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Malnutrition among Women of Reproductive Age in South Asia: Scope, Determinants, and Interventions

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A B S T R A C T

This study discusses the complex problem of malnutrition among women aged 15–49 years in a region characterized by pronounced socio-economic disparity and gender inequity: South Asia. Malnutrition-which can involve both under and over nutrition, including micronutrient deficiency, as well as overweight and obesity—has serious consequences for maternal morbidity, the health of the pregnancy, and future generations. We draw from demographic and health surveys (DHS), peer-reviewed literature, and program evaluations and conduct a narrative review of the prevalence of forms of malnutrition, the role of social, economic, and cultural underlying determinants, and current public health activities, which have been carried out by governments, NGOs, and international organizations. Despite interventions including food supple-mentation, micronutrient fortification, behavior change communication and community nutrition education some obstacles still remain. These include deep seeded gender norms, programs not reaching to rural oft marginalized communities, monitors and data collection systems not uniformly applied, and fragmented policies. The paper presents priority areas for action and a strategic response that includes strengthening multi-sectoral approaches; increasing gender-sensitive community interaction; scaling up fortified food interventions; and developing strong surveillance systems. Key components to achieving progress in women of reproductive age include the enhancement of the primary health care system, more empowered women and advances in the science of nutrition. This review adds to the debate on how to accomplish nutrition targets/Sustainable Development Goals in South Asia through feasible pathways to improve maternal and child health.

Keywords: Malnutrition, Micronutrient deficiency, Public health activities.

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INTRODUCTION

Malnutrition in Women of Reproductive Age (WRA), those who are 15–49 years, is an urgent and complex public health problem in South Asia. Although the economy is growing and health infrastructure is improving, the region suffers from a disproportionate burden of under- as well as overnutrition, commonly referred to as “double burden of malnutrition.” Those aged 62 and younger are at higher risk because of the biological, socioeconomic, and cultural conditionings that intersect with the underlying power structures and the overall inequalities of food access, healthcare and education (Osmani & Sen, 2003).

The South Asian region, consisting of countries like India, Pakistan, Bangladesh, Nepal, Sri Lanka, Bhutan and Maldives, home to a quarter of world’s population, has some of the highest rates of malnutrition in the world. In South Asia, more than 35% of women are anemic and women also suffer from micronutrient deficiencies,

including iron, zinc, vitamin A and folate, says the Global Nutrition Report (2021). ” Although underweight remains prevalent, particularly in rural and low-income areas, rates of overweight and obesity are also increasing as a result of urbanization, dietary shifts, and decreased physical activity (Global Nutrition 2021_Report).

This twin burden of undernutrition is layered with entrenched gender norms related to food distribution within the household, early marriage and lack of decision making power for women. Elsewhere in South Asia, women receive the smallest and last portion of food, especially in joint family arrangement where men dominate the household. Such sociocultural and economic factors contribute to suboptimal caloric and nutrient consumption, especially during pregnancy and lactation when a women’s nutrition is constrained – facts critical for the health of the mother and the child (Sen & Iyer, 2012). Adolescent girls are disproportionately exposed to chronic undernutrition because they marry young, deliver children as teenagers and have obstructed labor, low birthweight babies and elevated risk of maternal death related to it (Bhutta et al., 2013).

Further, nutritional status among WRA affects not only individual morbidity, but the impacts are also felt at intergenerational levels. Maternal malnutrition is associated with IUGR, stunting, and with cognitive impairment in the offspring. We need our maternal hospitals to both provide these critical supplements and to diagnose and treat deficiencies in vitamins like Folic Acid and Iron when missing; deficiencies in these vitamin cause conditions that lead to preterm labor, maternal complications postpartum, and defects in the baby’s neural tube. Conversely, overweight and obese women carry an increased risk of gestational diabetes, hypertension and delivery complications that will only add further pressures to under-resourced health systems in the region (Black et al. 2019)

Although there are numerous national and subnational initiatives, malnutrition in WRA within South Asia generally has not been well addressed. Several public health strategies such as iron and folic acid supplementation, and food fortification, conditional cash transfers, and behavioral change communication have been used with varying success. Lack of implementation challenges, low coverage, poor cultural acceptance, and poor monitoring system frequently make these programs less effective (Kavle & Landry, 2018). Furthermore, much of the interventions to date are still concentrating on pregnant and lactating women, with less consideration for adolescents and non-pregnant women, and do not adequately capture the life-situation nature of malnutrition (UNICEF, 2020).

Data is also sparse in the region and barriers are there in rational policy making. In a poor country like India, the national nutrition surveys are sparse, regionally biased or not disaggregated by age, caste and socio-economic status. Lacking strong and timely data, it is a major problem to recognize at risk subpopulations and to focus intervention (Khan et al., 2022). In addition, the COVID19 pandemic has accentuated nutritional vulnerabilities through disruption of food supply chains, constraint health access and rise in household food insecurity especially in woman led and low-income households (FAO, 2021).

Acknowledging that malnutrition is both a cause and an outcome of gender inequality, this article seeks to understand both the magnitude and implications of malnutrition, and policy responses to it using available evidence among women of reproductive age in South Asia. A number of programs have been initiated throughout the region to improve their (women’s) diets; however, further integrated, gender sensitive and multisectoral approaches that tackle the immediate and root causes are still required. This involves improving early health care, supporting girls' education, economic empowerment of women, and equitable access to nutrition throughout the life course (Gillespie et al., 2019).

This article presents an overview of malnutrition among WRA in South Asia, covering the epidemiology, underlying determinants, and interventions. It summarizes successes achieved and challenges remaining in addressing the nutritional needs of women and outlines evidence-based recommendations for future research, policy, and practice.

