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Complementary and Integrated Nutritional Interventions in Midwifery Care for Adolescent Reproductive and Respiratory Health in Urban Communities: A Systematic Literature Review

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Abstract

Urban adolescents and women of reproductive age continue to experience interconnected nutritional, reproductive, and respiratory health challenges, particularly in low- and middle-income countries. This systematic review aimed to synthesize recent evidence on complementary and integrated nutritional interventions within midwifery care to improve reproductive and respiratory health outcomes among urban adolescents. Following PRISMA 2020 guidelines, we conducted a systematic search in Scopus and supplemented it with manual reference screening for studies published between 2017 and 2025. Eligible studies included peer-reviewed English-language articles involving adolescents or women of reproductive age in urban settings. A total of 24 studies met the inclusion criteria. Four key themes emerged: anemia and nutritional deficiencies, reproductive health knowledge and access, respiratory health and environmental risks, and systemic barriers to healthcare services. The findings revealed persistent issues related to anemia, malnutrition, menstrual health, and limited reproductive health knowledge, while environmental exposures and unhealthy lifestyles contributed to poor respiratory outcomes. Socioeconomic inequality and restricted healthcare access further exacerbated these challenges. The review highlights the importance of integrated, community-based nutritional interventions within midwifery services to support better health outcomes and reduce urban health disparities.

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Introduction

Urbanization has transformed the global health landscape, particularly in low- and middle-income countries (LMICs), where rapid population growth, socioeconomic inequality, environmental degradation, and limited access to quality healthcare services continue to influence the health

outcomes of adolescents and women of reproductive age (Shi, 2022). This reflects a distinct urban health paradox in LMICs, whereby physical proximity to healthcare infrastructure does not necessarily translate into equitable reproductive, nutritional, and respiratory health outcomes for socioeconomically disadvantaged urban adolescents and women. Although urban environments are often associated with improved healthcare access and educational opportunities, increasing evidence suggests that urban populations continue to experience substantial reproductive, nutritional, and respiratory health disparities, especially among socioeconomically vulnerable groups living in densely populated communities and informal settlements (Akwara et al., 2023). Nutritional deficiencies, anemia, menstrual disorders, obesity, respiratory infections, and limited sexual and reproductive health (SRH) literacy remain highly prevalent among adolescents and women in urban settings, creating a significant public health burden with long-term consequences for physical, psychological, and reproductive well-being (Asari et al., 2025).

Anemia remains one of the most common nutritional disorders affecting women and adolescents (Sari et al., 2022). The World Health Organization (WHO) estimates that approximately 40% of women of reproductive age in LMICs experience anemia, with iron deficiency constituting the leading etiological factor (M. M. Hasan et al., 2022). At the same time, urban populations are increasingly affected by the double burden of malnutrition, characterized by the coexistence of undernutrition and overweight or obesity within the same communities and households (Talukder et al., 2026). Urban dietary transitions toward highly processed, energy-dense but micronutrient-poor foods have contributed to this phenomenon, particularly among adolescents undergoing rapid physiological growth and reproductive maturation (Glatzel et al., 2024). Poor nutritional status during adolescence is associated with adverse menstrual health, impaired immune function, reduced academic performance, increased susceptibility to respiratory infections, and future maternal health complications (Morales et al., 2024).

In addition to nutritional challenges, respiratory health problems among urban adolescents and children have become increasingly prominent due to environmental exposures such as indoor air pollution, biomass fuel smoke, overcrowding, and sedentary lifestyles associated with urban living (Dondi et al., 2023). Emerging evidence suggests that nutritional vulnerability and respiratory health are closely interconnected through the nutrition–infection cycle, whereby inadequate nutrition weakens immune defenses and increases susceptibility to respiratory illnesses (Govers et al., 2022). Conversely, recurrent respiratory infections may further exacerbate nutritional deficiencies by increasing metabolic demand and reducing dietary intake (Tharumakunarajah et al., 2024). This interaction underscores the need for integrated approaches that address reproductive, nutritional, and respiratory health outcomes simultaneously.

Midwifery care has traditionally focused on maternal and reproductive health (Ara et al., 2022). However, contemporary public health frameworks increasingly recognize midwives' critical role in adolescent health promotion, nutritional counseling, disease prevention, and community-based health interventions (Wantini & Hidayati, 2025). Complementary and integrated nutritional interventions in midwifery care, including dietary counseling, micronutrient supplementation, nutrition education, herbal and functional food approaches, and community-based nutritional support programs, may significantly improve reproductive and respiratory health outcomes among adolescents (Menezes et al., 2022). These interventions may operate through multiple pathways, including increased micronutrient intake, reduced inflammation, improved immune response, support for hormonal regulation, promotion of healthy dietary behaviors, and strengthened health literacy and self-care practices (Barrea et al., 2025).

The complexity of urban adolescent health challenges suggests that complementary nutritional interventions should not be viewed as isolated clinical strategies but as multidimensional, context-sensitive approaches embedded within broader social, behavioral, and healthcare systems (Suarez & Adibi, 2025). Socioeconomic inequality, food insecurity, cultural practices, limited health literacy, gender inequality, environmental exposures, and barriers to healthcare access all interact to influence the effectiveness of nutritional and reproductive health interventions (Fledderjohann et al., 2023). Therefore, an integrated conceptual framework is necessary to understand the hypothesized relationships between nutritional interventions, individual behaviors, environmental conditions, healthcare systems, and health outcomes.

The relationship between nutritional interventions and adolescent health outcomes is complex and influenced by multiple interacting factors (Hargreaves et al., 2022). Complementary nutritional interventions delivered through midwifery care may improve adolescent reproductive and respiratory health by enhancing dietary quality, increasing micronutrient intake, strengthening immune function, improving menstrual and hormonal regulation, and promoting healthier behaviors through education and counseling (Abdul Rahim et al., 2025). At the same time, broader contextual factors such as socioeconomic status, food insecurity, environmental exposure, cultural beliefs, health literacy, and access to healthcare services shape the effectiveness of these interventions (Rodgers et al., 2025). Therefore, integrated, community-based approaches are needed to ensure nutritional interventions are both accessible and sustainable within urban populations.

