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Fertility Policy Transitions and Female Physical and Mental Health: Evidence from China

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Abstract: Over the past decade, China has experienced rapid and large-scale fertility policy transitions, shifting from a strict one-child policy to a comprehensive three-child policy, which provides a unique natural experiment to explore how policy-driven fertility pattern changes affect women's physical and mental health. To address the absence of an integrated analytical framework, we developed a multidimensional framework synthesizing life course epidemiology, allostatic load theory, resource allocation theory, and cumulative health disadvantage theory, combined with systematic literature review and policy analysis. Empirical evidence indicates that post-policy maternal populations are characterized by advanced age, higher parity, and prolonged interpregnancy intervals. These shifts have elevated perinatal complication risks, which in turn heighten long-term cardiometabolic disease burdens and exacerbate psychological distress, with rural women disproportionately affected. While China's experience offers valuable insights for global reproductive health research, existing studies remain predominantly observational, with insufficient long-term follow-up data. We recommend optimizing maternal health services, increasing rural healthcare investment, strengthening supportive policies, and conducting long-term cohort studies to improve women's health outcomes.

1. Introduction

Pregnancy and parturition involve profound physiological adaptive changes, which exert long-lasting impacts on women's cardiovascular function, metabolic homeostasis and mental health. The association between reproductive history and maternal physical and mental health follows a nonlinear pattern, modulated by parity, maternal age at childbirth, and interpregnancy interval.

Unlike most countries that adopt gradual adjustments to fertility policies, China has implemented a series of intensive policy reforms within a short period, including the selective two-child policy, the universal two-child policy, and the three-child policy. Specifically, China enforced the one-child policy starting in 1979. The selective two-child policy was launched in 2013, allowing couples with either partner as an only child to have a second child legally. The universal two-child policy was fully implemented in 2015, followed by the introduction of the three-child policy in 2021. These rapid institutional changes have reshaped the reproductive trajectories of hundreds of millions of women and formed a globally rare pattern of interrupted and delayed childbearing. During the one-

child policy era, the reproductive pathway of most urban women was strictly restricted to a single birth. After policy relaxation, a large number of women with one child re-entered the reproductive cycle after a break of several to more than ten years. National data show that the proportion of advanced-age mothers rose from 14.6% in the one-child policy period to 31.6% in the universal two-child policy period [1]. This unique contextual setting provides a valuable opportunity to explore how fertility policy shifts affect maternal physical and mental health.

Although extensive literature has documented the relationship between childbearing and women's health, systematic research from the perspective of China's fertility policy transition remains limited. First, most existing studies on parity and women's health originate from European and American countries, where childbearing is largely a voluntarily chosen continuous pattern, which differs substantially from China's policy-driven "interruption-restart" reproductive behaviour [2]. Second, existing studies tend to examine parity, childbearing age and interpregnancy interval in isolation, with most focusing on short-term perinatal outcomes rather than long-term chronic disease risks, while insufficient attention has been paid to mental health problems. Third, mechanistic evidence linking policy changes to maternal physical and mental health remains scarce. It is urgent to develop an integrated theoretical framework to explain how fertility policy shifts shape women's physical and mental health by altering reproductive behavioural patterns.

This study aims to: (1) construct a comprehensive four-dimensional framework to interpret the impacts of China's fertility policy transition on maternal physical and mental health; (2) systematically synthesize findings from Chinese cohort studies and policy analyses; (3) summarize key evidence and draw policy implications for global reproductive health practice.

2. Study Design and Methods

This study employed a theory-driven approach to explore the impacts of China's fertility policy transitions on women's physical and mental health. A four-dimensional analytical framework was constructed by systematically integrating four core theories—life course epidemiology, allostatic load theory, resource allocation theory, and cumulative health disadvantage theory—to elaborate the mechanisms and internal logic underlying these impacts. This framework incorporates multidimensional interrelated factors: the biological dimension covers key physiological indicators (parity, childbearing age, interpregnancy interval), the economic dimension focuses on resource scarcity constraints (especially the allocation of health investment and time resources), and the sociological dimension addresses gender norms and social pressure, aiming to reveal multi-pathway, multi-dimensional transmission mechanisms of policy-induced reproductive behaviour changes on maternal health and explore heterogeneous effects across women with different endowments.

