies and strengthening reproductive health service delivery in rapidly expanding urban and peri-urban settlements to reduce persistent reproductive health inequalities. *(Afr J Reprod Health 2026; 30 [8]: 53-65).*

Keywords: Urbanisation; Contraceptive uptake; Fertility transition; Reproductive health

Résumé

Cette étude, s'appuyant sur une approche qualitative descriptive et interprétative, a analysé des données secondaires harmonisées issues des Indicateurs du développement dans le monde de la Banque mondiale, couvrant six pays entre 2000 et 2024. Une évaluation des tendances longitudinales et des comparaisons internationales ont permis d'examiner la population urbaine, la prévalence de la contraception moderne et les taux de fécondité. Les résultats indiquent une expansion urbaine soutenue dans tous les pays, accompagnée d'une augmentation progressive du recours à la contraception et d'une baisse de la fécondité. Cependant, ces tendances demeurent inégales selon les contextes nationaux. Le Ghana et la Sierra Leone associent une urbanisation relativement élevée à une nette amélioration de la prévalence de la contraception et à une baisse plus rapide de la fécondité. À l'inverse, le Nigéria et la Guinée maintiennent des taux de fécondité comparativement élevés malgré une croissance urbaine substantielle et un recours plus faible à la contraception. La Gambie et le Libéria présentent des trajectoires intermédiaires caractérisées par une urbanisation modérée, une augmentation de l'utilisation de la contraception et une réduction progressive de la fécondité. Ces résultats indiquent que l'urbanisation à elle seule ne produit pas des résultats uniformes en matière de reproduction ; les transitions de la fécondité sont plutôt influencées par l'accès à la contraception et l'efficacité des services de santé urbains. L'étude recommande d'intégrer la planification familiale aux stratégies de développement urbain et de renforcer l'offre de services de santé reproductive dans les zones urbaines et périurbaines en expansion rapide afin de réduire les inégalités persistantes en matière de santé reproductive. *(Afr J Reprod Health 2026; 30 [8]:53-65).*

Mots-clés: Urbanisation ; Utilisation de la contraception ; Transition de la fécondité ; Santé reproductive

Introduction

Rapid urbanisation across African economies is reshaping demographic and social outcomes, with significant implications for reproductive behaviour. Urban growth has been accompanied by profound spatial and socioeconomic inequalities in access to infrastructure and services, which structure differentiated urban experiences and their outcomes. Evidence from Global South cities demonstrates that urban infrastructure and service provision are unevenly distributed, producing

systematic disparities in the proximity, quantity, and quality of essential services.[1, 2] In sub-Saharan Africa, rapid urban population growth, the expansion of informal settlements, and persistent deficits in housing and basic services remain the defining features of contemporary urbanisation.[3] Within West Africa, urban expansion is increasingly concentrated in small and medium-sized cities, where limited planning capacity and weak land-use regulation intensify pressures on infrastructure and social services, with marked cross-country variation in governance capacity and urban development trajectories.[4, 5, 6] These uneven urban transformations provide important context for understanding differentiated demographic outcomes within and across urban settings. Evidence from health financing and public health research further links out-of-pocket spending, domestic resource mobilisation, and system capacity to maternal and child health outcomes[7, 8, 9] Reproductive behaviour, particularly contraceptive uptake and childbearing patterns, is closely linked to urban structural conditions. While urban residence is often associated with improved access to education and health services, empirical evidence challenges the assumption of a uniform urban advantage. Aprilla *et al*.[10] showed that urban women may possess higher contraceptive knowledge yet exhibit lower modern contraceptive use than their rural counterparts, highlighting the decisive role of service availability and information provision rather than knowledge alone.

Intra-urban inequalities in access to services, documented across Global South cities[1], suggest that reproductive health outcomes are similarly stratified within urban populations. Fertility patterns in sub-Saharan African cities further reflect this heterogeneity, with generally lower urban fertility relative to rural areas but persistently high fertility among residents of informal settlements, where service access is constrained and the unmet need for family planning remains elevated.[3,11]Contemporary urbanisation in selected African contexts is increasingly shaped by infrastructure-led development linked to engagement with the Belt and Road Initiative. While infrastructure investment has been identified as a driver of urban transformation[12], the associated risks of uneven development and widening inequalities have also been documented.[13] However, the literature remains weakly integrated with demographic research, offering limited empirical evidence on how infrastructure-driven urban growth intersects with contraceptive behaviour and fertility dynamics.

Existing studies privilege the structural determinants of urban inequality and infrastructure provision while providing comparatively limited engagement with demographic transitions and the diffusion of reproductive norms and practices. The existing evidence base remains uneven, resulting in a fragmented understanding of how urbanisation shapes contraceptive uptake and childbearing patterns across diverse urban contexts. Current studies provide limited integrated and comparative insights into the interconnections between urbanisation, access to reproductive health services and fertility behaviour.

In particular, there has been insufficient attention paid to the contextual mechanisms through which urban growth influences service availability and individual reproductive choices, alongside weak cross-country comparative evidence. Addressing these gaps requires a comparative examination of how different urbanisation trajectories are associated with patterns of contraceptive use and childbearing across selected African countries, as well as an assessment of how uneven urban conditions mediate these relationships.

Against this background, this study seeks to examine how divergent urbanisation trajectories across selected African countries shape contraceptive uptake and childbearing patterns, with particular emphasis on the mediating role of uneven urban conditions. Specifically, it analyses the ways in which urbanisation influences contraceptive use and fertility outcomes, investigates the contextual mechanisms linking urban growth, service access, and reproductive behaviour, and compares pathways and divergences across the selected countries.

Literature review

Theoretical and conceptual perspectives

The reviewed literature provides uneven support for the proposed framework, with comparatively strong evidence on structural determinants and infrastructure, moderate engagement with infrastructure-led development dynamics, and weak empirical grounding for demographic

transitions and ideational diffusion theory. Urban inequality and its structural determinants are well documented. Rigolon et al.[1] demonstrated systematic socioeconomic disparities in access to urban green spaces across Global South cities, underscoring how infrastructure and service provision generate spatially differentiated urban outcomes. Similarly, Joshi et al.[2] identified infrastructure barriers constraining urban mobility access in Delhi, while Titz and Chiotha[3] documented persistent deficits in housing, infrastructure, and service provision across sub-Saharan African cities.Himaz[13] highlights the risks associated with trade expansion, including malinvestment, rising debt burdens, and widening inequalities, indicating that large-scale infrastructure programmes can intensify uneven urban outcomes. In contrast, demographic transition processes and ideational diffusion remain weakly theorised.

