LIFESTYLE DISEASES IN ADOLESCENTS:

ADDRESSING PHYSICAL, EMOTIONAL, AND BEHAVIORAL ISSUES

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PREFACE

In a person's life, adolescence is a crucial period since it determines how they will view the world and interact with it as adults. It is imperative to understand adolescent development, environmental influences, and risk and protective variables that can affect adolescent health to support the health and healthy development of all adolescents. Thus, maintaining a healthy youth population will ensure a healthy adult population in the future. Approximately 20% of adolescents experience a mental health disorder each year, with depression and anxiety being the most common. About 11% of adolescents aged 13-15 years use tobacco products worldwide. Eating disorders like Anorexia and Bulimia are more prevalent in high-income countries, affecting 1-3% of adolescents. The three modifiable lifestyle behaviours strongly associated with development of LSRDs - Smoking, unhealthy diet, and physical inactivity, are alarmingly increasing in youth and adolescents.

If teenagers are equipped with information and have life skills, they will not only benefit socially and economically, but also support the country's future development in a much better way. Several factors have been identified as leading causes of lifestyle diseases, including lack of physical activity, irregular eating habits, changing lifestyle choices, and sedentary work and stress. For example, the prevalence of obesity among adolescents has increased dramatically in many parts of the world, including both developed and developing countries. As of 2022, over 340 million children and adolescents aged 5-19 were overweight or obese.

The objective of the book “Lifestyle Related Diseases in Adolescents: Addressing Physical, Emotional, and Behavioural Issues” is to give an insight on the adolescent health as it is a distinct period in human development. There are twelve chapters in which we have taken a multicentric approach with topics ranging from emotional and cognitive health, nutrition, physical inactivity, eating and sleeping patterns. prevalence of obesity to drug and alcohol-abuse, social behaviour, and anxiety during adolescence. With this book we try to highlight the risk factors and determinants of all these LSRDs, which are a looming threat, endangering the youth of the world and where an immediate intervention is needed.

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CHAPTER 1

Introduction to Adolescent Health and Lifestyle-Related Diseases

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Abstract: Adolescence is a crucial developmental stage that has long-term effects on a person's health and well-being as well as the welfare of society at large. Children learn how to understand abstract concepts, form moral beliefs, and create and sustain fulfilling relationships during adolescence. During adolescence, young people go through a variety of transformations as they become physically adults. Changes in the youth begin with the appearance of secondary sexual traits. Dynamic brain development that is distinguished by interaction with social circumstances throughout adolescence impacts the talents that a person carries into adulthood. In girls, there is the onset of the menstrual cycle, which leaves a big impact on their body. Adolescents across the globe have a lifestyle risk index comprising risky drug and alcohol consumption, unprotected sex, sleep duration, and smoking, which is a fair to good indicator of medical conditions connected to lethal (performing suicide and self-harm) and non-fatal (major depressive disorders and severe psychological distress) diseases. According to the findings of this study, the lifestyle risk index is a valuable summary indicator in the context of teenage health promotion and noncommunicable disease prevention. Adolescent lifestyle risk variables were discovered to cluster, giving additional backing for the deployment of numerous health behavior modification interventions rather than those having a single behavior emphasis.

Keywords: Adolescent, Lifestyle related disorders, Menstrual Cycle, Physical Development.

1. INTRODUCTION

Over 18 billion adolescents, or 27% of the global population, were under the age of 24 in 2008. This was the biggest cohort ever (UN, World Population Prospects, 2008). The number of people in this population and their health condition are the predictors of future population health (The World Bank, 2007) (WHO, Women and Health, 2009). Most people believe that adolescence is a period of excellent

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health with a low disease burden (WHO, Global Health Risks, 2009). Risk elements and lifestyle choices that adolescents choose may not have a significant impact on their health at this time, but they could have a significant impact later in life and may have an impact on the health of generations to come (Patton *et al.,* 2010). With an estimated population exceeding 1/8 billion, or roughly one-fourth of the world's population, the generation of persons aged 10 to 24 now is the greatest in history (United Nations, 2015). Nearly 90% of the world's population resides in low- and middle-income nations, where they make up a significantly larger percentage of the population than in high-income nations due to higher birth rates. A complex web of influences from family, peers, the community, society, and culture affects young people's health and well-being both now and in the future as they mature into adults (Viner *et al.,* 2012).

2. ONSET OF PUBERTY

Similar to early infancy, adolescence is a delicate time when both healthy and unhealthy practices influence future course. This sensitivity has elements related to the physiologic changes occurring prior to, throughout, and after adolescence, as well as the social anchoring of health hazards. Hundred years ago, the general consensus was that puberty was simply a stage of physical development that thrust people into various social circumstances that had an impact on their health (Granville, 2016). We now recognize that adolescence is a highly programmed, physiologically influenced process that has a complicated impact on behavior, mental well-being, and health (Hall GS, 1905). For instance, the rise in behaviors associated with health or mental health states throughout adolescence is more closely connected to the date of puberty than to chronological age. These behavioral and mental health changes may be partially explained by alterations in oxytocin and vasopressin regulation that begin around puberty and have been connected to social connection, pair bonding, and parental behavior in other animals (Insel, 1997). Pubertal timing is also influenced by familial and societal variables, including parental health, marital conflict, and the existence of a stepfather, however, the underlying mechanisms are still unclear (Sandra *et al.* 2020) (Ellis & Garber, 2000).

3. PHYSICAL DEVELOPMENT

3.1. 10 to 14 Years of Age

These are often the first years of puberty. Early puberty is a time of fast growth for girls. The first menstrual cycle (menarche), which typically occurs between the ages of 11 and 14, causes development to halt (It can occur as young as at 9 years of age or as old as at 15 years of age). The height increase in males happens after the onset of other puberty symptoms. Despite being shorter than girls in

early adolescence, guys eventually grow to be taller than girls. This occurs because guys develop more quickly and for a greater amount of time after growth begins.

Due to improved nutrition and health, there has been an ongoing tendency towards early puberty and greater development. The onset of puberty also appears to be influenced by race. Girls of African origin and Hispanic descent, for instance, may grow their breasts earlier than girls of Caucasian heritage (Physical Development., 2021).

Both boys and females frequently experience increased sex drive as a result of the puberty-related hormone surge. Members of both sexes frequently engage in private masturbation. Hormones may also be the cause of episodes of confrontational behavior toward parents and other authoritative figures (Reynolds and Wines., 1951).

The development of one bodily component might not follow the course of another. For instance, the development of the nose, arms, and legs may occur more quickly than that of other body parts. Other bodily changes that often occur throughout puberty include:

- Bone development, which lengthens child's skeleton. Thickening of the skull's bones. The jaw moves forward, and the top of the head becomes more pronounced.
- Gaining weight. In adolescence, a teenager's weight almost doubles.
- Changes in the composition of body fat. Boys have more body fat than girls. Additionally, girls' current body fat migrates to the upper back, breasts, and pelvis.
- Increase in organ size. The size of the lungs grows, and the weight of the heart doubles.
- Boy's facial hair growth. Typically, hair grows from the top lip to the cheeks, then to the chin region.

Many males have gynecomastia, or the growth of breast tissue, between early and middle puberty. Usually, it disappears between six months to two years (van Sluijs *et al.,* 2021).

3.2. 15 to 18 Years of Age

Teens develop at their own rates, and each adolescent experiences healthy growth in a unique way.

CHAPTER 2

Emotional and Cognitive Development in Adolescents

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Abstract: The development of the neurobiological mechanisms underlying higher cognitive capabilities and social and emotional behavior occurs most rapidly during adolescence. However, emotions are intricate phenomena made up of several sub-processes. In this article, we make the case that looking at emotional and cognitive development from a process-level approach enables crucial insights into the mechanisms underlying teenagers' fluctuating moods and increased risk of psychosocial changes. Adolescence is also a time when emotional capacity changes, including enhancements in affective modulation and emotional cue discrimination. According to functional imaging studies utilizing cognitive and affective difficulties, frontal cortical networks go through developmental changes in processing. The complex paths that intersect in a unique way during adolescence are revealed by comparing the developmental progressions for the physiological sensitivity to emotion, emotional regulation ability, and motivation to experience particular affective states. We analyze how these overlapping trajectories may affect both positive outcomes, such as adolescent social relationships, and negative consequences, including psychosocial behavioral changes.

Keywords: Emotional ability, Social relationships, Psychosocial behavior, Behavioral changes.