An evidence base was established through systematic literature reviews and policy analyses, with systematic searches conducted in major academic databases (PubMed, Web of Science, Google Scholar) focusing on Chinese empirical evidence; included studies were published between 2016 and 2025, covering fertility policy, multiple pregnancy, advanced maternal age, interpregnancy interval, and maternal physical and mental health to capture research outputs post-implementation of China's universal two-child policy. A qualitative and interpretive analytical method was used to integrate multiple evidence sources, identify causal mechanisms, outcome indicators, and contextual factors of policy impacts, and thematically organize evidence into four domains: gestational and perinatal health outcomes, long-term chronic disease risks, postpartum mental health, and urban–rural health disparities.

3. Theoretical Framework

This theoretical framework integrates four complementary theoretical perspectives: life course

epidemiology, allostatic load theory, resource allocation theory, and cumulative health disadvantage theory, to interpret the impacts of fertility policy changes on women's physical and mental health across multiple dimensions.

3.1. Life Course Epidemiology

Life Course Epidemiology (LCE) posits that cumulative and interactive biological, psychological and social factors across the entire life span jointly shape individual health outcomes [3]. For women, pregnancy, childbirth and the postpartum period constitute critical life-course exposure events, whose health implications can be interpreted through the sensitive period model and cumulative risk model.

First, the pregnancy period represents a typical biological sensitive period, in which exposure factors exert far greater health hazards than in non-sensitive stages. Second, the cumulative model suggests that multiple pregnancies generate superimposed disease risks. Although physiological changes such as expanded blood volume, insulin resistance and upregulated lipid metabolism are partially reversible after delivery, residual damages accumulate with increasing parity and eventually exceed clinical thresholds, progressing into long-term chronic diseases. Third, the pathway model further indicates that childbearing age, interpregnancy interval and breastfeeding behaviour form a chained exposure pathway that shapes subsequent disease risk. Existing studies confirm that higher parity increases maternal risks of physical impairment, prenatal and postpartum depression, and mortality [4]. Women with more children are also more vulnerable to anxiety and depressive symptoms [5].

China's fertility policy transition has rendered such health accumulation a globally distinctive pattern. During the one-child policy era, reproductive trajectories of most urban women were restricted to a single birth. Relevant evidence indicates that the policy reduced total pregnancies and deliveries, thereby lowering maternal physical impairment and mortality, and forming an objective "low-parity protective effect" [6]. Following policy relaxation, numerous one-child women re-entered the reproductive cycle after a break of several to more than a decade, resulting in concentrated accumulation of reproductive burden within a compressed time window. This institutionally induced "interruption-restart" reproductive pattern exposes women not only to cumulative physiological strain from repeated pregnancies but also to excessively long Interpregnancy Interval (IPI). Both short and prolonged IPI elevate the risk of adverse perinatal outcomes [7]. Furthermore, longer IPI is often accompanied by advanced maternal age, which brings additional health challenges. Multiple studies have verified that advanced maternal age is significantly associated with chromosomal abnormalities, elevated miscarriage risk, stillbirth and other adverse perinatal outcomes [8].

3.2. Allostatic Load Theory

Allostatic load theory explains how chronic stress leads to physiological wear and tear through persistent overactivation of the neuroendocrine, immune and metabolic systems [9]. Cumulative allostatic load serves as an important precursor to cardiovascular diseases and is closely linked to mental disorders such as depression and anxiety.

