Nutrition in adolescent girls in South Asia

Victor Aguayo and **Kajali Paintal** review the nutritional status of adolescent girls in South Asia and suggest ways to accelerate improvement of their nutrition

Adolescence creates high nutrient demands. It also provides an opportunity to correct nutritional deficiencies that may have occurred in early childhood, allow catch-up growth, and increase linear growth for the next generation.[1 2] However, food insecurity, dieting, and illness can impair growth and development during adolescence.[3 4] Furthermore, adolescent pregnancy is a risk factor for nutrition deprivation in girls.[5 6]

A Unicef report in 2012 showed that in 11 out of 64 countries, over a quarter of adolescent girls were underweight, and in 21 out of 41 countries, more than one third of adolescent girls were anaemic.[7] Evidence shows that undernutrition in adolescent girls perpetuates the intergenerational transmission of nutrition deprivation from mothers to children.[8]

Globally, there are an estimated 600 million adolescent girls aged 10-19; a third of these live in South Asia, which has the highest burden of maternal and child undernutrition.[9 10] Improving the nutritional wellbeing of adolescent girls in South Asia is essential to achieve the global nutrition targets for 2025: to reduce the number of children under 5 years who are stunted by 40% and the number of women of reproductive age with anaemia by 50%.[11 12] In addition, well nourished adolescent girls would have better learning outcomes, delay their marriage and first pregnancy, increase their life choices, earn income, and advance the socioeconomic development of South Asian countries.[13-15]

We reviewed evidence from national surveys and research studies on the nutritional status of adolescent girls in South Asia and its determinants (box 1). A detailed account of our findings is available in the supplementary material on bmj.com. Based on our findings, we propose ways to accelerate improvement of the nutrition of adolescent girls in South Asia.

KEY MESSAGES

- Undernutrition and anaemia affect over 50% of adolescent girls in South Asia and improvement has been slow
- Overweight and obesity is an emerging problem affecting 3% to 24% of adolescent girls in South Asian countries
- Poor diets prevent catch-up growth in adolescence and intergenerational growth gains
- Large scale nutrition programmes for adolescent girls are needed and their coverage, effectiveness, and equity must be monitored

Current trends and challenges

Undernutrition and anaemia

Undernutrition and anaemia affect over 50% of adolescent girls in South Asia, particularly girls from poor socioeconomic backgrounds, and there has been little improvement over the past 10 years.

Our analysis indicates that 11.1% of South Asian adolescent girls aged 15-19 are too short, 38.6% are underweight, and 54.6% are anaemic. In India, 45% of adolescent girls are underweight and 56% are anaemic. Childbearing occurs mostly at ages 15-25 when Indian women are most likely to be underweight or anaemic. This is combined with an average weight gain of 7 kg for a full term pregnancy, which contributes to a high incidence of low birth weight, wasting, and stunting in their children.[16]

The decrease in the prevalence of underweight and anaemia among adolescent girls in South Asia over the past 10 years has been slow. The average annual rate of reduction is 1.8% for short stature and 1.1% for underweight, while the prevalence of anaemia is unchanged (figs 1 and 2).

Socioeconomic factors are major determinants of this poor nutrition. Short stature, underweight, and anaemia are higher among girls from rural areas, larger families, less educated or skilled parents, and lower income households, although there are differences between and within countries. Our analysis indicates that the prevalence of stunting is higher among girls from rural areas (range 30-60%) than girls from urban areas (15-39%). Similarly, the prevalence of anaemia is higher among girls of low socioeconomic status (range: 44-97%) than girls of middle or high socioeconomic status (26-67%). However, there are high levels of short stature, underweight, and anaemia among girls from urban areas and from wealthier households, which indicates that other determinants are also involved.

Overweight and obesity

Overweight and obesity is an emerging problem, particularly among urban residents and wealthier people.

Overweight and obesity in adolescent girls are associated with obesity in adult

Box 1: Study selection

Survey evidence—We reviewed all Demographic and Health Surveys (DHS) and National Nutrition Surveys (NNS) in South Asia published between January 1990 and December 2015. Inclusion criteria were 1) population-based sampling frame; 2) probability sampling; 3) national representative sample; 4) internationally-agreed indicators; and 5) sex-disaggregated findings. Seventeen surveys met these criteria: Afghanistan: NNS 2004, 2013; Bangladesh: DHS 1997, 2004, 2007, 2011; Bhutan: NNS 2015; India: National Family and Health Survey 1999, 2006 and Rapid Survey on Children 2014; Maldives: DHS 2009; Nepal: DHS 1996, 2006, 2011; Pakistan: DHS 2012; Sri Lanka: DHS 2007, NNS 2012.

