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Burden of Anxiety and Electronic Screen Syndrome in children during COVID-19 quarantine

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Abstract---Background: Quarantine is a state of enforced isolation of people with exposure to a contagious disease to prevent the spread of illness. Quarantine and isolation have been used as disease containment measures more recently in COVID-19, in this review we aimed to present the impact of quarantine on mental health of children and adolescents, and proposes measures to improve psychological outcomes of isolation, Summary: Overall, this review suggests that quarantine is associated with far reaching and significant negative impact on psychological wellbeing of children and adolescents. Of more concern is the finding that this negative psychological effect can still be detected months or years later. Stigma has also been rife in children and families who underwent quarantine. As quarantine is essential to contain diseases in many cases, it is important that steps and measures are taken to make this experience less traumatic for vulnerable young people. These strategies may ensure that the physical and mental health impact of quarantine on children and adolescents are kept minimal. Further research to examine long term impact of quarantine and prolonged school closures on children are urgently needed to guide policies.

Keywords---Burden; Anxiety; Electronic Screen Syndrome; children; COVID-19; quarantine

Introduction

Anxiety in children

Epidemiology

Early childhood — especially the period between term birth and ~2 years of age — is increasingly recognized as being very important for establishing cognitive abilities and behaviors that last a lifetime (**Gilmore et al., 2018**).

Childhood psychiatric disorders are a public health concern due to their prevalence, early onset, and impact on children, families, and communities (**Merikangas et al., 2022**).

Epidemiological studies have shown that the estimated prevalence of psychiatric disorders in preadolescents is around 12%, reaching 15% during adolescence. Affecting between 15 and 20% of youth, anxiety disorders are among the most prevalent psychiatric conditions in children and adolescents. It represents the earliest of all forms of psychopathology (**Benarous et al., 2019**).

Overall, anxiety disorders are more prevalent in girls compared to boys, although it is noteworthy that sex differences are accentuated by development, with prevalence ratios reaching 2–3:1 by adolescence (**Shobeiri et al., 2022**).

Although the prevalence of psychiatric disorders in children and adolescents is quite homogeneous among different cultures, there are differences between developed and developing countries (**Wang et al., 2017**).

Onset& Course

Mostly due to the frequent, early emerging specific phobias, the onset of the first or any anxiety disorder is usually in childhood, and thus considerably earlier than the onset of depressive or substance use disorders (Fig. 1a). However, there is considerable heterogeneity in the onset of the specific anxiety disorders with GAD, agoraphobia, panic disorder, and obsessive-compulsive disorder (OCD) mostly emerging in adolescence (Fig. 1b) (**Lijster et al., 2017**).

In addition to adverse long-term psychopathological outcomes, child and adolescent anxiety disorders were linked with poor long-term functioning and general health as well as interpersonal, financial, and educational difficulties in addition to suicidality (**Bhatia and Goyal, 2018**).

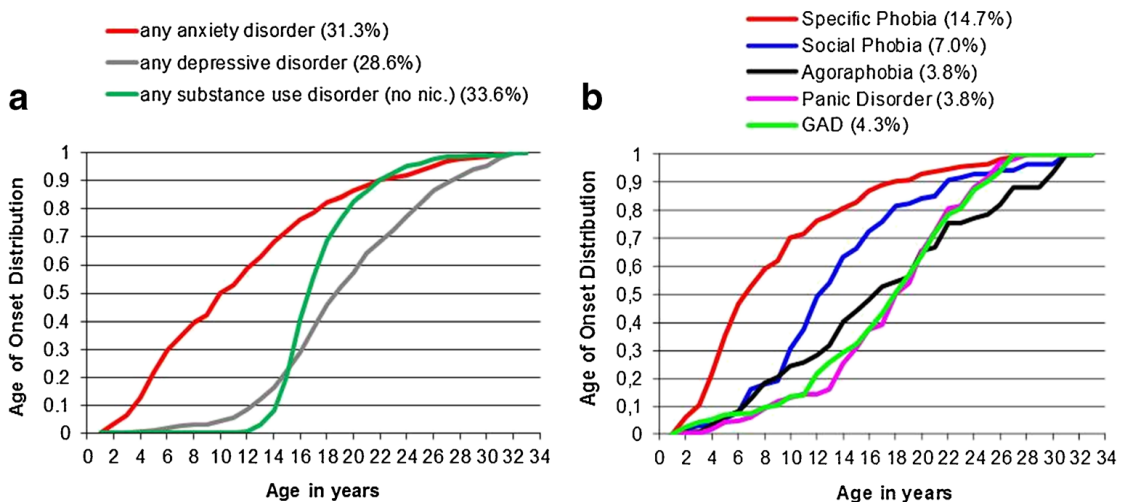


Figure 1: The age of onset distribution of (a) anxiety, depressive, and substance use disorders and (b) specific anxiety disorders (Beesdo et al., 2010).