LITERATURE REVIEW

Nutritional imbalances among women of reproductive age (WRA) have become a focal point in the global health conversation, with widely recognised implications for maternal, neonatal, and intergenerational health. All studies in South Asia show the region’s complex “triple burden” of malnutrition – undernutrition, micronutrient deficiencies, and rising overnutrition and obesity. In a multi-country study, Harding et al. In South Asia, nearly 11.8% of WRA in the same age group were underweight, and 36.3% were overweight or obese, and these dual burdens were also prevalent in the same communities, and even households as reported by Rashid et al. This contrasting coexistence indicates a paradigm shift in the region from nutrient inadequacy to the over consumption of energy-dense, nutrient-poor diets as the result of the process of urbanization, economic development and lifestyle changes (Harding et al., 2018).

Micronutrient deficiencies continue to be a problem in South Asia, including deficiencies in iron, iodine, vitamin A, and zinc. A systematic review of clinical trials of… Stevens, 2009 5. (2022) estimated that 50% reproductive age women in India, Pakistan, and Bangladesh are affected by anemia. The World Health Organisation (2021) also reported that South Asia accounts for the higher burden of anemia, negatively affecting immune response, maternal power and fetal growth. Furthermore, highly prevalent vitamin D and B12 deficiencies have been identified, particularly in vegetarians and the low-socioeconomic status individuals. These deficiencies are also related with higher risk of pre-eclampsia, intrauterine growth retardation and adverse birth outcomes, emphasizing the importance of stronger micronutrient interventions for WRA (Stevens et al., 2022).

Gender-related factors such as gender disparities, early marriage, and dietary taboos constitutes significant driving forces behind malnutrition. As osmani and Sen (2003) point out, this has serious ramifications for women's health, as persistent practices resulting from derived demand means that women often eat last and receive the least nutritious portions. These practices are added to in pregnancy and in some cultural settings to discourage protein-rich or 'hot' foods. In rural Nepal and Bangladesh, women often report they have little autonomy over food consumption, the latter being determined by in-laws or husbands (Bhutta et al., 2013). This gendered nutritional neglect not only bodes ill for the health of women but sets off a chain reaction that feeds into intergenerational cycles of malnutrition and poverty.

Education has become an important protective factor in the nutritional outcomes for women. Women with more education more frequently use health services, have more varied diets, and better receive and consume supplements during pregnancy. In a study based on Demographic and Health Survey data from South Asia, Smith & Haddad (2015) observed that the association of maternal education with undernutrition was more pronounced than that of household wealth. Also, women´s literacy and women´s knowledge of health is associated with higher maternal nutrition through increased use of contraceptives and delayed marriage (Smith & Haddad, 2015). But obstacles including school drop-out, poverty and child labor remain, putting schooling out of reach for girls in many areas of South Asia, especially among marginalized groups.

Poverty, and particularly food insecurity, play a dominant role in women\'s nutritional deficiencies. According to the World Bank (2021), 60%^* of South Asians, including many Sri Lankans, live in less than $3.65 per day (PPP2011), affecting their ability to access a variety of healthy food. Household coping strategies, such as reducing portion sizes or skipping meals, are commonly employed in food-insecure settings, conditions that are more likely to be borne by females. Das et al. (2020) found that among households affected by food insecurity in Bihar, India, women were significantly higher in reporting meal skipping than men, even during pregnancy. These gendered vulnerabilities are compounded during emergencies like pandemics or climate induced disasters, where the food system is disrupted and household incomes are compromised (Das et al., 2020).

In the last few decades, there have been a number of public health interventions focusing on the reduction of malnutrition of WRA in South Asia. These include iron and folic acid supplementation (IFAS), multiple micronutrient supplementation (MMS), food fortification, and conditional cash transfer programs like India’s Integrated Child Development Services (ICDS) and Pakistan’s Benazir Income Support Programme (BISP). Bhutta et al. (2013) showed that compared to routine iron-folic acid, MMS in Bangladesh prevented 11 % of stillbirth and 12 % of LBW showing the potential effects of well-designed nutrition programs. Yet, program effectiveness has been consistently undercut by challenges of implementation, including weak supply chains, low knowledge, and cultural resistance. The importance of context-responsive delivery models and community participation for supplementation programs to work has been underscored (Bhutta, Salam, & Das, 2013; Kavle & Landry, 2018).

The involvement of health systems in the challenge of women’s nutrition has also been widely addressed in the literature. A feeble health infrastructure, especially in rural areas, continues to be a critical stumbling block. In much of South Asia, women travel long distances to clinics, few female health workers are available and nutrition advice and counseling during pregnancy is poor. The early detection and intervention are poor in low- and middle-income countries (Chomba, 2010).Around half of the pregnant women in rural South Asia do not receive the recommended four antenatal attends and thus having limited opportunity for early screening and intervention (UNICEF, 2020). In Pakistan and India, evidence suggests that front-line health workers are undertrained in maternal nutrition counseling and that quality of services is variable from one region to another (UNICEF, 2020).

Lately, focus has turned its focus to overweight and obesity among women—an emerging threat in urban South Asia.

An analysis by Popkin et al. (2020) reported that although undernutrition remains an issue in rural areas, obesity is on the rise in urban women as a result of the growing consumption of processed foods and sedentarism. With changing consumption patterns, and aggressive marketing of fizzy drinks and snack foods, there has been an increase in gestational diabetes and maternal hypertension. Health systems, traditionally geared towards the problem of undernutrition, are now having to face the challenge of double burden (Popkin et al., 2020).

COVID-19 has compounded the food and health systems' fragility in the region. Nutrition programmes, antenatal care and markets became extremely difficult to access during lockdown. South Asia In South Asia, where the poorest and most marginalized women are bearing the brunt, the Global Alliance for Improved Nutrition (GAIN) has declared that food insecurity has risen by more than 25% in the pandemic. [ADD IN QUOTE ON WAR ON MATERNAL NUTRITION] This interruption undid years of maternal nutrition gains and made it clear that sustainable and scalable interventions are vitally needed to survive the next shock (GAIN, 2021).

