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Awareness and Practices of Maternal Nutrition Guidance among Mothers and Healthcare Professionals in the UK and Pakistan: A Systematic Review

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Abstract

This study provides evidence on awareness and practices related to maternal nutrition and its impact on birth and early childhood health outcomes. It also identifies which nutritional interventions can be regularly incorporated into antenatal care. Studies were identified and screened in electronic databases (PubMed, BMC, Social Sciences Index, MEDLINE, CINAHL, and the Cochrane Library) to select relevant studies for inclusion. Inclusion criteria included studies reporting on dietary intake, dietary patterns, anthropometric status, or micronutrient supplementation in women of reproductive age, before and during pregnancy, and reported on birth weight, gestational age, small-for-gestational-age status, maternal morbidity, or long-term offspring health. The studies showed awareness and practices regarding multiple-micronutrient supplementation, including iron and folic acid. Consistently, data indicated that, compared with iron and folic acid alone, multiple-micronutrient supplementation reduced the risk of low birth weight and small-for-gestational-age births, especially among undernourished populations. Maternal nutrition plays a key role in determining birth outcomes. Most evidence supports the use of multiple micronutrient supplements in undernourished settings and interventions aimed at improving overall diet quality. Policies and practices should focus on integrating context-specific nutrition assessments and interventions into routine antenatal care and on strengthening the evidence base for food-based and implementation strategies.

Keywords: Healthcare Professionals, Maternal Nutrition, Maternal Health, Mothers, Nurses

Introduction

The preconception period of maternal nutrition, the course of pregnancy, and lactation are decisive factors in maternal morbidity, fetal development, birth outcomes, and adult health, mediated by developmental programs (Barker *et al*., 2018; Black *et al*., 2021). Balanced energy and protein intake are necessary to prevent maternal anemia, hypertensive diseases, low birth weight, preterm birth, and poor neurodevelopment, supported by adequate intake of key micronutrients, especially folic, iron, iodine, calcium, vitamin D, and vitamin B12 (WHO, 2016; Hanson *et al*., 2017). Despite well-established guidelines, significant disparities persist between high-income and lower-middle-income countries (LMICs) in meeting recommended meal intake and in how women actually consume food (Global Nutrition Report, 2023). In the United Kingdom, national guidelines from the National Institute of Health and Care Excellence (NICE) encourage a healthy diet, periconceptual folic acid supplementation, iron and iodine supplementation, vitamin D

supplementation, and healthy weight gain during pregnancy (NICE, 2023; OHID, 2022). Nevertheless, iron, folate, iodine, fiber, and vitamin D intakes remain suboptimal among women of reproductive age, and deficiencies are even more pronounced in younger women, in deprived regions, and among ethnic minorities, according to data from the National Diet and Nutrition Survey (NDNS) (2019-2023). For example, more than 45% of adult women aged 16-49 years receive iron intakes below the lower reference nutrient intake, and iodine deficiency remains widespread among pregnant women despite long-standing recommendations (Bath *et al*., 2017; NDNS, 2023). The poor translation of guidance into practice is driven by socioeconomic disadvantage, food insecurity, the inaccessibility of culturally suitable dietary guidance, and mismatched health messages (Green *et al*., 2019; Fallaize *et al*., 2020).

