Adolescent Girls: Nutrition and Health Status in Indian perspective

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ABSTRACT

The Latin term adolescere, which means "grow up" or "to grow into maturity," is the source of the English word adolescence, which dates back to the 15th century. Adolescent is the time for physical, psychological, and cognitive development. However, the health of adolescent girls differs from that of men due to biological, social interactions, and financial disparities, and while a woman's life span is longer than a man's, women suffer greater mortality across their entire lives. The various forms of discrimination against adolescent girls in society have an impact on their overall health status. Surprisingly, the prevalence of both undernutrition and overnutrition is noted among adolescent girls. It could be attributed to economic position, a lack of nutrition and health awareness, or an insufficient understanding of food habits and knowledge on nutrients requirement. Anaemia is more common in adolescent girls because to low socioeconomic level, lack of dietary awareness, lack of nutritional supplementation, poor individual hygiene, infections, and a prolonged menstrual cycle. Prevalence of hypertension is also being increasing in overweight adolescent girls due to the unhealthy food intake and sedentary lifestyle. Prevalence of dyslipidaemia is less in adolescents but, if present, is likely to elevate the possibility of CVD events subsequently in their life and may cause early mortality.

Keywords: Adolescent Girls; Dietary profile; Nutritional status; Health Status

INTRODUCTION

The concept of adolescence, which distinguishes the unique period between childhood and full maturation, is contemporary—and even postmodern [1]. The Latin term adolescere, which means "grow up" or "to grow into maturity," is the source of the English word adolescence, which dates back to the 15th century [2]. Adolescents are characterized by the World Health Organization as "young people between the ages of 10 and 19 years"[3]. Because adolescence is a time of immense physical, psychological, and cognitive development, it is a particularly special stage of life. Recently, adolescents acquire greater proficiency in deductive thinking, reasoning ethically and logically, and becoming more capable of abstract thought and reasoned judgments. The timing of these sex-specific developmental changes varies, with girls' physical growth and reproductive development usually occurring between the ages of 10 and 14 years and boys' between 12 and 16 years [4]. The brain architecture and cognitive development adequately mature for complex abstract thinking by the ages of 15–17 years for boys and 14–16 years for girls. Adolescents' internal changes are influenced by and in turn affected by changes occurring in their environment. These outside factors, which vary between cultures and countries, include social conventions and ideals as well as the evolving relationships, duties, and obligations associated with this stage of life [5].

Approximately 25% of the world's population is comprised of adolescents [6]. In India, adolescents represent more than 21.4% of the population, with adolescent girls accounting up around 10 percent [7]. Adolescence is a crucial phase in the lifespan of humans, a phase of change among childhood and adulthood that is characterized by fast growth spurt [8] Considering the exception of the first year of life, the majority of adolescence causes a growth rate that is greater than any other stage of lifespan. Since adolescence is a time of significant growth and development, adolescents, particularly the early stages of adolescence, represent the most important age groups for interventions. People grow approximately 15% of their final height and 50% of their adult weight during adolescence. Demands for nutrients rise throughout this growth and development phase, and these demands are also strongly impacted by energy expenditure and disease [9].

Recently, adolescent is divided into three age groups:

1. Early adolescents, who are between the ages of 10 and 13 years

2. Middle adolescents, who are between the ages of 14 and 16 years and
3. Late adolescents, who are between the ages of 17 and 19 years.

This categorization is founded on developmental, psychological, and biological principles [10].

Girls' adolescence is a challenging time for growth, marked by stressful occasions like menarche, which is recognized as the start of female puberty. Adolescents face unique challenges, including those related to diet, menstruation, leucorrhea, and mental health [7].Various studies have reported that their diets are often high in fats and refined carbohydrate. Physical inactivity and sports in the outdoors, in addition to a diet of fat-rich 'junk' foods, is the leading cause for weight gain among the rich population. Several dietary behaviors appear to be relatively widespread among adolescents, including: snacking, mostly with high in energy foods; meal skipping, especially breakfast or infrequent meals; a high intake of fast food; and an insufficient intake of fruits and vegetables [11].