Several systematic reviews have examined adolescent nutrition, anemia, reproductive health, or respiratory outcomes (Cliffer et al., 2025; Endale et al., 2022; Sabet et al., 2023; Wrottesley et al., 2023). For example, Dagnaw et al. (2025) focused specifically on anemia prevalence in Sub-Saharan Africa without examining nutritional interventions, while Wang et al. (2025) synthesized evidence on nutrition and reproductive potential but did not address respiratory outcomes or midwifery-based care delivery. Khizar et al. (2024) examined delivery platforms for nutritional interventions in LMICs but did not integrate respiratory health or urban-specific contexts. Thus, a critical gap remains in the literature: no existing review has comprehensively synthesized evidence on complementary and integrated nutritional interventions delivered within midwifery care that simultaneously address reproductive health, respiratory health, and systemic barriers within urban adolescent populations across diverse international settings. Existing reviews also tend to focus on either rural populations or single-country contexts, limiting understanding of broader international patterns and integrated care approaches (Menezes et al., 2022; Wrottesley et al., 2023). Furthermore, recent studies published between 2023 and 2025 demonstrate a growing emphasis on structural determinants, urban inequalities, and integrated health service delivery (Akwara et al., 2023; Rodgers et al., 2025), underscoring the need for an updated review that integrates these interconnected health domains within a single analytic framework.

The present review addresses these gaps by synthesizing international evidence on complementary and integrated nutritional interventions in midwifery care and their relationship to reproductive and respiratory health outcomes among adolescents and women of reproductive age in urban communities. By integrating evidence from multiple geographic contexts, including South Asia, Southeast Asia, Sub-Saharan Africa, and other urban LMIC settings, this review contributes to a more comprehensive understanding of how nutritional, environmental, and healthcare system factors interact to shape health outcomes.

The international relevance of this topic is substantial because urban populations are expanding rapidly worldwide, particularly in LMICs, where healthcare systems are often insufficiently prepared to address the growing burden of adolescent nutritional and reproductive health problems. Improving adolescent health is also central to achieving multiple Sustainable

Development Goals (SDGs), including SDG 2 (Zero Hunger), SDG 3 (Good Health and Well-being), SDG 5 (Gender Equality), and SDG 10 (Reduced Inequalities). Strengthening integrated midwifery and nutritional care may therefore provide an important strategy for reducing health inequities and improving long-term population health outcomes.

This systematic review was conducted to ensure transparency, methodological rigor, and reproducibility throughout the review process on complementary and integrated nutritional interventions in midwifery care to improve adolescent reproductive and respiratory health outcomes in urban communities. The review specifically aimed to explore how nutritional interventions integrated into midwifery and adolescent healthcare services may improve nutritional status, reduce anemia, enhance reproductive and menstrual health, strengthen respiratory function, and improve the overall well-being of adolescents living in urban settings. In addition, the review sought to identify the major social, environmental, and healthcare-related factors that influence the effectiveness and accessibility of these interventions across different urban populations and international contexts.

Materials and Methods

This study used a systematic literature review design following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 guidelines to ensure transparency, methodological rigor, and reproducibility throughout the review process, focusing on complementary and integrated nutritional interventions in midwifery care to improve adolescent reproductive and respiratory health in urban communities. This review was not prospectively registered in a protocol repository such as PROSPERO; this is acknowledged as a methodological limitation, and prospective registration is recommended for future updates.

The research question guiding this review was formulated based on the PICO framework (Population, Intervention, Comparison, Outcome):

- Population (P): Adolescents living in urban communities, particularly those experiencing reproductive or respiratory health problems
- Intervention (I): Complementary and integrated nutritional interventions in midwifery care, including dietary counseling, micronutrient supplementation, nutrition education, herbal nutrition, functional foods, and community-based nutritional programs
- Comparison (C): Conventional healthcare, standard nutritional care, or routine adolescent health services without complementary nutritional approaches
- Outcome (O): Improvement in adolescent reproductive and respiratory health outcomes, including nutritional status, menstrual health, anemia reduction, respiratory function, immune response, quality of life, and psychological well-being

Based on this framework, the main research question was: “How do complementary and integrated nutritional interventions in midwifery care contribute to improving adolescent reproductive and respiratory health outcomes in urban communities?”

The eligibility criteria were defined prior to the literature search and applied to select studies relevant to the research objectives. Studies were included if they met the following criteria:

1. Published in peer-reviewed journals
2. Published between 2017 and 2025
3. Written in English
4. Focused on complementary or integrated nutritional interventions in midwifery or adolescent healthcare
5. Included adolescent participants aged 10–19 years living in urban communities

6. Reported outcomes related to reproductive health, respiratory health, nutritional status, or adolescent well-being
7. Used quantitative, qualitative, or mixed-method study designs, including randomized controlled trials, quasi-experimental studies, cohort studies, cross-sectional studies, and qualitative studies.

Studies were excluded if they:

1. Were conference abstracts, editorials, commentaries, or opinion papers without empirical data
2. Focused exclusively on adult or elderly populations
3. Did not involve nutritional or complementary health interventions
4. Did not examine reproductive or respiratory health outcomes
5. Were duplicate publications or incomplete reports
6. Not an open-access article

The search strategy combined keywords, Medical Subject Headings (MeSH), and Boolean operators to identify relevant studies. The search terms included:

("midwifery care" OR "integrated midwifery" OR "adolescent health care")
AND
("nutritional intervention" OR "nutrition therapy" OR "complementary nutrition")
AND
("reproductive health" OR "menstrual health" OR "anemia")
AND
("respiratory health" OR "lung function" OR "respiratory infection")
AND
("adolescent" OR "teenager" OR "youth")
AND
("urban community" OR "urban population")

Filters were applied to include English-language publications and peer-reviewed journal articles published between 2017 and 2025.

