

Examining the Impacts on Adolescents Post COVID-19 Pandemic: A Literature Review

Laurel Kessinger

The University of Georgia

HPRB 5010 | Dr. Proctor

April 2023

Table of Contents

Research Question.....3

INTRODUCTION.....3

Theory.....5

METHODS.....7

RESULTS.....10

Individual Level Factors10

Demographic Associations.....10

Psychosocial Factors12

Interpersonal Level Factors15

Organizational Level Factors.....16

Policy Level Factors17

DISCUSSION.....19

Limitations.....19

CONCLUSION.....20

Implications of Research.....20

REFERENCES.....22

Research Question

What are the risk factors that have influenced mental health outcomes in adolescents as a result of the COVID-19 pandemic from the socioecological perspective?

INTRODUCTION

All societies throughout human history have recognized and defined the transition from childhood to adulthood as one of the most profound times in an individual's life. This period occurs from ages 10-19 and is characterized by the initiation of biological changes, known as puberty, and the culmination of significant physiological and neurobiological maturation (American Psychological Association, 2017). Adolescence is a vital time of growth when youth begin to rely more on peer connections for social support and development. The transition into adulthood is accompanied by rapid changes in the brain and body, self-exploration, and increased independence. However, these sudden changes can create challenges and stress for this demographic. As youth undergo cognitive development, neurons increase in length and interconnectedness among other neurons causing a more complex way of thinking compared to childhood (Office of Juvenile Justice and Delinquency Prevention, 2017). The frontal lobe of the brain controls executive functions, the perception of consequences and impulse control, and develops at differing rates within adolescents (Office of Juvenile Justice and Delinquency Prevention, 2017). Later developments to the frontal lobe may lead to poor judgment, increased engagement in risky behaviors, and mood swings. In a psychosocial context, enhanced development of abstract reasoning during adolescence is accompanied by increased awareness of oneself and how they perceive themselves as different from family, friends, and other peers (Office of Juvenile Justice and Delinquency Prevention, 2017). This in conjunction with adolescents maturing both mentally and physically at different rates may cause difficulties

Mental Health of Adolescents Post Pandemic

surrounding self-esteem to simultaneously occur. Low self-esteem during adolescence is linked to poorer academic performance, increased risk of developing anxiety and depressive symptoms, suicidal ideation and disordered eating (Masselink et al., 2018).

Disruptions to an adolescent's typical environment greatly influence their physical development and mental health. Therefore, when the COVID-19 virus became a global pandemic in early 2020 many medical and public health professionals resorted to the ideology that "time will tell what the future holds" for children and adolescents who lived through the pandemic (World Health Organization, 2020). Some individuals may become more resilient as a result of a stressful life event, while others will develop psychopathologies, such as anxiety or depression (Kalia et al., 2020). COVID-19 is currently being studied as to whether it may be considered an early life adversity (ELA), which is characterized as environmental exposures that increase the likelihood of significant alterations to adolescents psychologically, behaviorally, or neurobiologically (Holuka et al., 2020). ELAs are correlated with a myriad of adverse health outcomes later in life, including increased risk for mental illness and chronic disease, as well as a lowered life expectancy (Kalia et al., 2020).

Governmental lockdowns and restrictions enacted to slow down the spread of the COVID-19 virus will continue to have lasting effects on the mental health of American youth (Magson et al., 2021). The American Psychological Association defines the period of adolescence being marked by increased focus on peer-related activities and social acceptance while simultaneously pursuing greater independence and autonomy from parents and other family members (American Psychological Association, 2017). Lockdowns thus inherently inhibited these fundamental principles of adolescence as restaurants, shops, grocery stores, recreational centers, and most notably schools began to close. Although some adolescents were

Mental Health of Adolescents Post Pandemic

unable to grasp the magnitude of the societal constraints caused by the pandemic, they still reported increased feelings of uncertainty over the future, fear for themselves and or loved ones contracting the disease, and isolation from peers and society (Singh et al., 2020). Due to differing population densities, cultural norms, and overall political divisiveness within the United States, various regions implemented and adhered to diverging lockdown measures (Brooks et al., 2020). States with longer quarantines were more likely to be associated with higher rates of adverse psychological outcomes, such as anxiety or depression (Brooks et al., 2020). States with officials that followed the initial quarantine recommendations may be seen as a protective factor for some because studies have found that for people already in quarantine, extensions of isolation periods correlate to heightened frustration or demoralization (Brooks et al., 2020). School closures for prolonged periods of time typically result in disrupted engagement in academic and extracurricular activities. This has led to many American adolescents seeking more attention from their parents and becoming more dependent on them, displaying a relationship that is contrary to typical teenage years (Singh et al., 2020). This development is associated with resistance to going back to school and continual engagement with learning as well as increased difficulties fostering relationships with mentors and peers (Singh et al., 2020). This has great potential to have long standing psychological impacts to adolescence throughout their lifespans.