1. INTRODUCTION

Adolescence is a transition period in which an individual prepares himself for adulthood. It can be considered the transitional period from childhood to adulthood for a person (Vigil *et al.,* 2016). The changes are influenced by biological factors for which race, ethnicity and gender play a key role. As individualsreach puberty, secondary sexual characteristics are developed, and they grow to full adult height and also gain reproductive capability. Biological changes

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are mainly controlled and induced by various chemical messengers, such as hormones secreted in the body during adolescence and onwards (Perry, 2000). At an appropriate time, the hormones are released and acted upon by the target. As a result, there is a change in size, shape and quantity of organs/hormones that the body requires as one progresses toward sexual maturity. This can also cause a change in one's mood and behavior (Kabotyanski and Somerville, 2021). According to WHO, adolescence is a phase where a person undergoes physical, psycho-social and cognitive growth. This period of metamorphosis that ranges from 10 to 19 years of age is important as it forms the foundation for good health (WHO 2023). Preadolescence or early adolescence ismarked from the age of 10 to 13 years. At this stage, girls and boys do not appeal to their physical appearance and often get bullied by others due to the same (Topciu, 2020). The short period of preadolescence is an important phase that is characterized by behavioral, physical, cognitive, hormonal, and emotional development. Though it is a transition period, it certainly requires attention as it comes with specific characteristics that change the person. The major change in preadolescence is contributed by hormones and goes along with sexual maturation (Wood, 2018). Adolescents may undergo physical changes that have a positive or negative impact on the way they perceive themselves; this can influence them socially and psychologically. The person may experience a rapid change in mood, a sense of insecurity, and nervousness due to variation in hormone levels, which acts on their brain. As a result, the preadolescent may feel difficulty regulating the emotions that they experience and exhibit a typical change in their pattern of behavior (Mascia *et al.,* 2023).

Puberty can be defined as an endocrinological process that causes sexual maturation by increasing certain hormones. The changes that occur in an individual can be seen in their physical growth, sexually dimorphic changes in voice, body characteristics, facial structure, circadian regulation, sleep pattern, metabolic change, and behavioral, social as well as emotional change (Breehl, 2023).

2. DEVELOPMENTAL CHANGES IN ADOLESCENCE

At the onset of puberty, the HPG (hypothalamic-pituitary-gonadal) axis gets reactivated. Initially, the hypothalamus region of the brain starts to release massive GnRH (gonadotropin-releasing hormone) in a pulsatile manner while the person is asleep. The activity of the HPG axis is high during the prenatal and early postnatal stages, after which its activity ceases until puberty. Estradiol, testosterone, and DHEA (dehydroepiandrosterone) help in the development of secondary sexual characteristics. Gonadal hormones include estradiol and testosterone, while DHEA is an adrenal androgen (Marceau, 2015). In the neuro-

endocrine systems, the level of GnRH contributes to metabolic change, neurobehavioral change and pubertal growth. The reproductive capability is not only limited to the development of secondary sexual characteristics or physical changes, but it also includes changes in the structure of the brain. Organizational effects and activational effects are the two methods by which sex steroid activity alters brain systems. The former causes permanent structural change, which includes myelination, dendritic branching and neuronal number, while the latter is a temporary change in the action of the neuronal system, *e.g.*, the hormonal mechanisms that activate the neural system that establishes mating in animals after the onset of puberty (Peper and Dahl, 2013). In this manner, puberty changes the brain structure and organization permanently into its mature form. The addition or deletion in the neuronal number changes the size of the brain regions like the hypothalamus, amygdala and pituitary gland. Improper growth and development of these three regions of the brain can lead to several health problems, as they are responsible for the regulation of certain hormones that are required till the end of life. Metabolic disorders, sleep disorders and Klinefelter syndrome are certain examples (Sheng, 2021). On considering the genetic disorder Klinefelter syndrome, the testosterone produced in the body is relatively low due to the presence of an additional X chromosome and also there is a considerable reduction in the volume of the amygdala during adolescence. The change in brain structure and hormones together contribute to the emotional and social issues that are faced by a person diagnosed with Klinefelter syndrome. Another mechanism that alters the brain structure is the change in the overall complexity of brain circuits by having an increased number of neuron-to-neuron connections (Martinez, 2020). The region of the brain that has increased hormone receptors for estrogen is the hippocampus; the hormone estrogen also helps in the formation of such neuronal connections. The process of myelination that occurs in the neurons during the stage of puberty plays a key role in insulating the neurons present in the brain. This process of brain maturation helps the transmission of electrical signals to be more efficient communicators and in quick information processing (Kabotyanski and Somerville, 2021).

3. HORMONAL CHANGES

3.1. GnRH, FSH and LH

GnRH (Gonadotropin-releasing hormone) acts on the gonads and helps in the secretion of sex steroids.. Neurons present in the hypothalamus rhythmically release GnRH into the portal circulation, which binds to the specific receptors in the anterior pituitary and activates the secretion and release of FSH (follicle-stimulating hormone) and LH (luteinizing hormone). The half-life of GnRH is only a few minutes since it is secreted directly into the portal circulation, so the

CHAPTER 3

Effect of Mass Media on the Psychological Development of Adolescents

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Abstract: On the mainstream media, a platform that constantly evolves, youngsters may communicate with one another, express themselves, and share material of all types. It has led to the establishment of a brand-new cultural framework that affects how people interact as well as how organizations and technologies are used. Hypothetically, mass media is considered an instrument with two sharp blades. Although it provides benefits, children may experience some drawbacks as well. Even though mass media is typically discussed negatively, there are some compelling arguments in its favor. Juveniles and adolescents have the capacity to be knowledgeable viewers of media. They do not just take in everything they see, read, or hear on social networks or in the headlines. You can help kids develop the skills necessary to control media effects. Teenagers and young people are vulnerable to intentional and direct media influence. The news media might potentially indirectly affect anything. In a nutshell, youth are significantly impacted by the media. It may influence how they think and act, which may cause severe social difficulties. This matter should be managed by adults.

Keywords: Adolescent, Mass media, Psychological.

1. INTRODUCTION

The widespread use of digital media (such as texting, social media, electronic gaming, and computer use) by kids and adolescents is a result of the availability of laptops, cellphones, TVs, and tablets in homes (Twenge & Martin, 2020). Though the utilization of digital media can improve connectivity, communication, and some learning programs when it is moderated properly, the American Academy of Pediatrics has advised against allowing children and youth aged 5 to 18 to spend more than 2 hours per day using digital media (“ Media Use in

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School-Aged Children and Adolescents," 2016) (Strasburger *et al.,* 2013). There is growing concern that spending too much time on digital media can harm children's and adolescents' health and development (Przybylski, 2017) (Twenge & Campbell, 2019). Indeed, given that studies have connected increased usage of digital media to obesity and overweight, these worries have some basis. Poor cognition, restlessness, attentional issues, sleep issues, worse academic performance and suicidal thoughts are other drawbacks of using digital media (Crespo *et al.,* 2001) (Sisson *et al.,* 2010). Although several studies have demonstrated the detrimental impacts of digital media usage during years of development, little is known about the causes of why children spend a lot of time using them. The household setting and careers, according to recently published research, are crucial to children's use of digital media (Lauricella *et al.,* 2015). Besides this, there is also a good and positive side of mass media, which is unavoidable. The general public's awareness-building efforts and the communication of government directives with local police, sanitation personnel, and health professionals through mass media are also crucial (Sharma *et al.,* 2020). Newspapers, radio, social media (such as Facebook, WhatsApp, Instagram, Twitter, and YouTube), and television news are all examples of mass media. Additionally, the media encourage good personal hygiene, social distance rules, and reporting on the numerous news and current events that are happening across the world (Dhanashree *et al.,* 2021). It is important to understand the type of existing media, its role, and its impact on the general youth and adolescent population and how the media is important in the psychological and emotional development of the youth.

2. MASS MEDIA

A wide variety of media that are spread widely through mass communication are referred to as mass media.

Electronic information is sent by media like movies, radio, musical recordings, or television in broadcast media. Digital media includes both online and cellular mass communication. Examples of digital media include email, social networking sites, websites, online television and radio stations. Many other sizable media companies have a second internet presence through strategies like connecting to or streaming TV ads or scattering QR tags in printed or outdoor advertisements to direct mobile consumers to a website. They can exploit the Internet's simple accessibility and reaching capabilities in this way to distribute information quickly and easily throughout many different parts of the world at once (Mass Media Questions and Answers - ENotes.com, 2016). Any technique used to connect to or reach a broad audience is known as mass media, to put it simply. The mass media serves as the primary medium for communication between and

among the public. Some of the most popular mass media outlets include newspapers, television, radio, web-based publications, and others (Fig. **1**).

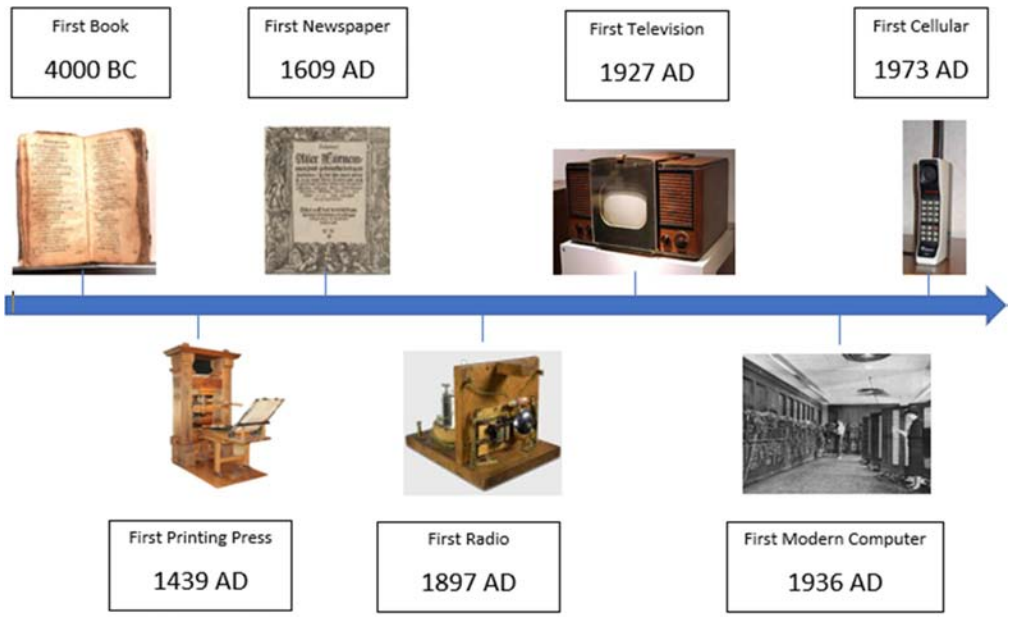

Fig. (1). Timeline of the development of mass media.

