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To What Extent Has the COVID-19 Pandemic Influenced Levels of Anxiety and Depression in Children and Adolescents?

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Abstract. COVID-19 affects not only the physical health but also the mental well-being of many people, including children and adolescents. Since these are the people who are of vital importance to the future development of human society , their mental health condition is worth studying. This project is to determine the impact of the COVID-19 pandemic on the level of anxiety and depression in children and adolescents from a psychological perspective. The extended project concludes that COVID-19 does increase the level of anxiety and depression in the target population, despite some positive impacts. This dissertation below will discuss how and why personal, societal, and familial factors influence level of anxiety and depression among children and adolescents during the pandemic and suggests that researchers should focus on the long-term effects of COVID-19 and approaches to reduce anxiety and depression following the pandemic.

Keywords: COVID-19, levels of anxiety, children and adolescents

1. Introduction

This EPQ aims to find out the impact of the COVID-19 pandemic on the levels of anxiety and depression in children and adolescents. Academic research and online resources are searched and evaluated to study the effects of COVID-19 on the target population.

This project is closely related to psychology, a subject that is often given even greater importance than those studying physical health in modern society. Since the end of the 19th century, when psychology became an independent subject, many hypotheses have been tested and verified, and many theories established. People are paying increasing attention to it, and many scholars and students are attracted by it.

Although the World Health Organization declared on May 5, 2023, that COVID-19 would no longer constitute a "public health emergency of international concern", lifting the highest level of alert set on January 30, 2020 (WHO chief declares end to COVID-19 as a global health emergency) COVID-19 still has a great impact on people's health. From December 2019 to 11 October 2020, there were over 37 million confirmed cases of COVID-19, and 1 million deaths globally due to the virus. The virus is related to respiratory illness, periodically result in severe pneumonia and acute respiratory distress syndrome. [16]. This virus is known to be related to respiratory illness, which can lead to severe pneumonia and acute respiratory distress syndrome. The impact of the COVID-19 pandemic on mental health, however, remains less understood.

Covid-19 has had a significant impact on people's lives, including children and adolescents. With the closure of schools and the implementation of national lockdown, the younger generation has had to stay at home, which may lead to a rise in anxiety and depression levels. Furthermore, the lockdown made it challenging for children and adolescents with existing mental health issues to receive medical care or psychological help promptly. This could present a challenge when they require additional help and support after the crisis [14].

COVID-19 is defined as an acute disease in humans caused by a corona-virus, which is characterized mainly by fever and cough and is capable of progressing to severe symptoms and in some cases death especially in older people and those with underlying health conditions. It was originally identified in China in 2019 and became a pandemic in 2020. [28]

Children are defined as human beings between the stages of birth and puberty, or between the developmental period of infancy and puberty. The legal definition of child generally refers to a minor, otherwise known as a person younger than the age

of majority. Children generally have fewer rights and responsibilities than adults. They are classed as unable to make serious decisions. (Mosby's dictionary of medicine, nursing & health professions. No date)

Adolescence is a transitional stage of physical and psychological development that generally occurs during the period from puberty to adulthood. Adolescence is usually associated with the teenage years, but its physical, psychological, or cultural expressions may begin earlier and end later. Puberty, particularly in females, typically begins during preadolescence. Physical growth and cognitive development can extend past the teens. Age provides only a rough marker of adolescence, and scholars have not agreed upon a precise definition. Some definitions start as early as 10 and end as late as 25 or 26. The World Health Organization, however, officially designates an adolescent as someone between the ages of 10 and 19 (WHO. No date).

This dissertation will use the "WHO" definition. Adolescents are those of the age between 10 and 19 and children below 10. COVID-19 influences mental health in the youth, especially regarding their level of anxiety and depression.

Mental health includes our emotional, psychological, and social well-being. It affects how we think, feel, and act. It also helps determine how we handle stress, relate to others, and make choices. Mental health is important at every stage of life, from childhood through adulthood (mental health.gov. No date).

Occasional anxiety is expected in life. You might feel anxious when faced with a problem at work, before taking a test, or before making an important decision. An anxiety disorder, however, is more than temporary worry or fear. For a person with an anxiety disorder, the anxiety does not go away and can get worse over time. The symptoms can interfere with daily activities, job performance, schoolwork, and relationships (mental health.gov. No date).

Depression is a disorder of the brain. It's more than just a feeling of being "down in the dumps" or "blue" for a few days. If you are one of the more than 20 million people in the United States who have depression, you know that these feelings do not go away. They persist and interfere with your everyday life. There are a variety of causes, including genetic, environmental, psychological, and biochemical factors. Depression usually starts between the ages of 15 and 30 and is much more common in women. Women can also get postpartum depression after the birth of a baby. Some people get seasonal affective disorder in the winter. Depression is one part of bipolar disorder (mental health.gov. No date).

Good mental health in children and adolescents was especially important during COVID-19. Children are the future labour force of society meaning that the future is on their shoulders. Therefore, they must have healthy mental states. This dissertation will analyze how COVID-19 has changed anxiety and depression levels in children and adolescents in terms of positive effects, no effects, and negative effects. Followed by the discussion of the impact of COVID-19 on children and adolescents from the perspective of its impact on anxiety and depression levels, the differences between the research groups, that is, children and adolescents, why COVID-19 causes changes in anxiety and depression levels, possible errors in the research process, and effects of levels of anxiety and depression in adolescents.