Increasing levels of sugar, saturated fat, sodium chloride, and intake of calories can result in obesity, hypertension, dyslipidemia, and decreased glucose tolerance [12]. Simultaneously, the prevalence of anaemia in adolescent girls is concerning for a variety of reasons [9].Consequently, every adolescent demands unique health care throughout this particular stage of life from family members, teachers. close relatives, neighborhood, and government-led programs and policies [13]. However, they receive less consideration and care, and they are not well informed about the changes that are occurring during this stage. For adolescents to believe that these changes are normal, they require appropriate communication, advice, and direction regarding their whole-body growth and development [14].The present study is relying on information of adolescent girls by socio-demographic profile, nutrition and health status.

HEALTH CARE FACILITIES

Adolescent girls reach around half of adult body weight during this stage of life, considering the teen period critical. Girls have the chance to lay down the basis for both their own health and the health of any future children they may bear during their adolescence. Factors that limit one's ability to reach and utilize healthcare services in the event of disease or as a preventative step are referred to as barriers to accessing such facilities. Multiple factors, such as the inability to reach independent decisions and family and society standards, influence such obstacles. Adolescent girls who self-report as having mild symptoms typically

don't seek help because of the widespread shame and taboos around their sexuality [15, 16].

HEALTH CARE PROGRAMS FOR ADOLESCENT GIRLS

Different ministries of India government launched healthcare programs to support adolescent girl's health. "Kishori Shakti Yojana" aims to end the cycle of gender and nutritional deprivation and offer a nurturing environment for personal growth [17]. The goals of the Rajiv Gandhi Scheme for Empowerment of Adolescent Girls, or "SABLA," are to provide adolescent girls with opportunities to empower themselves, enhance their nutrition and health, raise public awareness of issues related to health, hygiene, nutrition, family and child care, and sexual and reproductive health, and improve their home and skills for life [18]. Implemented in both rural and urban areas, the "Balika Samridhi Yojana" aims to improve enrolment and retention of girl children in schools, raise the age at which girls marry, and support girls in engaging in income-generating activities. It also seeks to change negative attitudes that families and the community have toward the girl child from birth and toward their mothers [19]. "Program for Adolescent Reproductive and Sexual Health (ARSH)" Under reproductive and child health II, all adolescent married and single girls and boys receive the following package of services: outreach, referral, curative, preventive, and curative care [20].The "Nutrition Programme for Adolescent Girls (NPAG)" focuses on females who are under specified weight thresholds, such as adolescents aged 11 to 15 who weigh less than 30 kg and adolescents aged 15 to 19 who weigh less than 35 kg [21].

FOOD HABITS

It is widely accepted that sustaining a healthy body and being active demands appropriate nutrition. To ensure all the nutrients are consumed in appropriate amounts and proportions, the dietary components must be carefully selected. Several studies have found that while adolescents typically consume more protein, total lipids, saturated fat, and cholesterol than is recommended, their diets typically lack sufficient amounts of calcium, iron, zinc, folic acid, and fiber [22].

Nutritious food habit is important for adolescents' growth and development. This age group suffers from both undernutrition and overnutrition [11]. Adolescence is a time with substantial nutritional demands. These nutritional needs combine the needs for both physical development and physical activity. In a world that is changing, there are a number of reasons why diets alter, such as increased eating out, availability, social pressure, and

modifications to exercise routines. Adolescents are prone for skipping breakfast and snacking [23]. Additionally, persons are more likely to become obese during adolescence. Obesity in adolescents becomes worse by a number of variables, including a diet high in fat and junk food consumption, inactivity, and a lack of exercise opportunities. These days, eating fast food is practically a global a passing trend. Indian school-age children have been consuming more junk food due to changes in their lifestyle [24, 25].

Attractive packaging, peer pressure, perceived excellent taste, and marketing have all contributed to drawing adolescents to retail enterprises [26]. The calorie density of fast food exceeds the recommended daily intake. The modern world's adaptation to a fast food-eating culture has detrimental effects on health. It has been established that a high intake of fast food is a factor in India's school-age obesity rate. In a different research, 98% of children in Lucknow, India, reported consuming fast food [27]. A high intake of junk food has also been connected to a higher chance of noncommunicable diet-related disorders like obesity, diabetes, and hypertension in early life [28].