3. RISE OF SOCIAL MEDIA

Social media are web platforms that enable individuals to engage in opportunistic interactions and selective self-presentation with both large and niche audiences that value subscriber content and the impression of social engagement (Carr & Hayes., 2015). The evolution of the technological basis and the use of social media will have a substantial influence on the related communication areas in the twenty years that follow, which will affect both their theoretical and practical aspects. The fundamental mechanisms of social media, user behavior, and the growing significance of connections to and within social media will inevitably change the tools. Social networks will be utilized more personally and persistently, expanding the range of interactions and engagements by enabling mass communications that may be obtained, interpreted, and addressed professionally, as well as the reverse (Carr *et al.,* 2010). Internet messaging will become increasingly mass market-oriented, utilizing social media's capacity to reach vast, contextually varied audiences. While communications are increasingly published by groups (like social networking teams) and automated, algorithmic systems, they will nonetheless look interpersonal and delivered by an individualistic sender (Marwick & Boyd., 2011). Because of technological

CHAPTER 4

Adolescent Nutritional Requirements: Myth *vs.* Reality

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Abstract: In order to stay healthy, you need to eat a variety of nutritious food every day. Teenagers go through big physical changes in puberty. They need extra nutrition to cater to these changes. The level of physical activity and stage of development will determine exactly how much healthy food one needs. Nutrition is the study of food in relation to the health of an individual, community or society and the process through which food is used to sustain life and growth. Good nutrition means eating the right amount of healthy food and not skipping meals. Essential nutrients are compounds that the body cannot make or have in insufficient amounts. According to the World Health Organization, these nutrients must come in food and are vital for disease prevention and good health. These essential nutrients are calcium, iron, protein, zinc and micronutrients like vitamin D, vitamin E, potassium and fiber. Adolescents tend to eat more meals away from home. Eating the wrong types of food after long intervals and unhealthy eating can cause nutritional deficiency in adolescence. Adolescence needs extra nutrients for optimal physical growth, bone growth and strength, pubertal growth and development, hormonal changes, organ and tissue development, including the brain, increased physical activity levels and basal metabolic rate. Adolescence is a growing phase of life, and having a balanced food is very important. Adolescents should not skip their breakfast; they should drink plenty of water and limit highly processed food, sugary drinks and eating out. Healthy eating habits and physical activity help lower the risk of obesity during adolescence. Any nutritional deficiency experienced during this critical time of life can have an effect on the future health of the individual. All parents should pay attention to the nutritional needs of their teenagers. Adolescence, the period between childhood and adulthood, is a window of opportunity for improving nutritional status and correcting nutritional practices.

Keywords: Adolescent, Deficiency disease, Developmental changes, Nutritional requirements, Teenage.

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1. INTRODUCTION

Adolescence is mentioned as the transitional stage of development that bridges childhood and adulthood. This challenging yet exciting phase is associated with accelerated physical growth, reproductive maturation, and cognitive transformations. It is generally defined as the period of life that occurs between 12 and 21 years of age, and depending upon the growth pattern, it is further classified into three developmental stages: (1) Early adolescence (12–14 years): associated with the onset of puberty and increased cognitive development; (2) Middle adolescence (14–17 years): associated with increased independence and experimentation; and (3) Late adolescence (18–21 years): associated with making important personal and occupational decisions (Das *et al.,* 2017).

The rapid growth spurt that takes place between 12 to 15 years in boys and 10 to 13 years in girls makes adolescence an extremely vulnerable period of life due to various reasons. One is a greater demand for nutrients owing to the developmental changes that occur in full swing. Changes in lifestyle and eating behaviors and psychological changes occurring due to peer pressure and the generation gap between parents and children are other factors. Hence, adolescence provides a window of opportunity for good nutrition. Poor nutrition can make them susceptible to undernutrition and malnutrition, while overnutrition can lead to obesity (Marino and King, 1980).

With regard to energy, the growth rate, body composition, and physical activity level contribute significantly to the energy requirements of adolescents. It varies among boys and girls. The growth spurt and developmental changes affect the amount of calories consumed by adolescents (MeśIas *et al.,* 2011). Excessive concern is expressed about weight gain, which is commonly observed in adolescent girls. Underweight may occur due to insufficient energy intake due to restrictive dieting or skipping meals. On the other hand, an opposite situation may also occur with increased consumption of calorie-dense foods, snacks, and processed foods, along with decreased physical activity, leading to obesity among adolescents. Hence, maintaining energy balance becomes very important (Das *et al.,* 2017; Story, 2009).

Boys in the age group 13–15 years require 2750 kcal/day, while those in the age group 16–17 years require 3020 kcal/day. Girls in the age group 13–15 years and 16–17 years require 2330 kcal/day and 2440 kcal/day, respectively (Lifshitz, 1993). Protein intake is required in adolescence to support growth and development, changes during puberty, and the maintenance and deposition of additional lean body mass. Inadequate protein intake may lead to alterations in growth and development. In early adolescence, it leads to stunting or a delayed

increase in height and weight, and in late adolescence, it leads to a reduction in lean body mass, weight loss, and changes in body composition (Marino and King, 1980). Deficiencies of micronutrients like vitamin A, calcium, iodine, and zinc are commonly observed among adolescents. Obesity among adolescents is a major public health issue. Adolescents face eating disorders and disturbances like anorexia nervosa and bulimia nervosa due to excessive concern regarding their body image and weight (MeśIas *et al.,* 2011).

The phenomenal growth that occurs in adolescence, their risk-taking behavior, and their susceptibility to environmental influences create an increased demand for energy and other nutrients. They are a nutritionally vulnerable group as the demand is high, but with changes in their eating patterns and lifestyle, they end up consuming foods high in carbohydrates, fat, and sugar and low in nutrients like iron and calcium (MeśIas *et al.,* 2011). Good nutrition becomes important during this time to help prevent iron deficiency (anemia) and adult diet-related chronic diseases, such as cardiovascular disease, cancer, and osteoporosis. Failure to provide optimal nutrition can hinder full growth potential, sexual maturation, learning ability, concentration, and school performance (Galler *et al.,* 2017).

2. DEVELOPMENTAL CHANGES DURING ADOLESCENCE

The Latin word adolescere, which means “to mature”, is where the word “adolescence” hasoriginated from. It is the span of time between a person's childhood and maturity. Adolescence is typically understood to be the period of development that starts when puberty sets in and when sexual maturity or the ability to reproduce is acquired. It has been described as a time of rapid biological and psychological transformation.

Despite the fact that this period is characterized by general bodily transformations, the social and psychological aspects of the adolescent's behavior are influenced by the cultural environment. The teenager will have distinct emotions from a person who lives in a society where adolescents are considered the first phase of adult conduct and, thus, have significant responsibilities. For instance, in communities where adolescents’ years are viewed as difficult or confusing, although adolescence is a common feature of most communities, it is not seen in all cultures.

2.1. Physical Development

The final phase of teenage years and the onset of adolescence, which are typified by major physical alterations in both growth rate and sexual traits, are marked by puberty or sexual development. However, puberty is a progressive process rather than an abrupt occurrence. Both main and supplementary sexual features are

CHAPTER 5

Eating Disorders in Adolescents

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Abstract: Bulimia nervosa (BN) is a serious mental illness that frequently shows symptoms in adolescence or early adulthood. Binge eating and incorrect compensatory behavior to regulate weight are hallmarks of the eating disorder bulimia nervosa, which can have potentially harmful consequences. Although the exact cause of bulimia nervosa is unknown, it is most likely complex. The binge-like conduct linked to this illness may be influenced by the anomalies in interoceptive function, notably of the insula. Although the exact origin is unknown, scientists think a combination of genetic, biochemical, psychological, social, and behavioral variables is to blame. Treatment for bulimia will be more successful the sooner it is discovered. Treatments that work concentrate on nutrition, self-worth, problem-solving, coping mechanisms, and mental wellness. These therapies assist patients in the long-term maintenance of good behaviors.

Keywords: Anorexia nervosa, Adolescents, Bulimia nervosa, Eating disorder.