Theory

The socioecological model is a strategic and useful framework for understanding how the definition of health, including physical, mental, and social well-being, is impacted by interactions within individuals, between individuals, amongst communities, and by the physical and political environments in which individuals live and grow (Centers for Disease Control and Prevention, 2015). The socioecological approach was developed in the 1970s by Bronfenbrenner

Mental Health of Adolescents Post Pandemic

to better understand the impacts of changing environments on human development throughout their lifespans (Bronfenbrenner et al., 1977). Approximately a decade later McLeroy ameliorated and tailored this method so it could be used as a framework for health promotion and behavioral change (McLeroy et al., 1988).

The first level of this approach includes personal temperaments which include age, education, income, and the health history of individuals. The next level is known as the intrapersonal level which includes people who individuals tend to interact with the most and typically includes family, friends, and partners because they exert a great influence over the health behaviors of individuals. The third level deals with organizational factors which pertain to social relationships within communities, school settings, and other structures within the neighborhood. Lastly, policy level factors encompass the societal factors that impact an individual's health status which may include social and economic policies as well as cultural norms (Centers for Disease Control and Prevention, 2015). This model serves as a framework for illustrating how many complex factors play a role and interact with each other to affect the overall health status of individuals and populations.

The socioecological model was chosen for this literature review to adequately identify the individual level factors (ex. gender differences, stress response and coping skills, and substance use and abuse), interpersonal factors (ex. family dynamics, family income, peers), organizational/institutional factors (ex. school settings, ability to play sports), and policy factors (ex. access to mental health services) that may serve as a risk or protective factor regarding adolescent mental health (Yuhua et al., 2020).

METHODS

An extensive literature search was conducted through PubMed, Web of Science, PsycINFO, and UGA Galileo-Libraries for peer-reviewed articles that sought to identify the various individual, interpersonal, organizational and policy level factors that have impacted the mental health of adolescents post-COVID-19. Since this literature seeks to evaluate the mental health of youth, most articles only pertain to children aged 10-19. However, a few studies contained older subjects as the goal of this research was to analyze the myriad of entities that play into this phenomenon. Children aged 10-19 might not fully comprehend societal implications caused by the pandemic, so studies containing data from parents, guardians, teachers, and counselors about how they view the mental health impacts on adolescents was compiled to provide greater insight into the phenomena occurring. A total of 20 articles were collected for further analysis within this review.

Inclusionary and Exclusionary Data

All obtained articles had to be published within the past three years (beginning of the spread of the disease), with a focus on adolescents (10-19) in the United States, and factors relating to four levels of the model. Data from other countries was excluded because of the contrasting cultural norms and differences in how countries perceived and handled COVID-19. It was also a requirement that all articles be peer-reviewed. This excludes any articles classified as a literature review, meta-analysis, and systematic review.

PubMed

PubMed was chosen due to the vast and reliable searches that the database yields relating to biological and life sciences. Two searches were conducted that found four articles sufficient for this review. The initial search words were composed of “(mental health) AND (covid 19 or

Mental Health of Adolescents Post Pandemic

pandemic) AND (adolescents) AND (United States).” The inclusionary and exclusionary conditions were then applied, as well as including only ‘clinical trials’ as the article type. A total of 11 results were populated. A review of abstracts was then conducted to ensure each article dealt with adolescents in the United States and could be evaluated in agreement with the socio-ecological perspective. The second search from this database included “(mental health or anxiety or depression) AND (covid 19 or pandemic) AND (school children) AND (United States).” “Anxiety” and “depression” were added within mental health parameters to include more potential data. “Adolescents” was swapped out for “school children” to assess whether there was a difference in the amount and quality of sources generated relating to this realm of knowledge. The same process of applying inclusionary and exclusionary data as well as a brief review of abstracts was conducted. A total of 16 results were generated. With both searches combined, a total of 27 results were generated and the final number of articles obtained for this review was four.

Web of Science

Web of Science was chosen primarily because of the easy-to-use common search language, the framework of data displayed, and because the utilization of articles from more scientific fields (not just biological and life sciences) which may further help examine the research question at hand. The search terms included the same words used from the first database; however, synonyms were added to the terms so that more results could be generated with information that may have been previously skipped over. The following keywords were applied, “(covid-19 OR pandemic OR coronavirus) AND (United States) AND (mental health or anxiety or depression) AND (adolescence or teens or youth) AND (risk factors).” Including multiple phrases surrounding the COVID-19 disease as well as adolescence enabled for an

Mental Health of Adolescents Post Pandemic

improved evaluation of yielded results. After the inclusionary and exclusionary data were applied, 58 results were generated. A brief assessment of abstracts led to seven articles being chosen for further analysis in this review.