In conclusion, there is a rich body of evidence in the published literature on the burden, determinants and consequences of malnutrition amongst South Asian women of reproductive age. Nevertheless, Existing research gives much attention to individual-level risk factors and less on macro factors such as poverty, sex inequality and political commitment. There is also little concept of life-course nutrition approaches that integrate those that are effective in adolescence, pregnancy and the postpartum period. In addition, there is a large void in the program's oversight, evaluation and timely data collection—elements essential for policy changes based on evidence. This review underscores the importance of holistic, multi-sectoral approaches that are culturally specific, culturally equitable, and reflective of evolving nutrition challenges.

Context of South Asia

Demographic Overview

South Asia, which includes Afghanistan, Bangladesh, Bhutan, India, the Maldives, Nepal, Pakistan, and Sri Lanka, is also among the most populous and densely populated regions in the world, with an estimated 1.9 billion people compared to the global population—approximately one-fort of the global population (World Bank, 2023). Among this cohort, women of reproductive age (15-49 years) are a large demographic; they represent about 26–30% of the total female population in each country (United Nations Population Division, 2022). With demographic variation across countries in the region, the majority have similar challenges, including higher fertility rates in rural as opposed to urban areas, early marriage, and poor to limited reproductive health service provision.

Fertility rates have dropped across South Asia over recent decades, but are still above replacement in many countries. For example, Pakistan and Afghanistan have the total fertility rates of 3.4 and 4.6 births per woman, against 2.1 in Sri Lanka (UNFPA, 2021). Child marriage continues to be widespread in the area, with Bangladesh having one of the highest rates of early marriage in the world – more than 50% of girls are married before they reach 18 (UNICEF, 2020). Because these early marriages lead to early pregnancies which in turn have serious nutritional and health risks for adolescent girls who are not matured either biologically or socially to assume the role of a mother.

Population distribution is being dramatically changed through urbanization. Urban South Asia's population is estimated to be almost 40% by 2030 (UN DESA, 2022). Urban growth tends to be unplanned and accompanied by the growth of informal settlements, slums, and poor access to clean water, sanitation, and healthcare services. These settings have aggravated vulnerability to undernutrition as well as overnutrition in women of reproductive age. By contrast, rural populations continue to experience difficulties in accessing good quality maternal and nutrition care, and there are large areas of food insecurity and limited health care infrastructure (Ahmed and Ahmed, 2000).

Another demographic factor that is relevant to nutrition is age structure. A young population has a high demand for reproductive and maternal health services—over 60 per cent are under the age of 30 but health workers are in short supply in many countries. Moreover, adolescent girls, which is a large proportion of the WRA category, frequently have also nutritional deficiencies driven by insufficient dietary intake during critical periods of growth, compounded by early marriage and multiple pregnancy (Bhutta et al., 2013).

Migration also has implications for nutritional outcomes. Much of the intra-regional migration, and especially among male laborers, leaves women as the heads of families living in relative economic vulnerability. Such "left-behind" women may not have had enough income or have had adequate social support, and are particularly at risk of malnutrition. In Nepal and some regions of northern India, for instance, there have been reports of increasing undernutrition in women who are left behind in remote villages with poor access to markets or services due to male seasonal out-migration (Khanal et al., 2020).

The region has a demographic profile characterized by high

population density, young age structures, early marriage and early childbearing, and rapid urbanization, which creates a multi-faceted panorama of malnutrition among women of reproductive age. The demographic pressure on reproductive health services, exacerbated by gendered vulnerabilities, is a major factor leading to poor nutritional gains in the region (Gillespie et al., 2019).

Socioeconomic Disparities

Economic inequalities are at the root of malnutrition in South Asia. Parts of India and Bangladesh remain rife with poverty and malnutrition despite strong economic growth in both countries, where per capita income has more than doubled between 1990 and 2010 to $1,420 and $2,080, respectively. World Bank (2022) has estimated that some 400 million people in the South Asian countries live on less than $3.65 a day and, at nearly two-thirds of the poor in these countries, poor women bear the brunt of systemic gender disparity.

One of the key social predictors of malnutrition is education, particularly for girls. Poor access to education and information also affects women's nutrition; those who have no or low level of education are more likely to become malnourished as they are not aware of their dietary requirements, child spacing and antenatal care (Smith & Haddad, 2015). Further, female literacy is also linked with increased child health and utilization of health. Regrettably, levels of female literacy are still low in certain parts of the region: only 29% of Afghani women aged 15 and over can read and write, compared to 57% in India, and 71% in Sri Lanka, for example (UNESCO, 2021).

It is a lack of food Poor access to a varied and nutritious diets is a direct consequence of poverty. Many poor households rely on starch-heavy staples of carbohydrates such as rice and wheat and don't get sufficient amounts of protein, fruit and vegetables. This diet causes under- and "hidden hunger" due to micronutrient deficiencies (Black et al., 2013). Women in poor households often experience more of this labor due to food insecurities and may forgo their individual nutrition/care in favor of other family members (usually children and male kin) (Sen & Iyer, 2012). Women in Pakistan have been known to miss meals or reduce meal size in response to financial pressures resulting in chronic undernutrition (Khan et al., 2022).

Healthcare availability also differs widely by income, geography and caste or ethnicity. Dalit and Adivasi populations face considerable discrimination including less use of maternal nutrition services in rural Nepal and India. At the same time, urban poor living in slums in Bangladesh are frequently excluded from official health systems, and depend on under-resourced and informal care providers (Ahmed et al., 2020). Economic constraints, including out-of-pocket costs, makes women less likely to use antenatal and nutrition services.

