Dean&Francis
ISSN 2959-6149

Influencing Factors of Anxiety and Depression in Adolescents

Xinyun Zhang[1, *]

[1] Faculty of Arts, University of British Columbia, Vancouver, V6T 1Z1, Canada
*Corresponding author: marsha04@student.ubc.ca

Abstract:

Adolescent clinical depression and anxiety are on the increase, and the worldwide society considers this a public health issue. These issues degrade academic performance, social abilities, and fundamental life skills as people grow. Not addressing these problems may affect their job, relationships, and satisfaction as an adult. Researchers rely on biological, psychological, and technological systems to solve these young people's many difficulties. One aim is to investigate whether these people have genetic features that indicate susceptibility and their families' mental health histories. Others investigate how the COVID-19 epidemic affected teenage mental health. Social media use analysis tools incorporate machine learning and longitudinal data collecting. Socio-ecological model of biological, predispositional anxiety and stress, and technology 'neuroscience' unconsciously cause teenage anxiety and depression. Although worrying is caused by genetic susceptibility and neurochemical imbalances, contextual variables including family dysfunction, academic overpressure, and pandemic problems are all causes. These difficulties include disruptive social media use and sleep-sustained don'ts of developmental and socially necessary digital invasive devices. The silent triad of genetics, life stress, and social media time combine to increase mental health risk, as expected. The findings indicate that anxiety and sadness are caused by several, interconnected variables. The best way to prevent and cure mental health issues in modern culture is via collaboration between schools, healthcare professionals, and families.

Keywords: Anxiety, depression, adolescents

1. Introduction

1.1 Prevalence and Significance

Teenage anxiety and depression have emerged as a significant concern in contemporary society. The numbers that researchers report appear concerning, providing valuable insights into the populations most severely affected. Bitsko and colleagues examined mental health monitoring data collected in the United States from 2013 through 2019 [1]. Their work reveals a consistent increase in anxiety and depression among young people, particularly within educational settings. Meanwhile, Kong and colleagues conducted comprehensive surveys across China and identified similar patterns [2]. They noted that specific age groups and gender demographics reported elevated symptom levels. Both studies indicate that this issue transcends national boundaries and manifests across various cultures. The findings suggest that improved support systems are necessary in schools and communities. Parents and teachers observe notable changes in mood and behavior among adolescents.

The significance of understanding this phenomenon becomes critical as anxiety and depression rates continue to climb among teenagers. These disorders are not uniform across all countries; the variations are important for identifying risk patterns. Teenage anxiety and sadness are caused by risk factors and new studies, as listed in this text. The report notes that "family conflicts, economic difficulties, and academic pressure" may cause adolescent mental health concerns and offers to discuss them. Besides issue diagnosis, the purpose is to suggest family and educational activities.

Youth mental health issues need multiple solutions. Youth are immersed in a life stream that is growing faster than society can provide health care. The terms "digital natives" is applied to many young people to capture the tremendous time they spend online and the mental pressure and social nets are exerting along the digital likings and capture of the new devices. All these add more pressure on mental health services and education. The families are burdened and the support the government is obliged to offer is increasing the overall the whole societies' health care outlays. There is also the cost of losing these people in terms of productivity and contribution to the whole society. It is more than reasonable to start looking for mental health problems through mobile devices and it is possible that the pressure of more than one hundred people at school can also be relieved. However, early spotting brings up private problems that a lot of countries still don't know how to handle. It's important to look closely at the pain that could have been avoided to see how many lives and resources "today's society" can save.

People have suggested giving good practices to educational institutions, hospital places, and community-based groups. Researchers can help teens all over the world improve their mental health by combining survey data with data-driven technology advances. Some people may question whether or not schools are ready to use the new strategies, but these worries can be eased by starting aggressive professional development programs. In the long run, similar tactics may help reduce the shame surrounding mental health and encourage conversation about it.

1.2 Research Objectives

Adolescent worry and sadness numbers are rising all the time, so it's important to understand ideas like these. In some countries, these disorders are more common than others, and knowing the differences is important for finding people who might be at risk. We are trying to find a few main reasons why teens and young adults experience anxiety and sadness by looking at the latest data and risk factors. As a way to add to the big conversation about youth mental health, the data shows a number of possible causes, such as family problems, financial problems, and stress at school. Aside from listing the issues, the goal is to also offer ways for schools or parents to fix them.