Aprilla *et al*.[10] examined urban–rural disparities in contraceptive use without situating these patterns within broader demographic transition frameworks, while the diffusion of fertility norms and practices across urban contexts remains largely unexamined. This uneven theoretical coverage necessitates a closer empirical scrutiny of how structural urban transformations translate into differentiated reproductive outcomes.

Urbanisation trajectories and urban inequalities

The emphasis on structural determinants is reinforced by evidence of urbanisation trajectories and inequalities in rapidly urbanising contexts. Sharifi et al.[14] identified dominant thematic clusters in urban studies centred on socioeconomic inequalities, economic growth, land use, and governance, while noting the underrepresentation of rapidly urbanising countries in the literature. Regional evidence indicates that sub-Saharan African cities are undergoing rapid and insufficiently understood transformations characterised by population growth, informal settlement expansion, and persistent infrastructure deficits.[3] Rigolon et al.[1] provide multidimensional tools for assessing spatial inequalities in service quantity, proximity, and quality.

Within West Africa, urbanisation in The Gambia, Ghana, Guinea, Liberia, Nigeria, and Sierra Leone is driven by rural–urban migration and natural increases, intensifying pressures on housing and services[4]. Urban expansion beyond major metropolitan centres into small- and medium-sized cities often proceeds under weak planning and land-use regulation, producing spatial sprawl and service deficits.

The proliferation of informal settlements reflects structural housing shortages and contributes to unequal access to water, sanitation, and healthcare.[6] Cross-country contrasts in governance capacity and development trajectories further shape the scale and form of urban inequalities[5], providing the contextual conditions within which reproductive behaviours are embedded in the society.

Contraceptive uptake in rapidly urbanising contexts

Within these uneven urban landscapes, contraceptive uptake is mediated by differentiated access to services and information availability. Aprilla et al.[10] showed that urban women may exhibit higher contraceptive knowledge but lower modern contraceptive use than rural women, challenging assumptions of an inherent urban advantage and highlighting service availability as a binding constraint. Intra-urban inequalities in service access documented across Global South cities[1] imply similar stratification in family planning provision, particularly in informal settlements, where formal services are weak. Additional studies have shown that socioeconomic status, insurance, empowerment, and community-level factors significantly influence service use and facility delivery.[15-19]

Broader evidence indicates that contraceptive uptake is shaped by education, wealth, media exposure, religion, and gender relations. Education enhances knowledge and use, while socioeconomic advantages improve access and normative acceptance of family planning. Religious beliefs and opposition from male partners can constrain uptake.[20] Informal providers partially compensate for gaps in formal provision in underserved urban areas, although quality remains uneven. These findings suggest that urban residence alone does not guarantee improved reproductive health outcomes, as persistent intra-urban inequalities structure differentiated patterns of access and utilisation.

Urbanisation and childbearing patterns

Patterns of contraceptive access and use are reflected in fertility dynamics in urban contexts. Urban fertility in sub-Saharan Africa is generally lower than rural fertility because of greater access to education, health services, and formal labour opportunities that delay marriage and childbearing.[11] However, substantial intra-urban differentials persist, with relatively high fertility among residents of informal settlements, where the unmet need for family planning remains elevated and economic insecurity is pervasive. Fertility decline in African cities has slowed in recent decades, reflecting a persistently high desired family size and limited increases in contraceptive use.[11] Macro-environmental pressures including emissions and pollution have also been associated with poorer health outcomes and reproductive vulnerabilities.[20-22]

The structural determinants of fertility change are consistently supported. Persistent deficits in housing and services shape urban livelihoods[3], while infrastructure-led urban transformation linked to large-scale investment initiatives contributes to uneven development.[23] Women's empowerment is associated with lower fertility, although the effects vary across dimensions and contexts.[24] These findings suggest that fertility change in urban Africa is mediated less by uniform ideational diffusion and more by structurally embedded inequalities in access to services, employment, and secure housing.

Urbanisation–contraception–fertility nexus and gaps

Synthesising these strands reveals limited direct evidence on integrated urbanisation–contraception–fertility pathways. While education, service access, and housing conditions are individually linked to reproductive outcomes, these mechanisms are rarely examined within a coherent analytical framework that connects urban growth processes to fertility changes. Empirical work on related urban transformation remains largely detached from demographic outcomes, and most studies adopt a single-country design, limiting comparative inferences. Methodologically, the literature is dominated by cross-sectional quantitative studies, with limited longitudinal or mixed-methods evidence.

Broader syntheses suggest that urbanisation influences reproductive outcomes through expanded access to services, education, and employment, which generally support lower fertility and higher contraceptive uptake. However, persistent intra-urban inequalities, particularly in informal settlements, mean that fragmented governance, insecure housing, and informal employment constrain access to quality family planning and sustain elevated unmet needs. These gaps justify integrated, comparative research designs capable of linking urban structural transformation, infrastructure development, and reproductive outcomes across diverse African urban contexts.

Methods

Research design and philosophical orientation

This study adopts a qualitative, interpretive, and descriptive–analytical design grounded in critical realist epistemology that recognises macro-level indicators as socially embedded representations of underlying demographic and institutional processes. The objective is not causal inference but a theoretically informed interpretation of patterned associations between urbanisation trajectories, contraceptive uptake, and childbearing outcomes across selected African countries. The design aligns with comparative development demography, privileging contextual explanations and policy-relevant synthesis over econometric estimations.

Data source and justification

Secondary macro-level data were drawn from the World Bank World Development Indicators (WDI) [25], selected for cross-national comparability, temporal coverage and methodological transparency. WDI indicators are harmonised from national statistical systems and international agencies, enabling consistent longitudinal comparisons across countries and over time.
The use of the WDI is appropriate for mapping broad demographic transitions and urbanisation dynamics and situating reproductive health outcomes within macro-structural change,

consistent with prior comparative demographic research.[26, 27]

The sample comprises six West African countries -The Gambia, Ghana, Guinea, Liberia, Nigeria, and Sierra Leone–observed annually from 2000 to 2024. Selection was theory-driven and comparative, capturing variations in urbanisation pace, governance capacity, post-conflict recovery trajectories, and family planning system maturity. This configuration enables a contrastive interpretation of divergent urban transitions within a shared regional and infrastructural policy context while avoiding claims of representativeness beyond the selected cases.

