

Closing the Nutrient Gap During Adolescent Pregnancies

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Key messages

- > Twenty thousand girls a day below age 18 become pregnant in developing countries.
- > Adolescence, a period of catch-up growth, involves a higher need for macro- and micronutrients in the growth process.
- > Gross paucity of data exists concerning dietary practices and nutrient intakes among pregnant adolescent girls in developing countries.
- > Childbearing during adolescence hampers both the post-menarcheal linear and the ponderal growth of the young girls and has adverse effects on birth outcomes.
- > Strategies to identify undernourished girls, delay marriage, and prevent early and frequent pregnancies until adult height is reached are critical, alongside other multisectoral reproductive nutrition and health programs.
- > Nutrition-specific and nutrition-sensitive interventions, along with access to adolescent-friendly services that adopt a lifecycle approach will help improve nutritional status.

Around the world today, 580 million adolescent girls¹ between the ages of 10 and 19 years are standing at the crossroads of childhood and adulthood, and four out of five of them reside in developing countries. These girls have the potential to grow and progress in every sector, to break the cycle of intergeneration-

al poverty, and to advance economies. Yet they are overlooked. Adolescent girls in developing countries are more likely to be nutritionally depleted, pulled out of school, and married off early, compared with their counterparts in developed countries. They also face the reality that a leading cause of death and retarded growth for girls under 19 years is pregnancy and childbirth.

The burden of motherhood in childhood

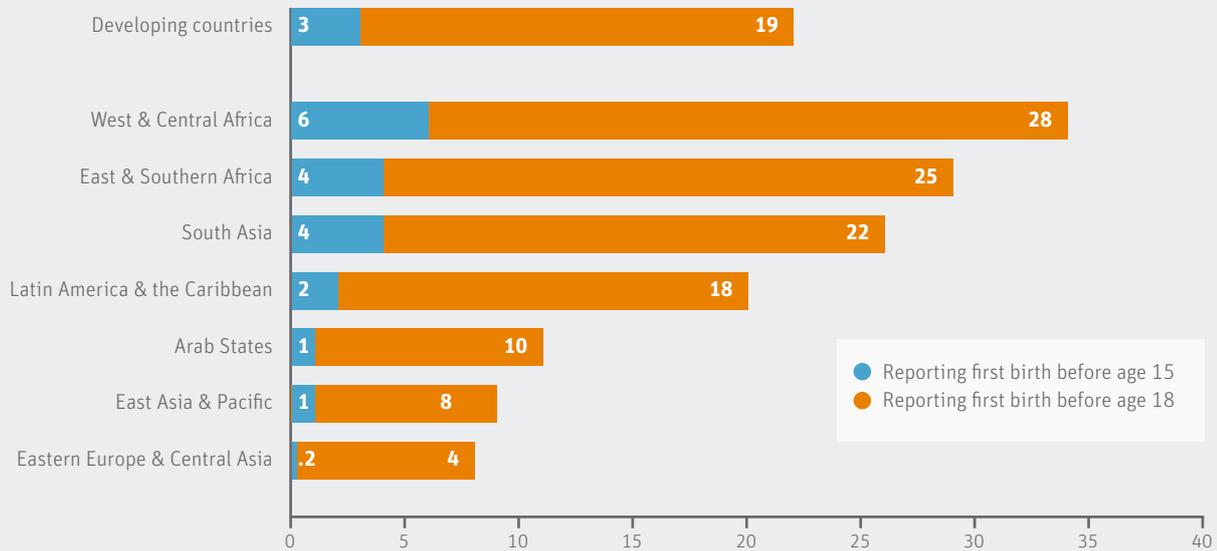
Adolescent pregnancy is a worldwide concern, particularly as it relates to poverty and social disadvantage.² According to the most recent estimates for 2013, every day 20,000 girls below age 18 – nearly 19% of adolescents – become pregnant and give birth in developing countries (**Figure 1**). With 17.4 million pregnant adolescents, South Asia has the highest burden.¹ A high prevalence of child marriage as a cultural norm is one of the major reasons for teenage pregnancy.