Working hard is important when dealing with the very difficult problem of teen mental health. Children's lives are full of activities that not even adults can understand. the term "digital natives" has come to refer to kids who spend most of their time on the internet, are constantly under pressure to get likes (auctores), and are instantly fascinated by even the most basic new gadgets. Failure to give these teens enough care when they are 15 years old leads to problems that last until they are 25 years old, which has been shown to cause huge social and economic problems for families and the country as a whole. Imagine less serious situations where early warning signs could be spotted, especially if this is related to phone apps used for mental health evaluation. Some find this many checks excessive, making privacy a major issue. Checking the problem of extended pain is a way to save money and valuable human life in the modern world.

The new study adds to what is already known and helps schools, health care workers, and support groups make better decisions about how to improve the mental health and wellness of teens. Using behavioral data and mental health technology together can help with figuring out how many teens are struggling with mental health issues in their neighborhoods. Some people may wonder about the extent to which schools have the resources and training to use these new techniques, but extensive training for teach-

ISSN 2959-6149

ers can be instrumental in overcoming these gaps. Adolescent mental health stigma and discourse on psychological wellbeing, even among the support networks, might be positively influenced through the integrated approaches outlined initiatives.

2. Biological and Psychosocial Risk Factors

Biological and mental health variables may predispose some to anxiety disorders. Genetics, hormones, and early brain development seldom contribute alone. Psychological pressures like persistent trauma or terror frequently combine with biology. Better neuroimaging technologies showing brain structure and function changes in anxiety-prone patients and longitudinal genetic predisposition and environmental interactions have also helped the authors understand.

2.1 Traditional Risk Factors

Probably the greatest of indicators is family history. The fact remains that an individual who has relatives with an anxiety disorder or other mood disorder has a higher likelihood of also being affected by such problems. However, it is not just genetics. The particular combination of these genetic susceptibilities with the events of personal life and temperament determines the risk.

In a study that examined data obtained through the Tracking Adolescents' Individual Lives Survey (TRAILS) longitudinal research, Sijtsema et al, found that factors of psychosocial and biological risks tend to interact with each other long-term, given genetic predispositions, temperament, and early life experiences, affecting the development of anxiety [3]. They followed teenagers into early childhood and even into early adulthood, and then examined how early childhood vulnerability patterns were established through the three main causal factors. Their findings emphasised the significance of hereditary aspects whereby specific gene types determine how neurotransmitters work and the fact that the environmental factors of temperament and early life experiences show a high contribution.

More precisely, the authors of the study discovered that the interplay between genetic predisposition and conditions of behavioral inhibition could be combined, which presupposes a higher degree of anxiety problems development in children. This risk was further increased by exposure to stressor events during childhood (e.g., family discord, abuse, etc.), which is a multi-level and complex mechanism. The longitudinal study was practical because it enabled the researcher to monitor how one factor impacted upon the other over a period of several years and to capture patterns and inter-relationships that would have not been possible even in a brief research paper.

2.2 Machine Learning Risk Identification

Lots of data is obtained using more traditional methods of research and these are very important, but it is likely that machine learning can play an interesting role in understanding the complex patterns of risk. Liu et al. used machine learning to discover risk factors of generalized anxiety disorder, and discovered new patterns of relationships between variables [4]. Therefore, the authors wanted to determine how important risk variables are in the context of generalized anxiety disorder (GAD) and how they are related to each other in individuals.

The machine learning algorithms found new patterns of interaction-the combinations of interactions that increased the risk of GAD in teens. Neuroticism (tendency to be pessimistic), pressure at school, and peer rejection were the combination of factors that dramatically increased risk for anxiety. Such findings suggest that risk is not a unidimensional construct, and that it is a series of elements that may contribute to or reduce the risk of anxiety. In order to do that, this research is extended to allow for more personalized risk analysis. Such complex relationships can help clinicians and researchers identify which teens are in need of early intervention.

3. COVID-19 Pandemic Impact

The COVID-19 pandemic was a tremendous international emergency because it has affected all aspects of daily life. While much has been mentioned about the health implications of the virus on physical well-being, less attention has been paid to its effects on mental well-being. The pandemic has created more depression, anxiety, and other psychological issues among the population around the globe.