1. INTRODUCTION

Adolescence is a critical stage in human development marked by significant physical, psychological, and social changes during which individuals undergo rapid growth, forming their identities and adopting various behaviors, including eating habits. Unfortunately, the vulnerability of adolescents to societal pressures, coupled with the desire for acceptance and conformity, often leads to the development of unhealthy eating habits. Adolescents are highly influenced by societal norms, media portrayals of beauty, and peer perceptions (Morris & Katzman, 2003). The rise of social media has amplified the impact of societal standards of beauty on adolescents. Platforms filled with images of seemingly perfect bodies can trigger body dissatisfaction and low self-esteem among adole-

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scents (Blowers *et al.,* 2003). The pursuit of an idealized body image may lead some to engage in extreme dieting or compulsive exercise, exacerbating the risk of malnutrition and related health problems. In a recent study by Jiotsa *et al.,* to evaluate the association between social media exposure and body dissatisfaction and body image disorders, it was concluded that the extensive use of social media among teenagers and young adults may heighten feelings of body dissatisfaction and intensify their drive for a slender physique, thereby increasing their susceptibility to eating disorders (Jiotsa *et al.,* 2021).

Eating disorders impact a significant portion of the global population, with a prevalence of at least 9%. This places them among the most widespread mental health disorders worldwide (Santomauro *et al.,* 2021). There are many causes of eating disorders. They may be brought on by stressful life events such as loss or trauma, interpersonal issues, physical illness, or a change in one's stage of life, like starting college, getting married, or having a child. A depressive condition, obsessive-compulsive disorder, substance abuse, or another psychiatric disorder may coexist with an eating disorder. Similarly, several factors may contribute to the development of eating disorders in adolescents. Genetic predispositions, biological factors, psychological factors (such as perfectionism and low self-esteem), and environmental influences (such as peer pressure and societal expectations) play interconnected roles (Jacobi *et al.,* 2004; Neumark-Sztainer *et al.,* 2007; Mazzeo *et al.,* 2009; Mennittol, 2023). Additionally, traumatic experiences, such as bullying or societal discrimination based on body image, can contribute to the vulnerability of adolescents to eating disorders (Xu *et al.,* 2010; Kaewpradub *et al.,* 2017). The prevalence of fast-food culture and the widespread availability of processed foods further contribute to the development of poor eating habits, leading to nutritional imbalances and potential health issues (Askari Majabadi *et al.,* 2016; Fuhrman, 2018).

The noticeable and persistent anomalies in eating patterns, as well as the unsettling emotions and thoughts that accompany them, are characteristics of eating disorders, which are mental conditions. The severity of these illnesses, which affect social, psychological, and physical function, can be very high. Eating disorders, such as bulimia nervosa, anorexia nervosa and binge-eating disorder, are serious mental health conditions that often emerge during adolescence (Hosseini & Padhy, 2023). When taking into account all eating disorders, they can impact up to 5% of people and are most prevalent in adolescence and the early stages of adulthood. There are a few that are more common in women, like bulimia nervosa and anorexia nervosa, but they can all affect anyone at any age.

2. WHAT IS BULIMIA NERVOSA (BN)

Bulimia nervosa is a condition in which an enormous amount of food is consumed uncontrollably in a short period of time, which is then followed by compensatory behaviors, including self-induced vomiting, the overuse of laxatives, or excessive exercise (Harrington *et al.,* 2015). It is one of the several types of eating disorders (Mond, 2013). Binge eating and incorrect compensatory behavior to regulate weight are hallmarks of the eating disorder bulimia nervosa, which can have potentially harmful consequences (Jain *et al.,* 2022). Intense binge eating is described by the term bulimia, which is derived from the words "vous" (bos) and "limos" (starvation). Because of the presence of oppressive feelings and corrective conduct meant to avoid weight gain, bulimia nervosa is characterized by recurrent episodes of overeating (Varsou, 2000). Among the behavioral patterns that bulimic persons adopt are excessive exercise, purging (self-induced vomiting) right after meals, abusing laxatives and diuretics excessively, as well as the usage of drugs that enhance metabolism or inhibit hunger (Nolan & Geracioti, 2004). When episodes of overeating happen at least twice a week for three months, according to the diagnostic criteria, bulimia is considered to be present (Zambelas, 2007).

Out of 306 mental and physical illnesses, bulimia nervosa was listed as the 12th major cause of disability-adjusted life years (DALYs) in females aged 15 to 19 in high-income group countries. Although its ranking did not significantly alter internationally between 1990 and 2013, it has improved in low-income and middle-income nations, moving up from 58th in 1990 to 46th in 2013 (Erskine *et al.,* 2016). In Europe, 1-2% of women report having bulimia nervosa, while 1-4% of women report having binge eating disorders (BED) (Keski-Rahkonen & Mustelin, 2016). Nearly 1.32 billion total DALYs are caused by eating disorders among women aged 15 to 49 in India. In China, over 1.38 billion, along with the United States, have the highest contributions (Thomas *et al.,* 2016). Eating disorders are prevalent worldwide and are linked to rising health costs in Asia (Van Hoeken *et al.,* 2016). Teenage girls and young women with eating disorders frequently suffer from bulimia nervosa. This condition affects 1%–3% of women and 0.1–0.3% of men. The preferred form of treatment is cognitive behavioral therapy, while antidepressant drugs may also be beneficial (Mitchell *et al.,* 2012).

2.1. Epidemiology of BN

Both sexes can be impacted by bulimia nervosa, however women are disproportionately affected. Around 12.4 years old is the average age of onset. According to estimates, there are 0.9% of teenagers who have bulimia nervosa, 1.5% of women overall, and 0.5% of males overall who have the disorder in the

CHAPTER 6

Physical Inactivity among Adolescents

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Abstract: Adolescence is a vital developmental stage in which personal lifestyle choices and behavior patterns emerge, including the decision to be physically active. Physical inactivity, lazy behavior, and low oxygen consumption are all substantial risk factors for the development of chronic illnesses, which result in morbidity and death, as well as an expensive burden on society from health and social care services and decreased occupational productivity. During adolescence, a unique mix of biological and psychological elements combine to generate a special necessity for health-related physical exercise. At the same time, many of these variables operate as impediments to encouraging youngsters to develop regular exercise routines. Teenagers and young adults are becoming more aware of its importance, especially in light of our culture's constant connectedness and media consumption. This chapter focuses on physical inactivity among teenagers, the risks they promote and the different ways to cure such problems.

Keywords: Adolescence, Brain development, Physical inactivity, Risk factors, Young adults.

1. INTRODUCTION

Given the speed at which psychological and bodily changes take place throughout adolescence, it is a crucial time in human development. In many cultures, adolescence and early adulthood mark a dramatic change in roles and lifestyles as young people leave school and pursue a range of alternative paths, such as further education, family, the military, the workforce, or unemployment. It is crucial to be aware of the regional variations in these routes' timeframes. (World Health Organization, 2017). Young adulthood in Western nations is marked by wide variations in self-perceptions, identity exploration, and growing engagement in risky behaviors, as well as demographics (housing, income, *etc.*). The age at which a person reaches biological maturity is falling globally. In high-income nations, the age at which many "adult" milestones are reached has increased

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concurrently (Health for the World's Adolescents, 2014). The capacity to effectively track trends in physical activity compliance over the complete teenage and young adult age range is also impacted by this significant change in the recommended amounts of physical activity for those 18 years of age and above (Arnett, 2000). Global surveillance data, for instance, show that 73% of adults *i.e.*, more than 18 years old, and 20% of individuals under 18 years old, are categorized as adequately active (Arnett *et al.,* 2017). The World Health Organization (WHO) suggests that individuals under the age of 18 should engage in moderate-to-vigorous physical activity for at least 60 minutes a day, while those who are older than 18 should engage in a minimum of 150-300 minutes of moderately intense exercise or 75-150 minutes of intense physical activity every week, or a comparable combination (Ong *et al.,* 2006; Winpenny *et al.*, 2020).

2. PHYSICAL INACTIVITY

Physical inactivity is among the four largest causes of death worldwide. Physical activity is important in the development of good cardiorespiratory fitness, which corresponds inversely with morbidity and death (Lee *et al.,* 2012). Within groups of equivalent fitness, however, the risk is larger for sedentary adults than for those fulfilling physical activity requirements.

Peer acceptability, physical prowess, sexual attractiveness, and self-perception influence the normal adolescent's drive for physical exercise, and it is no longer a biological matter. Sports participation helps the gifted high school athlete with these problems. However, for the non-athletic teen, physical exercise could be the antithesis of these objectives, which are satisfied by “hanging out”, defying adult roles, and embracing unconventional hair or clothing trends (Fig. **1**). For a lot of teens, being physically active is just not “cool” (Rowland, 1999). These social obstacles to consistent physical activity are exacerbated by the increased desire for autonomy and rejection of adult-focused health objectives. The teenager gets older enough to drive, has greater access to fast food and money, and is exposed to more drugs and cigarettes.

3. FACTORS CAUSING PHYSICAL INACTIVITY

Particularly for younger generations, the digital revolution of the last few decades has drastically altered lifestyle and communication patterns. 95% of 15-year-olds worldwide had access to the internet at home in 2015 (PISA, 2015). The worldwide incidence of physical inactivity among teenagers aged 11 to 17 has stayed relatively consistent at roughly 80% during this digital revolution, indicating that increasing access to and usage of digital media may not be the primary cause of teenage physical inactivity (Shin *et al.,* 2019). Alternatively, digital media might be taking the place of other conventional types of sedentary

behavior; between 2010 and 2016, 13–18-year-olds significantly reduced their use of 'legacy media' (books, magazines, newspapers, films, and TV), and the percentage of 16–17-year-olds who read a book or magazine every day fell from 60% in the late 1970s to 16% by 2016 (Twenge *et al.,* 2019).