Variable definition and operationalization

Urbanisation is operationalised as the percentage of the population residing in urban areas (WDI: Urban population, % of the total), capturing structural shifts in settlement patterns. Contraceptive uptake was measured by the prevalence of modern contraceptive use among women of reproductive age (WDI: Contraceptive prevalence, modern methods), reflecting access to and utilisation of family planning services. Childbearing outcomes are proxied by the total fertility rate (births per woman), which is a standard summary measure of fertility regimes. These indicators are interpreted as macro-level expressions of the underlying processes of service access, gender relations, and normative change.

Analytical strategy

The analysis proceeds through longitudinal trend analysis, cross-country comparison, and graphical interpretation of co-evolving trajectories of urbanisation, contraceptive uptake, and fertility. Country-specific temporal patterns were examined to identify the convergence, divergence, and temporal lags between urban growth and reproductive change. Comparative interpretation is theoretically informed and policy-oriented, drawing on pattern matching and analytic induction to link observed trends to the contextual mechanisms highlighted in the literature. No econometric modelling was undertaken.

The interpretation is anchored in the Demographic Transition Theory, which anticipates fertility decline alongside socio-structural change.[28] Urban Social Change perspectives emphasise infrastructural inequality and differentiated urban advantage[29] and a Reproductive Health and Rights framework that foregrounds access, agency, and service environments.[30] These lenses guide the interpretation of how uneven urban conditions mediate reproductive outcomes.

Ethical considerations

The study relies exclusively on anonymised, publicly available secondary data, entailing no human subject involvement. Therefore, ethical approval was not required. Analytical interpretation was undertaken with sensitivity to contextual heterogeneity and without stigmatising national trajectories.

Results

Urbanisation trajectories and cross-country differentiation

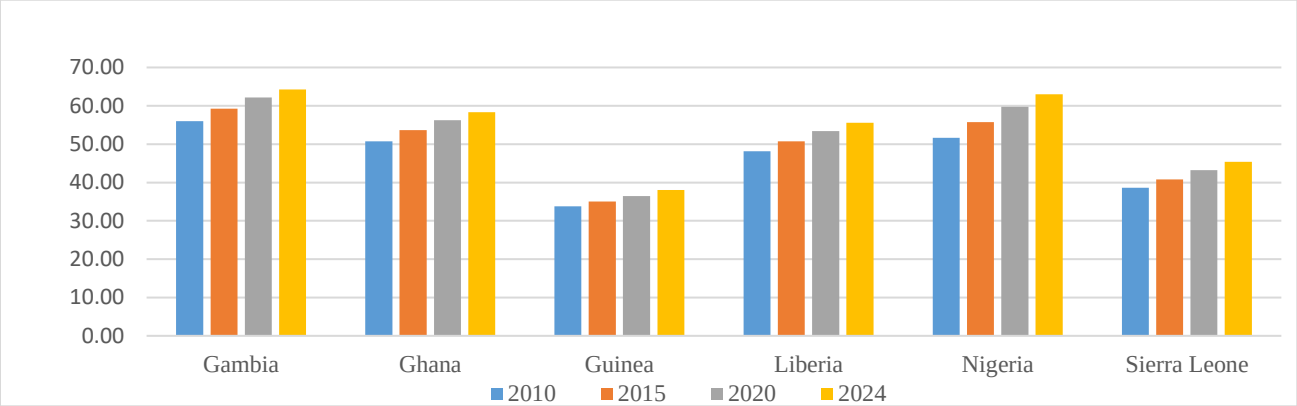
Figures 1 indicates sustained urban expansion across all six selected African countries between 2000 and 2024, with pronounced heterogeneity in levels and tempo. Ghana and Nigeria record the highest urban shares by 2024 (58.4% and 63.0%, respectively), reflecting long-standing metropolitan concentration and dense urban networks.Liberia and Sierra Leone exhibit comparatively rapid post-conflict urban growth, with urban shares rising from the low-40s to the mid-50s and mid-40s, respectively, consistent with accelerated urban concentration during the institutional reconstruction. Guinea remains structurally less urbanised but demonstrates steady incrementality, while The Gambia shows a high and rising urban concentration within a compact territorial system. The trajectories in Figure 1 are broadly monotonic, indicating incremental urban transition rather than punctuated regime shifts, with divergence in the starting levels persisting into the most recent period.

Urbanisation and contraceptive uptake: co-evolving trends

Figure 2 presents the trends in modern contraceptive prevalence across selected African countries between 2010 and 2024. When interpreted alongside the urban population