Occupation status and financial independence are important forces contributing to the status of women's nutrition. EGA women are faced with restricted financial autonomy and household decision-making power on account of their presence in the informal and unpaid labor sectors. Patriarchal practices in many South Asian communities limit women's movements, employment opportunities, and autonomy with resultant adverse effects on food security and health (Gillespie et al., 2019). On the other hand, employed women who have some command over household income are more likely to devote higher income shares to nutrition and health for themselves and their children (FAO, 2019).

There's also variability in the effectiveness of social safety nets and government schemes. Although programmes like India's PDS (Public Distribution System) and Pakistan's Ehsaas Program intend to offer subsidized food and cash, service coverage, administrative hurdles and awareness gaps deny vulnerable women full benefits. Moreover, in many programs, the provision of enough calories instead of a nourishing diet for children is a primary goal and it does not meet their specific needs of essential micronutrients (Kavle & Landry, 2018).

In sum, there are profound socioeconomic inequities— including for poverty, education, health care access, and the power relations between genders— that are inextricably linked to women of reproductive age's nutritional outcomes in South Asia. Without addressing the underlying factors, measures to address malnutrition are expected to be short-lived (Bhutta et al., 2013).

Defining Malnutrition in Women of Reproductive Age

Malnutrition among women of reproductive age (WRA) is a complex condition that includes undernutrition, micronutrient deficiencies, overweight, obesity, and an invisible forms of malnutrition termed "hidden hunger. These different manifestations of malnutrition are frequently concurrent, particularly in low- and middle-income countries (LMICs) such as those in South Asia, and result from insufficient and imbalanced nutrition in vulnerable periods such as adolescence, pregnancy, and lactation. knowledge of these classifications is important to guiding targeted interventions to address the heterogeneous nutritional vulnerabilities of WRA (Black et al., 2013).

Underweight

Undernutrition is also a widely-prevalent form of

malnutrition among women of South Asian region, particularly in women from rural and low socio-economic status and is often measured by body mass index (BMI < 18.5 kg/m²). WRA with underweight status is strongly linked to chronic energy deficiency, often as a result of insufficient caloric consumption, frequent infections, early marital status, and repeated pregnancies. Based on the Global Nutrition Report (2021), the prevalence of underweight among women of reproductive age cumulated at 21.4% in India, 14.4% in Bangladesh, and 15.1% in Nepal. These levels are still unacceptably high even in light of recent economic growth and public health measures.

Adverse outcomes of being underweight are most acute during pregnancy including increased risk of intrauterine growth restriction (IUGR), low birth weight and prematurity, with greater neonate and maternal death (Kozuki et al., 2015). Women will also have exhausted stores of nutrients before pregnancy due to undernourishment, resulting in poor gestational weight gain and suboptimal lactation. In addition, the physical needs for nutritional support during the age of adolescence are further intensified if pregnancies are occurring at a young age, which perpetuates an intergenerational cycle of mal-nutrition (Bhutta et al., 2013).

Although specific interventions including iron and folic acid supplementation and food rationing systems have been in place in countries such as India and Pakistan, rates of underweight have been declining slowly or remain unchanged in the last two decades. Structural factors—such as gendered food distribution, poor antenatal advice, and lack of dietary diversity—persistently contribute to suboptimal progress in women nutrition in resource-poor societies (G.A Gillespie, Imanari, Haddad, Samman, & Shrimpton, 2019).

Micronutrient Deficiencies

Micronutrient deficiencies such as iron, iodine, vitamin A, folate, and zinc— continue to affect a large segment of WRA in South Asia, and what is also known as the “hidden hunger” phenomenon. Such micronutrient deficiencies do not result in the all too striking visual signs that characterize macronutrient deficiencies, however, they exert massive effects on maternal health, fetal growth and immune capacity. Iron-deficiency anemia is the most common micronutrient disease among South Asian women. More than 50% of WRA are anemic in both India and Pakistan, where national surveys indicate lacklustre progress over the last 20 years (WHO, 2021).

During pregnancy, iron-deficiency anaemia is linked with elevated maternal risk of haemorrhage, sepsis, low birth weight and perinatal mortality (Stevens et al., 2022). Additionally, low folate increases the risk of neural tube defects in children, and insufficiency of vitamin A and zinc weakens immune response, raising the risk of infections (Kavle & Landry, 2018). Vitamin D insufficiency is also a significant problem for the public health, especially in urban and indoor living people. A latest survey in Pakistan reported 80% of WRA as vitamin D deficient because of restricted sun exposure, dietary insufficiency, and fortification (Khan et al., 2022).

Strategies to address these deficiencies include supplementation, food fortification and nutrition education. But the effectiveness of such interventions is mixed from one country to another. For instance, India’s experience with its iron supplementation program is likely to have been marked by low coverage/lower adherence rates in the past due to the poor taste, side effects, and intermittent supply (Bhutta et al., 2013). Also, food fortification has not yet been scaled up among much of the population in rural Nepal and Bhutan, in northern Pakistan, and where populations are still very vulnerable.

Inadequate information about micronutrients and insufficient access to diversified diets also play a major role in these deficits. Long-term malnutrition risk is magnified by the fact that, especially if they are girls, adolescents may skip meals or diet due to cultural prohibitions, insecurity with body image, or unavailability of food — all of which make it more likely they will become or remain long-term nutritionally deficient (UNICEF, 2020).

Overweight, Obesity, and “Hidden Hunger”

Underweight and micronutrient deficiencies are the nutritional burdens in the rural poor strata of South Asia but overweight and obesity are increasing among the urban and middle- income group women of this region at an alarming rate. This paradoxical condition — termed the “double burden of malnutrition” — is partly the result of dietary changes, sedimentary lifestyles, and greater intake of processed, calorific food. For WRA, overweight is on the rise in India from 13% in 2005 to 24% in 2021, and similarly in Pakistan, Sri Lanka and Bangladesh (NFHS-5, 2021).