Fig. (1). Figure showing physical activity guidelines for teenagers.
Source: https://growinghealthykids.com.au/growing-healthy-teens/keeping-teens-active. Accessed on 2024 Feb 9.

There are several reasons for physical inactivity among teenagers, which are the following:

- Free time: Using a computer, playing video games, or watching TV while seated.
- Environmental elements: Air pollution, air traffic congestion, and a dearth of parks and pedestrian walkways.
- Social shifts: Technological progress, societal transformations, and economic expansion.
- Factors pertaining to policies: Transportation and education.

The following are other variables that may affect physical activity:

- Personal attributes: Gender, age, and physical maturation.
- Social influences include education, peers, and family.
- Playgrounds, bike lanes, and green areas are examples of environmental variables.

CHAPTER 7

Irregular Sleeping Patterns in Adolescents

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Abstract: Sleep plays a critical role in sustaining health and well-being in teenagers and young adults, and this link is increasingly studied. Many young patients who visit doctors have problems or diseases that are related to sleep deprivation. Due to the accelerated brain development that occurs throughout adolescence, sleep may be especially crucial during this time. Pre-adolescents and teenagers have different average sleep durations, but for both age groups, 9 hours seems to be the ideal amount of sleep. However, evidence indicates that teenagers frequently do not get enough sleep, particularly during the week when school is in session. Sleep has a variety of purposes, such as fostering cognitive, physical, and immune development. Studies have also shown a link between insufficient sleep and adult cardiac disease. Teenagers and young adults are becoming more aware of its importance, especially in light of our culture's constant connectedness and media consumption. This chapter focuses on the irregular sleeping patterns among teenagers, the risks they promote and the different ways to cure such problems.

Keywords: Adolescence, Brain development, Irregular sleep, Sleeping pattern, Sleep deprivation, Young adults.

1. INTRODUCTION

Sleep is critically important for individuals of all ages, but it holds particular significance among young people due to its profound impact on physical health, cognitive function, emotional well-being, and overall development.

Sleep plays a vital role in brain development, especially during childhood and adolescence. It supports learning, memory consolidation, and cognitive function. Sufficient sleep is necessary for the brain to process new information, form connections between neurons, and optimize overall cognitive abilities. Adequate sleep is essential for proper physical growth and development during childhood

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and adolescence. Growth hormone is primarily secreted during sleep, and insufficient sleep can interfere with its release, potentially impacting physical development (Leproult and Cauter; 2010). Quality sleep is essential for a healthy immune system. During sleep, the body produces and releases cytokines, a type of protein that helps the immune system fight off infections and inflammation. Inadequate sleep can weaken the immune response, making young individuals more susceptible to illnesses and infections (Besedovsky *et al*., 2012).

Sleep plays a crucial role in emotional regulation and mental health. Young individuals who get enough sleep are better equipped to regulate their emotions, cope with stress, and maintain overall psychological well-being. Conversely, insufficient sleep can lead to mood swings, irritability, and an increased risk of mental health issues such as depression and anxiety. Sleep has a significant impact on academic performance and educational attainment. Young people who regularly get enough sleep are better able to concentrate, retain information, and perform well in school. On the other hand, sleep deprivation can impair cognitive function, memory, and attention and negatively affect academic success.

Sleep deficiency can increase the risk of accidents and injuries among young individuals. Sleep-deprived adolescents may experience impaired judgment, slower reaction times, and decreased coordination, making them more vulnerable to accidents while driving, participating in sports, or engaging in other activities (Owens J, 2014). Insufficient sleep has been linked to an increased risk of behavioral problems among young people, including hyperactivity, impulsivity, and difficulties with impulse control. Establishing healthy sleep habits from a young age can help prevent or mitigate these issues.

2. ADOLESCENT SLEEP AND ITS BIOLOGY

The World Health Organization defines adolescents and young adults as individuals between the ages of 10 and 24. Numerous changes occur throughout this phase of growth and maturation, with brain development continuing throughout (Steinberg, 2010). The biology of sleep and its differences over this age range are, therefore, not surprising. It is known that adolescents experience a physiologic delay in the start of sleep, which might cause them to stay up longer. As shown by a lot of research done on this demographic, older teenagers are more frequently linked to this (Colrain & Baker, 2011). The internal circadian rhythms and the homeostatic sleep-wake system, two mechanisms involved in sleep regulation, have changed, which is why this has happened (Crowley *et al.,* 2007). Generally, adolescents have shorter sleep durations since they do not feel as drowsy and stay awake late. Due to the steady growth in time needed for the school day, this issue is most visible throughout the academic year. However, this

population's need for sleep has not decreased, leading to a period of significant sleep deprivation as compared to the adult population (Colrain & Baker, 2011).

3. SLEEP DISORDERS IN ADOLESCENTS

Of course, particular sleep disorders that afflict adolescents and young adults exist, with delayed sleep phase syndrome being the most prevalent. It is estimated that 7% of teenagers are affected by this, which manifests in adolescence and can last into early adulthood. Prolonged sleep phase syndrome is a pathological variation of the age-related delay in the timing of sleep onset; persons who have it often go to bed between 1 and 4 in the morning and rise considerably later (Figueiro, 2016). If the person's daily schedule prevents a late rise, this causes serious sleep deprivation. The recommended course of treatment involves gradually adjusting the sleep cycle, using bright light therapy in the morning, and avoiding bright light in the evening (Figueiro, 2016; Kotagal & Pianosi, 2006). Night terrors, sleepwalking, sleep-onset anxiety, restless legs, and narcolepsy are a few less frequent sleep disorders, although they are outside the purview of this article (Kotagal & Pianosi, 2006).

4. RELATION BETWEEN SLEEP AND HEALTH

It is significant to highlight that there is frequently a bidirectional link between sleep and the intricacy of this relationship. Sleep fragmentation, in which people struggle to fall asleep and wake up feeling exhausted, can be a warning sign of a patient developing sleep disorders. Further health effects of insufficient sleep, such as daytime somnolence, reduced cognition, and low mood, may follow from this fragmented sleep. This reciprocal association between sleep fragmentation and underlying medical conditions like obstructive sleep apnea must be taken into account. Additionally, this relationship between sleep and health in adolescents and young adults might persist into adulthood, so it is important to keep an eye on it (Ellen *et al.,* 2017).

5. TEENAGE SLEEP DEPRIVATION CAUSES

Many teens frequently do not get enough sleep for a variety of reasons, including:

5.1. Hormonal Time Shift

Teenagers' body clocks are shifted forward by around one or two hours due to puberty hormones, which makes them sleepier one to two hours later. However, early school beginnings prevent them from sleeping in even when they fall asleep later. Chronic sleep deprivation results from this daily “sleep debt”.

CHAPTER 8

Obesity in Adolescents-Causes and Consequences

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Abstract: In today's world, epidemic levels of kid obesity may be seen in both industrialized nations and poor countries. It is common knowledge that excessive weight gain and obesity in children have a detrimental effect on physical health as well as mental health. Children who are overweight at a younger age are at a greater risk of emerging non-communicable illnesses, such as cardiovascular and diabetes conditions, including a greater possibility that they remain overweight when they reach adulthood. It is believed that obesity is a disorder that may be caused by various different reasons; however, the process of obesity is not completely understood. The increasing prevalence of obesity around the globe may be attributed in large part to environmental factors, the decisions that people make about their lifestyles and the cultural contexts in which they live. It is generally believed that an increase in the amount of calories and fat that one consumes is the main reason for obesity and overweight. Alternatively, several facts show that factors influencing the worldwide increase in obesity rates include extreme sugar intake in soft drinks and a continual reduction in physical movement. Children's obesity may have detrimental effects on a child's physical health, along with their emotional and social health, as well as their sense of self-worth. There is a connection between this and a child's poor scholastic progress as well as their worse quality of life. In addition to juvenile obesity, a number of co-morbid diseases are also prevalent in children. These co-morbid illnesses include hepatic, metabolic, orthopedic, pulmonary, neurological, renal, and cardiovascular disorders. Other co-morbid illnesses include diabetes and asthma.

Keywords: Adolescents, Disorder, Obesity, Physical health, Weight gains.

1. INTRODUCTION

Chronic nutritional deficits are a consequence of the rapid epidemiological and nutritional change that is occurring all across the globe. Some instances of chronic nutritional deficits include the prevalence of anemia, stunting, and shortages of zinc and iron. Contemporarily, the incidence of diabetes and obesity, in addition to other NRCDs (nutrition-related chronic diseases) like comparable cardiovas-

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cular disease, diabetes, obesity and various cancer forms, is rapidly growing. Obesity has developed into a widespread epidemic in the world's wealthiest countries. It has been established that the pervasiveness of obesity in childhood is greatest in rich countries, but it is also growing in developing nations (Popkin and Doak., 1998). Women are more likely to be overweight than males because of underlying hormonal variations (Gupta RK., 2009). Thus, obesity is more common in women than in men.