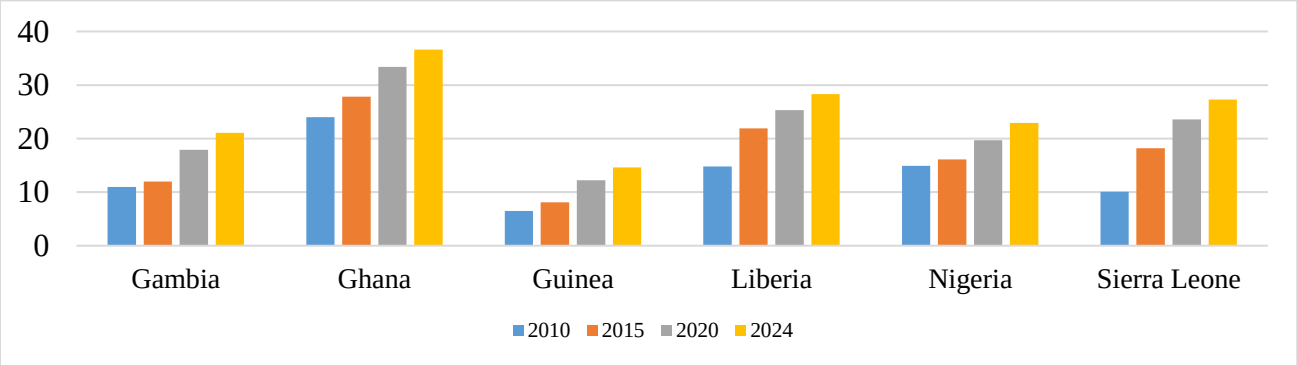
Table 1: Data description

Variable	Measurement	Description	Source
TFR	Fertility rate, total (births per woman)	Represents the average number of children a woman is expected to have over her reproductive lifetime (ages 15–49) based on current age-specific fertility rates; used as a summary indicator of overall fertility behaviour and population growth potential.	WDI
URB	Urban population (% of total population)	It measures the proportion of the total population residing in areas officially classified as urban, capturing the degree of urbanisation and spatial population concentration within the country.	WDI
URB_GRT	Urban population growth (annual %)	indicates the annual percentage change in the size of the urban population, reflecting the pace of urban expansion driven by migration, natural increase, and reclassification of settlements.	WDI
CPM	Contraceptive prevalence, any method (% of married women ages 15–49)	Refers to the percentage of married or in-union women of reproductive age who are using any form of contraception (modern or traditional), serving as a proxy for access to family planning services and fertility regulation.	WDI



Source: Authors' illustration using World Bank data

Figure 1: Urban population of selected African countries.



Source: Authors' illustration using World Bank data

Figure 2: Contraceptive prevalence in selected African countries

trajectories reported, the figure suggests that increases in contraceptive uptake tend to coincide temporally with phases of accelerated urban growth, albeit with uneven gradients and evident lags across countries. Ghana exhibits a sustained rise in contraceptive prevalence from the low-20s to

over one-third by 2024, which is broadly consistent with its steady urban expansion.

Liberia and Sierra Leone show pronounced post-2010 increases in uptake alongside continued urbanisation, with Sierra Leone's rise from under 5% to over one-quarter by 2024, indicating notable acceleration from a low baseline. Nigeria's trajectory remains comparatively flat despite substantial urban growth, whereas Guinea's increase is incremental from a persistently low base. These patterns point to a patterned association rather than a uniform "urban advantage", with substantial cross-country variations in the slope and timing of change.

Contraceptive uptake and childbearing patterns

Figure 3 shows declining total fertility rates across all countries over the study period, with levels remaining comparatively higher in Nigeria and Guinea by 2024 than in Ghana and Sierra Leone. The temporal alignment of rising contraceptive prevalence and declining fertility is most pronounced in Ghana and Sierra Leone, where sustained increases in modern method use coincide with sharper fertility reductions. In Nigeria, fertility decline proceeds more gradually alongside modest increases in contraceptive prevalence, while Guinea's fertility reduction remains slower, mirroring the persistently low uptake. These patterned co-evolutions point to differentiated tempo and sequencing in fertility transitions across urbanising contexts without implying directional effects.

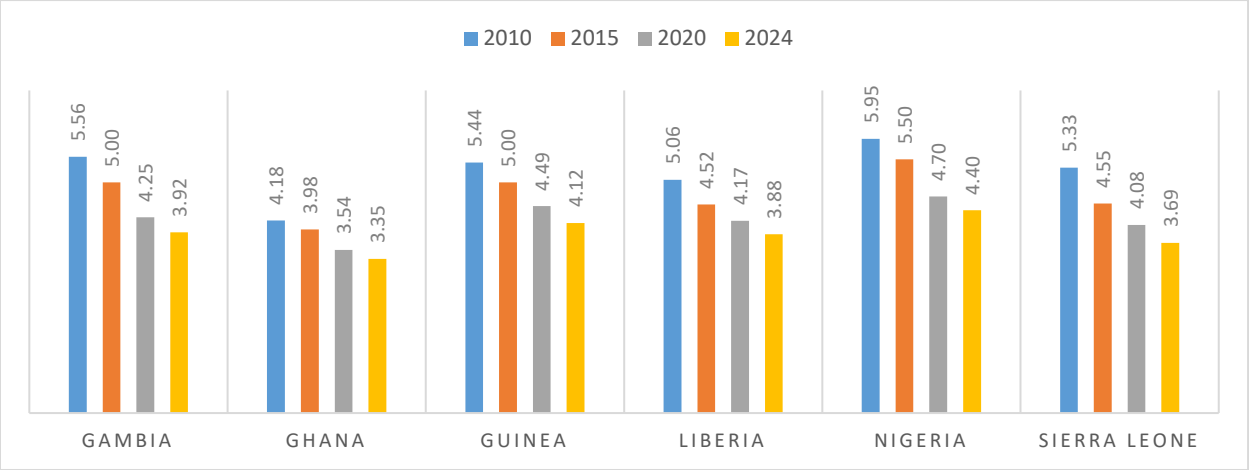
Cross-country patterns in urbanisation, contraceptive uptake, and fertility dynamics

Figures 4 and 5 jointly provide a descriptive synthesis of cross-country patterns linking urbanisation, contraceptive uptake, and childbearing outcomes across selected African countries. Together, they illuminate how fertility transitions unfold within heterogeneous urban contexts and how differences in contraceptive behaviour shape reproductive outcomes across countries that share broad regional and developmental characteristics.

Figure 4 traces urbanisation–fertility trajectories over time and reveals evidence of partial convergence in fertility decline, alongside persistent divergence in urbanisation pathways. Ghana and Sierra Leone exhibit a clear movement towards lower fertility regimes by 2024, reflecting sustained fertility reductions as urbanisation advances. In contrast, Nigeria and Guinea remain situated within comparatively higher fertility profiles, despite continued urban growth, indicating that urban expansion alone has not uniformly translated into rapid fertility decline. The Gambia and Liberia occupy intermediate positions, characterised by gradual fertility reduction accompanied by moderate urbanisation. These contrasting trajectories suggest that similar levels of urban growth can be associated with different fertility outcomes, underscoring the nonlinear and context-dependent nature of urbanisation–fertility linkages within the region.