Obesity in WRA is associated with a range of negative reproductive health outcomes such as gestational diabetes, pre-eclampsia, infertility, cesarean section, and postpartum problems (Popkin et al., 2020). In addition, obese women are more likely to have macrosomic babies, leading to an increased risk of birth trauma and childhood obesity. These tendencies pose a mounting burden on resource-limited health systems in South Asia traditionally geared to

undernutrition and shifting to manage the emergent burden of non-communicable diseases (Black et al. 2013Reinhard, Black and Mindt 2018).

This phenomenon is closely associated with "hidden hunger," wherein populations obtain enough –even too many– calories, but suffer from a shortage of essential vitamins and minerals. Hidden hunger is most common in poor urban women who consume affordable, ultra-processed foods that are rich in sugar, salt, fat and low in micronutrient density. Among overweight women, even more, are deficient in micronutrients – especially iron, calcium and B vitamins – which affects their general health and puts pregnancy at risk (GAIN, 2021).

These initiatives to reverse the tide of overweight and obesity are still in their infancy in South Asia and are usually restricted to intermittent drives inculcating healthy eating and promoting exercise. Taxing sugary drinks or banning the marketing of junk foods to women and children are measures that have met little political support in few countries. Thus, without integrated interventions for over- and undernutrition together, actions to address women's overall nutritional status will continue to be fragmented and insufficient (Gillespie et al., 2019).

Risk Factors and Determinants

Malnutrition in women of reproductive age (WRA) in South Asia is not simply an outcome of poor dietary intake, but is influenced by a set of complex factors such as, socio-economic, cultural, education, and health system-related factors. These factors condition women's ability to access nourishment, health, freedom, and chances for a better health. To address malnutrition successfully, we need to gain insight into these multifactorial drivers and how they contribute to the perpetuation of nutritional vulnerability in various stages of a woman's life.

Poverty and Food Insecurity

Poverty still is one of the strongest determinants of malnutrition among WRA in South Asia. Economic hardship limits the options of the home to access a variety of nutritious foodstuffs, hence resulting in a monotonous diet led by carbohydrates with a high cost fisheries products, fruits and vegetables. Over 400 million people in South Asia are poor (World Bank 2022) and women and girls are disproportionately poor because of underlying gender hierarchies and lack of opportunity to earn income.

One of the most distinctive causes of malnutrition is poverty that results in a lack of food (food insecurity), which not only decreases the intake of food (energy), but also the nutrients in the food consumed. Households that are food insecure tend to adopt negative coping strategies including meal skipping, eating less preferred food, and prioritizing food needs of adult males. According to a research carried out in Bihar, India, food-insecure women were found to have markedly higher prevalence of underweight and anemia especially during pregnancy (Das et al., 2020). In Pakistan and Nepal, household food insecurity is also significantly related to low BMI and insufficient GvWG among women (Khan et al., 2022).

The COVID-19 pandemic made food insecurity even more acute, driving millions into poverty and wrecking supply chains. Women, particularly those engaged in informal labor and who relied on daily wages, were affected more heavily, with limited access to both income and food. Nutritional deficits increased among those already hovering on the edge (GAIN, 2021).

Cultural Norms and Gender Dynamics

Underpinning aspects of culture and gender-discriminatory power relations are key to understanding why women in South Asia suffer greater levels of malnutrition than men. Women in many families are to eat the contents of what is leftover or less iron-rich food as family members as the men have precedence over them especially in joint family systems. Such practices also echo gendered power relations where women are dispossessed of the agency to make choices regarding food consumption, health care and reproductive behaviour (Sen & Iyer, 2012).

Food consumption during pregnancy is also affected by cultural taboos. Several South Asian cultures forbid pregnant women from eating "hot" foods like meat, eggs or fish, based on misinformation about what they may do to a developing fetus. These limitations frequently result in insufficient protein and micronutrient intake during increased nutritional requirements. In rural Bangladesh and Nepal, dietary restrictions during pregnancy and postpartum established by elderly family members, most notably mothers-in-law, have been identified in qualitative work (Bhutta et al., 2013).

Norms of the patriarchy also lead to early marriage and adolescent pregnancies — which dramatically increase nutritional risks. Early married girls tend to leave school, control less in terms of sexual and reproductive health, and deliver before their bodies are fully ready, with poor pregnancy outcomes and perpetuation of intergenerational malnutrition (UNICEF, 2020).

Education and Awareness

Education is an important determinant of women's nutritional status as it influences their awareness, decision-making and ability to access health services. These might partly explain why women who had higher levels of

education were more aware of dietary diversity, supplementation, and recommended ANC. They also have more freedom to decide where food is distributed in the household and access to timely medical care (Smith & Haddad, 2015).

Based on the Demographic and Health Surveys data from India, Bangladesh, and Nepal, among educational strata, women with secondary and higher levels of education were disproportionately less likely to be underweight and more likely to consume iron-rich foods and antenatal supplements relative to those with no formal education (Harding et al., 2018). Additionally, maternal education has been shown to have strong spillover benefits in relation to child nutrition, school attendances, and immunisation coverage thus strengthening the case to addressing malnutrition as part of a long term strategy to invest in girls' education.

In spite of these advantages, the gender gap in education endures. Female literacy is alarmingly low in Afghanistan and in some parts of Pakistan, especially in rural and tribal areas. Structural barriers such as poverty, child marriage, insecurity, and cultural practices still act as constraints that hinder school access for girls which ultimately affects their future income and health knowledge (UNESCO, 2021).