Research evidence—We searched PubMed, Popline, and Google Scholar for peer reviewed observational and intervention studies published between January 1990 and December 2015. Search terms: <adolescent>, <girl>, <nutrition>, <anemia>, <deficiency>, <food>, <weight> and <height> each term combined with <Afghanistan>, <Bangladesh>, <Bhutan>, <India>, <Maldives>, <Nepal>, <Pakistan>, <Sri Lanka>, or <Asia>. We screened all the references in these papers to add any relevant publication missed by our search; 177 publications were included in our review

Data provided—The 17 national surveys provided information on adolescent girls aged 15-19 but only two provided information on adolescent girls aged 10-14; 11 provided information on all adolescent girls, irrespective of their marital or maternal status; all provided information on weight and the prevalence of underweight; 13 provided information on the proportion of girls who were overweight or obese; 12 provided information on girls' height and the proportion of girls <145 cm; and nine provided information on the proportion of girls with anaemia. Of the 177 research publications, 119 (67%) were from India, 21 (12%) from Bangladesh, 17 (10%) from Pakistan, 11 (6%) from Sri Lanka, five (3%) from Nepal, one (1%) from Bhutan, and three (2%) covered several countries. Ninety six publications (54%) focused on urban adolescent girls and 95 (54%) on girls attending school. There were 163 observational studies and 14 were intervention studies

Analysis Was descriptive; meta-analysis was inappropriate because of the heterogeneity of the studies

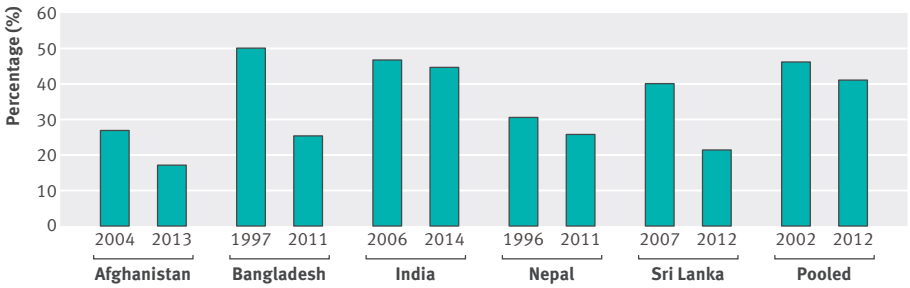

Fig 1 | Trends in the prevalence of underweight (body mass index <18.5) in adolescent girls aged 15-19 in selected South Asian countries

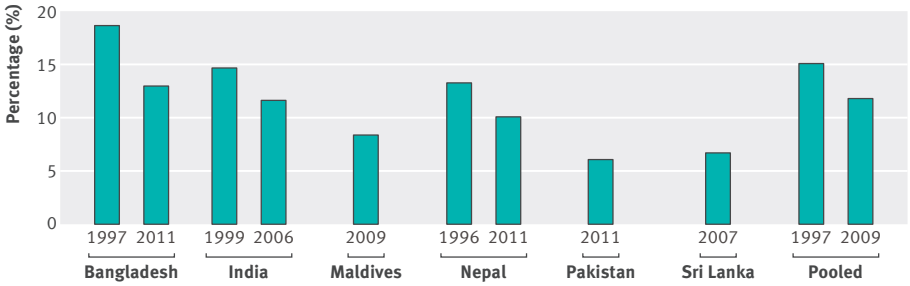

Fig 2 | Trends in the prevalence of short stature (height <145 cm) in adolescent girls aged 15-19 in selected South Asian countries

