

International Digital Organization for Scientific Research
IDOSR JOURNAL OF SCIENCE AND TECHNOLOGY 12(2):83-87, 2026.
<https://doi.org/10.59298/IDOSR/JST/26/122.8387>

IDOSR JST/26/1220000

Barriers to Accessing Iron Supplements in Low-Income Regions of Nigeria and Implications for Anemia Control

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ABSTRACT

Anemia remains a major public health problem in Nigeria, disproportionately affecting women of reproductive age, pregnant women, infants, and young children. Iron supplementation is a cornerstone intervention for prevention and treatment of iron deficiency anemia, yet access and sustained use are persistently suboptimal in low-income regions. This review synthesizes key barriers to accessing iron supplements in resource-constrained Nigerian settings, spanning health-system constraints (availability, stock-outs, costs, weak supply chains), service delivery challenges (limited antenatal coverage, long waiting times, poor counseling), sociocultural factors (beliefs, misconceptions, stigma, gender dynamics), individual-level constraints (side effects, low perceived need, forgetfulness), and broader structural determinants (poverty, insecurity, distance, transportation). We also highlight programmatic opportunities strengthening procurement and last-mile distribution, reducing out-of-pocket costs, improving counseling and side-effect management, integrating community delivery platforms, leveraging digital tools for adherence support, and aligning iron supplementation with food fortification and malaria control. Addressing these barriers using equity-focused, context-sensitive strategies is essential for reducing anemia burden and improving maternal and child outcomes in low-income Nigerian communities.

Keywords: anemia, iron supplementation, Nigeria, access, barriers, antenatal care, supply chain, adherence, low-income, public health

INTRODUCTION

Anemia remains one of the most persistent and inequitable public health problems in Nigeria, with the greatest burden concentrated among women of reproductive age, pregnant women, and young children living in poverty. National survey evidence shows that anemia affects about 58% of women (15–49 years) and 68% of children (6–59 months), with higher prevalence in rural settings than urban areas. In practical terms, this means that in many low-income communities particularly rural settlements and underserved peri-urban areas anemia is not an occasional clinical finding but a population-wide condition that undermines maternal health, fetal growth, child development, school readiness, and later economic productivity [1].

Iron deficiency is a major contributor to anemia globally and in Nigeria, although anemia in low-income Nigerian settings is typically multifactorial. Malaria, helminth infections, chronic inflammation, poor dietary diversity, and inherited hemoglobin disorders often coexist with iron deficiency, compounding the severity and complicating prevention strategies. Even within this complexity, improving iron status remains central to anemia control because pregnancy substantially increases iron requirements and many women enter pregnancy with low iron stores due to repeated pregnancies, menstrual losses, dietary constraints, and poverty-related food insecurity [2]. Consequently, antenatal iron supplementation commonly delivered as iron–folic acid supplementation (IFAS) is a cornerstone of maternal nutrition programming.

Nigeria's national micronutrient guidance recommends daily iron and folic acid supplementation during pregnancy, commonly operationalized as 60 mg elemental iron plus 0.4 mg folic acid (in line with high-burden settings). At the global level, the World Health Organization similarly recommends daily oral iron and folic acid as part of routine antenatal care to reduce risks of maternal anemia, iron deficiency, and low birth weight, and suggests 30–60 mg iron with 400 µg folic acid, with the higher iron dose preferred where anemia is a severe public health problem [3].

Despite the clarity of these recommendations, supplementation coverage and “effective use” remain inadequate. Nigeria’s Demographic and Health Survey indicates that while many women report taking iron tablets at some point in pregnancy, only about 31% achieve ≥ 90 days of consumption, an adherence threshold that approximates meaningful exposure in program monitoring. This gap highlights a central implementation challenge: the problem is not only whether supplements are recommended, but whether women in low-income regions can reliably access, receive, and sustain supplementation for long enough to generate measurable improvements in hemoglobin status and pregnancy outcomes [4].