Health Services Access

Ensuring the timely, high-quality medical care to those in need is key in the prevention and treatment of malnutrition among WRA. In South Asia several obstacles, including financial cost, geographical distance, shortage of skilled providers, and gender roles, restrict women's ability to participate in antenatal services, including routine antenatal care, nutritional education, and supplementation. Less than a half of pregnant women in South Asia receive the recommended four antenatal care checks (UNICEF, 2020) which are important for the screening and management of malnutrition.

In rural areas, where there are no female health workers and no culturally sensitive services, women are even less likely to seek care. Women in India and Nepal may prefer female providers for reproductive and nutrition services but, due to a shortage of workers, these services may not be gender-sensitive (Ahmed et al., 2020). Additionally, nutrition-specific interventions and counseling are not always part of the training of frontline health workers, limiting the effectiveness of government programs such as iron and folic acid supplementation or Integrated Child Development Services (ICDS).

Breaking up of the health system is a factor as well. Nutrition programmes are often provided in a vacuum from either maternal health or social protection systems, leading to wasteful duplication of service and missed synergies. For instance, though multiple South Asian countries provide micronutrient supplementation in pregnancy, few integrate these with larger social policies, such as coverage for food security initiatives, conditional cash transfers to mothers, or family planning (Gillespie et al., 2019).

Health Consequences

The impact of undernutrition among women of reproductive age (WRA) in South Asia is severe, multifaceted, and affects not just the individual but also their families and communities. Malnutrition undermines the physical and reproductive health of women, heightens the risks of obstetrical complications, and generates a long-term cycle of ill health(b19). These health indicators are especially important in a region that has high levels of maternal morbidity and mortality and significantly lower child development indicators than the rest of the globe.

Maternal Health Outcomes

Malnutrition in WRA undermines physical reserve capacity and susceptibility to multiple morbidities. Malnourished women are vulnerable to fatigue, weakened immune system, slow wound healing and menstruation irregularity that can decrease their reproductive values and quality of life. Chronically low energy intake negatively affects work capacity and predisposes to infections, including UTI and reproductive tract infections (Black et al., 2013).

Micronutrient inadequacies also have serious effects. Anemia due to iron deficiency has symptoms such as fatigue, dizziness and shortness of breath because the blood is incapable of carrying enough oxygen to these bodily functions. In more severe cases, it can cause cardiac strain and the mother's heart to fail during delivery. A lack of Vitamin A impacts the immune system and susceptibility to infection; zinc and Vitamin D deficit are associated with poor bone health and musculoskeletal pain (Stevens et al., 2022). Furthermore, inadequate folate during preconception and early pregnancy is a direct cause of NTDs and suboptimal fetal neural development (Bhutta et al., 2013).

It also makes women prone to non-communicable diseases (NCDs) such as type 2 diabetes, hypertension, and heart diseases in later life. The simultaneous presence of undernutrition and the new appearing obesity in urban women sets up a situation in which ends of the malnutrition continuum result in long-term ill health that is most commonly not recognized and remains untreated in resource-deprived settings (Popkin et al., 2020).

Pregnancy Complications

Pregnancy is a nutritionally stressful physiologic condition, and insufficient nourished women are at markedly increased

risk for complications during pregnancy, delivery and the puerperium. Poor maternal diet pre-conception and during pregnancy is strongly related to IUGR, LBW, preterm birth, and perinatal mortality (Kozuki et al., 2015). These risks are especially increased in adolescent mothers, because their bodies are still growing and do not have the nutrient stores to sustain pregnancy.

Iron-deficiency anemia is one of the most common preventable causes of maternal mortality among pregnant and postpartum women and a risk factor for such outcomes as postpartum hemorrhage, sepsis, and poor wound healing in South Asia. Women Health Organization (WHO, 2021) reports that anemia among pregnant women causes 20% of maternal deaths in low and middle income countries of which most of them occur in the sub-Saharan Africa including South Asia. Frequent, severe anaemia increases blood transfusion at birth and further complicates recovery in the post-partum period (UNICEF, 2020).

Obesity, which is becoming more common in urban WRA, also carries its own range of pregnancy risks. Overweight and obese women also have an increased risk of gestational diabetes, pre-eclampsia and pregnancy-induced hypertension. These factors not only put woman at risk of adverse delivery outcomes but also of surgical interventions, including caesarean section, and extended hospital stay, (Harding et al., 2018). Additionally, obese mothers may encounter challenges in establishing and maintaining breast feeding, and as a result the nutrition and immunity of newborns is also affected (Kavle & Landry, 2018).

Weak maternal diet also disrupts lactation. Malnourished pregnant women tend to lactate less milk and of poorer quality, which can result in a poor nutritional start in the life of the child. Maternal micronutrient deficiencies, most notably of vitamin A, iodine, and B vitamins, have an immediate effect on breast milk production and nutrient content for infants (Bhutta et al., 2013).

Intergenerational Impact on Children

The most significant impact of maternal malnutrition is likely to be its intergenerational effect. Children whose mother had insufficient intake are also at an increased risk of stunting, wasting and low birth weight– conditions strongly associated with poor cognitive function, motor ability and academic achievement (Black et al. 2013). Insufficient nutrition in the fetus results in permanent changes to the structure and function of organs, including the brain, heart, kidney and pancreas, based on the “fetal origins of adult disease” hypothesis (Barker, 1998).

And babies born to anemic or otherwise micronutrition-impaired mothers frequently inherit weakened immunity and are more susceptible to diseases like diarrhea and pneumonia. They’re also more likely to die before they’re five years old, especially if they don’t have access to health care and sanitation. UNICEF (2020) suggested that the risk of child mortality is associated with maternal undernutrition, withthis risk being especially heightened in the South Asian region, where 35% of children under five years are stunted and 16% are wasted.