PsycINFO

PsycINFO was utilized due to its large resources in peer-reviewed literature pertaining to mental health and behavioral sciences. Again, an increased number of keywords relating to the original search was included so that more research was made available. Words searched were “(mental health or anxiety or depression or stress or loneliness) AND (adolescents) AND (covid-19 or coronavirus or pandemic) AND (united states or America or USA or U.S).” After the initial inclusionary and exclusionary data were applied, 258 results were yielded. The search was then limited to only the years 2022-2023 and included only articles from academic journals so the number of results would be minimized and intended to provide more updated information. This led to 110 generated results that were then skimmed by abstracts to obtain four articles from this database.

UGA Galileo- Libraries

The UGA Galileo-Libraries database was used due to its ability to cross search various fields of study throughout many databases so the likelihood of missing potentially insightful data within the previous three databases searches could be mitigated. One search was conducted using the same keywords from PsycINFO, however the word ‘post’ and ‘after’ were added in front of each of the keywords relating to COVID-19 so that results would contain data from more recent time periods throughout the pandemic. Additionally, only studies that are peer-reviewed, found in scholarly journals, and published in 2022-2023 were accepted for further evaluation. This led to 44 yielded studies which then were browsed by abstracts to gather five sources for this review.

RESULTS

Individual Factors

Upon conducting a comprehensive analysis of the obtained research, it was most logical to divide the individual level factors of the socioecological model into two further distinctions: demographic associations and psychosocial factors so that individual nonmodifiable and modifiable associations could be separately evaluated.

i. Demographic Associations

The COVID-19 pandemic had a contrasting impact on mental health of adolescents' boys versus girls, as well as diverging effects amongst younger and older cohorts of both genders. Stress levels gradually increased each month throughout the pandemic, which can be determined by elevated levels of the cortisol hormone found in hair strands of adolescents (Fung et al., 2022). Although levels differed on an individual basis, greater time in quarantine had a significant effect on increasing cortisol levels for both male and female adolescents (Fung et al., 2022). Girls, however, were more likely to worry about the pandemic as well as feel more nervous, anxious, depressed, lonely, and worried about the pandemic's financial impact (Temple et al., 2022). On average, girls reported increased depressive and anxious symptoms in the months following the pandemic (Silk et al., 2022). This may be attributed to disruptions to a regular schedule, the loss of space and privacy, and difficulties switching to online learning (Silk et al., 2022). Thus indicating that interruptions to everyday lives influenced the mental health status of adolescent girl's post-pandemic. However, girls were also more likely to use strategies to cope with stress (Temple et al., 2022). Youth girls also expressed that they had more free time to relax and enjoy activities they felt was time constrained prior to the pandemic. Some common activities included art projects, exercising, household chores, sleeping, and spending more time

Mental Health of Adolescents Post Pandemic

with family, which are all seen as protective factors for adolescent emotion and physical well-being (Silk et al., 2022). Male adolescents that reported worsened moods throughout the pandemic also reported higher rates of social isolation, disruptions to everyday routines, and impacts related to poorer mental health status (Tetreault et al., 2021). Researchers have hypothesized this phenomenon may be due a decrease in after school extracurricular activities which were the norm prior to the pandemic (Tetreault et al., 2021). More females than males felt anxious returning to in-person learning when schools opened back up (Yin et. al, 2022). Females also reported higher rates of fear of contracting COVID-19, anxiety towards social interactions, and schoolwork. However, by September 2021, 51% of female students and 44% of male students reported less anxiety about school compared to April 2021 (Yin et. al, 2022). This may demonstrate that as time endures anxieties relating to school will likely continue to decrease. Older adolescent males and males with a history of depression were more likely to indicate perceived worsened moods and increased feelings of anxiety associated with lowered feelings of closeness to friends (Tetreault et al., 2021). Some studies found that adolescent males with higher socioeconomic status reported increased rates of perceived worsened moods and anxiety symptoms (Tetreault et al., 2021). When comparing high school underclassmen (9th-10th grade) with upperclassmen (11th-12th grade), students in older grades expressed more worry about financial impacts and felt less safe from COVID-19 in indoor public spaces (Temple et al., 2022). However, underclassmen students reported higher feelings of anxiousness, depression/hopelessness, and stress compared to older grades (Temple et al., 2022). This concedes that youth individuals who were younger when the pandemic began may have been hit harder regarding mental health than older adolescents. This may be due to older adolescents already

Mental Health of Adolescents Post Pandemic

having formed better coping strategies when faced with stress and or already having formed better study habits that transferred over to online schooling.

Black, Hispanic, and other minority adolescent students living in rural areas were more likely to report feelings of extreme worry about the pandemic about the health of themselves and others as well as higher feelings of being unsafe out in public compared to white students in rural areas (Gazmararian et al., 2021). This may be attributed to the general mistrust of science and medicine relating to historical mistreatment of Black populations (i.e. Tuskegee Study), which was seen to decrease the trustworthiness of media covering COVID-19 by particular groups (Kenworthy et al., 2022).