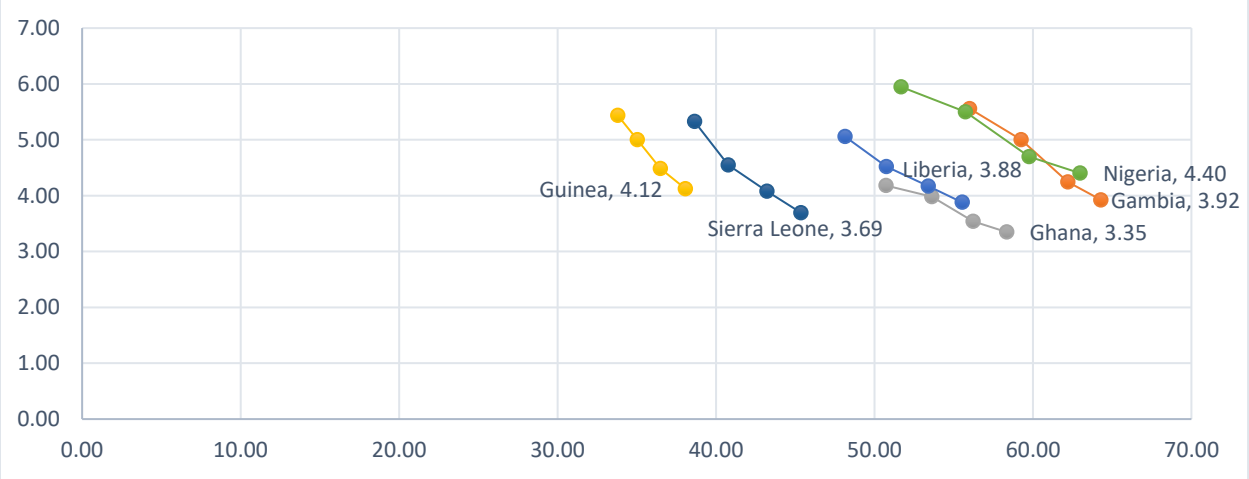
Figure 5 complements this dynamic perspective by comparing urbanisation levels and contraceptive uptake across countries in 2024. The figure shows a broadly positive association between urbanisation and contraceptive prevalence, with more urbanised countries generally exhibiting higher levels of contraceptive use. Ghana and Sierra Leone combine relatively higher urbanisation with greater contraceptive use, consistent with their positioning within lower-fertility regimes in Figure 4. In contrast, Nigeria and Guinea display lower contraceptive uptake despite substantial urban populations, highlighting a disconnect between urban concentration and effective access to or utilisation of family planning services. The Gambia and Liberia again present intermediate profiles, combining moderate urbanisation with rising contraceptive prevalence.

Taken together, the two figures suggest that partial convergence in fertility outcomes across selected African countries coexist with persistent divergence in both urbanisation intensity and contraceptive uptake. While urbanisation appears to create enabling conditions for fertility decline, its demographic effects are mediated by variations in contraceptive access, uptake and broader urban conditions. These patterns point to the existence of multiple urbanisation–reproductive pathways within a shared regional context, reinforcing the need to account for uneven urban development and differential reproductive health environments when



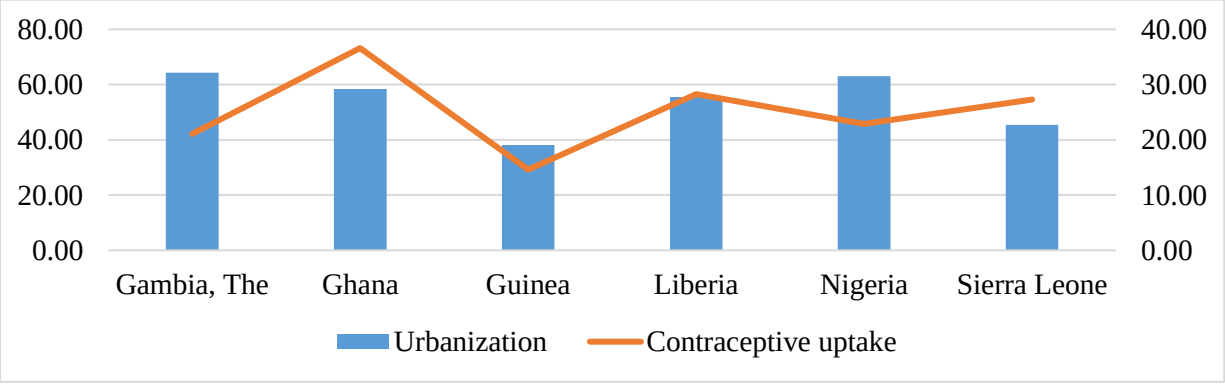
Source: Authors' illustration using World Bank data

Figure 3: Fertility rate for selected African countries



Source: Authors' illustration using World Bank data

Figure 4: Urbanisation and fertility trajectories for selected African countries.



Source: Authors' illustration using World Bank data

Figure 5: Urbanization and contraceptive uptake for selected African countries

assessing fertility transitions in rapidly urbanising African economies in the future

Discussion

The co-evolution of urban growth and contraceptive uptake observed across the selected African countries broadly reflects the expectation that fertility behaviour changes alongside structural transformation[28]. However, the cross-country trajectories illustrated in Figure 4 reveal that these transitions do not follow uniform paths. Ghana and Sierra Leone demonstrate a clearer movement toward lower fertility regimes as urbanisation advances, whereas Nigeria and Guinea continue to exhibit relatively higher fertility levels despite sustained urban expansion. The Gambia and Liberia occupy intermediate positions, characterised by gradual fertility decline accompanied by moderate urban growth. These divergent trajectories indicate that urbanisation alone does not consistently produce reproductive responses across national contexts.

The comparatively flatter trajectory observed in Nigeria and the persistently elevated fertility pattern in Guinea suggest that increasing urban residence can coexist with constrained reproductive health environments and uneven intra-urban access to services in both countries. Urban populations are not homogeneous, and the advantages often associated with city residents may be limited by disparities in infrastructure, service distribution, and socioeconomic conditions[29]. The evidence presented in Figure 5 supports this interpretation, showing that Nigeria and Guinea record lower contraceptive uptake despite their sizeable urban populations. This indicates that knowledge diffusion and urban exposure do not automatically translate into higher contraceptive use, where service availability, affordability, and continuity remain limited[10]. In such contexts, Structural constraints within health systems and welfare environments may therefore weaken the translation of urban growth into reproductive health gains.[31-35]

In contrast, the concurrent increase in contraceptive prevalence and decline in fertility observed in Ghana and Sierra Leone reflect contexts where urbanisation appears to be accompanied by stronger service provision and supportive institutional conditions[27]. Figures 4 and 5 suggest that these countries combine expanding urban populations with relatively steeper increases in contraceptive uptake. This pattern indicates that the demographic effects of urban growth are mediated by the accessibility and effectiveness of such services. The persistence of relatively higher fertility in Nigeria alongside slower contraceptive expansion reflects heterogeneous transition pathways shaped by differences in governance capacity, service delivery environments, and social conditions within urban spaces[11].