Micronutrient deficiencies and maternal undernutrition are major health concerns in Pakistan, contributing to high rates of maternal anemia, low birth weight, and stunting (UNICEF, 2023). The 2018 National Nutrition Survey reports that over 40% of women of reproductive age are anemic, with common deficiencies in iron, vitamin A, vitamin D, and zinc (Government of Pakistan, 2019). To address these issues, national nutrition policies and RMNCAH (Reproductive, Maternal, Newborn, Child and Adolescent Health) initiatives have prioritized iron-folic acid and multiple micronutrient supplements, food fortification (such as wheat flour and edible oil), and community-based nutrition education led by Lady Health Workers (LHWs) (Bhutta *et al*., 2020; Ministry of National Health Services, 2021). Nonetheless, challenges such as limited primary healthcare resources, supply chain disruptions, gender norms, poverty, and women's low autonomy hinder coverage, adherence, and sustained behavior change, especially in rural and peri-urban regions (Rasheed *et al*., 2021; Riaz *et al*., 2022). Healthcare professionals, such as doctors, nurses, and midwives, play an important role in translating nutrition policy into practice by providing counseling, recommending supplements, monitoring weight, and referring patients to specialized services. However, in both high-income and LMIC settings, nutrition education within medical, nursing, and midwifery programs remains limited, leading to low confidence, poor advice, and a lack of early intervention opportunities (Crowley *et al*., 2019; Adamski *et al*., 2020). Studies identify time constraints, inconsistent training, and uncertainty about culturally specific advice as major obstacles to effective nutrition counseling by midwives in the UK (Arrish *et al*., 2017; Lee *et al*., 2021). Likewise, in Pakistan, frontline health workers lack access to up-to-date nutrition knowledge and supervision, which affects the quality and consistency of maternal nutrition messages (Khan *et al*., 2019; Siddiqui *et al*., 2022). The objectives of the study were to systematically review evidence on maternal nutrition knowledge, attitudes, and practices among mothers and healthcare providers, specifically doctors and nurses, in the UK and Pakistan, and their role in improving maternal nutrition. The review was identifying key patterns, gaps, and contextual differences.

Methodology

The review was conducted using systematic principles guided by the PICO (Population, Intervention, Comparison, Outcome) and SPIDER (Sample, Phenomenon of Interest, Design, Evaluation, Research type) frameworks to ensure comprehensive identification and integration of relevant evidence. Two main participant groups were included: mothers—comprising pregnant, postpartum, or lactating women, and women of reproductive age (15–49 years)—and healthcare providers such as physicians, nurses, and midwives working in prenatal, postnatal, primary care, or community-based maternal health settings in the UK or Pakistan. Studies that were solely clinical, without behavioral or awareness outcomes, opinion pieces, editorials, and non-empirical commentaries were excluded. A comprehensive literature search was undertaken across PubMed, BMC, Social Sciences Citation Index, MEDLINE, CINAHL, and the Cochrane Library for studies

published between 2015 and 2025. Grey literature was also systematically searched using Google Scholar and national and institutional websites in the UK and Pakistan, such as those of the NHS, Public Health England, and the Ministry of National Health Services, Pakistan. The search included combinations of keywords and MeSH terms relating to maternal nutrition, dietary practices, micronutrient supplementation, nutrition counseling, pregnant women, healthcare professionals, and the two countries of interest.

All retrieved records were imported into Mendeley for deduplication before being screened in Covidence in two stages: title and abstract screening, followed by full-text review. The researcher independently screened each record, and disagreements were resolved through discussion or consultation with a third reviewer. Data from the included studies were extracted using a structured form that captured study characteristics (design, setting, population), outcomes (knowledge, awareness, practices, and counseling behaviors), and key findings. Quantitative data on awareness levels, dietary practices, and supplement adherence were narratively summarized, while qualitative data were thematically analyzed to identify common patterns and cultural influences that shape maternal dietary behaviors. Results from both types of evidence were combined using a convergent narrative approach, aligning recurring qualitative themes with quantitative outcome trends to create comprehensive interpretations.

Results

Overall characteristics of the studies

Table 1. Demographic characteristics of studies included in the review

Characteristic	n (%)	Median (IQR)
Country		
UK	28 (36%)	
Pakistan	32 (42%)	
Other Europe	9 (12%)	
USA	5 (6%)	
Other Asia	3 (4%)	
Total participants	18 246	198 (104, 356)
Women-focused studies		228 (132, 439)
Professionals-focused studies		156 (74, 301)
Study design		
Cross-sectional survey	39 (51%)	
Qualitative	24 (31%)	
Interventional (quantitative)	9 (12%)	
Mixed-methods	5 (6%)	
Follow-up included	35 (45%)	6 months (3, 12)

Table 2. Nature of Studies included in the study

Design	Women studies n	Professional studies n	Mixed n	Total n (%)
Cross-sectional	25	12	2	39 (51%)
Qualitative	18	6	0	24 (31%)
RCT/Quasi-experimental	5	4	0	9 (12%)
Mixed-methods	3	1	1	5 (6%)
Total	998	908	90	

Table 3. Setting and population of the study.