This intergenerational cycle of malnutrition is also reinforced by the fact that girls born to undernourished families become undernourished adolescents and mothers. This cycle would be hard to interrupt without specific interventions to improve the nutritional status of mothers throughout the life-course—from adolescence to pregnancy to well beyond. Not addressing this not only has health implications but also consequences for the economy in a reduction in productivity, greater burden on health systems and less human capital development (Gillespie et al., 2019).

In fact, studies have also suggested that maternal obesity may increase the risks of childhood obesity and metabolic disease in later life of the offspring. NORWAY: Offspring of overweight mothers have higher odds of being macrosomic, having birth injuries, and developing insulin resistance as adolescents. They are conditions that augur long-term risk for non-communicable diseases such as diabetes and hypertension, and they basically defer the public health burden (Popkin et al., 2020).

Current Interventions & Policies

The reduction of malnutrition in women of reproductive age (WRA) has been a priority agenda for public health in South Asia, and multiple governmental and non-governmental sectors have been implementing nutrition-specific and nutrition-sensitive interventions in the region. Although some national programs, international partnerships, and community-based approaches have demonstrated significant potential, there are still challenges to achieve broad coverage, proper surveillance and long-term sustainability. This chapter discusses the main actions that have been taken by governments, non-governmental organizations (NGOs), health systems, and regional alliances to address WRA malnutrition.

Government Nutrition Programs

Governments in South Asia have delivered many scaled-up nutrition programs aiming at women, especially women during antenatal and lactation. India’s Integrated Child Development Services (ICDS) and Poshan Abhiyaan (National Nutrition Mission) have been amongst the the most ambitious efforts globally in providing supplementary nutrition, health education and antenatal care through

Anganwadi centers. The Janani Suraksha Yojana (JSY) also encourages institutional deliveries and indirectly enhances maternal nutrition by the means of CCT (Ministry of Women and Child Development, 2021). Nonetheless, assessment studies have produced mixed findings owing to implementation deficiencies, lack of monitoring, and inadequate field staff training (Avula et al., 2013).

For Pakistan, the Benazir Income Support Programme (BISP), which has a health-nutrition arm called the Nashonuma Program, make conditional cash transfers to pregnant and lactating women. Those who attend health and nutrition counseling sessions receive cash and specialized nutritious food. While coverage had increased in some areas, political interference, illiteracy, and geographical inequities remain (Khan et al., 2022).

The National Nutrition Services (NNS) of Bangladesh integrates nutrition into primary healthcare in community clinics, offering iron-folic acid supplements, deworming medications, and nutrition counseling. Sri Lanka's Maternal and Child Health Programme based on a robust system of public health midwifery is also a success, with marked reduction of maternal malnutrition and better birth outcomes (UNICEF, 2020). But one of the most widely shared shortcomings of the national programmes is that most of them concentrate on pregnancy related nutrition and neglect the needs of adolescent girls and non-pregnant women during reproductive age.

NGO and Community-Based Initiatives

The role of NGOs and community-led initiatives is key, as these can complement government initiatives, particularly in marginalized and distant areas. Civil society organizations (CSOs) such as BRAC in Bangladesh, The Aga Khan Foundation in Pakistan and Action Against Hunger in India and Nepal have implemented large-scale, community-based nutrition programmes, which have focused on behaviour change, women's empowerment and nutrition-sensitive agriculture (BRAC, 2020). These programmes widely use peer educators and women's groups to drive awareness of dietary diversity, exclusive breastfeeding and the importance of micronutrient supplementation.

The positive deviance approach and mother support group have shown promising as an intervention to alter maternal behaviours and infant feeding choices. In Nepal, participatory learning and action (PLA) groups led by female community health workers reduced maternal undernutrition and increased use of antenatal care (Marston et al., 2013). Because models like these are community-owned and culturally sensitive they can also be more sustainable than top-down approaches.

Its hard to scale this NGOs led muay thai programs, despite their promise and funding is an issue. They may risk ebbs and flows in funding, lose some of the benefits of coordinated action and are likely to bypass the national health systems. Potential community-based impacts need to be coupled with broader health policy and governments need to facilitate scale up of what works if maximum impact is to be achieved (Gillespie et al., 2019).

Role of Health Care Systems

It is imperative to integrate nutrition services into national health systems to guarantee sustained, equitable access to nutrition-based support throughout the reproductive lifecycle. But health system resources in South Asia are patchy – especially in rural and vulnerable areas. PHCs and maternal health clinics, where WRA are likely to present, are often short staffed, under resourced and ill prepared to deliver comprehensive nutrition services (UNICEF, 2020).

Antenatal care visits present an important opportunity to screen for undernutrition, counsel concerning dietary practices, and administer iron and folic acid. Nevertheless, service coverage remains inconsistent. In Afghanistan, and elsewhere in India and Pakistan, fewer than a half of pregnant women achieve the minimum required 4 antenatal visits (WHO, 2021). Furthermore, health workers were not highly trained in maternal nutrition and the counselling sessions were more to do curative constraints rather than preventive practices.

Task shifting and enhancing community health workers – for example India's Accredited Social Health Activists (ASHAs) or Nepal's Female Community Health Volunteers (FCHVs) – have been found effective in extending service coverage. Such workers are critical to providing home-based care, teaching families and handing out supplements. But paying, supervising, and training them sufficiently is a challenge throughout the region (Kavle & Landry, 2018).

With advancing technology, digital resources, and mHealth technology are being utilized to provide novel means of delivering nutrition education and monitoring adherence. Mobile apps, such as India's Anemia Mukt Bharat Dashboard and Pakistan's Ehsaas Nashonuma Monitoring System, support real-time data collection and analysis; however, their functionality relies on digital literacy and infrastructure being in place (GAIN, 2021).

Policy Frameworks & Regional Collaborations

Increasingly, policy perspectives in South Asia now appreciate the need for a multisectoral approach to maternal nutrition. Nations like India and Bangladesh have devised national nutrition plans that combine agriculture, education, social protection, and women's empowerment agendas.

