

**STRESS PERCEIVED AMONG CHILDREN AND ADOLESCENTS DURING COVID-19  
PANDEMIC****\*<sup>1</sup>Monisha Mohanraj, <sup>2</sup>Janavi S Gauradas, <sup>3</sup>Venkateswaramurthy Nallasamy**<sup>1,2</sup>Pharm D, JKKN College of Pharmacy, Komarapalayam, Namakkal, 638183, Tamil Nadu, India.<sup>3</sup>Professor and Head, JKKN College of Pharmacy, Komarapalayam, Namakkal, 638183, Tamil Nadu, India.**\*Corresponding Author: Monisha Mohanraj**

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**INTRODUCTION**

Complex and encompassing, mental health goes much beyond the absence of disease. It refers to a person's ability to relate with others and their environment in a way that encourages the best possible use of their cognitive, affective, and relational skills as well as general wellbeing.<sup>[1]</sup> The absence of mental disorders is only one aspect of mental wellness. It is described as a state of wellbeing in which each person reaches their full potential, is able to deal with everyday stressors, can work productively and fruitfully, and can contribute to their community.<sup>[2]</sup>

Stress is defined as a state of mental and physical strain that results from any situation that endangers our homeostasis.<sup>[3]</sup> Everyone experiences stress on some level, and it is a regular occurrence in people's daily lives. It is a typical response to challenging circumstances or an uncertain environment, but it becomes problematic when environmental demands surpass an individual's adaptive capacity to cope. When a person is unsure about their physical, emotional, or psychological capacity to handle the events, they perceive these environmental demands as a threat to their wellbeing.<sup>[4]</sup> Hans Selye, a professor at McGill University, coined the term "stress" for the first time in 1936. According to him, stress is the body's "non-specific response to a demand." Stress is the collective biological impact of any unpleasant physical, mental, emotional, internal, or external stimuli that tend to undermine a person's natural state of well-being.<sup>[4]</sup>

About 243 million people in India are teenagers, or one-fourth of the total population. These teenagers make up 20% of the 1.2 billion teenagers worldwide. According to the National Mental Health Survey 2015–2016 of India, the prevalence of all mental illnesses among people aged 13 to 17 was 7.3%; however, a comprehensive analysis found that the prevalence of psychiatric disorders among teenagers ranged from 0.48% to 29.40%.<sup>[5]</sup>

This area of medicine receives less attention in India for a variety of reasons, ranging from social to medical causes, which leads to a lack of statistics on prevalence and treatment information. The majority of mental health illnesses go undiagnosed because of the carelessness and ignorance of parents.<sup>[6]</sup> The burden of disease and damage among people aged 10 to 19 worldwide attributed to mental health is 16%. Over one fifth of the population, or 190 million teenagers, are thought to be in this age group.<sup>[7]</sup>

Adolescents are those between the ages of 10 and 19 according to the World Health Organization. Both physically and mentally, adolescence is a time of transition. The teenager establishes closer relationships with peer groups and romantic interest throughout this stage.<sup>[8]</sup> Throughout this stage of life, physical and mental development are constant.<sup>[9]</sup> The transitional period between childhood and adulthood is known as adolescence and is marked by a high rate of biological and emotional development.<sup>[10]</sup> Adolescence is a transformative time in a person's sexual development, and it is greatly impacted by their environment's socioeconomic status and way of life. One of the main mental health concerns that adolescents deal with is emotional and behavioural disorders.<sup>[11]</sup>

Numerous studies on the subject of adolescent or young people's mental health have found that 7.8% of those affected have mental health issues,<sup>[12]</sup> 13.8% have emotional and behavioural issues,<sup>[13]</sup> 15% had a high risk of such issues,<sup>[14]</sup> and another 26% had psychiatric issues.<sup>15</sup> Additionally, 15% had a total difficulties score that was 17.2% above the normal level.<sup>[16]</sup>