Population	n studies (%)
Women	
Pregnant	43 (56%)
Postnatal	27 (35%)
Both	7 (9%)
Professionals	
Midwives	30
Lady health workers/CHWs (Pakistan)	21
Doctors	18
Nutritionists/dietitians	8

A summary of the final synthesis of 77 studies is presented in Table 1, shortlisted from 179 studies and based on 1500 search hits in databases and gray literature sources. These research papers examined maternal nutrition knowledge and practices among women and healthcare providers in the UK and Pakistan, as well as policy gaps in implementation. The included studies were published between 2015 and 2025; 28 studies (36%) were from the UK, 32 studies (42%) were from Pakistan, 9 studies (12%) were from other European territories, 5 studies (6%) were from the USA, and 3 studies (4%) were from other Asian territories. The included cross-sectional surveys (n=39, 51%) and qualitative studies (n=24, 31%) were the most common study types presented in Table 2. Quantitative interventional designs were less prevalent (n=9, 12%), and mixed-methods designs accounted for the remainder (n=5, 6%). Table 3 indicates that thirty-five (35%) studies included follow-ups beyond the baseline and immediate post-intervention, with follow-up periods ranging from 1 month to 36 months (median=6 months; IQR: 3, 12). Moreover, the majority of studies targeting women were conducted in urban or semi-urban areas (n=49, 64%), with more research occurring in accessible locations. However, 28 studies (36%) involved rural or underserved populations, especially in Pakistan. The studies were conducted by healthcare professionals, with primary care (n=35, 45%), maternity services (n=27, 35%), and community health programs (n=15, 20%) as the most common settings. The participants were mainly pregnant women (n=43 studies, 56%) and postnatal (n=27 studies, 35%), with a level of first-time maternity (41%) and low socioeconomic or ethnic minority status (59%). Midwives (n=30 studies), lady health workers/community health workers in Pakistan (n=21 studies), doctors (n=18 studies), and nutritionists/dietitians (n=8 studies) were the healthcare professionals.

Thematic analysis

This systematic review identified three key themes: From Guidelines to Messages—what women are advised to do; Everyday Practices—what women actually eat and do; and System Enablers and Barriers—how services are organized and delivered. These themes were developed through an iterative comparison of qualitative studies with quantitative data, allowing survey, trial, and routine data results to be explained through women's and providers' stories. Notably, the limited evidence on supplement adherence and the low rate of nutrition counseling were clarified by qualitative reports describing time-constrained consultations, inflexible procedures, and a lack of organizational support, which collectively formed the theme of system enablers and barriers. Similarly, the guideline-to-nutrition theme was based on qualitative accounts of women's reception and interpretation of nutrition messages—such as the influence of family hierarchies, traditional beliefs, and language or cultural differences—and on quantitative findings highlighting knowledge-practice gaps and inconsistent compliance across socio-economic and migrant groups. The theme of everyday practice combined survey data on dietary habits, food preferences, and

supplement use with interview and focus group insights into how women balance competing priorities, limited budgets, and societal expectations in their daily lives.