A bidirectional association was found between sleep and socioemotional experiences while experiencing an ongoing stressor, indicating that adverse effects of one condition negatively impact the other and vice-versa (Palmer et al., 2022). Poorer sleep quality, difficulties falling asleep, and nightmares typically induced higher negative effects, loneliness, and post-traumatic stress the following day. Simultaneously, increased negative effects, loneliness, and post-traumatic stress throughout the day predicted difficulties falling asleep, nightmares, and overall poorer sleep quality the same night, displaying a continual cycle (Palmer et al., 2022). Rapid eye movement (REM) sleep deems that neurons activated in stressful events throughout the day may be reactivated during sleep and may influence memory consolidation (Palmer et al., 2022). The repetition of consolidating adverse events into memory is related to decreased emotional importance of that event, thus displaying its potential unfavorable effects on adolescent mental health (Palmer et al., 2022).

ii. Psychosocial Factors

Mental Health of Adolescents Post Pandemic

Psychosocial factors are psychological and or social conditions that may impact the physical or mental health of individuals. Perceived stress impacts the coping skills and engagement of substance use across both male and female adolescents of older and younger cohorts. With one-third of adolescents reporting that they felt extremely or very worried about the financial strains as a result of the pandemic on their family, it is essential to delve into the associated coping strategies of American youth (Temple et al., 2022). Adolescents reported various adaptive mechanisms as a response to stress. In fact, 50-70% of adolescents reported listening to music, watching tv or a movie, sleeping and using social media more than pre-pandemic times. (Temple et al., 2022). Also, 76% engaged in screen-based entertainment and used social media platforms more so than before (Silk et al., 2022). Youth that engaged in social distancing as a result of fear of getting sick or avoidance of judgment reported greater ratings of anxiety compared to other reasons for social distancing engagement (Oosterhoff et al., 2020).

Decreased social interactions enabled fewer adolescents to obtain substances causing rates of use and misuse to fall during quarantine, however these rates now remain steady with pre-pandemic times (Pelham et al., 2021). Adolescents with more reports of internalizing symptoms (social withdrawal tendencies, anxiety and depressive symptoms) versus externalizing problems (poor impulse control, aggression) were more likely to engage in substance use (Pelham et al., 2021). This reveals that adolescents experiencing more problems associated with mental health were more likely to participate in substance use and or misuse. Youth who communicated higher levels of extreme stress were 2.37 times more likely to engage in substance use behaviors compared to those who indicated lighter loads of stress (Pelham et al., 2021). One study found that only 8% of participants indicated they engaged in substance use of any kind over the previous 30 days. However, among those that reported use of any substance, 72% indicated a

Mental Health of Adolescents Post Pandemic

minimum of one to two days of the use of any substance. The greatest reports of substance use were attributed to uncertainty about the future (Pelham et al., 2021).

Youth with psychiatric disorders prior to the pandemic reported worsened psychiatric symptoms 10 months after the onset of the pandemic (Doyle et al., 2022). Individuals who showed worsening symptoms of impulsivity and inattention reported minimal changes in hopelessness and despair. However, individuals that displayed increased symptoms of depression also reported increased feelings of hopelessness, despair, and social withdrawal with little changes in hyperactivity/ impulsivity (Doyle et al., 2022). These findings indicate that American youth who meet the criteria for ADHD likely saw worsened behaviors of impulsivity and inattention, yet symptoms of depression did not change (Doyle et al., 2022). However, an antagonistic relationship is simultaneously occurring. American youth that are more likely to experience depressive symptoms likely saw worsened feelings of hopelessness, despair, and social withdrawal, yet not decreased impulsivity and inattention (Doyle et al., 2022). When comparing suicide ideation and attempted suicides in the same months in 2019 and 2020, respectively, there was a 1.6 times higher odds ratio for suicide ideation and 1.77 higher odds ratio for suicide attempts (Hill et al., 2020).

Adolescents with Anorexia Nervosa (AN), which affects females at disproportionate rates, were at a greater risk for engagement in compulsive exercise behaviors (Datta et al., 2023). This caused expected body weights of adolescent females with AN to be lower than prior to the pandemic (Datta et al., 2023). They were also more likely to undertake compensatory behaviors including dietary restrictions and feelings of guilt with eating, which likely negatively influences their mental health well-being (Datta et al., 2023). Reasons for increases in eating disorder (ED)

symptomatology can likely be attributed to attempts to cope with stress due to feelings of anxiety and depression associated with the pandemic (Datta et al., 2023).