3.1 Longitudinal Changes

Monitoring the mental health effects of the pandemic over time is one of the most valuable strategies for gaining insights into how the pandemic has affected people mentally. Barendse et al, offer an analysis of depression and anxiety symptoms in 12 samples pre-COVID-19 and during COVID-19, identifying increased symptoms due to the pandemic context and detecting vulnerable subgroups [5]. According to the study, symptoms of depression and anxiety showed moderate to large increases during the pandemic.

The most significant finding of this study is that it iden-

tifies particular subgroups that are more susceptible. Those who had underlying mental health conditions in adolescence and young adulthood, those belonging to economically underprivileged groups, and those who live in overcrowded or stressful conditions were affected by the symptoms to a greater extent.

3.2 Global Meta-analysis

Researchers have gathered data from nations and healthcare systems to understand the pandemic's mental health consequences. A meta-analysis by Racine et al. examined global health system data on COVID-19-related depression and anxiety [6]. This research collated worldwide information to show how mental health issues worsened.

They confirmed local reports that sadness and anxiety symptoms rose greatly during the epidemic. Many people reported increased discomfort following the epidemic in North America, Europe, and Asia. Lack of health treatment, social support, and cultural views about mental illness may explain the surge. Those differences likely affect how many seek help.

3.3 Gender Disparities

Though the pandemic affected all people, gender has been found to impact how mental health symptoms occurred and endured in notably different ways Wade et al, Mental health inequalities between carers in the context of COVID-19, which discusses cross-generational experiences and gender vulnerabilities in a sample of 2,500 people (65% female, aged 18-65). Their study found that women were much more likely than men to become anxious and depressed in response to lockdown measures - particularly those with to juggle work-from-home responsibilities with caring duties.

Women were more likely than men to run the gamut of the emotional and logistical challenges of the pandemic: being at the forefront of household chores, homeschooling children and caring for sick family members. These increased pressures were not shared equally in domestic responsibilities, and so the difference in stress and mental health widened further. Researchers also mentioned intergenerational implications - the mental health problems of primary caregivers are passed to children and other family members, creating a ripple effect of mental illness through family systems.

4. Influence of Social Media

In recent years, social media has taken a prominent role in young people's lives and overshadowed how young people communicate, socialise and identify themselves. While social media has many benefits such as connectivity and information sharing, there is an increasing amount of evidence that problematic use of social media is detrimental to adolescent mental health.

4.1 Problematic Social Media Use

The article from Thompson et al provides a systematic review of longitudinal studies that identified risk factors for problematic social media use and provided evidence of causal relationships to developing mental health problems. As they discuss in their review, the use of social media in an uncontrolled and constant manner is more likely to create feelings of loneliness, heightened anxiety, and decreased self-esteem.

Thompson et al, identified a series of predisposing factors towards problematic use, including lack of self-esteem, social discomfort, and cyber bullying [8]. These are prone to form a vicious circle: people with social withdrawal/ lack of self-esteem may use social media as a 'safe' alternative for validation; yet, overuse may ironically worsen the problem.

4.2 Social Media and Depression Link

Vitagliano et al. found a correlation between excessive social media usage and depression in early adolescence [9]. The research suggests that mood modulation and self-esteem may mediate the link, but other variables may also contribute. They observed a relationship between social media usage and depression, particularly in early adolescence when self-concept and emotional control are forming.

Vitagliano et al. examined how social media influences mood and self-esteem [9]. They found that adolescents who used social media more frequently had experienced elevated negative moods, unrealistic social comparisons, and compared themselves to idealized images and lives on the platforms. Such experiences might lower self-esteem and lead to depression. The study also found that social comparison processes significantly influenced internal self-evaluations and mood, which is essential for addressing mental health problems associated with identity development on social media.

Algorithm-driven social media platforms exacerbate adolescent mental health difficulties. By using advanced algorithms to determine a user's preferences for more specific content, such platforms strive to maximize individual participation. This can create echo chambers that reinforce vulnerable adolescents' negative thoughts or expose them to harmful material about self-harm, disordered eating, or other problematic behaviors. The tailored and never-ending stream of content may also distort reality and make

ISSN 2959-6149

adolescents think everyone lives a perfect life, while they are the only ones facing developmental challenges.