Children from low socioeconomic class (SES) also reported a higher prevalence of underweight and skipped meals at much higher rates. Adolescents from lower socioeconomic backgrounds regularly ate more fast food and baked goods. Overweight and obesity affect adults in India, but they also affect adolescents and young people. Over the past few decades, there has been an increase in childhood and teenage obesity [25]. According to Jain et al. (2023), there was a notable increase in the prevalence of obesity among adolesecent girls. Participants who engaged in unhealthy eating habits also likely to be physically sedentary, watched television for extended periods of time, and consumed junk food while doing so [29].

NUTRITIONAL STATUS

Adolescence is an important stage in the human life cycle that is marked by significant development and growth, as well as different physiological and psychological alterations. This stage of life is distinguished by unique characteristics. These include significance rapid rate of physical, social, and psychological maturation, as well as sexual maturity [10]. Nutritional demands and status are directly impacted by psychological, biological, and cognitive alterations that occur in puberty and adolescent. Puberty leads adolescents to undergo significant physical growth and development, which significantly increases their need for protein, energy, and many vitamins and minerals. Adolescents are at nutritional risk due to their increased

energy and nutrient demands, growing financial freedom, growing desire for food independence, and developing intellectual capacity [30].

Adolescent girls facing acute energy deficiency experience a decrease in muscular strength and working ability, lean body mass, and short stature, all of which raise the likelihood of unfavorable reproductive complications. Adolescent nutrition is a critical predictor of well-being [31]. Undernutrition extends on to the following generation when mothers and babies born into malnourished environments suffer from nutritional deficiencies. For adolescents who are sexually active, this nutritional deficit exacerbates during illnesses and resulting in decreased physical output and unfavorable reproductive outcomes [32].

Adolescent undernutrition can interrupt normal growth and puberty development while also increasing the risk of infectious illnesses [33]. It is also linked to lower educational success and income status in adulthood [34]. Undernourished adolescent girls who become pregnant are more likely to deliver birth to a baby with low birth weight or intrauterine growth restriction, which is more susceptible to metabolic disorders, decreased growth efficiency, organ damage and abnormal development, poor neonatal health, cardiovascular diseases, hormonal imbalance, and changes in body composition in later life [35].

In a rural part of a Maharashtra district, 36.54% of adolescent girls were underweight, 48.37% were stunted, and thinness was 18.87%. Several characteristics, including married life, religion and level of education, family type and size, and income level, were found to be substantially linked with undernutrition [10]. Prevalence of underweight among adolescent girls was 48.5% of urban slums of Hyderabad [7].Prashant and Shaw 2009 study from urban slum of Nalgonda town reported that the underweight and thinness adolescent girls were 42.6% and 20.6% respectively [36]. Smitha Malenahalli et al., reported from city of Mysore that 66.3% were undernourished [30].

A significant percentage of the population in India is overweight or obese. The term "double burden of malnutrition" refers to the simultaneous occurrence of both under- and overnutrition within a community. As a result of the nutritional shift, double burden of malnutrition is currently a growing public health concern. Adolescents' girls who are malnourished may experience low immunity and short height, whereas those who are overweight or obese may be more susceptible to noncommunicable diseases [37]. Obesity is "one of current most overlooked public health problems," according to the World

Health Organization, and the number of overweight and obese children and adolescents has also been rising [38]. One of the major risk factors for childhood and adolescent obesity was snacking on high-energy junk food [39].Prevalence of obesity among adolescents were 33.7% in city of Mysore [30]. According to Seema et al., 2021, 6.8% of adolescents were obese and 17.1% were overweight in the district of Rohtak, Haryana [40]. In Meerut, Uttar Pradesh, the overall incidence of overweight and obesity among adolescent girls was 17.43 and 6.88%, respectively [29].

HEALTH OF ADOLESCENT GIRLS

Adolescence is a phase in which eroticism is found. This phase is distinguished by enhanced growing physically as well as cognitive and changes in behavior, which causes the transition from childhood to adulthood for both males and girls [41]. Adolescents are not a homogeneous group. They differ based upon age, gender, marital status, class, region, and cultural background. It is so critical to address factors influencing their diverse demands, and health-seeking behavior is one such component, because their health status will be critical in deciding India's health, morbidity, and mortality rates, as well as its population growth [42]. Adolescent-friendly medical facilities, preventive, promotional, and curative interventions, a referral system, iron folic acid pills, and specific counselling were all required. However, poor understanding and a lack of awareness are the primary underlying causes. It is a time when adolescent females demand extra attention, protection, and care, which benefits the individual, family, and nation as a whole [43].