Interpersonal Factors

Varying family dynamics, income, parental education, and parental responses to the pandemic served on a continuum of protective to risk factors that may influence mental health status of American youth. Regarding family dynamics, individuals who spent more time with their family reported greater positive impacts to their well-being (Silk et al., 2022). Adolescents whose parents were unmarried or with a lower educational status were more likely to engage in a form of substance use (Pelham et al., 2021). It is reported that youth in families that incurred a loss of income due to the pandemic were 23% more likely to use substances (Pelham et al., 2021). Students that qualified for Free Reduced Lunches (FRL) saw increased rates of worry for themselves, family members, and the financial impact of COVID-19 on the family's overall well-being compared to students that were not eligible for FRL (Temple et al., 2022). Overall, families experiencing financial constraints prior to and throughout the pandemic saw greater impacts to their adolescent's psychological well-being.

The mental health of parents is tied to the mental health of their children. Parents with a lower educational status as well as parents experiencing high amounts of coparenting conflict saw the greatest rates of depression (Feinberg et al., 2022). Uncertainties and intense feelings of overwhelmingness presumably impacted perceived parenting quality amongst many American families. Middle-income parents, which represents half of the country, saw a more pronounced decline in parenting quality when compared to their upper and lower-income counterparts (Feinberg et al., 2022). This mentality undoubtedly spread throughout hundreds of millions of homes across America, thus impacting adolescents along the way. Mothers reported more

Mental Health of Adolescents Post Pandemic

pronounced increases in depression compared to fathers (Feinberg et al., 2022). This may be due to increased caregiving responsibilities and undoubtedly impacts the well-being of their children. Parents that engaged in alcohol, cannabis, or nicotine throughout the pandemic had children that were more likely to also engage in substance use, with the most notable effects being alcohol use (Pelham et al., 2021).

Organizational Factors

Containment policies implemented throughout the pandemic include school closures, social distancing, and restrictions on in-person pursuits. However, when supplemental supportive services were administered to these policies, COVID-19 related stress and worry among adolescents still lingered (Xiao et al., 2023). Studies have shown that 65% of teenage girls reported engaging in only two hours of schoolwork each day which they indicated had negative impacts to their stress concerning their academic future (Silk et al., 2022). This demonstrates the immediate burdens of the rapid organizational changes in school structure and that ingrained achievement related pressures in society play a large role in academic stress levels (Silk et al., 2022). Student disorientation resulting from the lack of regular schedules coincided with same day increases in both anxiety and depressive symptoms while also experiencing declines in perceived positive impacts with increases in perceived negative effects (Silk et al., 2022). This shows that irregular schedules in the lives of adolescents does not only correlate with higher rates of anxiety and depression, but also that adolescents display worsened perceptions of well-being. Perceived teacher support acted as a buffer against self-isolation throughout the pandemic and its associated negative mental health outcomes (Wright & Wachs, 2022). This knowledge demonstrates the pertinence of teacher support in mitigating emotional distress and their potential role as a coping mechanism for adolescent stress (Wright & Wachs, 2022).

Mental Health of Adolescents Post Pandemic

Belonging to a middle or high school sports team enhances the sense of belonging as well as promotes physical activity, which both serve as protective factors for adolescent depression (McGuine et al., 2022). When comparing students who attended schools that did and did not provide Fall sports in 2020, those that did not play on any high school sports team experienced higher scores on the GAD-7 (self-reported Generalized Anxiety Disorder questionnaire with seven items evaluating an individual's anxiety status over the past two weeks) as well as depressive symptoms on the PHQ-9 questionnaire (self-reported Patient Health Questionnaire with 9 items evaluating an individual's degree of depression) (McGuine et al., 2022). This directly demonstrates the benefits of playing sports on the mental health of adolescents post quarantine. Researchers adjusted for age, sex, type of instruction (face-to-face versus online), and the percentage of students eligible for FRL, however, they still saw that adolescents who did not play sports were six times more likely to self-report moderate to severe symptoms of anxiety and more than twice as likely to self-report moderate to severe symptoms of depression (McGuine et al., 2022). Adolescent girls reported only 15-30 minutes of exercise a day during quarantine, of which the recommended amount is at least 60 minutes (Silk et al., 2022). This insufficient amount of physical activity for teenage girls may reinforce poor health habits in the future. For both boys and girls, physical inactivity rates were 41% higher for students not engaged in any school sport (McGuine et al., 2022). Physical activity is viewed as a safeguard for mental health of teenagers, so this demonstrates that increased sedentary time due to the pandemic is a risk factor for decreased psychological well-being.