Correlation between the serotonin in serum and in CSF and anxiety

Anxiety disorder is a group of mental disorders that include anxiety disorder, panic, phobia, obsessive and compulsive disorder, and post-traumatic stress syndrome. In addition to psychiatric symptoms, these disorders also cause physical symptoms (Goodwin et al., 2022).

Many diseases and is often part of complete body function assessments. Measurement of peripheral serotonergic parameters related to 5-hydroxytryptamine (5-HT, serotonin) such as whole blood serotonin, platelet serotonin transporters, and platelets inositol 1,4,5- trisphosphate (IP3) have been identified as clinical predictors of obsessive-compulsive disorder (OCD) (Bandelow et al., 2017).

Łoś and Waszkiewicz (2021) reported that a higher concentration of serotonin in whole blood was a factor that may predict better improvement in patients with OCD.

Maron and Nutt (2022) study found that 5-hydroxytryptamine (5-HT, also called serotonin)-related biomarkers have found decreased platelet 5-HT-reuptake-site binding in GAD patients, but unchanged 5-HT binding in lymphocytes as compared with controls.

Effect of anxiety on children health

Psychiatric disorders in childhood can negatively affect healthy development by interfering with children's ability to achieve social, emotional, cognitive, and academic milestones and to function in daily settings. In addition, mental disorders account for the largest area of aggregate medical spending among all health disorders that contribute to overall child health expenses (Melnyk, 2020).

Electronic Screen Syndrome

In 2012, Victoria L. Dunckley M.D. was the first to describe what is now called Electronic Screen Syndrome. She listed complaints that many parents can relate to: "He's revved up all the time.", "He can't focus at all and is totally defiant. Getting ready for school or bedtime is a daily nightmare."; "She's exhausted and has meltdowns even when she's slept enough.", "He flies into a rage over the slightest thing. They do, and a great many people--from parents to pundits--are wondering if this is bad for them or good for them. The answer is "it depends" **(Hall, 2020)**.

ESS can mimic virtually any mental health disorder; these symptoms markedly improve or resolve with strict removal of electronic media and may or may not recur when the media are re-introduced. Boys with ADHD and autism are particularly vulnerable **(Hall, 2020)**.

Students are facing very different experiences with home learning. School closure is almost certain to increase educational inequalities. In particular, many parents of both primary and secondary school students report struggling with supporting home learning **(Andrew et al., 2020)**.

Technology does not need rhythm. It does not need recovery. But if we try to ignore or do not care about our own need for life rhythm – after a while – we will not feel well. A brain that does not get enough sleep will end up shutting down. The consequences will be bad cognitive function, problems to concentrate and remember and, in the end, even depression **(Victorin, 2018)**.

Many young people have lifestyle or rhythm problems. They complain of extreme tiredness, anxiety, depression, problems to concentrate, bad school results, eating disorders and even self-destructive behavior. When they are asked about their daily life, this commonly reveals facts such as lack of sleep, irregular eating, to little exercise and long sedentary time in front of screens **(Weigle et al., 2021)**. Recent studies show dramatic changes in human behavior among school children, starting after the year of 2007. For example, (I) less hanging out with friends; (II) less interest for taking a driver's license; (III) less dating; (IV) more likely to feel lonely **(Twenge, 2017)**.

What happens after long screen-time is that the brain becomes overstimulated and 'worn out'. It gets a sensory and cognitive overload. Some of the effects of this are problems to concentrate, dysfunction at school and depression. This is what is called psychiatric unhealth **(Victorin, 2018)**.

Reports have also shown a clear correlation between psychiatric unhealth and bad school performance **(Yadav and Chakraborty, 2018)**.

Long-term human development is a dynamic process that is affected by a variety of biopsychosocial factors **(Laird et al., 2019)**.