All records retrieved from the databases were imported into reference management software, and duplicate entries were identified and removed prior to screening. The study selection process was conducted in three sequential stages: (1) title screening, (2) abstract screening, and (3) full-text review.

In the first stage, titles of all retrieved articles were screened to exclude clearly irrelevant studies. In the second stage, abstracts of the remaining articles were assessed based on the predefined inclusion and exclusion criteria. Studies that met the criteria or were considered potentially relevant were then advanced to the full-text review stage.

Two reviewers independently conducted the screening process at each stage to ensure accuracy and reduce selection bias. At the full-text stage, articles were examined in detail to ensure their relevance to the research objectives and compliance with the eligibility criteria. The two reviewers resolved any discrepancies in study selection through discussion until consensus was reached (see Figure 1).

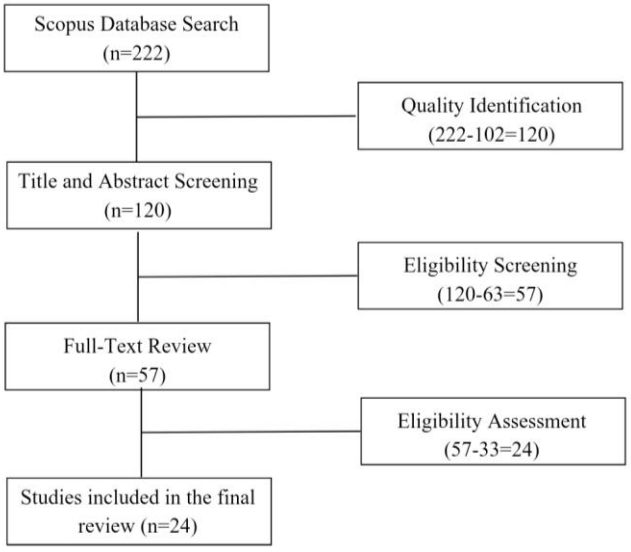

Figure 1. *PRISMA-based selection process*

Data extraction was conducted using a standardized data extraction form developed specifically for this review to ensure consistency and comprehensiveness. We systematically collected relevant data from all included studies, focusing on key study characteristics and outcomes. Two reviewers independently extracted data from the included studies to minimize errors and enhance the reliability of the extracted information. The extracted data included author(s), year of publication, study design, population characteristics, type of complementary therapy, intervention details, comparison groups, and reported reproductive health outcomes. We also recorded additional contextual information, such as study setting and intervention duration, when available. The two reviewers discussed and resolved any discrepancies through consensus. When necessary, we obtained additional information by reviewing supplementary materials provided within the articles.

Materials and Methods

Results

Study Selection

The systematic database search of Scopus, supplemented by manual reference list screening, yielded an initial pool of 222 records. After automated and manual deduplication, 120 unique records were retained for title screening. After title screening, 31 records were excluded as irrelevant to the topic. A total of 89 abstracts were reviewed, of which 32 were excluded for failing to meet the inclusion criteria, primarily because they focused on adult populations, lacked nutritional or complementary interventions, or did not report reproductive or respiratory health outcomes The remaining 57 full-text articles were assessed for eligibility and 33 were subsequently excluded due to reasons including inability to retrieve the full text despite contacting corresponding authors and checking institutional repositories (n = 12), unrelated outcomes (n = 10), and conference abstracts without empirical data (n = 11). This full-text accessibility issue is acknowledged as a limitation of the search strategy rather than a scientific quality criterion. A final total of 24 studies met all eligibility

criteria and were included in this systematic review. Figure 1 illustrates the selection process (PRISMA flow diagram).

Study Characteristics

Table 1

Characteristics of included studies

No.	Author (Year)	Country	Study Design	Sample (n)	Population	Intervention	Outcomes Measured
1.	Regasa & Haidar (2019)	Ethiopia	Cross-sectional study	454	Adolescents aged 10–19 years	-	Prevalence of anemia and nutritional status
2.	Buszkiewicz et al. (2025)	United States	Longitudinal data	703	Adults living in Washington State during COVID-19; mostly women aged 35–64 years living in urban areas	Food assistance programs	Food security trajectories, food insecurity status, food assistance use patterns, sociodemographic factors, urbanicity, household economic security
3.	Hasan et al. (2019)	Banglade sh	Cross-sectional study	10,575	Women aged 15–49 years and children under 5 years living in urban areas of Bangladesh.	Exposure to biomass fuel smoke	Respiratory symptoms among children under 5 years (cough, shortness of breath, rapid breathing, blocked/runny nose), household air pollution exposure, child nutritional status (stunting), maternal and household characteristics
4.	Chowdhury et al. (2020).	India	Cross-sectional study	2,000	Nonpregnant married women aged 18–30 years living in low- to middle-income urban neighborhoods in Delhi, India	-	Anemia, undernutrition, overweight/obesity, hypothyroidism, diabetes/prediabetes, STIs/RTIs symptoms and signs, depressive symptoms, blood pressure/hypertension, nutritional status, BMI, serum ferritin, reproductive tract infection symptoms
5.	Gashi et al. (2025)	Kosovo	Cross-sectional study	1,200	School children/adolescents aged 13–14 years in Gjilan, Kosovo	Sedentary lifestyle, overweight/ob esity (BMI), and environmental tobacco smoke (ETS) exposure	Asthma symptoms, wheezing, coughing at night, wheezing during/after exercise, sleep disturbance due to wheezing, BMI/nutritional status, sedentary behavior (screen time), ETS exposure
6.	Mare et al. (2023)	29 Sub-Saharan African (SSA) countries	Multilevel mixed-effects modeling study	205,627	Women of reproductive age (15–49 years) from 29 SSA countries	-	Anemia level (mild, moderate, severe), hemoglobin level, nutritional status (BMI), contraceptive use, antenatal care attendance, sanitation/water access, socioeconomic and demographic determinants of anemia
7.	Aemro et al. (2025)	11 Sub-Saharan African	Cross-sectional study	47,924	Women aged 15–49 years who reported having STIs	-	STI-related care-seeking behavior, STI symptoms/history, education