A pandemic is the global or transnational spread of a disease that affects a large population, according to the World Health Organization (WHO). A coronavirus known as COVID-19 that spreads by droplets from one person to another has just been identified. The virus first surfaced in Wuhan, China, in December of 2019. In January 2020, a public health emergency of global importance was declared.<sup>[17,18]</sup> As of April 18, there were approximately 23,00,000 cases reported from across the globe. Presently, with no medicine or vaccine available for Covid-19, the situation has turned worrisome.<sup>[19,20]</sup>

### FACTORS OF STRESS

The four basic categories of stress include physical, emotional, social, and behavioural stress elements. Because it also has a big impact on a student's life, the examination is regarded as the fifth part of the study. Many of these factors come and go as a result of short-term stress. On the other hand, factors connected to persistent, long-lasting stress may be harmful. Consequences can include exhaustion, a bad mood, and health issues. High levels of stress can influence behaviour changes such as drug use, restlessness, eating disorders, and other medical problems as well as mental health problems including depression, anxiety, and interpersonal problems if they are not treated or controlled (e.g. headaches, bowel problems, heart disease, etc.).

#### Physical, Physiological or Psychosomatic factors

Physical manifestations of stress or tension include being easily tired, tense muscles, palpitations (a racing heart or accelerated heart rate), sweating (cold sweat) or hot flushes, irregular or shallow breathing, a feeling of choking or smothering with pain in the chest, nausea or abdominal distress, feeling numb or experiencing tingling sensations in certain parts of the body, experiencing a dry mouth and the urge to swallow, and feeling the urge to sneeze.

#### Emotional factors

Feeling occasionally down and defeated, feeling distant from oneself, worrying about losing control or going insane, fear of dying, great apprehension, fearfulness, or terror (often accompanied by feelings of impending doom), increased irritability or anger, anxiety or feelings of panic, tearfulness, increased interpersonal conflicts, etc. are some emotional indicators of tension or stress.

#### Social factors

Issues with family acceptance, a lack of sharing, a feeling of isolation, difficulties participating in leisure

activities, etc. are only a few examples of the social factors that contribute to stress or tension.

#### Examination factors

Exam factors are a number of situations that are connected to exams, evaluations, academic or extracurricular activities, performances, or competitions which may cause stress in students.

#### Behavioural factors

Restlessness (feeling tense or on edge), shaking, temper outbursts, withdrawal from social interactions, binge drinking and/or smoking, sleep disturbances (having trouble falling asleep, having nightmares, sleeping excessively, or waking up tired), not feeling hungry or overeating, slow psychomotor coordination, rushing around, and working longer hours are all signs of stress or tension.<sup>[4]</sup>

### PHYSIOLOGY OF STRESS

Throughout our lives, the types of pressures we face and how we handle them change. When both of these characteristics of stress are changing, adolescence is a period of development. Though the majority of us are aware that stressors alter over adolescence, we tend to underappreciate the various ways that adolescents react to stress.<sup>[21]</sup> The HPA and sympathetic nervous systems are stimulated by physical stress. Catecholamine production, insulin suppression, mobilisation of energy storage through gluconeogenesis and glycogenolysis, suppression of the immune-inflammatory response, and delayed wound healing are only a few of the physiological consequences of cortisol.<sup>[21]</sup> B-cell apoptosis is a consequence of the immune system being downregulated.<sup>[22,23]</sup> Through influences on collagen synthesis, wound healing is also slowed down.<sup>[24]</sup> A mineralocorticoid hormone called aldosterone maintains blood pressure by causing sodium and water retention.<sup>[25]</sup> The mineralocorticoid and glucocorticoid receptors in the brain are glucocorticoid binding receptors. Preserving function is the brain's initial reaction to glucocorticoids. Cortisol, corticosterone, and dexamethasone are examples of glucocorticoid hormones that have a variety of energy-conserving and energy-supply-maintaining effects, including the reduction of inflammation, the restriction of growth, the production of energy, and the removal of unneeded or dysfunctional cellular components.<sup>[25]</sup>