Limitless scrolling, push alerts, and intermittent incentives of likes and comments in social networking applications may lead to addiction that disrupts sleep, education, and sociability. Social isolation and FOMO may be daunting for teenagers who are still establishing their identity and social abilities.

5. Advanced Analytics and Integration of Social Determinants

Big data and advanced analytics have recently gained popularity in the field as a means of improving the understanding, prediction, and management of adolescent mental health issues, as they are compounded by existing social, economic, and environmental conditions in association with personal predispositions.

5.1 Machine Learning and Real-World Data

Deng et al, demonstrate how the application of real-world data and integration of social determinants frameworks help identify adolescent depression and anxiety, showcasing big data analytics for early identification [10]. They accomplish this by gathering disparate data sources (electronic health records, social media activity, and socioeconomic data) and using advanced algorithms to identify patterns that can indicate possible developing mental conditions. Big data analytics may enable proactive mental health treatments for teenagers, as shown in this research.

Real-time analysis of diverse and complex data streams is Deng et al.'s main advantage [10]. They demonstrated that machine learning algorithms could detect high-risk teens for sadness and anxiety before clinical symptoms manifested. Early detection is crucial for treatment and prevention. Deng showed that lower academic achievement, social media use, and healthcare use for physical issues substantially predicted sadness and anxiety.

5.2 Social Determinants Integration

Deng et al.'s models stress the impact of social determinants—broader social, economic, and environmental factors—in adolescent health, such as mental health, to supplement individual data points [10]. Social concerns might worsen or shield cognitive deficits. Positive family and local relationships may boost psychological resiliency. They protect against mental diseases, but poverty and violence increase risk.

Adding these more broad social elements to analytical models will complete the mapping of teenage mental health determinants and help therapists develop more precise therapies. The framework shows how individual vulnerabilities and environmental factors including social and financial stability, neighborhood safety, family stability, and community resources affect mental health.

6. Discussion and Future Directions

6.1 Convergent Themes

A synthesis of the vast literature on adolescent anxiety and depression across biological, psychological, social, and technological domains suggests that these complex mental health issues often develop through related pathways involving biological dispositions, genetic temperaments, and social and technological influences.

Adolescent mental health is seldom caused by one issue, as these themes show. It's the result of several inspirations from different areas. Common paths suggest the need for a comprehensive strategy, thus they must be recognized. These connected effects cause specific issues, but when evaluated in context, they enable wider preventative and treatment strategies.

6.2 Prevention and Intervention Implications

Understanding the causes of teenage anxiety and depression may aid prevention and holistic therapy. Genetic, psychological, or social marker identification of at-risk adolescents enables them to obtain care before problems occur. Internet safety, resilience, and social connection may be taught in prevention initiatives. Schools, families, and doctors must promote mental wellness.

Treatment may improve with tech. Data-driven systems can monitor mental health symptoms and risk factors to address symptom worsening early for individualized therapy. More holistic strategies that combine psychological therapy, social support, and technology are more likely to succeed.

Implementing school-based mental health initiatives is another important solution. School is a natural place to reach many adolescents and promote mental health. Direct delivery of evidence-based emotional control skill training, stress mitigation, and healthy coping style programs has reduced anxiety and depression. Multi-stakeholder investment programs that involve teachers, parents, and peers build a support network for vulnerable adolescents and are most successful.

Healthcare systems are crucial for managing teenage mental health disorders. Integrating mental health screenings into regular childhood care could help identify and treat mental health disorders early. Training primary care professionals to recognize anxiety and depression symp-

toms and providing referral options will be invaluable. Additionally, accessible, culturally sensitive, and developmentally sensitive adolescent mental health care should be created to meet their unique requirements.

6.3 Future Research Priorities

Despite tremendous progress, there are still gaps in studies on long-term effects, intervention efficacy, and technology's involvement in teenagers' mental health. Learning the long-term impact of early childhood interventions on adult mental health is crucial. To verify their practicality, new technologies should be evaluated to reduce symptoms and boost resilience.

Other priorities include studying prevention programs in different populations, finding the best match between digital mental health tools and traditional therapeutic practices, and determining how new technologies may contribute to and solve adolescent mental health issues.