Menstrual hygiene

An adolescent girl's menstrual cycle is an essential part of her life. In India, young girls are prohibited to participate in religious or cultural events, manage household tasks, or be around other women while they are menstruating because they are seen as impure. A modern understanding of menstruation, starting in early adolescence, would enhance safe behaviors and ease the suffering of thousands of women [44].

Discussing menstrual hygiene is considered taboo and may lead to discomfort for women. Urinary tract infections and infections of the reproductive system are caused by poor menstrual hygiene. In order to prevent the many negative impacts of poor menstrual hygiene practices, which can include cancer, toxic shock syndrome, abortions, genitals rashes, reproductive tract infections, and infertility, learning about menstruation hygiene is an essential component of health education. Adolescent girls typically find discussing menstruation

uncomfortable, which prevents them from getting enough information about this taboo topic in society. A girl's everyday activities are further hampered by a lack of scientific knowledge, which also has an impact on her college appearance and academic achievement. Future generations' health will be impacted by the choices they make today on reproductive health [45].

Safe menstrual management means applying a clean menstrual management material to soak up or gather blood, which can be changed in privacy as often as required for the time of the menstruating period, washing the body with soap and water as needed, and having disposal facilities for used menstrual management materials [46]. Poor menstrual hygiene management in adolescent girls (15-19 years old) is a public health issue. Millions of Indian women and girls address severe barriers to comfortable and respectable period hygiene care [47]. To encourage menstrual hygiene practices among rural regions adolescent girls, the Indian government launched an effort in 2011 to raise education about menstruation hygiene, provide access to the usage of high-quality sanitary napkins, and dispose of sanitary napkins in a sustainable way [48].

Anaemia

Most nutritional issues worldwide are caused by anaemia, which is mostly caused by an iron deficiency. Although it affects people of all ages, women who are childbearing age have a greater risk of it. Due to low socioeconomic position and limited access to healthcare facilities, the prevalence of the disease is significantly higher in developing countries. Adolescent girls are more prone to the circumstance and are more susceptible to nutritional problems. Research revealed that the biggest nutritional issue in emerging nations was adolescent anaemia. When compared to other developing countries, India appears to have a higher incidence of anaemia among adolescent girls. Adolescent girls in general are still vulnerable to a number of issues linked to anaemia, which is linked to impaired pubertal growth spurt and cognitive development and is one of the leading causes of maternal mortality (20%–25%) [49].

The National Family Health Survey (NFHS-2019-2021) reported the large percentage of anaemia (59.1%) among adolescents' girls (15-19 years) in India [50].

Girls are more at risk for nutritional anaemia because the adolescent period denotes the onset of the menstrual cycle. Anaemia in young children and pregnant women was the focal point of numerous research; however, there were relatively few on adolescent girls. Prevalence rate of

anaemia among adolescent girls was 48.63% in Tamil Nadu [9].

In their study of adolescent girls in North East Delhi, Aggarwal et al. found that 45% of them had anaemia [51]. Toteja et al., 2006 also showed that prevalence rate of was 90.1% among adolescents girls [52]. It is noted that risk anaemia was high in late adolescent girls compared to early adolescent period of girls [53]. Although the fact that anaemia is regarded as complicated. Menstruation is a significant risk factor for the development of anaemia in adolescent girls, with the greatest risk occurring between the ages of 10 and 19 years. At this stage of life, growth spurt, pubertal growth, and peak activity level all result in higher requirements for macro and micronutrients [54]. Furthermore, to iron loss from menstruation, a variety of other significant contributing factors, including socioeconomic status, environmental and personal hygiene, etc., have been identified as being significant for the development of anaemia [55].