### PHYSIOLOGY OF COVID-19

The respiratory tract infection COVID-19, which causes symptoms like fever, chills, a dry cough, exhaustion, and a shortness of breath, was first identified in Wuhan, China, in December 2019.<sup>[26]</sup> The world is now immobile due to this unusual viral pneumonia, which has had devastating health and financial effects. Although the novel coronavirus is related to SARS and MERS-CoV, its effects are more debilitating, as seen by the exponential rise in infected cases.<sup>[27]</sup>

The COVID-19 incubation period ranges from one to fourteen days, with a mean of six days, during which asymptomatic carriers of the virus might spread the illness to healthy individuals through touch or droplets.<sup>[28]</sup> The primary organs that are harmed are the lungs, which can result in pneumonia and, in more serious cases, respiratory failure that may require mechanical ventilation. On rare occasions, patients may have symptoms related to their gastrointestinal system, hearts, and brains, either with or without lung involvement. Acute respiratory distress syndrome (ARDS) with hyaline membrane, acute fibrinous organising pneumonia (AFOP), or moderate congestion and alveolar exudation are all pathological signs of the lungs that correlate with the severity of the disease. Secondary involvement may also impact organs like the liver and kidneys.<sup>[29]</sup> Children are less likely to have severe infections since they are either asymptomatic or pauci-symptomatic (fever (50%), cough (38%), tiredness, rhinorrhoea, or nasal congestion).<sup>[30,31]</sup> Children, especially newborns and infants, frequently experience digestive problems such vomiting, cramping, and diarrhoea.<sup>[32]</sup>

#### PANDEMIC IN INDIA

India announced its first COVID-19 case on January 30, 2020, in Kerala. The index case was a student who was hospitalised in isolation after returning from Wuhan. There were three confirmed cases in Kerala as of February 3; each of the first cases originated in a separate city. On February 20th, they were deemed to be recovered. India reported its first two COVID-19-related fatalities on March 14.<sup>[33]</sup> India's government abruptly implemented a 21-day statewide lockdown on March 25, 2020, which included the closing of all non-essential markets and a complete suspension of all domestic, foreign, and national aircraft.<sup>[33]</sup> To stop the spread of the virus, more than a third of the world's population has been placed under a lockdown with limited movement.<sup>[34]</sup> Here is a list of nations and restrictions that is continually being updated. A third of the world's population is under coronavirus lockdown.<sup>[35]</sup> Wearing a mask, keeping their distance from others, and often sanitising their hands have all been strongly encouraged. When it comes to lockdowns, India is similar to the rest of the world. Challenges in the medical field for Indians further exacerbate the concerns that increase psychological discomfort.<sup>[36,37]</sup>

Numerous nations have been compelled to announce emergency preparations and impose social and public limitations as a result of the COVID-19 epidemic. Curfew enforcement, house quarantine, and isolation are all part of the public health procedure, and as a result, the educational systems were compelled to employ online learning tools. Anxiety, despair, post-traumatic stress, tension, and other psychological problems are all on the rise as a result of the COVID-19 epidemic.<sup>[38]</sup> Most people find being quarantined or isolated at home unpleasant because it restricts their independence and

makes them worried about illnesses, losing their employment, getting bored, being alone, and developing depression and anxiety.<sup>[39,40]</sup>