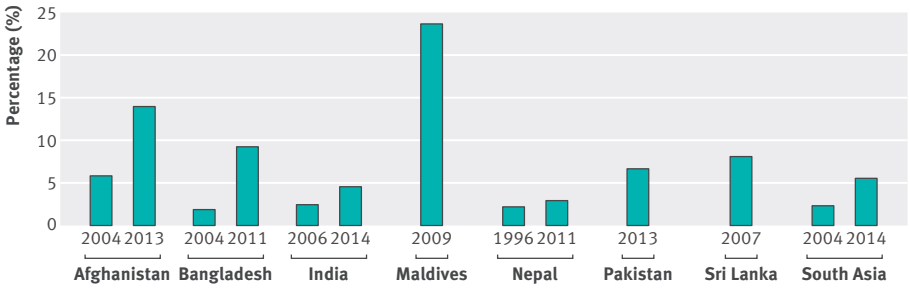

Fig 3 | Trends in the prevalence of overweight and obesity (body mass index ≥25) in adolescent girls aged 15-19 in South Asia

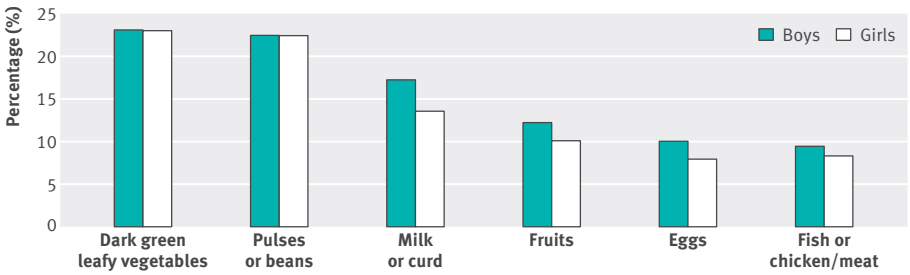

Fig 4 | Proportion of adolescent boys and girls aged 15-19 in India consuming specific foods at least once a week, 2006

women, which increases the risk of diabetes, hypertension, caesarean delivery, postpartum haemorrhage, high birthweight babies, and infant overweight and obesity.[17-19]

Over the past 10 years, overweight and obesity in Afghanistan, Bangladesh, and India have increased twofold to fivefold (fig 3). At the same time, there are still high but declining rates of underweight and short stature. Our analysis indicates that 5.5% of girls aged 15-19 are overweight or obese (body mass index ≥25), ranging from 2.9% in Nepal to 23.5% in the Maldives. In the Maldives, for example, the proportion of adolescent girls who are overweight or obese is similar to that of girls who are underweight.

Overweight and obesity are more common among adolescent girls from more educated or skilled families, higher income households, and urban areas. However, in some rural areas, the prevalence of overweight is close to that of underweight.[20]

Diet

The diets of adolescent girls in South Asia are often too poor to meet the nutritional needs for healthy growth and development.

Our review indicates that only 20% to 40% of South Asian adolescent girls meet the recommended dietary intake. Energy intake is mostly obtained from carbohydrates in the form of cereal grains, roots, and tubers. Protein intake is low; 40% to 75% of girls consume less than 50% of the recommended dietary intake in the form of meat, chicken, dairy products, or fish. Data from surveys in India indicate that boys consume foods of high nutrient value, such as milk, fruit, eggs, and meat, more often than girls (fig 4).

Consumption of fast foods and foods high in fat and sugar, such as chocolate, cakes, pastries, ice cream, biscuits, and sugary drinks, is very high among adolescent girls living in urban areas, particularly among wealthier girls aged 14-18. A review of 11 school based studies in Bangladesh, India, and Pakistan found that consumption of these foods is an important risk factor for overweight and obesity among children and adolescents.[21]

Nutrition programmes

Nutrition education, behaviour change initiatives, and micronutrient and macronutrient supplementation programmes can improve nutrition knowledge, practices, and outcomes in adolescent girls in South Asia.

We found 11 studies on community based interventions in South Asia—mainly in rural and urban Bangladesh and India—on nutrition education and behaviour change among adolescent girls. These interventions improved girls' knowledge about their nutrient requirements; the importance of energy, protein, iron, and calcium rich foods during adolescence; and how to improve recipes and cooking methods. They also improved girls' dietary practices, including meal quality, quantity, and frequency; intake of low fat and fibre-rich foods such as whole grain cereals, fruits, and vegetables; consumption of home cooked meals; and not skipping meals.