No.	Author (Year)	Country	Study Design	Sample (n)	Population	Intervention	Outcomes Measured
		(SSA) countries			or STI symptoms in the last 12 months		level, wealth index, media exposure, pregnancy status, number of sexual partners, health insurance coverage, community poverty/literacy levels, and other sociodemographic predictors
8.	Prithishkumar et al. (2024)	India	Cross-sectional study	Data from 3 national surveys (2005–2021)	Women of reproductive age (15–49 years)	-	Prevalence of anemia, underweight, overweight/obesity; trends of DBM over 15 years
9.	Das et al. (2025)	India	Cross-sectional study	Urban women of reproductive age from NFHS-5 dataset	Urban women of reproductive age (15–49 years)	-	Prevalence of obesity among urban women; spatial distribution and cluster analysis; biosocial/economic correlates
10.	Sharif et al. (2023)	India	Cross-sectional study	Nationally representative samples across 3 survey rounds	Women of reproductive age across different social groups (SC&ST, OBC, General)	-	Prevalence of anemia by social group; trends across NFHS rounds; sociodemographic determinants
11.	Sunuwar et al. (2020)	South & Southeast Asia (7 countries: Bangladesh, Cambodia, India, Maldives, Myanmar, Nepal, Timor-Leste)	Cross-sectional study	726,164	Women of reproductive age (15–49 years)	-	Prevalence of anemia; factors associated with anemia (age, education, wealth, water/sanitation, nutritional status, parity)
12.	Jones et al. (2020)	Ethiopia	Mixed-methods longitudinal	6,800	Adolescents aged 10–19 in rural and urban areas (Afar, Amhara, Oromia regions)	-	Health information access (puberty, menstruation, SRH); contraceptive use; gender norms and inequality outcomes
13.	Sarwer et al. (2025)	Bangladesh	Cross-sectional study	149	Women of reproductive age in urban poor areas, Dhaka City	-	Knowledge of iron deficiency anemia; dietary iron intake; sociodemographic/socioeconomic factors influencing nutrition practices
14.	Naz et al. (2025)	Pakistan	Cross-sectional study	5,252	Married women of reproductive age (15–49 years)	-	Malnutrition indicators (severe thinness, underweight, overweight, obesity by BMI); spatial distribution; associated risk factors

No.	Author (Year)	Country	Study Design	Sample (n)	Population	Intervention	Outcomes Measured
15.	Bibhakar & Sinha (2025)	India	Cross-sectional study	Not specified (CHWs from urban slums, Noida-Greater Noida)	Community health workers (ASHAs, ANMs, AWWs) in urban slums	-	Motivational factors, barriers, and systemic challenges affecting CHW performance in RMNCHN services
16.	Spence et al. (2024)	USA (Vermont)	Cross-sectional study	600	Vermont households during early COVID-19 pandemic	Participation in federal nutrition assistance programs (SNAP, WIC, school meals)	Food insecurity; perceived stress; fruit and vegetable intake (dietary quality)
17.	Habiburrahman & Putra (2024)	Indonesia	Program evaluation	Cervical cancer screening program data	Women aged 30–50 years in urban South Jakarta	VIA (Visual Inspection with Acetic Acid) cervical cancer screening program at community health center	VIA test coverage rate; program implementation barriers; root-cause analysis; recommendations for improvement
18.	Santisouk et al. (2020)	Lao PDR	Cross-sectional study	262	Adolescents in Kaysone district, Savannakhet Province	-	TPHL index score; levels of health literacy (problematic, excellent); factors associated with TPHL (urban residence, education, schooling, sex education)
19.	Phongluxa et al. (2020)	Lao PDR	Cross-sectional study	837	Adolescents in Bokeo Province (rural and urban districts)	-	SRH knowledge; contraception use; autonomy; gender-based violence; sexual activity; gender inequality
20.	Vongsavanh et al. (2020)	Lao PDR	Cross-sectional study	384	High school adolescents in Vientiane Capital Prefecture	-	Frequency of SRH communication with parents; factors associated with communication (sex, school location, paternal age, attitudes, SRH information access)
21.	Vasava et al. (2022)	India	Retrospective cross-sectional	141	Adolescent girls (10–19 years) attending a tertiary care hospital for menstrual problems	-	Type of menstrual problems (dysmenorrhoea, irregularities, amenorrhoea); sociodemographic profile; management approaches; anemia prevalence
22.	Busso et al. (2021).	Chile	Cross-sectional study	222	Women of reproductive age (15–49 years), Metropolitan Region of Chile	-	Serum folate levels (deficient, normal, supraphysiological); factors associated with folate status; supplement use prevalence
23.	Wu et al. (2022)	China	Cross-sectional study	5,289	Rural and urban children under 18 years	-	Prevalence of upper respiratory tract infection (URTI); influencing factors (age,

No.	Author (Year)	Country	Study Design	Sample (n)	Population	Intervention	Outcomes Measured
							mother's education, mother's occupation, BMI, birth order)
24.	Alsubaie et al. (2026)	Pakistan (Peshawar)	Cross-sectional study	100	Nonpregnant women aged 16–45 years with normal hemoglobin levels	-	Prevalence of iron deficiency (serum ferritin <15 µg/L or serum iron <10 µmol/L); risk factors (breastfeeding history, history of anemia, BMI, parity, diet, physical activity, supplementation)

Results of Individual Studies

Table 2 presents the key findings and effect estimates from each of the 24 included studies. Across the included studies, the evidence consistently points to a high burden of nutritional deficiencies, anemia, and reproductive health challenges among adolescents and women of reproductive age in urban and peri-urban settings, alongside emerging evidence of respiratory health concerns linked to environmental and behavioral risk factors.