Several studies have reported negative associations between language/cognitive development and excessive screen exposure during early childhood **(Kim and Chung, 2021)**

Previous study reported that a daily TV time of more than two hours was related to delays in language development in toddlers **(Domingues-Montanari, 2017)**.

Conversely, certain educational video programs may positively affect child development and school readiness. High quality and interactive screen time may facilitate language learning and social interaction **(Landry et al., 2017)**.

A previous literature review reported a suspected association between screen time and poor sleep outcomes and stimulated debate to assess the quality of evidence and quantify the magnitude of the potential relationship **(Orben and Przybylski, 2019)**.

The Coronavirus Disease 2019 (COVID-19)

The Coronavirus Disease 2019 (COVID-19) epidemic emerged in Wuhan, China, spread worldwide **(Qiu et al., 2020)**.

In January 2020 the World Health Organization (WHO) declared the outbreak of a new coronavirus disease, COVID-19, to be a Public Health Emergency of International Concern. WHO stated that there is a high risk of COVID-19 spreading to other countries around the world. In March 2020, WHO made the assessment that COVID-19 can be characterized as a pandemic. This pandemic has resulted in governments implementing disease containment measures such as school closures, social distancing, and home quarantine **(WHO, 2020 B)**.

Relations between the post COVID time and anxiety

COVID-19 has required many countries across the globe to implement early quarantine measures as the fundamental disease control tool **(Rubin and Wessely, 2020)**.

Previous outbreaks have reported that psychological impact of quarantine can vary from immediate effects, like irritability, fear of contracting and spreading infection to family members, anger, confusion, frustration, loneliness, denial, anxiety, depression, insomnia, despair, to extremes of consequences, including suicide **(Dubey et al., 2020)**.

During and following COVID-19 infection, patients are at increased risk for depression and anxiety **(Deng et al., 2021)**.

At approximately 1 month following infection, 31–38% of patients report depressive symptoms, 22–42% report anxiety symptoms, and 20% report obsessive-compulsive symptoms **(Mazza et al., 2020)**.

Rates vary depending on the population studied, methods used to evaluate symptoms, and how long after infection symptoms are assessed (**Nakamura et al., 2021**).

In the study by **Taquet et al. (2021)**, a new or recurrent anxiety disorder was documented in 12.8% and depressive disorder in 9.9%. Severe COVID-19 disease was associated with higher rates of these diagnoses, but all patients with COVID-19 had higher rates of psychiatric diagnoses when compared to controls.

Factors can be related to anxiety in children and it's correlation to COVID-19

Children aged 2 years are reported to be aware of the changes around them (**Dalton et al., 2019**). Uncertainties regarding pandemic itself, strict social distancing measures, widespread and prolonged school closures, parental stressors, and loss of loved ones are likely to affect children and adolescent's wellbeing in addition to specific psychological effects of quarantine and isolation (**Dalton et al., 2020**).

There are some geographical and temporal differences in the relative prevalence of various psychological problems in children. Most studies from Asia showed a higher prevalence of psychological morbidities as compared with other developed countries like Italy and Spain (**Orgilés et al., 2020**).

Aspects of Children's Life That are Changed During COVID 19 Quarantine *Psychiatric Issues*

Uncertainty of disease status, restrictions on mobility and daily activities, separation from loved ones, and boredom may contribute to negative effects of quarantine (**Brooks et al., 2020**).

Although children are vulnerable to environmental risks but statistics regarding psychological impact of home confinement, quarantine and isolation in children and adolescents are elusive and very few studies address this important aspect (**Pisano et al., 2020**).

Given the prolonged quarantine and isolation in COVID-19, likelihood of worse psychological outcomes in vulnerable populations including children and adolescents won't come as a surprise. As there is evidence that significant burden of mental illnesses originate in young age and adult life productivity is also deeply rooted in early years, close attention to mental health of young people in quarantine is warranted to avoid any long-term consequences (**Lu et al., 2018**).

Stigma

Infectious diseases, where quarantine is required, are likely to evoke social processes that stigmatize people affected by it (**Haas, 2021**).

Physical Health

Confinement during disease outbreak is likely to have negative effects on children's physical wellbeing and it has been documented in recent COVID-19 pandemic studies as well (**Orgilés et al., 2020**).

Parents in Italy and Spain during COVID-19 reported negative impact on physical health with less physical activity, and more screen time than usual among children (**Orgilés et al., 2020**).