Adolescents at the peak of their growth velocity

Adolescence is the only time in life, besides the critical window of the first 1,000 days, when growth velocity increases tremendously.³ Approximately 50% of adult body weight and 15% of final adult height are attained during adolescence.^{2,4} The increment in skeletal mass, body size, and body density associated with pubescence, as well as the fact that adolescence may be an opportunity for catch-up growth, highlights the higher needs for nutrient intake, involving both macro- and micronutrients, in the growth process.

Adolescent pregnancy – a double jeopardy

Pregnancy in adolescence is a critical period, as active growth is occurring in both the young mother and the fetus. The adverse effects of adolescent pregnancy on birth outcomes, such as maternal and neonatal mortality, preterm delivery, and low birth weight, have been well established.^{5,6} In many South Asian and African countries, there is evidence that chronic undernutrition can delay physical maturation and extend the adolescent growth period beyond 20 years, coinciding with the age of first pregnancy.⁷

FIGURE 1: Percentage of women between the ages of 20 and 24 reporting a birth before age 18 and before age 15¹

Source: UNFPA, 2013. Calculations based on data for 81 countries, representing more than 83% of the population covered in these regions, using data collected between 1995 and 2011

Conventionally, it has been accepted that growth is largely completed by the time adolescents become pregnant because pregnancy occurs subsequent to menarche, when growth rate drops to a nadir.² However, scientific evidence from both developed⁸ and developing nations² has demonstrated that a large proportion of pregnant adolescents were still growing in height during and following pregnancy. Importantly, a prospective cohort study in Bangladesh concluded that childbearing during adolescence may hamper both the post-menarcheal linear and ponderal growth of the young girls, which could be a potential window of opportunity for catch-up growth in an undernourished population. Early pregnancy among adolescents results into an overall loss of 0.6 to 2.7 cm in attained height in rural Bangladeshi girls, which may contribute to stunting and increased obstetric risk.²

“Scientific evidence shows that a large proportion of pregnant adolescents are still growing in height during and following pregnancy”

Ideally during pregnancy, the goal is to balance partitioning of the nutrient needs between the mother and fetus, which is critical in assuring optimal fetal growth and adequate mater-

nal nutritional status. However, adolescent girls in developing countries are already nutritionally depleted, tend to enter pregnancy with poor nutritional status, and are likely to have suboptimal dietary intake during pregnancy and lactation. This leads to poor nutritional status of adolescent mothers themselves,



Indian adolescent girls enjoying the midday meal provided in schools by the Indian Government

and a reduction in the pregnant adolescent's potential growth, possibly due to a competition between the mother and the fetus for nutrients.^{2,3,8,9,10}

Research has established that preconception deficiencies of iron, folic acid, iodine, and calcium are predictors of poor pregnancy outcome.¹⁰ Tackling undernutrition, micronutrient deficiencies and anemia during adolescence, and preventing or delaying teenage pregnancy, has shown to be effective in breaking the perpetuating, vicious intergenerational cycle of growth failure among both adolescent girls, as well as the fetus.¹¹

Suboptimal nutrient intake among adolescent girls

The requirements of some nutrients are higher in adolescents than in any other age group. The Recommended Dietary Allowance (RDA)¹² for selected key nutrients shown in **Table 1** clearly highlights that the nutrient requirements tremendously increase during pregnancy in comparison to the non-pregnant girls of the same age group.

While there is a gross paucity of data available on dietary practices and nutrient intakes among pregnant adolescent girls, a recent systematic review¹³ of the dietary intake of adolescent girls in low- and middle-income countries (LMIC) clearly highlighted that the energy intakes among adolescent girls are low. The findings also underscored the fact that more than 50% of the adolescent girls have intakes of all micronutrients below the recommended levels.