Policy Factors

The access and availability of mental health services and organizations for adolescents was severely impacted by governmental lockdowns and restrictions. The stay-at-home mandates

Mental Health of Adolescents Post Pandemic

were associated with higher reports of abuse, feelings of isolation, stress/ anxiety, and depression (Runkle et al., 2023). Among participants enrolled in Mental Health and Substance Use (MHSU) services prior to the pandemic, 46.5% reported their services had worsened due to COVID-19, however 17.4% indicated they changed for the better (Hawke et al., 2021). Some institutions pertaining to mental and associated behavioral health problems were forced to temporarily suspend their services or pause their intake admissions, even though State Mental Health Authorities (SMHAs) across the country reported an increased demand of services for children and adolescents (Palinkas et al., 2021). Common reasons for decreased services include staff sick leaves due to COVID-19 infection, refusal to go into work out of fear of infection, staff burnout, and staff shortages (Palinkas et al., 2021). However, organizations able to secure sufficient staffing stated that issues arose due to the inability to train workers and the lack of proper administrative resources to optimize staff and funding (Palinkas et al., 2021). Some reports indicate that 85.7% of SMHA representatives experienced an increased need for youth mental health services experiencing depression, anxiety, and other common mental health occurrences as a result of lockdowns (Palinkas et al., 2021). However, many of the same SMHAs expressed that adolescents able to receive MHSU services during and post pandemic were not actually getting the services they needed. All these factors contribute to lowered numbers of adolescents obtaining the adequate treatments necessary for their declining mental health as result of the pandemic. Telehealth system structures skyrocketed as a result of the pandemic, however barriers to the use of telehealth systems were marked as the greatest threat to delivering MHSU services (Palinkas et al., 2021). The most frequently cited obstacles that contributed to limited use of services included restricted access to the internet, minimal access to the technology itself, and the definite number of minutes for families with cell-phone plans, with the foremost

challenge being that most services were not able to be reimbursed (Silk et al., 2022). Some representatives reported that parents were reluctant to use telehealth services because they were unfamiliar with the idea, felt uncomfortable with worries over lack of privacy, and because of virtual fatigue (Palinkas et al., 2021).

DISCUSSION

Limitations

Although this literature review used the socioecological model to evaluate many factors that have played a role in the changes of mental health status of many American adolescents, there are limitations that affect the overall findings. First, this study did not use any randomized controlled trials, thus relying on only observational studies so temporality cannot be established, and only sheer associations remain. All sources derived from only four databases; hence the current knowledge is restricted. Also, most of the studies were not generalizable to the entire U.S. adolescent population as most participants were White, and non-Hispanic. Many studies included online self-reported interviews and or questionnaires, therefore biases may be reflected. Although internet access is a widespread commodity in the United States, the online nature of measures may inhibit adolescent populations with limited access to the internet to be included within these studies. The sample sizes of the obtained studies varied greatly, so studies with smaller samples should be reproduced so that findings can be further applied. Overall, the greatest limitation in this realm of research is because studies are at most, a mere three years old. Many studies in this field provide redundant information because medical and public health professionals alike are still unsure of the long-term consequences. Further research is pertinent to address the gaps that play into adolescent mental health so that adequate policies and resources can be aimed at improving the health of adolescent individuals that need it most.

CONCLUSION

Future Implications

There is still a great deal of research needed to be done to fully assess the individual, interpersonal, community, and organizational factors that have played into the mental health crisis impacting adolescents as a result of the COVID-19 pandemic. While there is research included from regions of lower and higher socioeconomic status and well as urban, metropolitan, and rural areas, further research is needed to fully understand how the pandemic affected American youth in these various subpopulations so that health policy and procedures can adequately deploy measures to best serve the mental health of adolescents in the U.S. It is known that rural areas are disproportionately affected by adverse health outcomes across the spectrum, and this review only includes one study from a rural Georgia high school, so similar studies in rural settings in the Southeastern U.S. as well as other regions is needed to establish findings. Further research into psychological health impacts on various subpopulations is essential. For instance, there is limited research on COVID-19 ramifications on individuals with psychiatric disorders, as this review contains data from only one longitudinal study 10 months after the start of the pandemic. Future studies are therefore pertinent in assessing long-term associations, which would enable optimal care for adolescents with psychiatric illnesses. It is essential to use more longitudinal studies when evaluating prolonged mental health impacts because of the rapid nature of brain development during adolescence so that measures can be employed before younger generations reach adolescence. There should also be further research into the mental health impacts on younger school children so that those findings can be implemented across school systems to best serve them later in adolescence. Increased studies on how the COVID-19 pandemic adversely affected adolescents would function to increase the reproducibility and

Mental Health of Adolescents Post Pandemic

replicability of these studies and thus establish better findings. Knowledge pertaining to how the COVID-19 pandemic impacted adolescents is vital for gauging how they will engage within the workforce and impact the future of the American economy, which influences the vitality and longevity of all individual's and the American society as a whole.