Some previous reviews also emphasized loss of education, nutritional problems and social isolation leading to psychological harm as few of adverse effects of school closures. Besides, academics, school routines are important for children and they access many services including mental health support through schools.

Socialization

Social distancing measures like quarantine can worsen feelings of loneliness and isolation. Children and adolescents need to stay connected with family and friends, which gets difficult with school closures, limited visits with friends and families etc. Inability to activate your social network is noted to be associated with anxiety and distress (**Silva et al., 2021**).

Effects of COVID 19 Quarantine on Children

Quarantine and isolation are no doubt an unpleasant and distressing experience for all people who face it (**Brooks et al., 2020; Jiloha, 2020**).

Literature suggests significant psychological issues in quarantined individuals including anxiety, depression, sleep difficulties, anger and post-traumatic stress disorder in addition to suicide in adult (**Dragiotti, et al., 2022**).

Duration of quarantine, provision of inadequate information, boredom and frustration, fears about being infected, financial losses, and stigma were some of the factors identified with stress in quarantined population. Uncertainty of disease status, restrictions on mobility and daily activities, separation from loved ones, and boredom may contribute to negative effects of quarantine (**Brooks et al., 2020**).

The prevalence of depressive symptoms in any population during the first month of widely implemented quarantine due to COVID-19 is much higher than previous reports of the lifetime rate of depressive symptoms in this population (**Huang and Zhao, 2020**). The COVID-19 epidemic has caused serious threats to people's physical health and lives. It has also triggered a wide variety of psychological problems, such as panic disorder, anxiety and depression (**Qiu et al., 2020**).

Previous studies have shown mixed findings about the effects of some factors such as age on anxiety or depressive symptoms during the COVID-19 pandemic. One study reported that individuals between 18 and 30 years or above 60 years had the highest rates of psychological distress during the COVID-19 outbreaks (**Qiu et al., 2020**).

During the pandemic, prevalence of physically inactive students increased extensively, from 21.3% to 65.6%. Overall screen time increased considerably during the pandemic and screen time during leisure was also prolonged, indicating that nearly a quarter of students engaged in long screen time for leisure (**Xie et al., 2020**).

Effects of COVID 19 Quarantine on Children Electronics Usage

The COVID-19 pandemic as such has a definite adverse impact on the psychological profile of children, which is further aggravated by quarantine measures. One interesting aspect is that smartphones and social media, which were previously despised by most parents, have now become the only media for entertainment, information and education for children. Although many authors are favoring their use in mitigating the stress and depression of children, the parents need to have control over the judicious and reasonable use of electronic media and content of the programs their children are viewing (**Saxena and Saxena, 2020**).

During the pandemic, prevalence of physically inactive students increased extensively. Overall screen time increased considerably during the pandemic and screen time during leisure was also prolonged, indicating that nearly a quarter of students engaged in long screen time for leisure (**Xie et al., 2020**).

Children staying at home or closed places spend higher hours watching television or using digital media for entertainment purposes (**Király et al., 2020**). Recent empirical studies suggest a rapid increase in digital screen time in different populations during the COVID-19 pandemic (**Górnicka et al., 2020**).

The use of electronic devices is an essential component of a person's daily life and therefore a constant cause of concern due to an increased reliance (**Kamil et al., 2020**).

The requirement to complete their homework and take classes online for long hours looking at the screen with no option of going outside and perform extracurricular activities has led to an increase in the average screen time use (**Rubin and Wessely, 2020**).

Prevention and Interventions Strategies to Mitigate the Effects of COVID 19 Quarantine

Proposed Interventions and Components

Given the evidence of adverse psychosocial impact, effective measures need to be in place to mitigate the effects of home confinement on children and adolescents (**Clark et al., 2020**).

Immediate actions are warranted in various sectors (Figure 1) provide a framework for interventions to address psychological burden and stigma among quarantined children and adolescents (**Imran et al., 2020 A**).

Education

Education is one of the strongest predictors of the health of a nation and thus needs to be addressed on priority basis. With widespread and extended school closures around the globe, educational institutions need to be innovative and provide lessons and other services to students through alternate resources to minimize disruption in education (**Imran et al., 2020 A**).