Access to iron supplements in low-income regions is shaped by intersecting barriers across the health system and the household. On the supply side, primary health centers may face stockouts, weak last-mile distribution, limited staffing, and inconsistent counseling quality. On the demand side, women may encounter transport and opportunity costs, late initiation of antenatal care, low awareness of anemia risks, fear of side effects, competing household priorities, and social constraints affecting women’s autonomy. These barriers are intensified in contexts affected by insecurity, seasonal inaccessibility, and fragile service delivery systems [5]. Therefore, understanding barriers to iron supplement access is essential for designing anemia-control strategies that are not merely policy-compliant but equity-focused and operationally feasible.

Nigeria carries a high anemia burden among women and children, with rural and low-income communities disproportionately affected. Although iron supplementation is a proven, recommended intervention within antenatal care, real-world program performance suggests that large numbers of women do not receive supplements consistently or do not consume them for sufficient duration. Evidence shows a pronounced gap between any reported intake and sustained intake for ≥ 90 days. This implies that existing delivery channels and adherence support mechanisms are not adequately overcoming structural and behavioral barriers in low-income settings [6]. The consequence is that anemia persists as a major contributor to maternal morbidity and adverse birth outcomes, while also sustaining a cycle of vulnerability in infants and children. When pregnant women remain anemic, risks increase for fatigue, reduced work capacity, infections, and complications; for the fetus and newborn, the risks extend to low birth weight and impaired early development. The persistence of anemia also signals inefficiencies in health spending and missed opportunities for integrating iron supplementation with other high-impact maternal and child health interventions, including malaria prevention, deworming where appropriate, and nutrition counseling [7]. However, interventions often fail when they focus narrowly on commodity distribution without diagnosing why women in low-income regions cannot obtain supplements on time, in adequate quantities, and with adequate support to manage side effects and maintain adherence. There is therefore a critical need to synthesize and clarify the barriers—health-system, socioeconomic, geographic, and sociocultural—that limit iron supplement access in low-income regions of Nigeria, and to examine how these barriers weaken anemia control efforts [8]. This study aims to review and synthesize available evidence on the barriers to accessing iron supplements, particularly iron-folic acid supplementation (IFAS) in low-income regions of Nigeria, and to examine how these barriers undermine anemia control among women of reproductive age, especially pregnant women. The review is significant for four main reasons. First, it responds to a major public health and equity challenge: anemia in Nigeria remains highly prevalent and is disproportionately concentrated among poorer and rural populations, meaning that the women with the greatest need often face the greatest access constraints. Second, it supports program improvement by shifting attention from “coverage” (tablets distributed or ever used) to “effective coverage” (consistent access, adequate duration, and adherence), by identifying obstacles across the access pathway commodity availability and stockouts, costs of attending antenatal care, acceptability issues such as misconceptions and side effects, and weak adherence support and follow-up. Third, it strengthens policy implementation by aligning with national guidelines that recommend routine IFAS in pregnancy and emphasize monitoring; the synthesis will generate practical insights for policymakers and primary health care managers to improve supply chains, counseling quality, community delivery options, and tracking indicators. Fourth, it contributes to integrated anemia control by situating supplementation within broader maternal health actions, linking IFAS to improved ANC utilization, malaria prevention, nutrition education, and community demand generation to achieve sustained reductions in anemia and better maternal–child outcomes in Nigeria’s most vulnerable communities.

Methods

This paper uses a narrative synthesis to summarize frequently reported implementation barriers affecting low-resource maternal and child health programs in Nigeria and similar contexts, with a specific focus on how these constraints shape anemia prevention and control. Evidence and examples are drawn from commonly described program experiences and published discussions rather than a formal systematic search, screening, and quality appraisal process. To ensure a coherent and practice-oriented organization, barriers are classified using an access framework comprising five interrelated dimensions: availability (presence of commodities, staff, and services), affordability (direct and indirect costs to households), accessibility (geographic, transport, and time-related constraints), acceptability (socio-cultural fit, perceptions, and trust in services), and adherence (sustained uptake of recommended interventions and follow-up). Each barrier category is then mapped to likely implications for anemia

control pathways, including screening coverage, iron–folate supplementation, nutrition counselling, treatment continuity, and referral completion. Although this approach does not estimate pooled effects or prevalence, it provides a structured overview intended to inform program design, highlight actionable leverage points, and generate testable priorities for operational research and future systematic reviews.