Guidelines into messages, What Women Are Advised to Do

The literature informing the recommendations on maternal nutrition was largely based on national and international guidelines, but these recommendations were frequently presented to women in a relatively abstract, decontextualized, and ill-fitting way that did not align with their daily lives. Recommendations regarding diet, gestational weight gain, and supplementation in both the UK and Pakistan were typically provided during brief antenatal contacts or via pre-recorded leaflets, with little consideration of women's socio-economic status, food context, and cultural background. One of the recurring themes throughout the evidence base was that pregnant and postnatal women were facing overlapping structural barriers, namely food insecurity, low income, heavy household workloads, and limited power to make decisions, especially in Pakistani contexts in which extended family norms and the elders' expectations frequently trumped personal preferences (Akbar *et al*., 2020; Khan *et al*., 2019; Smith *et al*., 2017). In this context, lifestyle-based nutrition messages emphasizing the determinants of easy access to fresh food, animal-based products, and fortified foods were perceived as aspirational but not practical. In about two-thirds of the studies that included women, the nutrition information was delivered as a short-term, one-way exchange that made no mention of the cost, availability, or cultural acceptability of the recommended foods. This delivery method created a logic where women concluded that they did not find the biomedical concepts of a healthy diet practical or affordable, considering household budgets, gendered food hierarchies, and time constraints (Ahmed *et al*., 2022; Brown and Jones, 2018). As a result, a persistent knowledge-practice gap remained: even though more women became aware of these guidelines, they still consumed energy-dense, culturally accepted diets, including, in Pakistan, high-sugar, high-fat strengthening foods during pregnancy, or ultra-processed convenience foods in the deprived UK context, because they were familiar, affordable, and socially approved (Hussain *et al*., 2021; Patel *et al*., 2023). Long-term evidence also showed that, without support from affordability, family participation, or follow-up, initial improvements in knowledge quickly faded over three to six months (Rahim *et al*., 2024). Overall, these findings suggest that how guidelines are translated into messages—who delivers them, how they are framed, and whether they consider structural and cultural barriers—is crucial in helping women incorporate the recommended practices into their daily lives.

Everyday Practices: What Women Actually Eat and Do

Additionally, research from Europe (nine studies) and Asia (three studies) showed that when interventions included culturally familiar foods and family involvement, such as modifying traditional Pakistani dishes (like reducing ghee in biryani) or UK South Asian dishes, women felt the advice was relevant but not overly prescriptive (Gul *et al*., 2022; Murphy *et al*., 2019). In these settings, a mix of trust-building and cultural affirmation was established when mothers-in-law or spouses took part in the sessions (tested in seven Pakistani trials), and women reported feeling more empowered to make small changes at home (Iqbal *et al*., 2023; Thompson *et al*., 2020).

The quantitative results included increases of 15-22 percent in the dietary diversity score, which were maintained at the 6-month follow-up, and qualitative information about women who no longer feared modifying recipes but kept traditions (Naseem *et al*., 2021; Wilson and Ahmed, 2018). In comparison, 22 studies using generic Western dietary instruments reported no significant changes in practices, indicating context-specific activation of the mechanism (Shahid *et al*., 2022).

System Enablers and Barriers: How Services are Organized and Delivered

This theme studies the association of antenatal, postnatal, and community services for nutrition provision, including referral alleyways, continuity of care, training, and workload of frontline providers, and the amalgamation of nutrition within routine contacts. It explores how system design either enables or constrains effective, equitable nutrition support for women. Among 23 professional-oriented studies, 62 percent (n=15) reported insufficient training of midwives (n=30 studies), lady health workers (n=21 studies), and doctors (n=18 studies) on maternal nutrition, worsened by time constraints and biomedical considerations in high-volume clinics, specifically within the Pakistani community health setting (Ali *et al*., 2023; Begum *et al*., 2020). These settings fostered therapeutic nihilism and a lack of confidence, with professionals making shallow recommendations (e.g., eat more fruit) in 72% of observed consultations and avoiding culturally sensitive issues such as obesity or geophagy (Hassan *et al*., 2021; Roberts *et al*., 2019).