The differences between Ghana's steeper contraceptive trajectory and Nigeria's more gradual pattern further highlight the variation in institutional capacity and the maturity of family planning systems. The intermediate trajectories observed in Liberia and Sierra Leone, particularly the acceleration in contraceptive uptake after the early 2010s, suggest that periods of institutional recovery and health system restructuring can influence the pace of reproductive transitions. These contrasts indicate that urban development processes interact with pre-existing governance and service delivery structures, rather than producing uniform demographic outcomes. Consequently, urban expansion may simultaneously generate opportunities for improved reproductive health while reinforcing spatial inequalities in access to services[12].

Taken together, the descriptive evidence from the trajectory analysis and the urbanisation–contraceptive comparison indicates that the relationship between urban growth and reproductive change is mediated by structural and institutional conditions. While some countries demonstrate patterns consistent with declining fertility alongside urbanisation, others reveal persistent disparities in contraceptive uptake and reproductive outcomes. These findings suggest that urban transformation alone is insufficient to produce widespread improvements in reproductive health. Instead, the demographic benefits of urbanisation depend on the extent to which urban development is accompanied by effective service provision, equitable infrastructure, and supportive governance environments[30].

The policy implication is that urban areas often provide improved access to reproductive health services and family planning information, which contributes to increased contraceptive use and reduced fertility rates. Hu et al.[36] reported that

health conditions such as viral infections can affect female fertility outcomes and reproductive indicators. These findings, in line with Kang *et al*.[37] that highlighted that immune cell dynamics in the uterus play an important role in reproductive functioning and fertility potential. In a similar note, Yang *et al*.[38] demonstrated that COVID-19 vaccination among couples undergoing assisted reproductive technology does not negatively affect reproductive outcomes. Findings of Yang *et al*.[39] also identified hormonal receptor mechanisms that regulate reproductive physiology and fertility processes Ma *et al*.[40] showed that genetic and inflammatory pathways, particularly the interleukin-6 receptor, are associated with recurrent spontaneous abortion. Fei and Wang[41] emphasized that parental gender preferences and cultural expectations continue to shape fertility ideals and childbearing decisions.[31]

Limitations

This study exhibits several conceptual, methodological, and empirical strengths that enhance its contribution to debates on urbanisation and reproductive behaviour in African contexts. Conceptually, the analysis is explicitly anchored in established perspectives on demographic transition, urban social change, and reproductive health and rights, enabling a theoretically informed interpretation of patterned associations between urbanisation trajectories, contraceptive uptake, and childbearing outcomes.

This integrative framing ensures consistency among the study's objectives, research questions, and interpretive assertions, while preventing causal overextension. Methodologically, the qualitative, descriptive–analytical design provides analytical transparency by making explicit the logic of interpretation, the comparative strategy, and the boundaries of inference. The use of harmonised World Bank WDI indicators affords cross-country comparability over time, facilitating consistent longitudinal and contrastive analysis across diverse national contexts. The reliance on standardised international data enhances replicability, while the graphical trend analysis renders the co-evolution of urbanisation, contraceptive prevalence, and fertility trajectories accessible to both scholarly and policy audiences.Empirically, the comparative scope across six selected African countries advances the literature beyond single-country accounts, enabling identification of convergences, divergences, and differentiated transition pathways within a shared regional and infrastructural policy context. The qualitative interpretive reading of macro-level indicators adds value by situating descriptive patterns within broader theoretical debates on uneven urbanisation and stratified reproductive change, thereby generating policy-relevant insights grounded in longitudinal patterning rather than model-dependent estimates.

The dependence on aggregated, secondary macro-level indicators limits the ability to capture intra-urban heterogeneity and micro-level reproductive decision-making, including the varied experiences of populations within informal settlements and peripheral urban areas. As a result, observed national trajectories should be interpreted as composite expressions of heterogeneous urban contexts rather than as uniform urban experiences. Differences in statistical capacity and reporting practices between countries can cause inconsistencies in measurements and smoothing over time in WDI series. This can make trend comparisons seem less accurate. While the harmonisation protocols of WDI support comparability, periodic revisions and data gaps in some country series may influence the interpretation of slopes and temporal alignments.

The descriptive and non-causal analytical orientation precludes attribution of directionality or estimation of effects, limiting inference to patterned co-evolution and contextualised association. This methodological choice reflects the study's theoretical and epistemological positioning rather than an analytic deficiency, privileging interpretive synthesis and comparative pattern recognition over causal modelling. Finally, the focus on a selected set of West African countries supports contrastive insight within a shared policy frame but circumscribes generalisation beyond the cases examined. Future extensions may enhance this foundation by incorporating subnational or mixed-method evidence to elucidate the ways in which macro-level trajectories are influenced by intra-urban inequalities and service environments.

Conclusion

This study examined how divergent urbanisation trajectories across selected African countries are

associated with patterns of contraceptive uptake and childbearing outcomes, using a descriptive and comparative reading of harmonised World Bank WDI indicators. The integrated evidence from the cross-country trajectory analysis and the comparison of urbanisation and contraceptive uptake demonstrates that sustained urban expansion has co-evolved with declining fertility and rising contraceptive prevalence, but with marked heterogeneity in levels, pace and sequencing across countries.

Across the six cases, countries exhibiting steeper increases in contraceptive uptake also displayed more pronounced fertility decline, while contexts characterised by flatter contraceptive trajectories retained comparatively higher fertility profiles despite substantial urban growth. Ghana and Sierra Leone illustrate pathways in which higher urbanisation coincides with stronger contraceptive uptake and movement towards lower fertility regimes, whereas Nigeria and Guinea exemplify contexts in which urban expansion has not been matched by commensurate gains in contraceptive use. Liberia and The Gambia occupy intermediate positions, reflecting gradual reproductive change shaped by moderate urbanisation and evolving service environments. These patterns indicate differentiated urbanisation–reproductive pathways rather than convergence towards a single urban reproductive regime.