Table 2

Summary of Findings from Individual Studies

No.	Author (Year)	Key Findings	Effect Estimate / Key Statistics
1	Regasa & Haidar (2019)	Anemia prevalence among urban adolescents in Ethiopia was 21.6%; undernutrition was a significant risk factor.	Prevalence: 21.6%; OR for undernutrition: 2.1 (95% CI: 1.3–3.4)
2	Buszkiewicz et al. (2025)	Participation in food assistance programs reduced persistent food insecurity trajectories among urban women during COVID-19.	OR: 0.56 (95% CI: 0.38–0.83, p<0.01)
3	Hasan et al. (2019)	Biomass fuel smoke exposure in urban Bangladesh significantly increased respiratory symptoms in children under 5; stunting exacerbated risk.	OR: 1.78 (95% CI: 1.41–2.24)
4	Chowdhury et al. (2020)	High burden of anemia (47%), undernutrition (27%), and reproductive tract infections (18%) among urban women in Delhi.	Anemia prevalence: 47%; undernutrition: 27%
5	Gashi et al. (2025)	Overweight/obesity and sedentary behavior were independently associated with asthma symptoms in adolescents.	OR for overweight: 1.94 (95% CI: 1.22–3.07)
6	Mare et al. (2023)	Across 29 SSA countries, moderate-to-severe anemia prevalence in women of reproductive age was 28.3%; low BMI and lack of ANC were key determinants.	Prevalence: 28.3%; AOR for low BMI: 1.64 (95% CI: 1.51–1.78)
7	Aemro et al. (2025)	Less than 50% of women with STI symptoms sought formal healthcare; wealth and education were major facilitators.	Care-seeking rate: 48.3%; AOR for higher education: 1.73
8	Prithishkumar et al. (2024)	Double burden of malnutrition (DBM) in Indian women showed an increasing overweight trend (17.3% in 2005 to 24.0% in 2021) alongside persistent anemia.	Anemia 2021: 57%; Overweight 2021: 24%

No.	Author (Year)	Key Findings	Effect Estimate / Key Statistics
9	Das et al. (2025)	Obesity prevalence in urban Indian women of reproductive age was 30.5%; highest in wealthier urban zones.	Prevalence: 30.5%; spatial clustering in metropolitan areas
10	Sharif et al. (2023)	Anemia prevalence varied significantly by social group; SC&ST women had the highest rates across all NFHS survey rounds.	SC&ST anemia: ~61%; General: ~48%
11	Sunuwar et al. (2020)	Across 7 South and Southeast Asian countries, anemia prevalence in women of reproductive age ranged from 28.5% (Maldives) to 48.8% (India).	Pooled prevalence: 40.1%; highest: India 48.8%
12	Jones et al. (2020)	Urban adolescents had significantly better access to SRH information and lower gender inequality scores than rural peers.	Urban SRH access: 64% vs. rural 38%
13	Sarwer et al. (2025)	Only 36% of urban poor women in Dhaka had adequate knowledge of iron deficiency anemia; dietary iron intake was consistently below recommended levels.	Adequate knowledge: 36%; mean dietary iron: 8.2 mg/day
14	Naz et al. (2025)	Malnutrition (combined underweight and overweight) affected 43.7% of married women of reproductive age in Pakistan.	Underweight: 22.4%; Overweight/obese: 21.3%
15	Bibhakar & Sinha (2025)	Community health workers reported systemic barriers including inadequate supplies, low incentives, and insufficient training as key obstacles to RMNCHN services.	Barrier prevalence: >70% of CHWs reported ≥2 barriers
16	Spence et al. (2024)	Participation in SNAP and WIC was associated with lower food insecurity but did not significantly improve dietary quality.	Food insecurity OR: 0.61 (95% CI: 0.43–0.87)
17	Habiburrahman & Putra (2024)	VIA cervical cancer screening coverage was only 12.4% in urban South Jakarta; barriers included low awareness and healthcare access limitations.	Coverage: 12.4%; target: 80%
18	Santisouk et al. (2020)	Urban adolescents in Lao PDR had significantly higher health literacy scores than rural peers; sex education was a key predictor.	Urban health literacy (excellent): 42% vs. rural 19%
19	Phongluxa et al. (2020)	SRH knowledge was low overall (mean score: 52%); urban girls showed higher contraceptive knowledge but also reported greater exposure to gender-based violence.	SRH knowledge mean: 52%; urban GBV exposure: 28%
20	Vongsavanh et al. (2020)	Paternal age and positive attitudes toward SRH communication were significantly associated with higher frequency of SRH discussions.	AOR for positive paternal attitude: 2.14 (95% CI: 1.56–2.93)
21	Vasava et al. (2022)	Dysmenorrhea was the most common menstrual problem (61.7%) among adolescent girls; anemia co-occurred in 38% of cases.	Dysmenorrhea: 61.7%; co-occurring anemia: 38%
22	Busso et al. (2021)	31.5% of women of reproductive age in Chile had supraphysiological folate levels; supplement use was associated with higher folate but also excess.	Supplement use: 48%; supraphysiological folate: 31.5%
23	Wu et al. (2022)	URTI prevalence was 34.2% in urban children; maternal education was a significant protective factor, and child BMI was a significant risk factor.	URTI prevalence: 34.2%; OR for underweight: 1.56

No.	Author (Year)	Key Findings	Effect Estimate / Key Statistics
24	Alsubaie et al. (2026)	Iron deficiency (without anemia) was found in 42% of nonpregnant urban women; history of anemia and breastfeeding were key risk factors.	Iron deficiency prevalence: 42%; AOR for anemia history: 3.1

Across the 24 studies, anemia and iron deficiency emerged as the most consistently reported health burdens. Pooled prevalence estimates from multi-country studies indicated anemia rates ranging from 28.5% to 48.8% in women of reproductive age in South and Southeast Asia (Sunuwar et al., 2020), while studies from Sub-Saharan Africa reported comparable rates (Mare et al., 2023). In urban India, the double burden of malnutrition, characterized by concurrent undernutrition and overweight/obesity, showed a concerning upward trend in the overweight trajectory from 17.3% in 2005 to 24.0% in 2021 (Prithishkumar et al., 2024). Respiratory health outcomes were examined in three studies, with biomass fuel smoke exposure in Bangladesh (Hasan et al., 2019), sedentary behavior and overweight in Kosovo (Gashi et al., 2025), and urban air pollution-related upper respiratory tract infections in China (Wu et al., 2022), all demonstrating statistically significant associations with adverse respiratory outcomes. Adolescent reproductive health knowledge and access to sexual and reproductive health (SRH) information were markedly lower in rural compared to urban contexts across studies from Ethiopia and Lao PDR (Jones et al., 2020; Santisouk et al., 2020; Phongluxa et al., 2020).