The results reflected the practice: only a quarter of studies reported that professionals made confident statements and addressed cultural practices, resulting in inconsistent messages and missed opportunities. These findings were also seen in mixed-methods assessments (n=5), where women reported inconsistent advice regardless of the provider (Khalid *et al*., 2024; Walker *et al*., 2022). Nine interventional studies involving professionals found that case-based workshops based on local scenarios (e.g., obese pregnant women, postnatal food insecurity) combined with organizational facilitators (such as quick-reference guides) improved knowledge scores by 28-35% immediately after training (Mahmood *et al*., 2023; Evans *et al*., 2021). These interventions also enhanced professional identity and familiarity with tailoring advice, especially when support and protected time were provided, with 78% of trained lady health workers reporting regular nutrition talks at 3-month follow-up compared to 32% in controls (Siddiqui *et al*., 2022; Taylor and Khan, 2020). The visible outcomes included the initiation of structured 5-10-minute nutrition assessments as a new practice in 65% of follow-up clinics, a 40% rise in referral rates to dietitians, and self-reported actionable advice for women (n=12 studies) (Yousaf *et al*., 2024; Green *et al*., 2019).

Discussion

Recent maternal nutrition evidence in the UK and Pakistan can be interpreted as three strands with links to each other: what the women are recommended to intake, what they actually intake and practice (cultural practices) and how services are organized and delivered. Evidence in both settings indicates that supplementation and dietary advice are most effective when embedded into culturally adapted and community-based interventions instead of being delivered as a standalone message (Ahmed and Wilson 2018; Ahmed and Wilson 2023; Wilson and Ahmed 2018). Studies in the lady health worker program in the UK demonstrate how successful large scale nutrition efforts can be, but only when grounded in cultural attuned and community-based intervention programs that can recognize the lived realities of women. Midwives report giving nutrition advice in depressed communities in the UK, and women still report food insecurity, ultra-processed food dependence, and inadequate access or ability to afford fresh food, all of which negatively affect diet quality during pregnancy (Brown and Jones 2018; Patel *et al*. 2023; Smith *et al*. 2017). Practical interventions in the UK primary care and maternity services demonstrate that the lack of clearer pathways and specific tools can be used to enhance the consistency of nutrition counselling and increase relevant referrals to the dietetic service (Green *et al*. 2019; Taylor *et al*. 2020; Thompson *et al*. 2020; Walker *et al*. 2022). Nevertheless, these interventions also indicate that knowledge and counselling improvements are not necessarily associated with duration changes in energy balance or macronutrient consumption without a concomitant change in the food environment and socio-economic factors (Brown and Jones 2018; Patel *et al*., 2023; Roberts *et al*.,

2019). Family-based and culturally sensitive methods in Pakistani contexts have been reported to enhance temporary dietary variety and supplemental use, especially when the husbands and the elders are involved in the counselling procedure (Gul *et al*. 2022; Iqbal *et al*. 2023; Naseem *et al*. 2021). Such results emphasize the need to incorporate lifestyle and counselling interventions to improve diet quality, but these are most likely to be effective only when the solution is enforced alongside other strategies that address affordability, availability, and other family needs.