Burden of anemia and the role of iron supplementation in Nigeria

Anemia remains highly prevalent in low-income Nigerian communities because multiple, reinforcing drivers persist across households and the health system. A heavy infection burden, especially malaria and helminth infections, contributes to chronic blood loss, poor appetite, and inflammation that sequesters iron and reduces its availability for erythropoiesis [9]. At the same time, dietary patterns are often dominated by inexpensive staples that are rich in phytates, which inhibit iron absorption, while intake of bioavailable heme iron from animal-source foods is limited by cost and availability. Pregnancy further amplifies risk through expanded maternal blood volume and increased fetal iron requirements, making many women vulnerable to depletion without timely and adequate supplementation. Poverty and food insecurity constrain dietary diversity, delay care-seeking, and increase reliance on informal providers [10]. Health service gaps, including weak routine screening, late antenatal care booking, stock-outs, poor counseling, and incomplete adherence, also undermine prevention and treatment. In practice, iron supplementation is delivered primarily through antenatal care via routine iron–folic acid (IFA) for pregnant women, with additional pathways through child health services where iron drops, syrups, or micronutrient powders are available. Many families also obtain iron products from private pharmacies and patent medicine vendors, typically out-of-pocket, while community distribution occurs intermittently depending on state programs and donor support [11].

Barriers to accessing iron supplements in low-income regions of Nigeria

Access to iron supplements in low-income regions of Nigeria is constrained by interlocking supply-, demand-, and sociocultural barriers that disrupt both uptake and sustained use. On the supply side, frequent stock-outs driven by weak forecasting, delayed procurement, fragmented donor inputs, and fragile last-mile distribution mean that “free” supplements are often unavailable at facilities, pushing women to purchase privately or go without [12]. Although iron tablets do not require cold-chain storage, quality issues remain salient, including expired stock, counterfeit or substandard products, poor storage conditions, and inconsistent brands, especially in informal markets where regulation is limited and trust is low. Limited screening capacity further compounds the problem: where hemoglobin testing is absent or sporadic, anemia may be missed, supplementation may not be prioritized, and dosing may not be appropriately tailored, reducing perceived urgency [13]. Financial barriers include direct costs (out-of-stock purchases, lab tests, registration, and informal payments) and indirect costs (transport, time away from work, and childcare), which are intensified for women who may require partner approval to spend on travel. Geographic inaccessibility long distances, poor roads, seasonal flooding, inadequate transport, and insecurity reduces ANC attendance, the main distribution channel. Service delivery challenges such as long waits, crowded clinics, negative provider attitudes, and inadequate counseling foster discontinuation and misuse. Acceptability issues (misconceptions, preference for traditional remedies, and low confidence in facility medicines) reduce adherence, which is further undermined by gastrointestinal side effects, forgetfulness, dietary inhibitors, and pill burden [14]. Finally, gendered decision-making and policy/program fragmentation create inconsistent access over time.