REFERENCES

- American Psychological Association. (2017, February 23). *Adolescent behavior*. American Psychological Association. Retrieved from <https://www.apa.org/pubs/highlights/peeps/issue-88>
- Bronfenbrenner, U. (1977). Toward an experimental ecology of human development. *American Psychologist*, 32(7), 513–531. <https://doi.org/10.1037/0003-066X.32.7.513>
- Centers for Disease Control and Prevention. (2015, June 25). *Chapter 1: Models and frameworks*. Centers for Disease Control and Prevention. Retrieved March 14, 2023, from https://www.atsdr.cdc.gov/communityengagement/pce_models.html
- Brooks, S. K., Webster, R. K., Smith, L. E., Woodland, L., Wessely, S., Greenberg, N., & Rubin, G. J. (2020). The psychological impact of quarantine and how to reduce it: rapid review of the evidence. *Lancet*, 395(10227), 912-920. [https://doi.org/10.1016/S0140-6736\(20\)30460-8](https://doi.org/10.1016/S0140-6736(20)30460-8)
- Datta, N., Van Wye, E., Citron, K., Matheson, B., & Lock, J. D. (2023). The COVID-19 pandemic and youth with anorexia nervosa: A retrospective comparative cohort design. *Int J Eat Disord*, 56(1), 263-268. <https://doi.org/10.1002/eat.23817>
- Doyle, A. E., Colvin, M. K., Beery, C. S., Koven, M. R., Vuijk, P. J., & Braaten, E. B. (2022). Distinct patterns of emotional and behavioral change in child psychiatry outpatients during the COVID-19 pandemic. *Child Adolesc Psychiatry Ment Health*, 16(1), 12. <https://doi.org/10.1186/s13034-022-00441-6>
- Feinberg, M. E., J, A. M., Lee, J. K., Tornello, S. L., Hostetler, M. L., Cifelli, J. A., Bai, S., & Hotez, E. (2022). Impact of the COVID-19 Pandemic on Parent, Child, and Family Functioning. *Fam Process*, 61(1), 361-374. <https://doi.org/10.1111/famp.12649>

Mental Health of Adolescents Post Pandemic

- Fung, M. H., Taylor, B. K., Embury, C. M., Spooner, R. K., Johnson, H. J., Willett, M. P., Frenzel, M. R., Badura-Brack, A. S., White, S. F., & Wilson, T. W. (2022). Cortisol changes in healthy children and adolescents during the COVID-19 pandemic. *Stress*, 25(1), 323-330. <https://doi.org/10.1080/10253890.2022.2125798>
- Gazmararian, J., Weingart, R., Campbell, K., Cronin, T., & Ashta, J. (2021). Impact of COVID-19 Pandemic on the Mental Health of Students From 2 Semi-Rural High Schools in Georgia. *J Sch Health*, 91(5), 356-369. <https://doi.org/10.1111/josh.13007>
- Hawke, L. D., Sheikhan, N. Y., MacCon, K., & Henderson, J. (2021). Going virtual: youth attitudes toward and experiences of virtual mental health and substance use services during the COVID-19 pandemic. *BMC Health Serv Res*, 21(1), 340. <https://doi.org/10.1186/s12913-021-06321-7>
- Holuka, C., Merz, M. P., Fernandes, S. B., Charalambous, E. G., Seal, S. V., Grova, N., & Turner, J. D. (2020). The COVID-19 Pandemic: Does Our Early Life Environment, Life Trajectory and Socioeconomic Status Determine Disease Susceptibility and Severity? *Int J Mol Sci*, 21(14). <https://doi.org/10.3390/ijms21145094>
- Kenworthy, T., Harmon, S. L., Delouche, A., Abugattas, N., Zwiebel, H., Martinez, J., Sauvigne, K. C., Nelson, C. M., Horigian, V. E., Gwynn, L., & Pulgaron, E. R. (2022). Community voices on factors influencing COVID-19 concerns and health decisions among racial and ethnic minorities in the school setting. *Frontiers in Public Health*, 10. <https://doi.org/ARTN1002209>
10.3389/fpubh.2022.1002209
- Masselink, M., Van Roekel, E., & Oldehinkel, A. J. (2018). Self-esteem in Early Adolescence as Predictor of Depressive Symptoms in Late Adolescence and Early Adulthood: The

Mediating Role of Motivational and Social Factors. *J Youth Adolesc*, 47(5), 932-946.

<https://doi.org/10.1007/s10964-017-0727-z>

McGuine, T. A., K, M. B., Hetzel, S. J., Schwarz, A., Kliethermes, S., Reardon, C. L., Bell, D. R., Brooks, M. A., & Watson, A. M. (2022). High School Sports During the COVID-19 Pandemic: The Effect of Sport Participation on the Health of Adolescents. *J Athl Train*, 57(1), 51-58. <https://doi.org/10.4085/1062-6050-0121.21>

McLeroy, K. R., Bibeau, D., Steckler, A., & Glanz, K. (1988). An ecological perspective on health promotion programs. *Health Educ Q*, 15(4), 351-377.

<https://doi.org/10.1177/109019818801500401>

Oosterhoff, B., Palmer, C. A., Wilson, J., & Shook, N. (2020). Adolescents' Motivations to Engage in Social Distancing During the COVID-19 Pandemic: Associations With Mental and Social Health. *Journal of Adolescent Health*, 67(2), 179-185.