Hypertension

According to estimates, 31% of adults worldwide and 28% in India have hypertension, which is defined as an average systolic blood pressure of 140 mmHg, an average diastolic blood pressure of 90 mmHg, or the use of antihypertensive medication [56]. According to the National Family Health Survey-5 (NFHS-5), the prevalence of hypertension among Indian adolescents is 3.3% for girls and 4.6% for boys (NFHS-5). Though adolescence is generally regarded as a healthy period of life, there are a lot of deaths, illnesses, and injuries that occur throughout this stage of life. According to recent data, adolescent hypertension is another growing health issue [56]. Evaluating adolescent's incidence of overweight, obesity, and hypertension can help forecast a nation's population's future health [57]. A poor diet, a lack of activity, smoking and tobacco use are lifestyle-associated risk factors for hypertension, as are the indirect consequences of these behaviors, such as glucose intolerance, and hyperlipidemia. Already a very common risk factor for cardiovascular disease is hypertension. Because of variables like rising longevity and the prevalence of contributing causes, it is becoming a widespread health issue globally [58, 59]. Cerebrovascular disease, ischemic heart disease, cardiac failure, and kidney failure are all mostly caused by hypertension. The increased prevalence of cardiovascular illness is a reflection of the rising prevalence of hypertension in developing countries [60].Even in adults, children and adolescents with primary hypertension are easily affected by weight, lifestyle variables, and a favorable family history of the condition [61]. High blood

pressure seems to develop more quickly in adolescents and children and lasts into adulthood. A number of investigations have indicated an extensive positive correlation between a child or adolescent's arterial pressure and body mass index [60]. Additionally, there is a 12% increase in the risk of CVD development for each unit rise in BMI in adolescents [62].

Lipid Profile

Triglyceride (TG) and lipoprotein levels are indicators of lipid metabolism, which is influenced by both inherited and external factors. There are three possible causes of dyslipidemia: intrinsic, extrinsic, or a mix of both genetic and environmental variables [63].Dyslipidemias can affect the levels of low-density lipoprotein (LDL), high-density lipoprotein (HDL), total cholesterol (TC), or TG. They may occur alone or combined from childhood to adolescence and continue into adulthood [64].

Adolescent dyslipidaemia is a significant risk factor for cardiovascular disease that persists into adulthood. Dyslipidaemia or abnormal cholesterol levels promotes towards atherosclerosis in future [65]. Because lipid levels in adolescence are significantly connected with lipid concentrations in adulthood, dyslipidaemia is less prevalent in adolescents but, if present, is likely to elevate the possibility of CVD events subsequently in life and may cause early mortality [66]. Epidemiological information from several cohort analyses shows elevated LDL along with low HDL levels in adolescents significantly indicate excessive-risk carotid intima-media thickness (cIMT) in adults, which serves as a substitute indicator of early artherosclerosis. Anthropometrics and lifestyle variables have attracted a lot of attention in research on potential causes for dyslipidemia [67]. According studies, an elevated body mass index (BMI) and an elevated fat percentage are closely linked to dyslipidemia. Several studies examined into the impact of nutrition on lifestyle factors [66].

Dietary behavior is a crucial, hypothetically modifiable risk factor for lipid disorders. The USDA's Dietary Guidelines for Americans recommend children above the age of two take more vegetables, fruit, seafood, poultry, meat that is lean, wholesome grains, and low-fat dairy. While multiple studies focused on the impact of eating practices such as vegetarian or Western diets on cardiovascular risk, there are also few food-related studies specifically for kids [68].

CONCLUSION

Most changes begin in this period of transition, which demands good direction

and space that may not be obtained in a one-room home. Due to lack of knowledge of nutrition and health awareness and facilities, they are easily prone to anaemia, hypertension and hyperlipidaemia. Hygiene practice is essential especially during menstruation in adolescent girls but lack of scientific knowledge this period may be more vulnerable to anaemia. The government has made efforts to improve the health of adolescents by implementing target-based policies and initiatives that aim to alter the negative image of girls. Rural people are the main objective of contemporary adolescent health programs. Government should also ensure holistic support like health, nutrition and sociodemographic awareness to adolescent girls through school and college-based support in both rural and urban area.

Ethics approval and consent to participate

Not Applicable

Consent for publication

Not Applicable

Data Availability

The information included in this review is based on previously published research and databases that have been referenced. Upon reasonable request, the associated author provides the processed data.

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Authors' Contributions

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