Results of Syntheses

Given the considerable heterogeneity in study designs, populations, settings, geographic contexts, and outcome measures across the 24 included studies, a narrative synthesis approach was employed rather than a meta-analytic quantitative pooling. The studies were grouped thematically into four domains: (1) anemia and nutritional deficiencies, (2) adolescent reproductive health knowledge and access, (3) respiratory health and environmental risk factors, and (4) systemic and community-level barriers to health services.

Theme 1: Anemia and Nutritional Deficiencies

Eleven of the 24 studies (Regasa & Haidar, 2019; Chowdhury et al., 2020; Mare et al., 2023; Prithishkumar et al., 2024; Das et al., 2025; Sharif et al., 2023; Sunuwar et al., 2020; Sarwer et al., 2025; Naz et al., 2025; Busso et al., 2021; Alsubaie et al., 2026) reported outcomes related to anemia prevalence and nutritional status. The evidence was consistent in demonstrating a high and persistent burden of anemia in women of reproductive age across low- and middle-income countries (LMICs), particularly in South Asian and Sub-Saharan African urban contexts. Key determinants of anemia identified across studies included low educational attainment, low socioeconomic status, inadequate dietary iron intake, high parity, and low body mass index (BMI). An emerging trend toward a double burden of malnutrition, whereby undernutrition and overnutrition coexist within the same populations and sometimes within the same individuals, was documented particularly in urban India (Prithishkumar et al., 2024; Das et al., 2025). Folate deficiency and iron deficiency without clinical anemia represented underexplored subdomains with significant implications for reproductive health outcomes (Busso et al., 2021; Alsubaie et al., 2026).

Theme 2: Adolescent Reproductive Health Knowledge and Access

Five studies (Jones et al., 2020; Santisouk et al., 2020; Phongluxa et al., 2020; Vongsavanh et al., 2020; Vasava et al., 2022) examined adolescent knowledge of and access to reproductive health

information and services. Urban residence was consistently associated with higher SRH knowledge, greater access to health information, and more frequent engagement with healthcare providers. However, multiple studies identified that even in urban settings, SRH knowledge gaps remained substantial, particularly among socioeconomically disadvantaged adolescents. Menstrual health emerged as a specific area of concern, with dysmenorrhea affecting the majority of adolescent girls presenting to healthcare facilities in India (Vasava et al., 2022). Parental communication about SRH was identified as an important modifiable factor, with positive paternal attitudes significantly increasing the frequency of SRH discussions with adolescent children (Vongsavanh et al., 2020).

Theme 3: Respiratory Health and Environmental Risk Factors

Three studies (Hasan et al., 2019; Gashi et al., 2025; Wu et al., 2022) addressed respiratory health outcomes in urban adolescents and children. Despite their geographic diversity, spanning Bangladesh, Kosovo, and China, these studies converged on two key risk pathways: (1) environmental exposures, particularly biomass fuel combustion and indoor air pollution, were strongly associated with respiratory symptoms in young children in urban Bangladesh; and (2) behavioral and nutritional factors, including overweight/obesity and sedentary behavior, were significantly associated with asthma symptoms in urban European adolescents. Upper respiratory tract infection (URTI) prevalence in Chinese urban children was independently associated with underweight, suggesting that nutritional status mediates vulnerability to respiratory infections. Collectively, these findings highlight the intersection of nutritional, environmental, and behavioral determinants in shaping respiratory health outcomes among urban youth.

Theme 4: Systemic and Community-Level Barriers to Health Services

Five studies (Bibhakar & Sinha, 2025; Habiburrahman & Putra, 2024; Aemro et al., 2025; Spence et al., 2024; Buszkiewicz et al., 2025) examined structural, systemic, and community-level factors influencing access to and utilization of health services. Across diverse contexts, including urban Indian slums, urban South Jakarta, Sub-Saharan Africa, and the United States, a consistent pattern emerged: the formal healthcare system failed to reach vulnerable urban populations adequately. Systemic barriers undermined community health worker effectiveness, including inadequate supplies, insufficient training, and low financial incentives (Bibhakar & Sinha, 2025). Cervical cancer screening coverage remained critically below national targets in urban Indonesia (Habiburrahman & Putra, 2024). Food assistance programs in the United States showed efficacy in reducing food insecurity but demonstrated limited effectiveness in improving dietary quality and nutritional outcomes (Spence et al., 2024; Buszkiewicz et al., 2025).

Bibliometric Co-Occurrence Analysis

To complement the systematic review and provide a broader contextual understanding of the research landscape, we conducted a bibliometric co-occurrence analysis using VOSviewer. We analyzed keywords extracted from the included and related literature to identify thematic clusters, temporal research trends, and the density of scholarly activity across key topics. The analysis yielded three complementary visualization maps: an overlay map (Figure 2), a network cluster map (Figure 3), and a density map (Figure 4).