Against the backdrop of China's fertility policy shifts, allostatic load theory provides a critical mechanistic explanation for postpartum mental health. Policy-driven delayed childbearing, coupled with social expectations of intensive motherhood, exposes women to three major stressors: physiological recovery demands, heavy childcare burdens, and additional health anxiety related to late childbearing. Research demonstrates that high allostatic load is not only strongly correlated with gestational complications but also persists in elevating cardiovascular disease risk for 2 to 7

years after delivery [10]. The sharp rise in the proportion of advanced-age mothers after policy relaxation implies that a large number of women experience superimposed pregnancy-related physiological stress at an age when allostatic load has already naturally accumulated, highlighting the need for close attention to their long-term mental health consequences.

3.3. Resource Allocation Theory

Resource allocation theory emphasizes that households face inherent trade-offs due to the scarcity of economic and time resources [11]. From the perspective of economic resource allocation, constrained by limited household wealth, mothers often sacrifice their own well-being to secure better living conditions for children, such as reducing health investment and nutritional intake [12]. A study on sibling structure and maternal health finds that rural Chinese women with hypertension are less likely to receive medical treatment if they have more sons [13], reflecting maternal resource transfer and health sacrifice for offspring.

From the perspective of individual time allocation, women devote substantial time to domestic labour and paid work at the cost of rest. In the Chinese context, mothers are traditionally regarded as primary family caregivers, undertaking housework, spousal and elderly care, as well as childbearing and childcare responsibilities. Women therefore play multiple roles as wives, daughters and mothers. With socioeconomic development, increasing female labour force participation brings additional occupational pressure [14]. Given the fixed endowment of time, multiple social roles consume considerable physical and mental resources, resulting in insufficient sleep and rest, and further raising disease susceptibility.

3.4. Cumulative Health Disadvantage Theory

Cumulative disadvantage theory argues that initial adverse conditions expand gradually over time into substantial health disparities through continuous accumulation [15]. This theory is particularly applicable to the dramatic shifts in China's fertility policies. Urban women with high income and educational attainment can buffer the health risks of policy-induced late childbearing by accessing high-quality prenatal care, postpartum rehabilitation and assisted reproductive services. In contrast, rural and low-income women often face poorer nutritional status, limited medical access and heavier care burdens when choosing late second childbearing, which exacerbates cumulative health disadvantages. China's unique urban–rural dual fertility governance — the one-and-a-half-child policy implemented in rural areas during the one-child era, which allowed a second birth if the first child was a daughter — further complicates the accumulation process, leading to marked disparities in reproductive exposure patterns and long-term health trajectories across household registration groups and birth cohorts.

4. Empirical Evidence

The multidimensional health mechanisms elaborated in the theoretical framework have been empirically validated by growing empirical evidence in recent years. This section systematically reviews changes in women's physical and mental health following China's fertility policy transition from four dimensions: gestational and perinatal health, long-term disease risks, postpartum mental health, and urban–rural health disparities.

4.1. Gestational and Perinatal Women's Health

Since the implementation of the universal two-child policy, China's maternal population has

undergone pronounced structural changes, with a sharp rise in the proportion of advanced-age mothers (⩾35 years) and an increasing parity ratio as the two most prominent features. A national comparative study based on two major nationwide datasets covering 67.8 million births and 31.8 million deliveries found that during the policy impact period (July 2016 to December 2017), the proportions of multiparous women and mothers aged over 35 increased by 9.1 and 5.8 percentage points respectively [2]. Another retrospective study including 39,016 singleton high-risk pregnancy cases from 2010 to 2021 indicated that the share of advanced-age mothers rose from 14.6% in the one-child policy period to 31.6% in the universal two-child policy period, while the number of multiparous women nearly tripled [1].