<https://doi.org/10.1016/j.jadohealth.2020.05.004>

Palinkas, L. A., De Leon, J., Salinas, E., Chu, S., Hunter, K., Marshall, T. M., Tadehara, E., Strnad, C. M., Purtle, J., Horwitz, S. M., McKay, M. M., & Hoagwood, K. E. (2021). Impact of the COVID-19 Pandemic on Child and Adolescent Mental Health Policy and Practice Implementation. *Int J Environ Res Public Health*, 18(18).

<https://doi.org/10.3390/ijerph18189622>

Palmer, C. A., Oosterhoff, B., Massey, A., & Bawden, H. (2022). Daily Associations Between Adolescent Sleep and Socioemotional Experiences During an Ongoing Stressor. *J Adolesc Health*, 70(6), 970-977. <https://doi.org/10.1016/j.jadohealth.2022.01.127>

Pelham, W. E., 3rd, Tapert, S. F., Gonzalez, M. R., McCabe, C. J., Lisdahl, K. M., Alzueta, E., Baker, F. C., Breslin, F. J., Dick, A. S., Dowling, G. J., Guillaume, M., Hoffman, E. A.,

Mental Health of Adolescents Post Pandemic

- Marshall, A. T., McCandliss, B. D., Sheth, C. S., Sowell, E. R., Thompson, W. K., Van Rinsveld, A. M., Wade, N. E., & Brown, S. A. (2021). Early Adolescent Substance Use Before and During the COVID-19 Pandemic: A Longitudinal Survey in the ABCD Study Cohort. *J Adolesc Health, 69*(3), 390-397.
<https://doi.org/10.1016/j.jadohealth.2021.06.015>
- Runkle, J. D., Sugg, M. M., Yadav, S., Harden, S., Weiser, J., & Michael, K. (2023). Real-Time Mental Health Crisis Response in the United States to COVID-19. *Crisis, 44*(1), 29-40.
<https://doi.org/10.1027/0227-5910/a000826>
- Silk, J. S., Scott, L. N., Hutchinson, E. A., Lu, C., Sequeira, S. L., McKone, K. M. P., Do, Q. B., & Ladouceur, C. D. (2022). Storm Clouds and Silver Linings: Day-to-Day Life in COVID-19 Lockdown and Emotional Health in Adolescent Girls. *J Pediatr Psychol, 47*(1), 37-48. <https://doi.org/10.1093/jpepsy/jsab107>
- Singh, S., Roy, D., Sinha, K., Parveen, S., Sharma, G., & Joshi, G. (2020). Impact of COVID-19 and lockdown on mental health of children and adolescents: A narrative review with recommendations. *Psychiatry Res, 293*, 113429.
<https://doi.org/10.1016/j.psychres.2020.113429>
- Temple, J. R., Baumler, E., Wood, L., Guillot-Wright, S., Torres, E., & Thiel, M. (2022). The Impact of the COVID-19 Pandemic on Adolescent Mental Health and Substance Use. *J Adolesc Health, 71*(3), 277-284. <https://doi.org/10.1016/j.jadohealth.2022.05.025>
- Tetreault, E., Teferra, A. A., Keller-Hamilton, B., Shaw, S., Kahassai, S., Curran, H., Paskett, E. D., & Ferketich, A. K. (2021). Perceived Changes in Mood and Anxiety Among Male Youth During the COVID-19 Pandemic: Findings From a Mixed-Methods Study. *J Adolesc Health, 69*(2), 227-233. <https://doi.org/10.1016/j.jadohealth.2021.05.004>

Mental Health of Adolescents Post Pandemic

- Wright, M. F., & Wachs, S. (2022). Self-isolation during the beginning of the COVID-19 pandemic and adolescents' health outcomes: The moderating effect of perceived teacher support. *Sch Psychol*, 37(1), 47-53. <https://doi.org/10.1037/spq0000460>
- Xiao, Y., Brown, T. T., Snowden, L. R., Chow, J. C., & Mann, J. J. (2023). COVID-19 Policies, Pandemic Disruptions, and Changes in Child Mental Health and Sleep in the United States. *JAMA Netw Open*, 6(3), e232716. <https://doi.org/10.1001/jamanetworkopen.2023.2716>
- Yuhas, M., Porter, K. J., Hedrick, V., & Zoellner, J. M. (2020). Using a Socioecological Approach to Identify Factors Associated with Adolescent Sugar-Sweetened Beverage Intake. *J Acad Nutr Diet*, 120(9), 1557-1567. <https://doi.org/10.1016/j.jand.2020.01.019>
- Yin, O., Parikka, N., Ma, A., Kreniske, P., & Mellins, C. A. (2022). Persistent anxiety among high school students: Survey results from the second year of the COVID pandemic. *PloS one*, 17(9), e0275292. <https://doi.org/10.1371/journal.pone.0275292>