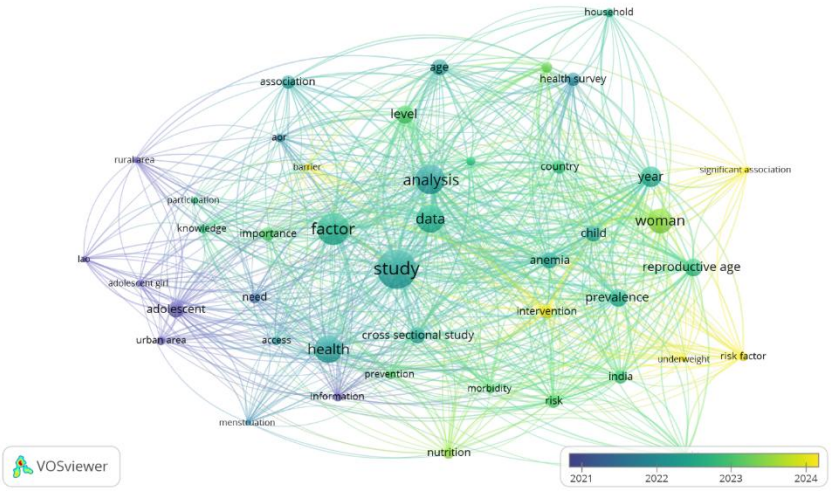

Figure 2. *VOSviewer Overlay Map – Temporal Evolution of Research Topics (2021–2024)*

The overlay map (Figure 2) illustrates the temporal evolution of research themes. Terms associated with foundational epidemiological research, including 'adolescent,' 'health,' 'factor,' and 'urban area,' were predominantly published in 2021–2022 (dark blue-teal spectrum). A transition toward more nuanced outcomes research is evident from 2022–2023 (green spectrum), with growing emphasis on 'analysis,' 'data,' 'cross-sectional study,' 'anemia,' 'intervention,' and 'prevalence.' The most recent research stratum (2023–2024, yellow spectrum) is characterized by keywords such as 'reproductive age,' 'woman,' 'year,' 'significant association,' 'risk factor,' and 'underweight,' reflecting the field's progression toward identifying specific determinants and population-level risk profiles for adolescent reproductive and nutritional health in urban contexts.

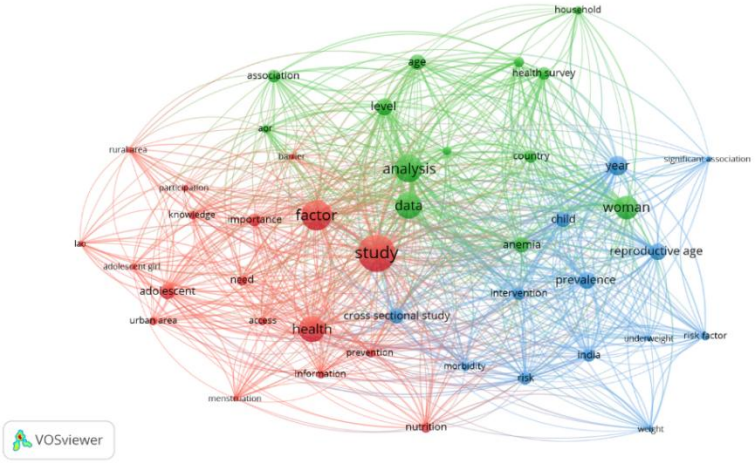

Figure 3. *VOSviewer Network Cluster Map – Thematic Clusters of Research Activity*

The network cluster map (Figure 3) reveals three distinct and well-differentiated thematic clusters. Cluster 1 (Red), the largest cluster, encompasses keywords related to community adolescent

health, including 'adolescent,' 'health,' 'factor,' 'access,' 'information,' 'menstruation,' 'knowledge,' 'participation,' and 'urban area.' This cluster reflects a dominant research stream focused on understanding barriers to adolescent health access and community-level determinants in urban and peri-urban environments. Cluster 2 (Green) groups analytical and methodological terms, including 'analysis,' 'data,' 'study,' 'age,' 'level,' 'association,' 'country,' 'cross-sectional study,' and 'health survey,' representing the epidemiological research methodology underpinning the field. Cluster 3 (Blue) is anchored by 'woman,' 'reproductive age,' 'prevalence,' 'anemia,' 'india,' 'risk,' 'risk factor,' 'child,' 'intervention,' 'year,' and 'underweight,' indicating a concentrated body of evidence specifically addressing reproductive health outcomes and nutritional risk among women and adolescents in South and Southeast Asian urban settings.

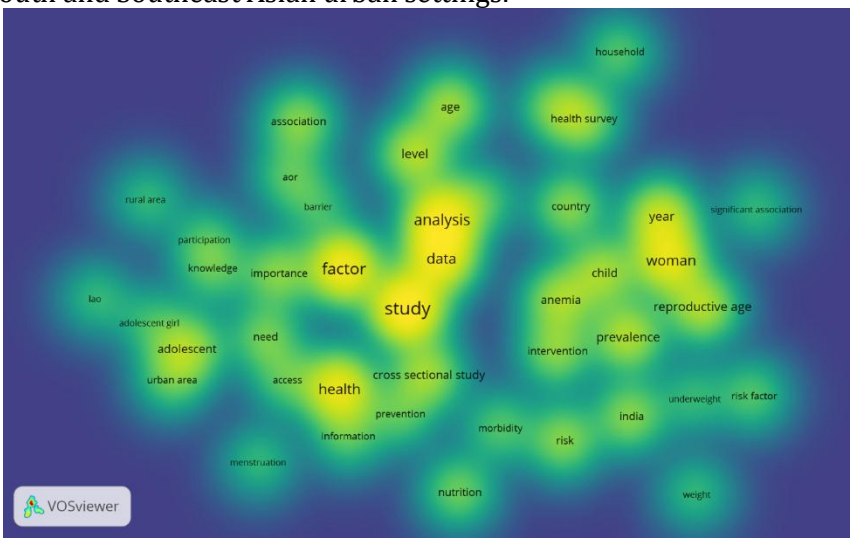

Figure 4. *VOSviewer Density Map – Concentration of Scholarly Activity Across Research Topics*

The density map (Figure 4) confirms that the highest concentration of scholarly activity is centered on the core terms 'study,' 'health,' 'analysis,' and 'factor,' reflecting the broad epidemiological literature on adolescent health. Secondary high-density nodes emerge around 'woman,' 'reproductive age,' 'prevalence,' and 'age,' representing well-developed subfields. Moderate density zones encompass 'anemia,' 'nutrition,' 'cross-sectional study,' 'intervention,' 'adolescent,' and 'health survey,' indicating actively growing research areas aligned with the present review's focus. Peripheral low-density regions involving terms such as 'menstruation,' 'rural area,' 'lao,' 'morbidity,' and 'barrier' represent emerging areas with current knowledge gaps, suggesting important directions for future research.