Fourteen intervention studies examining the effect of weekly iron and folic acid supplementation and six monthly deworming treatment reported an increase in haemoglobin concentration and decrease in the prevalence of moderate and severe anaemia among adolescent girls. Supplementation and deworming were often combined with nutrition education and counselling and resulted in increased knowledge about anaemia and the importance of iron and folic acid supplementation; increased compliance with iron and folic acid

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supplementation; increased knowledge about the benefits of consuming extra nutrients, green leafy vegetables, and fruits; and fewer health complaints such as loss of appetite, illness and infections, or physical weakness.

Three studies looked at the delivery of an energy and protein rich midday snack combined with weekly iron and folic acid supplementation and nutrition counselling. These interventions led to increased awareness of adequate food intake during adolescence, better compliance with iron and folic acid supplements, and higher exercise capacity and physical fitness in girls.

However, most of these studies were small and had different outcome measures. Large scale nutrition programmes for adolescent girls are rare, and their effectiveness has not been well documented.[22] Lack of human resources and funding, and low prioritisation of the nutrition of adolescent girls and women are among the main barriers to the delivery and uptake of nutrition programmes.[23]

The way forward

In light of our findings, we propose the following actions to accelerate improvement of the nutrition of adolescent girls in South Asia.

Nationally representative data

South Asian countries need to collect nationally representative data on the nutrition of adolescent girls and boys aged 10-19 disaggregated by sex, age group, geographic region, and socioeconomic status. Data need to show the extent and severity of the triple burden of poor nutrition in adolescents: growth failure (underweight and stunting), micronutrient deficiencies and anaemia, and overweight and obesity. The data must also show the adequacy of adolescents' diets and the socioeconomic determinants affecting this. The effect of national policies and programmes for adolescent nutrition must be measured, including their coverage, effectiveness, and equity. This evidence should be used to develop national policies and to scale up programmes.

Age of marriage and pregnancy

An estimated 45% of South Asian women aged 20-24 were married or in union before the age of 18.[9] Evidence from Bangladesh and India shows that childbearing during adolescence reduces post-menarchal height and weight gain and is associated with higher undernutrition in their children than in children born to adult women.[24 25] Policies and legislation must be strengthened and supplemented with social change efforts to delay the age at marriage and first pregnancy. Family planning programmes should pay particular attention to married adolescent girls to help them delay their first pregnancy.

Antenatal programmes

Poor pre-pregnancy nutrition and inadequate dietary intake during pregnancy result in poor nutritional status of pregnant adolescent girls and their children. Antenatal and postnatal care programmes must ensure that pregnant and lactating adolescent mothers receive suitable nutrition counselling and support. Data from rural India show that adolescent girls have limited contact with the health system during and after pregnancy.[26] Therefore, community based programmes must be introduced to complement the health system.

Multisectoral national nutrition programmes

Multisectoral national nutrition programmes are needed to provide evidence based nutrition interventions for adolescent girls and boys. Interventions should aim to improve the nutrition of adolescents throughout their teenage years, prevent and treat anaemia, support healthy diets, and promote physical activity.[27] Other sectors such as education, child protection, social policy, and water and sanitation can deliver interventions to tackle the underlying determinants of nutrition in adolescents. With an increasing number of girls attending school and continuing to secondary education, schools can help to ensure regular nutrition screening, education, and supplementation. Adolescent girls who attend school can reach those out of school and become role models for them.[28] However, national nutrition programmes need to include all adolescents, regardless of whether they attend school or not. India's national programme for the prevention of anaemia in adolescents is a good example of a large scale nutrition programme that brings together the ministries of education, health, and women and child development to reach all girls.[29]

While adolescent girls who are undernourished or/anaemic should be identified and targeted for food and micronutrient supplementation programmes, it is important that the programmes do not lead to an increase in adolescent marriage, or overweight and obesity. Adolescent girls who are better nourished tend to reach menarche at younger ages. Early menarche may lead to early marriage and first childbirth.[30 31] Therefore, strong policies and community mobilisation are needed to delay marriage and first childbirth among adolescent girls. At the same time, nutrition and food supplementation programmes need to ensure that they do not result in excessive weight gain or the adoption of dietary habits that could lead to overweight and obesity in adolescents.

Conclusion

The high prevalence and slow decline of undernutrition and anaemia and the increasing prevalence of overweight and obesity among adolescent girls in South Asia are a great concern. Adolescents are at a stage in their lives when lifelong nutrition patterns are formed. It is essential to provide adolescent girls with nutrition services, counselling, and support to stop the intergenerational transmission of poor growth and development in children in South Asia.

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