Cereal-based diets, with low consumption of nutrient-dense foods, characterize adolescent girls' intakes across regions. However, the consumption of energy-dense and sugary foods in urban areas is increasing among adolescent girls in LMIC,

reflecting the nutrition transition among adolescents in these regions. In comparison with adult pregnant women, a lower proportion of pregnant adolescent girls in The Philippines¹⁴ were found to be taking iron supplements, indicating limited benefit to them from public health programs. A recent study in The Lancet 2016 clearly highlighted that, across populations, the consumption of fruits and vegetables is low worldwide, which is associated with low affordability.¹⁵ To aggravate the situation, especially in South Asia, the diet of pregnant women and adolescent girls is subject to various food taboos and cultural norms that encourage females to consume less food during pregnancy so they will give birth to smaller babies and avoid difficult labor.

Charting the way forward for closing the nutrient gap

Despite recognizing the important role played by improving the nutritional intake of adolescent girls in general, and of pregnant adolescent girls in particular, in breaking the intergenerational malnutrition cycle, a WHO review¹⁷ clearly highlighted that few programs address adolescent nutrition in South Asia and elsewhere globally, and they are often small and experimental. They have largely been aimed at the prevention and control of anemia among adolescents, and their implementation remains patchy across countries. The promising interventions for adolescent nutrition identified by The Lancet in 2013¹⁸ are not yet being widely implemented, and are reflected as a strategic objective in only seven out of 22 Scaling Up Nutrition (SUN) signatory countries that have plans available.¹⁹ Unfortunately, adolescents are generally included *de facto*, as part of countries' direct nutrition interventions.

TABLE 1: Dietary Reference Intakes (DRI): Recommended Dietary Allowances of selected key nutrients during adolescence, pregnancy and lactation¹²

Nutrients		Girls		Pregnancy		Lactation	
		9–13 years	14–18 years	14–18 years	19–50 years	14–18 years	19–50 years
Macronutrients	Carbohydrates (g/d)	130	130	175 ↑	175	210	210
	Protein (g/d)	34	46	71 ↑	71	71	71
Minerals	Iron (mg/d)	8	15	27 ↑	27	10	9
	Calcium (mg/d)	1300	1300	1300	1000	1300	1000
	Iodine (µg/d)	120	150	220 ↑	220	290	290
	Zinc (mg)	8	9	12 ↑	11	13	12
Fat-soluble vitamins	Vitamin A (µg/d)	600	700	750 ↑	770	1200	1300
	Vitamin D (µg/d)	15	15	15	15	15	15
Water-soluble vitamins	Folate (µg/d)	300	400	600 ↑	600	500	500
	Vitamin C (mg/d)	45	65	80 ↑	85	115	120
	Vitamin B ₁₂ (µg/d)	1.8	2.4	2.6 ↑	2.6	2.8	2.8

↑ Indicates increased requirement for pregnant adolescent girls aged 14–18 years in comparison to non-pregnant adolescent girls of same age group

TABLE 2: Recommendations and actions to improve adolescents' nutrition¹⁶

Recommendations and actions	Who needs to take action?
Improve maternal nutrition and health	
Establish policies and strengthen interventions to ensure that pregnant and lactating adolescent mothers are adequately nourished	National policy-makers, health service providers
Introduce measures to prevent adolescent pregnancy and to encourage pregnancy spacing	National policy-makers, health service providers, education sector
Prevent and control anemia	
Promote healthy and diversified diets containing adequate amounts of bioavailable iron	National policy-makers, food and agriculture sectors, health and education sectors
Promote consumption of nutrient-dense foods, especially foods rich in iron	National policy-makers, health and education, food and agriculture sectors
Where necessary, implement supplementation strategies and consider fortification of wheat and maize flours with iron, folic acid, and other micronutrients in settings where these foods are major staples	National policy-makers, food and agriculture sectors
Prevent and treat malaria in pregnant women as part of strategies to prevent and control anemia	
Ensure universal access to, and use of, insecticide-treated nets	National policy-makers, health service providers, development partners
Provide preventive malaria treatment for pregnant women in areas with moderate to high malaria transmission	National policy-makers, health service providers
Offer a healthy diet to all populations	
Create coherence in national policies and investment plans, including trade, food, and agricultural policies, to promote a healthy diet and protect public health	Regional and national policy-makers, food and beverage industries, creative and media industries
Encourage consumer demand for healthy foods and meals	
Promote physical activity in adolescents	
Create a conducive environment that promotes physical activity to tackle sedentary lifestyle	Regional, national, and local policy-makers, urban planners, early-years education, health services
Promote optimal nutrition in adolescents with HIV/AIDS	
Provide nutrition counseling to improve health outcomes in adolescents with HIV	Health service providers, development partners