Adolescent mental health research and therapy must also prioritize health equality and culture. Existing knowledge is mainly based on Western and developed world research; hence, its applicability is limited. In future studies, culturally sensitive research designs should consider immigration status, racial and ethnic identity, socioeconomic background, cultural values regarding mental health outcomes, and treatment preferences.

The long-term effects of digital technology on teens' mental health and brain development are the second important link that needs more research. Researchers can see how early and strong exposure to technology changes cognitive, emotional, and social functioning over time as the first group of real digital natives grows up. A long-term view will help make technology use suggestions based on facts and personalized mental health treatments.

7. Conclusion

The research shows that a complicated relationship between biological sensitivity, psychological factors, and modern technology factors causes anxiety and sadness in teens. These results seem important because they show how tangled risk factors may rise when genetic weaknesses meet outside stressors, the Covid-19 pandemic, and unhealthy social-media habits. Machine-learning technologies may identify high-risk youth before symptoms manifest, allowing for early intervention.

The efforts to combat drug use should include school initiatives, family assistance, and technology monitoring. Prioritize mental health treatment that respects culture and progress in the health system. Long-term research on digital natives is limited, and cross-cultural checks are necessary to provide evidence-based solutions for this public health concern. Privacy supporters and critics could say that worries about data security could stop technology tracking systems from being used.

References

[1] Bitsko, R. H., Claussen, A. H., Lichstein, J., Black, L. I., Jones, S. E., Danielson, M. L., Hoenig, J. M., Davis, J. S. P., Brody, D. J., Gyawali, S., Maenner, M. J., Warner, M., Holland, K. M., Perou, R., Crosby, A. E., Blumberg, S. J., Avenevoli, S., & Kaminski, J. W. (2024). Mental health surveillance among children—United States, 2013–2019. MMWR Supplements, 71(2), 1–42.

[2] Kong, X. W., Yang, W., Xu, S., Yang, C., Kang, L., Qiu, L., & Liu, J. (2023). Analysis of the prevalence and influencing factors of anxiety and depression in the Chinese population: A cross-sectional survey. Heliyon, 9(5).

[3] Sijtsema, J. J., Veenstra, R., Creemers, D. H., Popma, A., Beeck, H. V., Franken, I. H., & Oldehinkel, A. J. (2021). Psychosocial and biological risk factors of anxiety disorders in adolescents: A TRAILS report. European Child & Adolescent Psychiatry, 30(12), 1969–1982.

[4] Liu, Y., Chen, C., Wang, H., Li, W., & Zhang, K. (2024). Key risk factors of generalized anxiety disorder in adolescents: Machine learning study. Frontiers in Public Health, 12, 1504739.

[5] Barendse, M. E. A., Flournoy, J. C., Casey, B. J., Chen, C., Larsen, B., Luna, B., & Yung-Ting, D. (2023). Longitudinal change in adolescent depression and anxiety symptoms from before to during the COVID-19 pandemic: A collaboration of 12 samples. Developmental Psychology, 59(4), 623–641.

[6] Racine, N., McArthur, B. A., Cooke, J. E., Eirich, R., Zhu, J., & Madigan, S. (2021). Global prevalence of depressive and anxiety symptoms in children and adolescents during COVID-19: A meta-analysis. JAMA Pediatrics, 175(11), 1142–1150.

[7] Wade, M., Prime, H., Johnson, D., May, S. S., Jenkins, J. M., & Browne, D. T. (2021). The disparate impact of COVID-19 on the mental health of female and male caregivers. Social Science & Medicine, 275, 113801.

[8] Thompson, R. S., Peterson, J. S., Martin, M. J., & Rogers, J. (2025). Risk factors for problematic social media use in youth: A systematic review of longitudinal studies. Adolescent Research Review, 10(2), 215–234.

[9] Vitagliano, E. M., Engel, N. R., & Thompson, R. (2025). Social media use and depressive symptoms during early adolescence. JAMA Network Open, 8(5), e2411544.

[10] Deng, X. Z., Ma, S., Song, S., Wang, R., Chen, L., & Liu, Z. (2025). Identifying adolescent depression and anxiety through real-world data and social determinants of health: Machine learning model development and validation. JMIR Mental Health, 12, e66665.