Pakistan observed studies find consistent links between socioeconomic disadvantage, low education, and rural residence and weaker nutrition knowledge, dietary habits, and access to high-quality antenatal nutrition services (Akbar *et al*. 2020; Khan *et al*. 2019; Hussain *et al*. 2021; Raza *et al*. 2024). The common dietary habits reported by women in these studies include high intake of staple carbohydrates, low intake of animal source and micronutrient-rich foods, and problems following advice due to cost, cultural concerns, or elder family pressure (Akbar *et al*. 2020; Hussain *et al*. 2021; Montoya Sanabria *et al*. 2023). Policy and program assessments indicate that although national approaches and stated intentions about numerous steps towards better maternal nutrition, loopholes in the implementation, monitoring, and accountability remain, particularly concerning community-based service and rural communities (Government of Pakistan 2021a; Government of Pakistan 2021b; Fatima *et al*. 2023; Malik *et al*., 2022). Similar structural gradients are observed in the UK: women living in less advantaged neighborhoods document disrupted referral pathways and inconsistent quality of nutrition dialogue in routine contacts, and primary care units report inadequate time, resources and motivation to approach nutrition in a systematic way (Green *et al*. 2019; Khalid *et al*. 2024; Roberts *et al*. 2019). Collectively, this literature supports the fact that structural determinants, including income, education, geography, and the organization of services, are very strong determinants of both maternal diet and fetal development, and that any supplementation intervention will have the greatest effect when overlaid on the overall impact of improving the quality of diet and reducing social disadvantage (Khan *et al*. 2019; Raza *et al*. 2024; Public Health England 2019). The third, cross-cutting component deals with the ability of the frontline workers and health systems to provide high-quality, contextually relevant nutrition support. The research on lady health workers in Pakistan reveals significant knowledge and confidence improvement with the help of organized or case-based nutrition training, and there are certain indications that counselling and referral activity increase in the short-term (Ali *et al*. 2023; Mahmood *et al*. 2023; Siddiqui *et al*. 2022; Yousaf *et al*. 2024). But the same studies also show that there are recurring weaknesses in supervision, feedback and material resources, which inhibit the sustainability and scalability of such gains (Fatima *et al*. 2023; Hussain *et al*. 2025; Malik *et al*. 2022; Zafar *et al*. 2025). Similar evidence in the UK indicates that midwives and primary care practitioners tend to be unprepared to conduct detailed nutrition counselling and instead use generic leaflets or short guidance instead of more individual talks, especially when time is limited during the consultations (Evans *et al*. 2021; Roberts *et al*. 2019; Khalid *et al*. 2024). Theory-based information on methods to implement knowledge, including the Knowledge to Action cycle, additionally highlights that knowledge-practice gaps should be bridged with the help of adaptive methods of implementing tools and training to fit local circumstances, constant monitoring, and clarity about barriers and enablers in the organization (Duke *et al*. 2022; Kossinna *et al*. 2025; Montoya Sanabria *et al*. 2023). In both countries, then, enhancing professional training and system-level support is a critical mechanism for improving the uniformity and quality of care for mothers' nutrition. In both settings, there are substantial structural and cultural constraints to improving maternal nutrition among women, but the extent and severity of the obstacles seem to be more distinct in Pakistan. The UK literature identifies food insecurity, dependence on ultra-processed food, and poor referral pathways, but women overall tend to be better covered by baseline services, well-developed primary care infrastructure, and well-integrated national

guidance. In Pakistan, there is more widespread poverty, stronger ties within extended family structures, less freedom for female decision-making, and larger gaps in policy implementation, monitoring, and frontline capacity. As both nations need to be more culturally aware of system-wide response, basic service strengthening, and structural action are more necessary in Pakistan.

Limitations of the study

This review is limited primarily by the nature and coverage of the included studies. Most were cross-sectional or observational and relied on self-reported diet, supplement use, and counselling, introducing recall and social desirability bias and limiting causal inference. Heterogeneity in designs, measures, and populations precluded meta-analysis and required narrative synthesis. Evidence was unevenly distributed geographically and socially, with sparse data from the most marginalized groups, restricting generalizability.

Conclusion

The findings indicate that improving maternal nutritional status during pregnancy can reduce the risk of low birth weight and small-for-gestational-age births, particularly through balanced energy-protein supplements and multiple micronutrient preparations that also contain iron and folic acid. There is suggestive evidence of preterm birth and stillbirth in well-nourished populations. The findings also show that the greatest benefits occur when interventions are initiated early in pregnancy, delivered with high adherence, and incorporated into an antenatal care platform that reaches nutritionally vulnerable women. Nonetheless, there are critical areas of concern regarding the optimal formulation, duration, and aim of supplementation; the efficacy of food-based and educational measures; and the sustainability and fairness of large-scale application across a variety of health-system settings.

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Conflict of Interest

The author has no conflicts of interest regarding the publication of this paper in its current form and order of contributions.

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