India's National Nutrition Strategy (2017) and Poshan Abhiyaan underscore the need to work across sectors to reduce stunting, anemia, and low birthweight, and Pakistan's Multi-Sectoral Nutrition Strategy (2018-2025) focuses on bolstering inter-ministerial cooperation and decentralizing nutrition programming (Ministry of Planning, Pakistan 2018).

Regionally, with regard to knowledge exchange, joint capacity development and the harmonization of policies among countries, efforts are being made by organizations such as SAARC and SUN(Scaling Up Nutrition) Movement. The SAARC Nutrition Strategy promotes country-level development of nation nutrition surveillance, the enhancement of school feeding programs, and women's empowerment as a mean of ensuring better nutrition (SAARC, 2019). Yet, such efforts are frequently met with bureaucratic inactivity, no political commitment, and funding uncertainties which in turn restrict the scope and effectiveness of these efforts.

Although good policies exist, the challenge is that a lack of implementation is the most binding constraint. Many services are not covered by real-time data monitoring systems and as a consequence are inefficient and poorly targeted. Further, policy support, when present, tends to focus on child nutrition and prioritizes women's nutrition as a secondary concern—often failing to take a life-course approach that includes adolescence, preconception, and interpregnancy intervals (Gillespie et al., 2019).

Recommendations for Future Action

Addressing malnutrition among women of reproductive age (WRA) in South Asia demands an integrated, sustained, and gender-sensitive approach that goes beyond treating symptoms to targeting root causes. The following recommendations are based on gaps identified in current policy and practice.

Strengthening Multisectoral Policies

The health sector, along with agriculture, education, water and sanitation, and social protection, contributes to nutrition outcomes. Accordingly, there is a need for countries to institutionalize multisectoral coordination in their national nutrition policies. Experience from India's Poshan Abhiyaan and Pakistan's Multi-Sectoral Nutrition Strategy indicate that multisectoral harmonization can help to improve policy coherence as well as pool resources across ministries (Gillespie et al., 2019). But for collaboration to succeed, it needs to go beyond policy rhetoric to actual coordinated budget lines, shared accountability measures, local decision-making frameworks. The incorporation of gender equity in nutrition-sensitive policies —including in agricultural extension, school feeding, and rural employment—can contribute to addressing the root causes of malnutrition among WRA (FAO, 2021).

Education and Community Empowerment

One of the strongest weapons to break the cycle of intergenerational malnutrition is education. Governments should invest in ensuring that girls are provided with access to and quality of secondary education, particularly in rural and impoverished areas. Concurrently, adult literacy and health education opportunities for women can provide greater exposure to dietary requirements, prenatal care, and food hygiene (Smith & Haddad, 2015). Scale up community action: Community based platforms (SHG, PLS and peer educator) for promoting social accountability and health seeking process should be scaled up. Such platforms also have potential in addressing harmful gender norms which limit women's control of food and health care decisions (Marston et al., 2013).

Innovations in Supplementation and Fortification

Iron and folic acid supplementation and multiple micronutrients programmes need to be scaled up with better delivery techniques. Novel formulations, including LNSs and biofortified crops, present more attractive options compared to traditional supplements, particularly for those with poor dietary diversity (Bhutta et al., 2013). Governments should also encourage large-scale food fortification, such as of wheat flour with iron and folic acid, edible oil with vitamin A, and salt with iodine, through legislation and partnerships with the food industry. Systems for monitoring have to guarantee the delivery of fortified products for at-risk women, especially in rural and low-income regions. BCC campaigns reinforce demand, compliance, and awareness to the public (GAIN, 2021).

Research and Surveillance

Nutrition surveillance and research capacity in South Asia needs to be improved--and soon! Regular, disaggregated nutrition surveys should be conducted by countries—collecting data broken down by age, marital status, income, and location—for targeted interventions. For example, real-time monitoring systems connected to digital health systems can enhance delivery, monitor compliance of supplementation, and monitor changes in vulnerabilities. Furthermore, formative research adapted locally should inform the development of culturally relevant interventions, notably about adolescent nutrition, urban obesity, and postpartum dietary behaviors. Investment in implementation research can aid in understanding what works, for whom, and under what circumstances, and in driving more effective and sustainable solutions (UNICEF, 2020; Khan et al.,

2022).

CONCLUSION

Malnutrition in women of childbearing age is a common and serious public health problem in South Asian countries. Even with years of economic growth, investments in health, and targeted programming, the region still faces a complicated burden of underweight, micronutrient deficiency, and increasing obesity—each posing separate risks for maternal and child health. The challenge is not only biological in nature, however, but also inextricably social: in poverty, patriarchy, limited access to education, and fragmented health systems.

This review shows that, although national governments and civil society actors have adopted a variety of nutrition strategies, from supplementation to fortification, from cash transfers to the promotion of behavior change, their effectiveness is inconsistent. Shortcomings in implementation, data, political will, and funding persist in stalling progress. Most programs also have a narrow concentration of attention on pregnant or lactating women, leaving the rest of the reproductive life span out of the field and failing to capitalize on critical opportunities for prevention.

In order to reverse this trend, a life-course and rights-based approach on maternal nutrition should be embraced by South Asian countries. Policies should be comprehensive and multisectoral; communities should be provided with information and resources; and supplementation, fortification, and data systems innovations should be fully leveraged. By viewing women's health as more than just a matter of maternity health, and instead as a cornerstone for national development, countries can make sustainable improvements in nutrition and disrupt the inter generational cycle of undernutrition.

Tackling malnutrition is as much a health issue but also a moral and developmental obligation. South Asia has the potential to bring about transformative change in the lives of its women and in the future of their future generations, when political will, evidence-based policies and gender-sensitive programming are available.

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