It is becoming more obvious that being overweight or obese as a youngster plays a key part in the progression of conditions like coronary heart disease and diabetes (type 2) (Bhave *et al.,* 2004). In the last four decades, predominantly in the industrialized world, there was a startling upsurge in the fraction of children and adolescents who are obese (Raj *et al.,* 2007) (Subramanyam and Rafi., 2003) (Chhatwal *et al.,* 2004) (Khadilkar and Khadilkar., 2004) (Panjikkaran and Kumari., 2009). In light of recent challenges to this notion, we now consider them as diverse expressions of the global malnutrition problem. Studies from different parts of India during the past ten years indicate a similar pattern. This innovative strategy allows us to manage undernutrition and also prevent diabetes, obesity, and other non-communicable metabolic diseases (NCMDs) since it simultaneously addresses the underlying causes of nutritional deficiencies. This article provides an overview of a few essential topics associated with the prevention of chronic diseases as well as obesity using a life-course perspective on child development and nutrition. These topics are tied to the fight against chronic diseases as well as obesity.

In the 21st century, obesity in teenagers is emerging as the utmost critical complication confronting the field of public health. The scale of the challenge is worldwide, and it is starting to have an influence on a number of middle- and low-income countries, predominantly in urban areas. The pace at which the prevalence is rising is a cause for concern. According to estimates, there were around 42 million overweight children less than five years old in the world in the year 2010. About 35 million of these individuals now call developing countries their home.

2. THE MEANING OF THE TERM“CHILDHOOD OBESITY”

Even if the meaning of being overweight and obese has changed over the years, it can still be summed up by saying that a person has an excessive amount of body fat (BF). In youngsters and adolescents, there is no unanimity over the ideal BMI (body mass index) to use as a cutoff point for overweight and excessive fatness. The CDCP defined “at risk for overweight” as having a BMI between the 85th and 95th percentiles for age and “overweight” as having a BMI at or above the

95th percentile for age (Williams *et al.,* 1992). Williams *et al.* (1992) performed an investigation on a total of 3,320 children aged between 5-18 years and described obesity as having at least a 25% male body fat percentage and a 30% female body fat percentage (Ghosh A., 2014).

An Indian research study demarcated overweight as enduring a BMI that is in the middle of the 85th and 95th percentile and obesity as enduring a BMI that is beyond or at the 95th percentile (Nawab *et al*., 2014). Another research study defined overweight and obesity using the 2007 growth reference from the World Health Organization (Flodmark *et al*., 2004). Table **1** represents the percentile range of BMI and class classified accordingly.

Table 1. Percentile range of BMI and class classified.

Class	Percentile Range of BMI
Under-Weight	<5%
Normal Weight	5% to <85%
Over-weight	85% to <95%
Obese	95% or Over

There are a number of methods that may be used in order to calculate the percentage of total body fat. Methods like MRI, multi-frequency BIA, and densitometry are used in the study. Methods such as skin-fold thickness, waist circumference, and BMI have all seen widespread use in the therapeutic environment. Although these methods are not as similar to those used in the investigation, they are sufficient for determining whether or not a threat exists. The Body Mass Index (BMI), on the other hand, may not be as useful in distinguishing between children and adults since children's bodies alter as they go through the process of normal development. Because it is unable to differentiate between fat-free mass (bone and muscle) as well as fat mass, the body mass index (BMI) may overstate obesity among large, muscular children and adolescents. In addition, the pattern of growth differs depending on a person's gender as well as their ethnic background. Studies that used BMI to classify children according to the amount of body fat found in their bodies showed that this method of classification had great specificity (95% to 100%) but poor sensitivity (36% to 66%) (Lazarus *et al*., 1996). Despite the fact that the adverse health impacts of obesity are connected to excessive fatness, the most accurate classification scheme needs to be grounded on fatness that has been actually assessed. Techniques such as densitometry may be used in research contexts, but their use in therapeutic settings is impractical due to the complexity involved. The term “bioelectrical impedance analysis” (BIA) refers to a technique that is often used in

CHAPTER 9

Consumption of Drugs and Substances of Abuse among Adolescents: Risk and Reasons

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Abstract: Adolescence is a crucial period of biological, psychological, and social development; hence, it is at higher risk of drug use and its negative effects. Adolescence is a crucial developmental stage that involves important behavioral, emotional, social, and cognitive changes. Teenagers may be predisposed to begin drug use, develop substance use disorders, and experience potentially substantial and permanent substance-related negative outcomes due to the neurobiological changes underpinning these intricate developmental processes. This chapter includes the study of recent research on this complicated subject, which aims to guide clinical care and research on teenagers. This chapter is about how addiction to drugs and substances of abuse is spreading among the youth and has become a serious problem. The chapter includes all the harmful effects of this practice among youth and how this habit is disturbing the young minds of our country with its bad impact on the thinking and decision-making power of youth, especially in the people taking drugs regularly. Types of substances of abuse and drugs, along with the ways by which they are taken by individuals, are also discussed in this chapter. Diseases associated with it and the neurological disturbance created by such drugs in individuals who are habitual of taking them are also reviewed and mentioned in this chapter in detail. Further, this chapter includes the law and order followed in our country regarding drugs and substances of abuse. Since addiction to the substance is a major problem, it is very important to get rid of this habit; for this, some ways are being used. Adolescent substance use is diverse, ranging from pathological to normal, and it can cause severe short- and long-term illnesses and even mortality. Adolescent drug use issues must be addressed by comprehending risk and resilience factors, underlying neurobiology, and the best developmentally sensitive therapies.

Keywords: Adolescents, Addiction, Cigarettes, Drugs, Substances of abuse, Stimulants.

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1. INTRODUCTION

Adolescence is a critical developmental period marked by significant behavioral, affective, cognitive, social, and emotional changes. Due to the high prevalence of hazardous substance use in this age group and the specific biopsychosocial context, research is increasingly concentrating on characterizing teenage substance use disorders, with a particular focus on the neurological alterations underpinning these complicated stages of development. These modifications may predispose adolescents to start using substances, develop substance use disorders, and suffer possibly serious and long-term drug-related consequences. The kids seem “COOL” as a result of using these substances.

Other risk factors include a lack of parental supervision, a lack of self-control, and mental illnesses like depression along with attention /hyperactivity disorder. The mindsets of parents and the examples they set regarding their personal use of alcohol, tobacco, prescription drugs, and other drugs have a significant influence on children. Most frequently, marijuana, alcohol, and nicotine from cigarettes and e-cigarettes are consumed by teenagers (Sharma M., 2013) (Henkel D., 2011).

According to nationwide surveys conducted in the US, the percentage of graduates of high school who claim to have never used any drugs in their lifetime has increased over the past 40 years. However, a variety of more powerful, more addictive, and hazardous goods are currently on the market, including electronic cigarettes, high-potency cannabis goods, and prescription opiates. These factors raise the risk that youth who start using drugs will experience both short-term and long-term effects (Underwood *et al*., 2020).

There were conflicting effects of the COVID-19 epidemic on teenage drug use. Rates of heavy drug use during these times increased because some teenagers turned to drug use as a stress-reduction technique. The danger of infection and serious sickness increases with the use of any drugs, particularly with inhalational drug usage (Fig. **1**). Therefore, a COVID-19 mitigation strategy must include measures to reduce substance use (National Institute on Drug Abuse (NIDA)., 2023).

Drinking has been promoted by society and the media as a normal, stylish, and even helpful coping method for stress, grief, or mental health concerns. There must be a difference in young people's drinking habits by continuously setting clear expectations. Adolescents whose family members drink excessively, on the other hand, may accept this behavior. Some youngsters experiment with alcohol and develop an alcohol use problem later in life. Starting drinking at a young age and heredity are known risk factors for developing the disease. Adolescents with

alcoholic family members should be informed that they are at a higher risk (Moonajilin *et al*., 2021).

Fig. (1). Excessive drugs and medicines adults and teens use on a daily basis.
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2. REASONS BEHIND SUBSTANCE INTAKE

Teenagers take drugs for several reasons, including:

- to participate in social activities or feel like a member of a community
- to reduce tension
- to venture out and take chances
- To alleviate mental health condition symptoms, such as sadness and anxiety.

In the study by Moonajilin *et al*. (2014), it was found that teenagers mostly consume alcohol, nicotine (in tobacco or vaping devices), and cannabis (Moonajilin *et al*., 2021).