#### CHALLENGES FACED BY CHILDREN AND ADOLESCENTS DUE TO COVID-19

There have been reports that the children's psychological well-being will be negatively impacted by this entire situation.<sup>[41,42]</sup> While the absence of understanding about infectious diseases might encourage widespread panic, the virus breakout and the execution of quick control methods may lead to extreme dread and social isolation.<sup>[40]</sup> People are under severe stress because of the novelty of the infection as well as the unpredictability and uncertainty of when the situation will be fully under control. This is especially true when social face-to-face connections are lost.<sup>[44]</sup> Lockdown was a necessary and crucial action at the time, but the closure of all schools, colleges, and universities made it difficult for students to go about their daily lives, go about their jobs, participate in the economy, and most importantly, complete their education.<sup>[45]</sup> The educational institutions decided to conduct online lessons in accordance with Indian Government and University Grants Commission norms in order to avert the deficiency in curriculum completion (UGC). However, because learning is a practical activity, it is well established that it works best when students engage with one another.<sup>[46]</sup> The physical and temporal dispersal of pupils makes online learning challenging at times.<sup>[47]</sup> Since unresolved learning challenges in kids can cause stress, worry, and major mental health problems, screening for them was crucial.<sup>[48,49]</sup> The regularity of online lessons, the capacity to attend classes, understanding online lectures, internet connection, the home environment, excitement and motivation, and a lack of physical exercise are just a few of the variables that could make studying difficult during the lockdown.<sup>[50]</sup> The students (fairly or very) commonly experienced stress and frustration; rage over events beyond their control; the feeling that challenges were piling up so high that they could not overcome them; they were unable to cope with all the things they had to do; they were unable to control the significant aspects of their lives; and upset over something that had happened unexpectedly.<sup>[51]</sup>

Students expressed feelings of sadness, tension, worry, fear, anger, and lack of motivation. Additionally cited were issues with time management, problem solving, and studying. Students in secondary schools who wanted to achieve high test scores in order to gain entrance to universities were concerned about their grades and the future.<sup>[51]</sup>

Due to the lack of interpersonal communication during the social distance, these psychological reactions are more likely to manifest and deteriorate.<sup>[52,53]</sup> Additionally, it was shown that remote learning is linked to stress, which is brought on by issues with academics, finances, and social interactions.<sup>[54]</sup>

Students can find it difficult to handle the online format. This includes the students' technological aptitude, the availability of adequate resources at home that support online learning, or a steady internet connection.<sup>55</sup> Additional sources of stress include the frequency and quality of exams, extensive curricula, parental expectations, loneliness, and worrying about the future.<sup>55]</sup>

Furthermore, due to the fact that female participants made up the majority of the sample, female students reported much higher levels of stress.<sup>55-58]</sup> High levels of stress in women have been linked to a number of things, including hormone changes, emotional expressiveness, and concerns about their social circumstances.<sup>59,60]</sup>

Numerous factors affect students' psychological well-being. Online learning, "home-quarantine," sleep and food problems, fear of dropping out of school, feelings of loneliness, and a family history of chronic illness were all associated with sadness, anxiety, and stress in students. Students' socio-demographic characteristics are thought to have a substantial impact on their psychological well-being. It is understood that personal and societal factors continued to have a significant role even during home confinement and close proximity to family.<sup>61]</sup>

The lockdown had the greatest impact on those who lacked sufficient supplies of daily necessities or were unable to get them. The fact that individuals who were unsure about supplies and those who had sufficient supplies appear to be less affected is notable. People who were unsure of their resources might have been considering shared consequences or relying on their sources for future use. The discovery of students' moderate depression is likely due to changes in their daily routines and teaching-learning activities.<sup>62]</sup>

### **SOCIAL BEHAVIOR**

Humans are innately sociable creatures with the capacity to cooperate well and a strong need to interact with others from an early stage of development.<sup>63,64]</sup> According to evolutionary theory, social connections were essential for human survival as well as for ensuring a child's normal cognitive, emotional, endocrine, and immunological development.<sup>65,66]</sup>

Adolescence is seen as a phase of intense social environment learning during which various important social cognitive skills, such as understanding the feelings, intentions, and beliefs of others, continue to develop.<sup>67,68]</sup> It is a stage of psychological transition from childhood to adulthood. It is also a time when teenagers are more sensitive to social situations and spend more time with their friends.<sup>67-70]</sup>

In reality, school is one of the most significant social contexts for most adolescents, and peers there have a growing influence on adolescents' self-concept,

wellbeing, and conduct.<sup>71,72]</sup> Cognition, emotions, attachment, and relationships all evolve through social interaction. Additionally, it helps to regulate the body's physiological reactions to immediate stressors and other pressing problems.<sup>73]</sup>