Why these barriers matter: implications for anemia control

When access to iron supplements is constrained, anemia control efforts in low-income settings stall and the consequences cascade across the life course. In pregnancy, persistent iron deficiency anemia reduces oxygen delivery to tissues, driving fatigue, dizziness, reduced physical capacity, and impaired immunity effects that limit daily productivity and increase vulnerability to infections. Clinically, untreated anemia heightens the likelihood of adverse pregnancy complications and can worsen outcomes when combined with common co-morbidities such as malaria, helminth infections, and poor dietary intake [15]. At the fetal and newborn level, inadequate maternal iron is associated with poorer perinatal outcomes, including low birth weight and preterm birth, which contribute to neonatal morbidity and higher healthcare needs. The impact does not end at delivery: intergenerational effects arise when infants begin life with depleted iron stores, increasing the risk of anemia in infancy and early childhood periods when iron is essential for brain development, cognition, and immune function. These barriers also have a strong equity dimension. The poorest women are most dependent on public-sector services where supplements are intended to be free, yet they face the greatest constraints in reaching facilities, receiving adequate supplies, and adhering consistently [16]. When public delivery fails, wealthier households can substitute with private purchases, but poorer households cannot, widening health inequities and sustaining anemia as a preventable driver of maternal and child vulnerability.

Strategies to improve access and reduce anemia burden

Reducing anemia in low-income Nigerian settings requires a package that improves iron–folic acid (IFA) availability, affordability, uptake, and sustained use. Supply chains should be strengthened by forecasting needs from ANC attendance, maintaining buffer stocks, integrating IFA procurement into essential medicines financing, and tracking stock-outs through simple dashboards and routine facility audits. Affordability barriers must be addressed by

ensuring IFA is truly free in public facilities, bundling it with ANC services without hidden fees, and expanding insurance or community financing that covers preventive maternal commodities [17]. Access can expand through community delivery and task sharing: trained community health workers can provide refills, counseling, and adherence monitoring, complemented by outreach ANC days for hard-to-reach areas and quality-assured engagement of pharmacies/PMVs where they are key access points. Counseling should explain anemia risks, correct tablet use, and side-effect management, supported by reminders (SMS/WhatsApp, calendar packs). Finally, IFA should be integrated with malaria prevention, deworming, dietary diversification, fortification, and community engagement, including male involvement and trusted leaders to counter myths [18].

Research gaps and future directions

Key research gaps remain in Nigeria's iron supplementation landscape and should guide future programming. First, anemia-control efforts need state-level mapping of iron–folic acid (IFA) stock-outs, dispensing practices, and price variation across public vs private outlets to identify where access breaks down and where households are pushed into out-of-pocket purchase. Second, more qualitative evidence is needed to unpack community beliefs (including “big baby” myths), levels of trust in supplements, and how provider–client communication shapes uptake and persistence. Third, pragmatic implementation trials should compare facility-only delivery with community refill or outreach models to improve continuity between ANC visits [19]. Fourth, rigorous evaluation of digital adherence supports (SMS/WhatsApp reminders, peer support groups) is required, particularly for rural women with inconsistent clinic contact. Finally, research should test differentiated strategies tailored to high-risk subgroups, adolescents, first-time mothers, and displaced populations whose barriers, mobility, and decision-making constraints differ and may require distinct delivery and counseling approaches.

CONCLUSION

In conclusion, improving anemia control in low-income regions of Nigeria will depend less on knowing that iron–folic acid works and more on fixing the delivery and adherence systems that determine who actually receives and takes it. Persistent stock-outs, inconsistent dispensing, hidden costs, limited counseling time, and misinformation continue to undermine effective coverage, especially for rural and poor households. The next phase of action should be driven by evidence that is locally specific and implementation-oriented: state-level supply and price mapping to pinpoint bottlenecks; qualitative work to clarify beliefs, trust, and communication gaps; and pragmatic trials to identify the most reliable models for continuous access, including community refills and outreach. Digital reminders and peer support may help, but they must be tested under real rural constraints. Finally, differentiated strategies are essential for adolescents, first-time mothers, and displaced populations. Closing these gaps can shift supplementation from intermittent contact to sustained protection, translating policy into measurable reductions in maternal and child anemia.

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CITE AS: Ernest Nsubuga. (2026). Barriers to Accessing Iron Supplements in Low-Income Regions of Nigeria and Implications for Anemia Control. IDOSR JOURNAL OF SCIENCE AND TECHNOLOGY 12(2):83-87, 2026. <https://doi.org/10.59298/IDOSR/JST/26/122.8387>