3. ADDICTIVES CONSUMED BY ADOLESCENTS

3.1. Alcohol

Drinking excessively can compromise the immune system, making the body a far simpler target for disease. People who drink regularly are more likely to suffer from illnesses like pneumonia and TB than non-drinkers. Even twenty-four hours

CHAPTER 10

Prevalence of Tobacco Use and Alcohol Consumption among Adolescents

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Abstract: Adolescence is a period in the life of an individual from 10 years to 19 years of age. This stage is marked by rapid physical, cognitive, and psychosocial growth in an individual and is a very crucial stage for their development. This is the time when the foundations of a healthy or unhealthy lifestyle are laid, and these habits may continue for a lifetime. Current research studies show high growth in the number of adolescents involved in risky behaviors, and this has become a matter of concern. The prevalence of risks in alcohol and tobacco consumption has increased tremendously. Tobacco and alcohol are known to be 'gateway drugs' as they are the first to be consumed when an individual starts such practices; the reasons are their easy availability, peer influences, acculturation, or even family history of substance use disorder. To decrease this and establish a healthy lifestyle, teenagers need proper information and guidance, including opportunities that may lead them to actively participate in interventions that are aimed to improve their physical and mental health. Mostly, alcohol and tobacco are seen to be prevalent together. Adolescents who show consistent drinking and tobacco smoking habits are more likely to show irritant, violent behaviors. Also, they are at higher risk of developing drug habits like marijuana abuse in their later stages of life.

This chapter basically examines the generality of tobacco and alcohol consumption, especially among adolescents, and the ways in which it causes harm to adolescents and its side effects. It gives an overview of the social, physical, and psychological effects it has on adolescents' lifestyles. It also covers risk factors and smoking and alcohol cessation efforts in the population. It gives special consideration to smoking cessation treatment, which includes peer influences, motivation, and nicotine dependence.

Keywords: Adolescence, Alcohol, Psychological, Tobacco.

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1. INTRODUCTION

Adolescence, called the transition stage, starts from puberty and continues till adulthood, where major physical and psychological development takes place. According to WHO, adolescents are individuals aged 10-19 years. They are a major part of the population that is they are 21 percent of the Indian population, and worldwide, they are 1.2 billion in number. Morbidity and mortality rates in this group are common and can be prevented (Sivagurunathan *et al*, 2015). Lack of proper knowledge and awareness about the various physical and psychological changes mainly affects children and adolescents. It is a critical stage in an individual's life. It is the time when people become individually independent, build new relationships, and develop skills that are required in society, and above all, this is the time when major hormonal imbalances govern one's body. Males and females become sexually mature. For females, it is time when menstruation starts.

But, in this era, being an adolescent demands much more, like a fast pace of life, increasing competition, social media, the effect of peers, and a lot more. This, combined with many other factors, contributes to increasing cases of suicides and depression among the teenage group, and to avoid such cases, they rely on false means like tobacco, drugs, and alcohol. Also, there are increasing cases of peer pressure that force individuals to indulge in such practices; also, a fear of missing out leads many teenagers to start consuming alcohol, tobacco, and other such products.

Alcohol and tobacco are known to cause many health-related problems. Alcohol can be consumed in several ways *i.e.*, in the form of several alcoholic beverages, and so is the case with tobacco, which can very easily be consumed either by chewing or by smoking (Myers and Kelly., 2006).

So, in this chapter, we will be basically looking into how alcohol and tobacco are associated with unhealthy lifestyles, with special emphasis given to adolescents. Also, we will look at some of the measures that can be used to prevent increasing alcohol and tobacco consumption by the youth.

2. UNHEALTHY LIFESTYLE ASSOCIATED WITH ALCOHOL CONSUMPTION

To understand how alcohol harms our body, let us first know about alcohol. Alcohol is an organic molecule that contains an aliphatic carbon atom with a hydroxyl (OH) functional group (Fig. **1**). Because OH is the functional group of all alcohols, the generic formula ROH is frequently used to denote alcohols, where R is an alkyl group. Alcohol is abundant in nature. The primary element in

alcoholic beverages, ethyl alcohol (ethanol), is well recognized to most people, yet it is only one of a family of chemical molecules known as alcohol. Ethanol is a kind of alcohol found in drinks such as beer, wine, and liquor (Alcohol Drinking, Lyon, 1988).

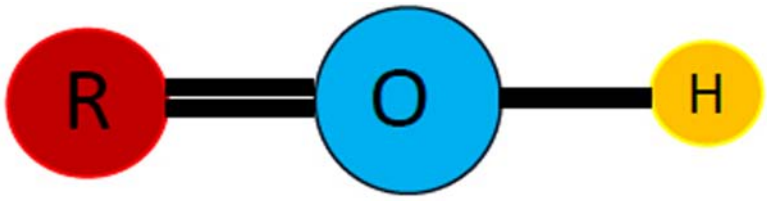

Fig. (1). Structure of alcohol.

2.1. Harmful Ingredients Found in Alcohol

Beer's glycerol content varies little, between 1.10 to 2.10 g/liter on average, including specific beers of European countries containing up to 3.17 g/liter. According to a review, the amount of aliphatic in fusel alcohol, which is higher in alcohols formed by the yeast fermentation of carbohydrates in beers created by different countries, is not affected considerably, though the amounts vary to some extent among beer types due to the yeast used and, in particular, the fermentation process conditions. Isopropanol, isobutanol, methyl-l-butanol, and 3-methyl-l-butanol are found in beer (International Agency for Research on Cancer, 2020).

Several studies have focused on phenethyl alcohol, an aromatic alcohol with a moderately strong rose-like scent. A tiny quantity of benzyl alcohol can be found in beer. Tyrosol and tryptophol, both of which are produced during the process of fermentation, have been found in a variety of beverages, with tyrosol levels varying from 1 to 29 mg/liter and tryptophol concentrations varying from 0.2 to 12 mg/liter (Boronat *et al*, 2020).

2.2. Factors Affecting Alcohol Consumption and Alcohol-related Harm in Adolescents

There are many individual and social variables that influence both the types and amounts of alcohol used as well as the extent to which alcohol-related issues exist in communities. Fig. (**2**) clearly depicts the chronic illness among alcohol users using a pie chart.

Economic growth, culture, social conventions, drinking accessibility, and drinking policy adoption and implementation are all societal effects. A certain amount and type of drinking has more detrimental effects on one's health and society in poorer

CHAPTER 11

Anxiety and Depression-Related Problems Associated with Adolescents

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Abstract: Adolescence, a transitional phase from childhood to adulthood, is marked by several critical changes in the human body, whether emotional, physical, psychological, or social. This sensitive phase, which primarily lasts from 10-19 years of age, lays the trajectory for overall development and health among adults. Neurobiological, environmental, genetic aspects, lifestyle, and behavioral factors, such as eating disorders, substance abuse, social media, physical inactivity, sex-related differences, *etc.*, can lead to disease onset, with anxiety and depression being the prominent ones. Besides, the adolescent brain is structurally different from the adult brain, with varying levels of hormones and neurotransmitters, making it more vulnerable to changes. Prevention, prompt diagnosis, and treatment are vital to improving adolescent mental health. Preventive interventions and mental well-being awareness are paramount to alleviating health loss. This chapter will mainly focus on the molecular basis of the adolescent brain, causes and symptoms of anxiety and depression, neuropsychiatric overview, appropriate measures for prevention, timely diagnosis, intervention, and treatment, and the role of society in shaping the adolescent brain.

Keywords: Adolescent lifestyle, Anxiety, Depression, Neuropsychiatry, Mental health.

1. INTRODUCTION

As humans transition from childhood to adulthood, they undergo a unique phase in life known as the adolescent stage or puberty, which begins at 10 years and lasts up to 19 years of age. However, puberty's physical, psychological, and cultural expression could start early and end later depending on environmental,

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hereditary, or cultural aspects (Spear, 2000). During this phase, adolescents undergo rapid physical, psychological, cognitive, and neural functioning changes leading to sexual maturity. Many changes contribute to the underlying biological and psychological processes. During adolescence, the body undergoes significant hormonal changes that lead to the development of secondary sexual characteristics, such as the growth of pubic hair and breasts in girls, deepening of the voice and growth of facial and chest hair in boys. These changes are attributed to the release of sex hormones, primarily estrogen, progesterone, and testosterone (Arain *et al*., 2013).

Adolescence is a phase of significant brain development and plasticity. The brain changes structurally and functionally, including increased white matter volume and myelination, changes in neural connectivity, pruning, and alterations in neurotransmitter function. These changes contribute to the development of cognitive and emotional processes and changes in behavior and social interactions. Cognitive development is closely linked to brain development, predominantly in the prefrontal cortex, which is accountable for decision-making, impulse control, and planning (Jay N Giedd, 2004). Social and environmental influences, including family dynamics, peer relationships, cultural norms, and societal expectations, also mold adolescents. These aspects can impact adolescent behavior, identity formation, and overall well-being. Intrinsic factors primarily drive the maturation of the brain during adolescence; however, environmental factors such as substance abuse can significantly alter this process (Tetteh-Quarshie et Risher, 2022). Scientists are keen to unravel why adolescence represents the period when the most prevalent psychiatric disorders first appear (Lee *et al*., 2014). According to the World Health Organization (WHO), mental health conditions affect a significant proportion of young people worldwide, with around 10-20% of individuals aged 10 to 19 experiencing mental health disorders. Despite predominance, mental health issues in young people frequently go unnoticed and untreated.