Unfortunately, during the COVID-19 pandemic, many teenagers were unable to attend school, which resulted in restricted peer connection. This imposed a gap in their social network that has been hesitantly filled by cyber interaction.<sup>74]</sup> Adolescents' usage of social media increases their brain connectivity in addition to the connections they make with their classmates.<sup>75]</sup>

### **BIOLOGICAL**

In every nation impacted by the economic closure, the pandemic has been growing and highlighting socioeconomic disparity. Due to parental fears and shortcomings, social isolation also resulted in higher rates of domestic violence, including child abuse or neglect.<sup>76]</sup> Along with remote learning, working from home, and endless housework, parenting during the epidemic presents extra challenges.<sup>77]</sup> Having children at home means paying a lot for everything from food to internet connection. Additionally, the internet frequently needs to be used by the entire family. This is considerably more difficult to handle for people who have limited financial resources or live in cramped housing.<sup>76]</sup> Adverse childhood events, such as trauma, can have long-term effects on brain development as well as promote mental and behavioural problems through neurochemical and physiological imbalance connected to neuroimmuno-endocrine regulation processes.<sup>78]</sup> In order to understand how individuals are handling the stress of the COVID-19 epidemic, it is important to examine this topic in great detail.<sup>79]</sup>

### **ENVIRONMENTAL**

In addition to proper cognitive development, children who spend a lot of time in nature also exhibit excellent health and physical development (such as the growth and improvement of locomotor skills), improved self-control (which reduces inappropriate in-class behaviours), and better communication and social development (more complex language) (multi-sensorial stimuli that raise curiosity and creativity).<sup>80]</sup>

The health of people can benefit from exposure to sunlight.<sup>81]</sup> Vitamin D production, which is involved in a number of physiological processes, requires adequate exposure to sunlight.<sup>82]</sup> However, inadequate sun exposure and low vitamin D levels may be the root causes of serious health problems and neuropsychiatric disorders like cardiovascular disease, metabolic syndrome, hypertension, multiple sclerosis, asthma, type 1 diabetes, autism, Alzheimer's disease, schizophrenia, and depression.<sup>81-85]</sup> Additionally, it has been shown that having higher serum levels of IL-6 as a child is linked to a higher chance of developing depression and psychosis as a young adult.<sup>86]</sup>

Therefore, since this protracted time of lockdown may potentially limit children's access to healthy sunlight exposure, we can see the significance of optimal sunlight exposure, particularly throughout childhood, in relation to mental health conditions.<sup>[76]</sup> Children are unfortunately not permitted to play outdoors or engage in unrestrained play because of quarantine. We are moving from "play-outside mode" to "play-indoor mode," which entails spending more time in front of a screen. Children (ages 4-8), preteens (9-12), and teenagers were studied to determine the detrimental effects of media and technology use (13-18). Increased screen time usage appears to be positively correlated with unhealthy eating, inactivity, overall bad health, as well as attention and physical issues.<sup>[87]</sup>

### CONCLUSION

Children and adolescents are exposed to stressful situations in the face of this pandemic scenario, such as the fear of contracting the illness, frustration, boredom, information overload, loss of family financial resources, and abrupt changes in daily activity patterns, which highlight the many dangers of COVID-19.<sup>[45]</sup>

All of these problems contribute to unforeseen future harms that might affect not just the health of one's own children but also the health care systems. In order to understand how individuals are handling the stress of the COVID-19 epidemic, it is important to examine this topic in great detail. We must ensure that families of children and adolescents receive the appropriate psychological support for their mental health. If there is existing emotional neglect, it is possible that it will be made worse by the work demands placed on parents and/or caregivers, as well as by societal injustices that may be connected to the global economic crisis and the layoffs of workers.<sup>[88]</sup>

The cumulative consequences of trauma can be quite harmful, and the damage may not even be apparent for a few years after the pandemic.<sup>[89]</sup> Additionally, it is commonly believed that social support is the presence of healthy relationships that foster a sense of belonging, foster trust, and promote self-care. Parenting has frequently been cited as the best tool for minimising negative effects on children's social, emotional, and behavioural development.<sup>[89]</sup>

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