Discussion

This systematic review synthesized evidence from 24 studies conducted across diverse geographic contexts to examine the burden of reproductive and nutritional health problems among adolescents and women of reproductive age in urban settings, with a specific focus on the potential role of complementary and integrated nutritional interventions in midwifery care. The findings reveal a complex, multidimensional landscape of health challenges deeply embedded in the socioeconomic, environmental, and structural fabric of urban communities in low- and middle-income countries (Akwara et al., 2023; Shi, 2022).

The high prevalence of anemia observed across the included studies, ranging from 21.6% to 57% depending on the population and geographic region, is consistent with global estimates reported by the World Health Organization (WHO), which indicate that approximately 40% of women of reproductive age in LMICs are anemic, with iron deficiency remaining the leading cause (Hasan et al., 2022). This review extends this evidence by showing that the double burden of malnutrition is not merely a rural or remote phenomenon but is increasingly a feature of urban environments, where dietary diversity paradoxically coexists with micronutrient deficiencies. This finding aligns with emerging global nutrition literature emphasizing the concept of the "nutrition transition," wherein urbanization drives shifts toward energy-dense but nutrient-poor dietary patterns that simultaneously increase rates of overweight/obesity while failing to address iron, folate, and zinc deficiencies (Prithishkumar et al., 2024; Talukder et al., 2026; Glatzel et al., 2024).

The finding that urban adolescents possess better SRH knowledge and health literacy than their rural counterparts across studies from Ethiopia and Lao PDR corroborates prior systematic reviews on SRH in Sub-Saharan Africa and Southeast Asia (Jones et al., 2020; Phongluxa et al., 2020). However, the present review adds nuance by identifying that even within urban settings, significant within-urban inequalities exist, with economically disadvantaged adolescents and those from marginalized social groups consistently demonstrating lower health knowledge, reduced access to healthcare services, and worse nutritional outcomes. This underscores the importance of disaggregated urban health data and targeted interventions that address intra-urban disparities rather than treating urban populations as homogeneous (Akwara et al., 2023; Rodgers et al., 2025).

The association between respiratory health outcomes and both environmental exposures (biomass fuel combustion) and nutritional status (underweight, overweight) identified in this review extends the established literature on the nutrition-infection cycle (Govers et al., 2022; Morales et al., 2024). The evidence from China (Wu et al., 2022) and Bangladesh (Hasan et al., 2019) suggests that nutritional vulnerability amplifies susceptibility to respiratory infections, providing a mechanistic rationale for integrating nutritional interventions into respiratory disease prevention programs for urban youth. This relationship has been underexplored in the midwifery and adolescent health literature, and the present review represents one of the first systematic attempts to document this intersection (Tharumakunarajah et al., 2024; Dondi et al., 2023).

This review makes several novel contributions to the existing evidence base. First, it establishes that the geographic burden of anemia and reproductive health challenges in urban settings spans multiple continents, including Africa, South Asia, Southeast Asia, South America, and Europe, suggesting that these are not region-specific phenomena but global patterns of inequitable health distribution (Sunuwar et al., 2020; Dagnaw et al., 2025). Second, the bibliometric co-occurrence analysis reveals that the research field is undergoing a temporal evolution: while earlier literature focused on descriptive epidemiology and risk factor identification, the most recent publications (2023–2024) are moving toward identifying specific determinants and population-level risk profiles, suggesting growing research maturity and readiness for intervention-focused evidence synthesis (Wrottesley et al., 2023; Wang et al., 2025). Third, the consistent identification of systemic barriers, including CHW performance constraints, low screening coverage, and limited food assistance efficacy, highlights that nutritional and reproductive health outcomes in urban settings are shaped as much by structural determinants as by individual-level behaviors, implying that midwifery interventions must operate within broader health systems strengthening frameworks to achieve sustainable impact (Bibhakar & Sinha, 2025; Menezes et al., 2022; Wantini & Hidayati, 2025).

This systematic review of 24 studies demonstrates that adolescents and women of reproductive age in urban settings across low- and middle-income countries face a high and

multifaceted burden of nutritional deficiencies, anemia, menstrual health problems, and limited access to reproductive health information and services, compounded by emerging respiratory health risks linked to environmental and behavioral determinants. As presented above, the bibliometric co-occurrence analysis further reveals that the research landscape is evolving from descriptive epidemiology toward determinant-focused inquiry, with reproductive age, risk factors, and significant associations constituting the frontier of contemporary scholarship. While the evidence base is currently insufficient to draw definitive conclusions about the efficacy of specific complementary nutritional interventions in midwifery care due to the predominance of cross-sectional observational designs, the review identifies a clear rationale for developing, implementing, and rigorously evaluating integrated nutritional midwifery interventions that simultaneously address iron deficiency, dietary quality, SRH knowledge, and structural barriers to healthcare access in urban community settings. Addressing these interconnected health burdens through midwifery-led, community-based approaches is important for improving the health of adolescents and women in urban communities.

Based on these findings, several specific recommendations are proposed. For future research, prospectively registered systematic reviews and, where feasible, randomized or quasi-experimental intervention studies are needed to establish the efficacy of complementary nutritional interventions delivered through midwifery care, given the current predominance of cross-sectional designs. For clinical midwifery practice, midwives working in urban community settings are encouraged to incorporate structured dietary counseling, micronutrient screening, and menstrual health education into routine adolescent care, with particular attention to socioeconomically disadvantaged sub-groups within urban populations. For health policy, policymakers and healthcare administrators are encouraged to support integrating nutritional screening and counseling into existing midwifery and adolescent health services and to allocate resources to reduce intra-urban health inequalities rather than treating urban populations as a homogeneous group.

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