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“The promising interventions for adolescent nutrition identified by The Lancet in 2013 are not yet being widely implemented”

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Measures for closing the nutrient gap include both the means of improving intake and availability of the foods necessary for a healthy balanced diet, as well as improving the bioavailability and absorption of the nutrients in the food. Equally important is to raise awareness of adequate nutrient intake among adolescents. From a public health perspective, as

Table 2 clearly shows, multiple sectors will need to collaborate in order to drive action forward in these recommended nutrition-specific and nutrition-sensitive areas. Additionally, linkages to policies and programs focusing on nutrition-sensitive interventions and being more sensitive to the specific needs of post-menarcheal married nulligravid and unmarried adolescents is most essential to reinforce improved dietary intake and nutrition for adolescents.

> **Strategies aiming to encourage adolescent girls, especially undernourished ones,** to delay marriage, and to prevent early and frequent pregnancies until adult height is reached are critical alongside other reproductive health and nutrition programs.

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> **Targeted food-based measures**, such as dietary diversification for improved macro- and micronutrient intake coupled with micronutrient fortification of staple foods and availability of adequately iodized salt, as well as provision of food supplements to overcome the intake gap, are critical. However, these interventions face challenges related to cost, gender discrimination, and unequal intra-household food distribution, especially in resource-poor settings. Efforts to ensure that adolescent girls, especially those in food-insecure areas, have access to a balanced diet and/or fortified foods providing the necessary nutrients will help improve their nutritional status. Along with conducive, promotive government policies, the role of the private sector in producing and marketing nutrient-rich healthy foods that appeal to adolescents becomes crucial in order to improve dietary intakes.

> **Dietary supplementation with weekly iron-folic acid tablets for the prevention of anemia** in adolescent girls and women of reproductive age is recommended.²⁰ India provides the largest-scale example of direct nutrition interventions, targeting 108 million adolescent girls and boys under the Weekly Iron-Folic Acid Supplementation (WIFS) program, which is coupled with bi-annual deworming.²¹

> **Nutrition interventions, along with access to information and adolescent-friendly services, should focus on a lifecycle approach** – both prior to and during pregnancy,

specifically targeting married and out-of-school adolescent girls. Awareness-centric programs should also involve boys and men so that they receive information about women's increased nutritional requirements during pregnancy and lactation, and may become better partners when they form families.

> **Nutrition-sensitive social protection program**

interventions focusing on keeping girls in education, bank-linked cash transfer schemes to promote school enrolment, noontime meals at schools, and conditional cash transfer linked to nutrition indicators have proved effective in empowering girls and their families. This in turn has the potential to delay marriage and early pregnancies.^{22,23}

Adolescence presents an opportunity to preserve investments made in childhood and to switch trajectories. The packaging of such interventions through a skilled workforce has the potential to reach a majority of adolescents when disseminated through effective channels and platforms such as schools and universities, as well as community-based, health-based and social protection programs. Equally important are awareness and mobilization via traditional media and social media, in the workplace and at youth centers, through the support of field-based NGOs. These platforms are not mutually exclusive, and if interventions can be carried out on all these platforms as an integrated system, this may help improve the nutritional status of non-pregnant as well as pregnant adolescents.



Beneficiaries of the Weekly Iron-Folic Acid Supplementation (WIFS) program of India (showing blue-colored iron-folic acid tablets)

> **Lastly, research on energy intake and expenditure as well as nutrient intakes among pregnant adolescent girls in malnourished settings** is much needed, and would serve as a powerful tool for policy reforms aiming to improve nutritional status and delay adolescent marriage and pregnancy. This would benefit the largest generation in the world today: adolescents.

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