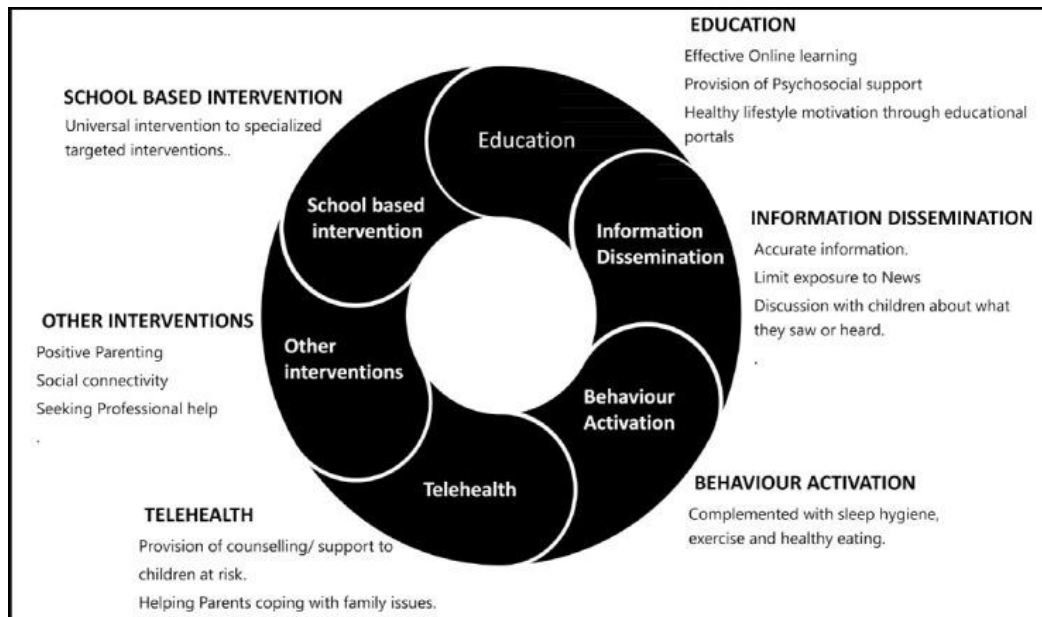


Figure 2: Interventions to reduce adverse psychosocial impact of quarantine in children and adolescents (**Imran, 2020 A**)

Information dissemination from media and other sources

It is a challenge to increase the sensitivity of media regarding reporting of events to reduce anxiety in the eye of lockdown and pandemics (**De Sousa et al., 2020**). It is important to acknowledge and validate children's thoughts, feelings and reactions in order to provide children with emotional scaffolding they need to thrive during quarantine (**De Sousa et al., 2020**).

It can be an appropriate culturally sensitive intervention to reduce the psychological impact of quarantine among children and adolescents, complemented with other approaches like lifestyle changes, counselling and family therapy (**Imran et al., 2020 A**).

Healthcare system response – Telehealth

Telehealth including telepsychiatry although an established modality in developed world is yet to gain momentum and popularity in low-and-middle income countries (LMIC). It can be used as an effective tool to provide counselling and

psychological support to children and adolescents at risk with prevailing higher social media use in youth **(Wang et al., 2020 B)**.

School-based strategies

Many children also experience severe illness themselves or in family or loss of loved ones during infectious diseases outbreak placing them at even higher risk of psychological distress. Schools offer a unique opportunity and a cost-effective way to reach out a large number of students **(Imran et al., 2020B)**.

Positive Parenting

Various guidelines by International organizations are available to help parents during quarantine. During this time of change and uncertainty, sticking to routines/ schedule as much as possible helps in reducing the psychological impact of quarantine **(Imran et al., 2020 A)**.

Seeking professional help

Families should be provided information to consult mental health professionals if child is too preoccupied with illness during quarantine or exhibiting signs of severe emotional disturbances **(Imran et al., 2020 A)**.

Role of Parents to Fight Anxiety during COVID 19 Quarantine

Guardians with higher education could probably offer more support to their children in several ways. An association has been found between parental education and parent-reported child mental health (for children aged 4 to 11 years old) **(Garcia de Avila et al., 2020)**.

Parents and other family members are encouraged to increase their communication with children to address their fears and concerns, play games, engage in physical activity, and use music therapy in the form of singing to reduce the worry, fear, and stress that children may feel **(Wang et al., 2020)**.

Parents' presence is important for children, and children need to feel safe within their families. If children lack emotion-focused conversations with their parents, it can lead to anxiety about the emotional state of their parents **(Pepperell et al., 2018)**.

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