By explicitly linking urbanisation trajectories to contraceptive uptake and fertility outcomes, the analysis addressed the study's objectives by documenting cross-country variations, situating these variations within a shared regional and infrastructural policy context, and interpreting observed divergences through contextualised patterning. The findings demonstrate that urban growth does not translate into reproductive changes in a linear or homogeneous manner. Instead, the timing and slope of contraceptive uptake relative to urban expansion are central to explaining the differences in fertility decline across cases.

Situated within the study's conceptual framing, the findings partially align with demographic transition perspectives while qualifying their universalist assumptions. The observed heterogeneity corresponds more closely with urban social change perspectives that emphasise differentiated urban advantage and infrastructural inequality, as well as with reproductive health and rights frameworks that foreground access, service environments, and agency as mediating conditions of reproductive behaviour. The lack of uniform convergence in contraceptive uptake despite widespread urbanisation offers limited support for diffusionist accounts and reinforces structurally mediated interpretations of reproductive change.

The study contributes to the literature by providing a comparative, macro-level synthesis of urbanisation, contraceptive uptake, and fertility dynamics in African contexts. By foregrounding divergence within a shared regional frame, the analysis extends existing work that often privileges single-country or cross-sectional designs and offers policy-relevant insights grounded in longitudinal patterning rather than causal claims. The descriptive evidence suggests that urban growth alone is insufficient to ensure broad-based reproductive health gains, underscoring the importance of embedding family planning provision within urban development and governance processes, particularly in rapidly expanding and uneven urban environments.

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References

1. Rigolon A, Browning MHEM, Lee K , Shin S. Access to urban green space in cities of the Global South: A systematic literature review. *Urban Science* 2018; 2(3): 67. https://doi.org/10.3390/urbansci2030067
2. Joshi S, Bailey A , Datta A. On the move? Exploring constraints to accessing urban mobility infrastructures. *Transport Policy* 2021; 102: 61–74. https://doi.org/10.1016/j.tranpol.2020.11.005
3. Korah A , Wimberly MC. Smaller cities have large impacts on West Africa's expanding urban system. *Sustainable Cities and Society* 2024; 106: 105381. https://doi.org/10.1016/j.scs.2024.105381
4. Titz A , Chiotha SS. Pathways for sustainable and inclusive cities in Southern and Eastern Africa through urban green infrastructure? *Sustainability* 2019; 11(10): 2729. https://doi.org/10.3390/su11102729
5. OECD , Sahel and West Africa Club. *Urbanisation and conflicts in North and West Africa*. Paris: OECD

Publishing; 2023. https://doi.org/10.1787/3fc68183-en
6. Essien E , Jesse EE. Urban informality in Nigeria: A midsized city perspective. *Environment, Development and Sustainability* 2024. https://doi.org/10.1007/s10668-024-05647-6
7. Azuh DE, Osabohien R, Orbih M ,Godwin A. Public health expenditure and under-five mortality in Nigeria: An overview for policy intervention. *Open Access Macedonian Journal of Medical Sciences* 2020; 8(E): 353–362.
8. Gershon O, Akhigbemidu A , Osabohien R. Domestic resource mobilization and under-five mortality in Nigeria. *Research in World Economy* 2020; 11(3): 320–332. https://doi.org/10.5430/rwe.v11n3p320
9. Jakovljevic M, Liu Y, Cerda A, Simonyan M, Correia T, Mariita RM, Kumara AS, Garcia L, Krstic K, Osabohien R , Toan TK. The Global South political economy of health financing and spending landscape–history and presence. *Journal of Medical Economics* 2021; 24(Sup1): 25–33. https://doi.org/10.1080/13696998.2021.2007691
10. Aprilla RM, et al. Urban–rural disparities in modern contraceptive use in sub-Saharan Africa: Evidence from DHS. *PLOS ONE* 2021; 16(3): e0248414. https://doi.org/10.1371/journal.pone.0248414
11. Harpham T, Tetui M, Smith R, Okwaro F, Biney A, Helzner J, Duminy J, Parnell S , Ganle J. Urban family planning in sub-Saharan Africa: An illustration of the cross-sectoral challenges of urban health. *Journal of Urban Health* 2022; 99(6): 1044–1053. https://doi.org/10.1007/s11524-022-00649-z
12. Apostolopoulou E, et al. Infrastructure-led development and uneven urban outcomes in the Global South. *World Development* 2023; 168: 106178. https://doi.org/10.1016/j.worlddev.2023.106178
13. Himaz R. Challenges associated with the BRI: A review of recent economics literature. *The Service Industries Journal* 2021; 41(7–8): 512–526. https://doi.org/10.1080/02642069.2019.1584193
14. Sharifi A, Khavarian-Garmsir AR, Allam Z , Asadzadeh A. Progress and prospects in planning: A bibliometric review of literature in urban studies and regional and urban planning, 1956–2022. *Progress in Planning* 2023; 173: 100740. https://doi.org/10.1016/j.progress.2023.100740
15. Feng Y, Ahuru RR, Anser MK, Osabohien R, Ahmad M , Efegber AH. Household economic wealth management and antenatal care utilization among business women in the reproductive-age. *African Journal of Reproductive Health* 2021; 25(6): 143–154.
16. Sui Y, Ahuru RR, Huang K, Anser MK , Osabohien R. Household socioeconomic status and antenatal care utilization among women in the reproductive-age. *Frontiers in Public Health* 2022; 9: 724337. https://doi.org/10.3389/fpubh.2021.724337
17. Nasir MH, Anser MK, Ahuru RR, Osabohien R, Ebiaku KC ,Abbas S. A comparative study of the effect of health insurance on women's use of health facility delivery: Evidence from demographic health survey in Benin Republic. *African Journal of Reproductive Health* 2022; 26(6): 104–115.
18. Xu Y, Peng MYP, Ahuru RR, Anser MK, Osabohien R , Aziz A. Individual and community-level factors associated with non-institutional delivery of women of childbearing-age in Nigeria. *Humanities and Social Sciences Communications* 2022; 9(1): 1–7. https://doi.org/10.1057/s41599-022-01168-7
19. Zhang X, Anser MK, Ahuru RR, Zhang Z, Peng MY, Osabohien R , Mirza M. Do predictors of health facility delivery among reproductive-age women differ by health insurance enrollment? A multilevel analysis of Nigeria's data. *Frontiers in Public Health* 2022; 10: 797272.
20. Boadu I. Coverage and determinants of modern contraceptive use in sub-Saharan Africa: Further analysis of demographic and health surveys. *Reproductive Health* 2022; 19(1): 18. https://doi.org/10.1186/s12978-022-01332-x
21. Matthew OA, Osabohien R, Fagbeminiyi F , Fasina A. Greenhouse gas emissions and health outcomes in Nigeria: Empirical insight from autoregressive distributed lag technique. *International Journal of Energy Economics and Policy* 2018; 8(3): 43–50.
22. Urhie E, Afolabi A, Afolabi A, Matthew O, Osabohien R , Ewetan O. Economic growth, air pollution and health outcomes in Nigeria: A moderated mediation model. *Cogent Social Sciences* 2020; 6(1): 1719570. https://doi.org/10.1080/23311886.2020.1719570
23. Apostolopoulou E, Cheng H, Silver J , Wiig A. Cities on the new silk road: The global urban geographies of China's Belt and Road Initiative. *Urban Geography* 2024; 45(6): 1095–1114. https://doi.org/10.1080/02723638.2023.2247283
24. Upadhyay UD, Gipson JD, Withers M, Lewis S, Ciaraldi EJ, Fraser A, Huchko MJ , Prata N. Women's empowerment and fertility: A review of the literature. *Social Science & Medicine* 2014; 115: 111–120. https://doi.org/10.1016/j.socscimed.2014.06.014
25.World Bank. *World Development Indicators.* Washington DC: World Bank; 2024. https://databank.worldbank.org/source/world-development-indicators
26.UN DESA. *World urbanization prospects: The 2018 revision.* New York: United Nations; 2019. https://doi.org/10.18356/625fcb1f-en
27. Bongaarts J. Fertility transition in sub-Saharan Africa: The role of family planning. *Population and Development Review* 2017; 43(S1): 39–58. https://doi.org/10.1111/j.1728-4457.2017.00185.x
28. Dyson T. *Population and development: The demographic transition.* Oxford: Oxford University Press; 2010. https://doi.org/10.1093/acprof:oso/9780199562427.001.0001
29. Montgomery MR. Urban poverty and health in developing countries. *Population and Development Review* 2009; 35(1): 121–138. https://doi.org/10.1111/j.1728-4457.2009.00294.x
30.Starrs AM, Ezeh AC, Barker G, Basu A, Bertrand JT, Blum R, Coll-Seck AM, Grover A, Laski L, Roa M, Sathar ZA. Accelerate progress—sexual and reproductive health and rights for all: report of the Guttmacher–Lancet Commission. The lancet. 2018;391(10140):2642-92