Psychological disorders like depression and anxiety are more likely to occur during adolescence. These disorders usually develop during the early to mid-adolescence period, while schizophrenia tends to manifest later in late adolescence and adulthood (Paus *et al*., 2008). Extreme worry, sleep difficulties, avoidance behaviors, fear, restlessness or nervousness, poor concentration, and irritability characterize anxiety in adolescents. Symptoms of depression may include loss of interest in hobbies, persistent low mood, persistent feelings of sadness, worthlessness or guilt, and disturbance to regulatory functions such as sleep and appetite (Racine *et al*., 2021; Waite et Creswell, 2014). Anxiety and depression are two sides of the same coin; they often co-exist in people with mental disorders that could be challenging to detect and treat in adolescents.

Common risk factors that encompass anxiety and depression include sex-related differences, genetic factors, environmental stressors, and cognitive factors, such as negative thinking patterns (Cummings *et al*., 2014). Studies have shown that anxiety and depression can significantly impact adolescents' brain structure and function, which is still developing. Researchers have recognized alterations in the amygdala, prefrontal cortex, and hippocampus regions of the brain affected substantially in adolescents who demonstrate anxiety and depression-like behavior (Parker *et al*., 2020).

Moreover, the manifestation can also lead to several diseases like major depressive disorder (MDD), bipolar disorder (BD), post-traumatic stress disorder (PTSD), obsessive-compulsive disorder (OCD), and many more. Though detection and treatment in adolescents is a major challenge, positive outcomes may be achieved with positive intermediations such as family and societal support, physical exercise, and neuropharmacological treatment. This chapter will delve into the phase of adolescence in detail as a highly multifaceted interaction between neurobiological, psychological, and social factors that impact the variations that occur during this time. We will focus on adolescent mental health disorders, mainly anxiety and depression, and how striking a delicate balance is essential so adolescents can navigate their way to healthy adulthood.

2. ADOLESCENT BRAIN

Adolescents have very distinct brain structures compared to adults. This is primarily because this phase is marked by significant brain development and varied plasticity; during this phase, the brain undergoes variations in both structure and function. The maturation of the brain during adolescence might be controlled by different factors such as genetics, neurobiological, unhealthy lifestyle, regulatory processes like eating and sleeping patterns, as well as prenatal and postnatal conditions, among others. Furthermore, different other factors such as the emergence of sex hormones like estrogen, progesterone, and testosterone, physical, emotional, financial, and mental stresses, along with substance abuse (nicotine, alcohol, drugs, *etc.*) can influence the progression and development of the adolescent brain (Arain *et al*., 2013). During early puberty, the brain undergoes a critical phase characterized by the overproduction of axons and synapses, which is followed by rapid removal during later adolescence. This eradication precisely happens in the dendrites of the amygdala, nucleus accumbens, and prefrontal cortex. Nevertheless, the density of the fibers connecting the amygdala and prefrontal cortex keeps growing during early adulthood (S L Andersen *et al*., 2000; Susan L Andersen Teicher, 2004; Zehr *et al*., 2006). During adolescence, the limbic system, which regulates emotions and reward processing, is very active. This can lead to increased sensitivity to social

CHAPTER 12

Pollution and Youth Health

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Abstract: Adolescents and children have been deemed more vulnerable to the impacts of air pollution than adults. Every day, almost 93% of the world's children and adolescents breathe dirty air, putting their health and development in danger. It demonstrates that pregnant women exposed to polluted air are more likely to give birth prematurely and have small, low-birth-weight babies. Air pollution has an impact on neurodevelopment and cognitive aptitude, as well as the risk of developing asthma and pediatric cancer. Children who have been exposed to high levels of air pollution may have a higher chance of developing chronic diseases such as cardiovascular disease later in life. One reason children are especially exposed to the impacts of air pollution is that they breathe faster than adults and thus absorb more toxins. They also reside closer to the ground, where some contaminants reach peak concentrations, during a period when their brains and bodies are still growing.

Numerous studies have revealed that air pollution has a negative impact on adolescents' health, with a particular emphasis on physical disorders, such as respiratory ailments. Furthermore, a few studies have found that kids who are exposed to poor air quality suffer from increased fatigue and mental issues both during and after the exposure.

Air pollution is a global health concern that has major public health consequences, especially for youth. In addition to short-term impacts, early exposure to criterion air pollutants may be related to low birth weight, increased oxidative stress, and endothelial dysfunction, all of which may have long-term consequences for chronic noncommunicable diseases. Given the emerging epidemic of chronic disease in low- and middle-income countries, as well as the vicious cycle of rapid urbanization and rising levels of air pollution, public health, and regulatory policies to protect air quality should be integrated into the primary healthcare system's main priorities and health professionals' educational curricula.

Keywords: Air pollution, Adolescent health, Pollution, Pulmonary health, Respiratory disorders.

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1. INTRODUCTION

Pollution is also a primary source of developmental impairments that are injuries that affect teenagers' health, limit their ability to study and lower their future wages. Pollution exposure during the first 1000 days of life - from conception to age two - is especially dangerous because children's bodies are growing, and their organ systems are undergoing complex developmental processes that are easily disrupted. Exposure to even low levels of pollution during the first 1000 days can stunt children's growth, increase their risk of disease, and cause lasting damage to their brains, lungs, reproductive organs, and immune systems. Air pollution, particularly fine particulate air pollution, poses a global risk (Landrigan, 2018). In low- and middle-income nations around the world, 98% of all children under five are exposed to PM2.5 levels that exceed WHO air quality limits, however, it is 52% of youngsters in high-income countries (WHO, 2018).

Adolescence is a sensitive developmental period marked by fast biological, neurological, and social changes that increase susceptibility to the appearance of emotional difficulties. Adolescents, for example, experience changes related to puberty, physical growth, circadian rhythms, psychopathology, and daily mood reactivity, all of which have an impact on their cognitive, emotional, social, and motivational processes. Adolescents' emotional well-being is highly linked to their physical surroundings and environments. Many cross-sectional and longitudinal studies in Asia show that kids exposed to higher levels of air pollution have more emotional disorders, such as worry and stress. (Armstrong-Carter *et al*., 2022).

Air pollution is one of our era's biggest scourges, not only because of its effect on climate change but also because of the increased sickness and mortality it causes. Many contaminants contribute significantly to human disease. Particulate Matter (PM), particles with varying but extremely small diameters, enter the respiratory system through inhalation, causing respiratory and cardiovascular disorders, reproductive and central nervous system dysfunctions, and cancer. Although ozone in the stratosphere protects against ultraviolet irradiation, it is toxic when present in large concentrations at ground level, harming the respiratory and cardiovascular systems. Furthermore, air pollutants that are detrimental to people include nitrogen oxide, sulfur dioxide, volatile organic compounds (VOCs), dioxins, and polycyclic aromatic hydrocarbons (PAHs). When inhaled at high concentrations, carbon monoxide can cause direct poisoning. Heavy metals, such as lead, when absorbed into the human body can cause either direct poisoning or chronic intoxication, depending on the level of exposure. The aforementioned compounds are mostly responsible for respiratory disorders such as Chronic Obstructive Pulmonary Disease (COPD), asthma, and bronchiolitis, but they also

cause lung cancer, cardiovascular events, central nervous system dysfunctions, and skin diseases. Natural disasters, as well as climate change caused by environmental degradation, have an impact on the geographical spread of many infectious diseases. Human actions have a negative impact on the ecosystem by damaging the water we drink, the air we breathe, and the soil where plants thrive. Although the Industrial Revolution was a major accomplishment in terms of technology, society, and the supply of various services, it also resulted in the release of massive amounts of pollutants into the atmosphere that are damaging to human health. The majority of environmental contaminants are released by large-scale human activities such as industrial machines, power plants, combustion engines, and automobiles. Pollutant emissions from power plants, refineries, and petrochemicals, the chemical and fertilizer industries, metallurgical and other industrial plants, and municipal incineration are also significant sources (Manisalidis *et al*., 2020).

The accumulation of greenhouse gases such as carbon dioxide, mostly from the combustion of fossil fuels, causes warming, which has an impact on air pollution levels, particularly ozone and particle matter (Brook *et al*., 2003). Heat-related health effects include increased rates of pregnancy complications, pre-eclampsia, eclampsia, low birth weight, renal effects, vector-borne diseases such as malaria and dengue, increased diarrheal and respiratory disease, food insecurity, decreased food quality (particularly grains), malnutrition, water scarcity, exposure to toxic chemicals, exacerbated poverty, natural disasters, and population displacement. Air pollution has numerous negative health effects on children. In addition to short-term effects such as intrauterine growth retardation, neonatal and infant mortality rates, malignancies (particularly leukemia and Hodgkin lymphoma), respiratory diseases, allergic disorders, and anaemia, early exposure to criteria air pollutants may be associated with an increase in oxidative stress, inflammation, and endothelial dysfunction, which may have long-term effects on chronic noncommunicable diseases. Youth are especially vulnerable to air pollution, from conception to adulthood. Protecting children's health is regularly mentioned as a crucial goal in important climate and environmental legislation, such as the zero-pollution action plan (Poursafa & Kelishadi, 2011).

Chemical contamination is another hazard. More than 140,000 new chemicals and insecticides have been developed over the last 50 years. Only around 12 of the thousands of chemicals in use today have been shown to induce developmental neurotoxicity in children. It is unknown how many untested chemicals are currently in widespread usage that could harm children's developing brains. Pollution can undermine efforts to improve children's development through improved nutrition, early learning, and better healthcare. Pollution erodes

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