The combination of advanced maternal age and higher parity significantly amplifies the risk of gestational complications. A pre-post comparative study in Huai'an provides key evidence: after policy implementation, the prevalence of multiple high-risk factors in pregnancy (MHFP) increased from 25.8% in 2015 to 38.4% in 2020-2021, with chronic conditions such as gestational diabetes and abnormal body mass index showing the largest growth [16]. Community prospective cohort studies further quantified the independent risk effect of advanced age. Among primiparous women, those aged over 35 exhibited 8.44 times higher risk of gestational hypertension and 9.92 times higher risk of preeclampsia/eclampsia compared with the 20-29 age group. Among women who have given birth before, those aged 35 and over are 3.29 times more likely to develop gestational diabetes and 1.89 times more likely to have a preterm birth [17].

Changes in the cesarean section rate present a complex pattern. Data from Hubei and Gansu provinces show that the overall cesarean section rate gradually declined from 45.1% in the one-child policy period to 38.9% after the universal two-child policy, whereas the proportion of cesarean deliveries indicated by uterine scar increased by 118.8% [18]. This contradictory trend reflects the dual effects of policy transition. On the one hand, interventions promoting vaginal delivery and regulations limiting primary cesarean sections have achieved initial effects. On the other hand, a large cohort of women with uterine scars caused by historically high cesarean rates entered subsequent childbearing cycles after policy relaxation, further exacerbating maternal health risks.

4.2. Long-Term Disease Risks

Gestational complications are not merely perinatal hazards but also early warning signals for women's long-term cardiometabolic health. Policy-driven parity accumulation and delayed childbearing may translate into a higher burden of chronic disease via residual effects of gestational cardiometabolic remodeling. Each pregnancy induces persistent physiological adaptations; as parity rises, residual dysfunction accumulates, gradually elevating long-term cardiovascular disease risk.

A cross-sectional study of 1,226 women aged 30 years and over in Chongqing revealed a dose–response relationship between parity and cardiometabolic disease (CMD). Compared with women with one live birth, those with two and three or more live births had a 1.91-fold and 2.15-fold higher risk of CMD, respectively. Notably, subgroup analysis found that among women who completed childbearing under different policy regimes, each additional live birth significantly increased the risk of obesity and CMD in younger cohorts (⩽45 years). This implies that women who had children under policy restrictions may face higher long-term disease risks than peers with unregulated fertility patterns [19]. Metabolic syndrome, a precursor to cardiovascular disease and type 2 diabetes, is also strongly linked to reproductive history. A cross-sectional study of 4,453 women aged 40 years and over in Guangxi reported a 23.9% prevalence of metabolic syndrome; women with three or more live births had a 1.56-fold higher risk than those with one [20]. Importantly, multiparous women often exhibit multiple risk factors—older age, higher gestational

BMI—making it difficult to attribute policy-related health impacts to a single factor.

4.3. Postpartum Mental Health

Fertility policy shifts have reshaped not only women's physical health but also their psychological well-being. Women face heightened risks of postpartum depressive symptoms and impaired task performance [21]. However, the direction of mental health effects is not unidirectional. A large-scale survey in Suzhou (3,113 questionnaires) provided nuanced insights: in the full sample and prenatal subgroup, a second birth correlated with increased anxiety; yet in the postpartum subgroup, it was associated with reduced depressive symptoms [22]. This seemingly paradoxical result may reflect two dynamics: prenatal anxiety likely stems from concerns about pregnancy risks, caregiving for the first child, and perceived resource constraints; lower postpartum depression risk may reflect advantages in childcare experience, social support, and psychological adjustment among multiparous women.

These findings highlight stage heterogeneity in the mental health impacts of fertility policy change—psychological trajectories differ fundamentally between the prenatal and postpartum periods, and between the initial policy exposure and long-term adaptation phases. Women who delay childbearing to a later age face not only higher perinatal complication risks but also more complex psychological burdens, underscoring the need for policymakers to integrate mental health services into continuous postpartum care systems when advancing fertility support measures.