31. Ai W, Aderemi TA, Bassey R , Khalid AA. Out-of-pocket expenditure and maternal mortality nexus in China: Implications for the Sustainable Development Goal 3. *African Journal of Reproductive Health* 2023; 27(12): 94–100.
32. Li H, Zhang X, Ma F , Osabohien R. Out-of-pocket medical expenditures, remittances and health outcomes in China. *African Journal of Reproductive Health* 2024; 28(8): 122–132.
33. Osabohien R, Jaaffar AH, Akpa AF , Jakovljevic M. Mobile money, medical cost anxiety and welfare of individuals within the reproductive age in Malaysia. *Humanities and Social Sciences Communications* 2024. https://doi.org/10.1057/s41599-024-02767-2
34. Zhang C, Jing X, Wang Z , Chen H. Belt and Road Initiative and urban landscapes: Quantifying land use changes and development strategies in Minsk, Vientiane, and Djibouti. *Land* 2025; 14(4): 875. https://doi.org/10.3390/land14040875
35. Jia H, Han X, Aderemi TA, Ifekwem NE , Al-Faryan MAS. Out-of-pocket expenditure and human welfare in Nigeria: Evidence from a fully modified ordinary least squares regression. *African Journal of Reproductive Health* 2025; 29(2): 151–159.
36. Hu YL, Zhang YJ, Lv XY, Liu RL, Zhong ZH, Fu LJ, Bao MH, Geng LH, Xu HJ, Yu SM, Ding YB. Impact of Omicron variant infection on female fertility and laboratory outcomes: a self-controlled study. American Journal of Reproductive Immunology. 2024;92(5):e70012. https://doi.org/10.1111/aji.70012
37. Kang S, Jin S, Mao X, He B, Wu C. CD4+T , CD8+T cells in uterus exhibit both selective dysfunction and residency signatures. Journal of Immunology Research. 2024;2024(1):5582151. https://doi.org/10.1155/2024/5582151
38. Yang J, Yao YL, Lv XY, Geng LH, Wang Y, Adu-Gyamfi EA, Wang XJ, Qian Y, Chen MX, Zhong ZH, Li RY, Wan Q, Ding YB. The safety and efficacy of inactivated COVID-19 vaccination in couples undergoing assisted reproductive technology: a prospective cohort study. Vaccine. 2025; 45:126635. https://doi.org/10.1016/j.vaccine.2024.126635
39. Yang Z, Ping YQ, Wang MW, Zhang C, Zhou SH, Xi YT, Zhu KK, Ding W, Zhang QY, Song ZC, Zhao RJ. Identification, structure, and agonist design of an androgen membrane receptor. Cell. 2025;188(6):1589-604.
40. Ma W, Gu Z, Lin Q, Cao M, Zhong J, Li X, Li H, Lin Y, Lin H, Xu M, Liu J, Du L, Song G. Integrative genetic and multi-omics analysis reveals the interleukin-6 receptor's role in recurrent spontaneous abortion. Frontiers in Immunology.2025;16:1659251. https://doi.org/10.3389/fimmu.2025.1659251
41. Fei Z, Wang Y. Parental gender preferences and fertility ideals in China. Acta Psychologica. 2026; 264:106523. https://doi.org/10.1016/j.actpsy.2026.106523