4.4. Urban–Rural Disparities in Women's Health

The health consequences of fertility policy transition are further stratified and magnified under China's urban–rural dual structure. Analysis of administrative birth records in Guangdong Province reveals notable household registration (hukou) disparities in health service utilization: rural migrant women are significantly less likely to deliver in tertiary hospitals than urban residents, yet exhibit a higher cesarean section rate [23]. This paradox reflects a structural dilemma faced by rural women in balancing medical accessibility and service quality. While access to high-tier healthcare resources remains limited, lower-tier institutions tend to adopt more lenient criteria for cesarean delivery.

Spatial accessibility of maternal and child health services also displays a clear urban–rural gradient. Spatiotemporal analysis covering Nanning, Guangxi, from 2013 to 2019 shows that although overall service accessibility increased following the relaxation of the two-child policy, with an average annual growth of 5.04% at the county level, availability gradually declined from urban centers to peripheral rural areas, with low-access zones predominantly concentrated in remote countryside [24]. This pattern indicates that the rising number of high-risk pregnancies induced by policy change has exerted an uneven pressure on grassroots maternal health systems. Urban areas, with concentrated medical resources, are better positioned to buffer health risks, whereas rural regions face a more severe mismatch between service demand and supply.

Notably, urban and rural areas demonstrate divergent trends in cesarean section rates. National household health survey data indicate that the overall rise in cesarean deliveries between 2008 and 2018 was mainly driven by increases in rural and less developed western regions. While the cesarean rate among urban primiparous women declined from 36.8% in 2008-2009 to 22.2% in 2016-2018, the corresponding change in rural areas was statistically insignificant [25]. This suggests that urban–rural gaps in obstetric intervention may continue to widen amid fertility policy adjustments. Lacking adequate emergency obstetric resources, rural women face a dilemma in which cesarean delivery may represent either unnecessary over-intervention or a necessary safeguard for high-risk pregnancies. This predicament becomes particularly acute amid the rising

prevalence of advanced maternal age and higher parity driven by fertility policy changes.

5. Conclusions

China's fundamental fertility policy transition has reshaped the maternal population into a structure characterized by advanced age (⩾35 years), increased higher-order parity, and prolonged interpregnancy intervals, with most women re-entering childbearing after a break of several to over ten years. These changes expose women to multifaceted health challenges: the combination of advanced age and multiple births significantly elevates perinatal complication risks, including gestational hypertension and diabetes, which in turn increase adverse perinatal outcomes such as preterm birth and low birth weight. Beyond the perinatal period, gestational complications act as early warnings of long-term cardiometabolic dysfunction, raising risks of chronic diseases like hypertension and type 2 diabetes that persist throughout women's lifetimes.

Additionally, policy-driven fertility changes intensify women's psychological stress and resource constraints. Balancing pregnancy, childbirth, childcare, and often paid work leaves women with limited health investment and leisure time, increasing risks of postpartum depression, anxiety, and persistent psychological distress, trapping them in dual physical and mental health impairments. These impacts are unevenly distributed due to China's urban-rural dual structure: rural women face disproportionately greater health risks, attributed to lower healthcare accessibility, inferior grassroots services, weaker health literacy, and limited psychological support, further widening urban–rural health gaps.

China's unique policy transition provides a natural experiment for global reproductive health research. Its rapid, large-scale reforms enable observation of population-level reproductive exposure changes; the urban–rural policy gradient offers a natural control to isolate policy effects; and the "interruption-restart" fertility model clarifies links between reproductive timing and long-term health, enriching global theoretical and practical evidence.

Notably, existing research has limitations: it is dominated by observational studies (restricting causal inference), lacks long-term follow-up data beyond five years postpartum, and insufficiently addresses subgroup heterogeneity. To mitigate these gaps and improve women's reproductive health, policy interventions should optimize targeted care for advanced-age and multiparous women, increase rural healthcare investment, enhance supportive policies for women's health and psychological well-being, and promote large-scale longitudinal cohort studies to inform evidence-based policy refinement.

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