2. Research Review

Many people believe that COVID-19 has caused anxiety among teenagers (Santabárbara J et al. 2021). There are thought to be many reasons for children and adolescents' anxiety, such as anxiety about the health of individuals or family members, fear of the virus itself, anxiety about the lockdown, or anxiety about the inability to perform their studies properly. However, academic research has shown that the effect of the COVID-19 pandemic on children and adolescent anxiety cannot be simply defined as negative. Some academic papers (C´enat et al.2022) suggested that the pandemic in some cases slowed down the development of youth anxiety, while some dissertations suggested that no statistics indicated a change in children and adolescent anxiety. However, some studies demonstrated that the pandemic had aggravated the anxiety of teenagers.

Furthermore, many scholars speculate that COVID-19 can also lead to an increase in depression among individuals under 18, similar to the effects observed in children and adolescents' anxiety levels. They believe that teenagers may experience excessive anxiety and worry about the current situation, which can eventually lead to a sense of sadness and helplessness. This feeling of depression can have a profound impact on young people, and it is reported that a significant number of underage individuals experience depression and even commit suicide for various reasons every year. (Panchal et al.2021) In light of this, researchers have conducted extensive studies on the effects of COVID-19 on teenage depression. The integration and analysis of these research investigations are divided into three parts: positive effects, no practical effects, and negative effects as analyzed below.

2.1. Positive Effects

Of the 30 papers that have been studied and analyzed, it is considered that "social support, positive coping skills, home quarantining, and parent-child discussions seem to positively impact adolescent mental health during this period of crisis "(Jones et al. 2021). This explains that during the COVID-19 pandemic, when the lives of children and adolescents changed dramatically, many developed anxiety or depression. At the same time, some of their symptoms have been reduced, although the overall results are negative. The authors of this dissertation are from the School of Public Health, College of Health Sciences, Jackson State University, Jackson, MS 39213, USA. Jones is a current doctoral student at the University while Mitra is a full professor.

There is no clear information about whether Bhuiyan is a student or a professor, even so, the reliability is quite high. There is no profit included in the paper, which furthers its reliability.

Another dissertation believed that good family relationships, exercising regularly, and having access to entertainment such as aerobics can reduce anxiety and depression levels. “Physical exercise, access to entertainment, positive familial relationships, and social support were associated with better mental health outcomes.”[20] The authors of this paper are from renowned universities and they are working on studies or projects about Children, Health, Medicine and Neuroscience. They are experts in their fields and there are no biased arguments, so the paper they post together is a very reliable, trustworthy source. There is a reference to 116 academic resources that the authors analyzed and included in their research, thus the data they use in their research is valid and reliable.

In *Challenges and burden of the Coronavirus 2019 (COVID-19) pandemic for child and adolescent mental health: a narrative review to highlight clinical and research needs in the acute phase and the long return to normality*, the author also considered that though the benefits of personal growth and family cohesion may not outweigh the serious crisis, there are still benefits to children and adolescents mental health, such as a decrease in anxiety and depression (Fegert et al. 2020). The researchers use the graph below to study the influence the COVID-19 pandemic had on people in three different stages (see figure 1), which demonstrates the similarities and differences in these phases. This supports a clear structure of the dissertation and increases the reliability of the paper because it standardizes the stages and makes the information more focused and accurate in these phases. The source is from Google Scholar and the authors are either experts in the field of children, psychotherapists, or work in big hospitals. The passage was written without a grant meaning it’s a non-profitable work. Despite these pros, the dissertation suggests the data it used had not been analyzed and the paper is not peer-reviewed by other experts in the field. Meanwhile, the article has a Creative Commons Attribution 4.0 International License, so it seems that the article might be authoritative. Therefore some of the results should be treated with caution.

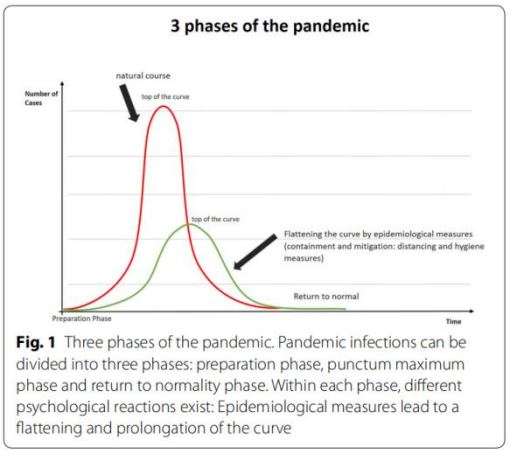

Fig. 1 Three phases of the pandemic. Pandemic infections can be divided into three phases: preparation phase, punctum maximum phase and return to normality phase. Within each phase, different psychological reactions exist: Epidemiological measures lead to a flattening and prolongation of the curve

Figure 1. The graph that separated the whole pandemic into three phases and analyzed the effect the pandemic had on people separately.

2.2. No Effect

In the papers researched, there is no academic work stating that the COVID-19 pandemic has a neutral influence on the levels of anxiety and depression in children and adolescents. The passages all indicate that the COVID-19 pandemic had some influence on the target population, positive or negative.

2.3. Negative Effects

In the 30 academic resources that have been studied, it is believed that the majority of academic data demonstrated that the corona-virus itself and the COVID-19 pandemic have significantly increased anxiety levels among children and adolescents. Especially in the two studies that studied the correlation between COVID-19 and anxiety, the huge impact of COVID-19 on people was shown significant. “Our results suggest that rates of anxiety in the general population could be more than 3 times higher during the COVID-19 pandemic.” [21] The author team includes experts in biology, psychology, psychiatry, pharmacy, and the brain, who are currently working for institutions, hospitals, and health care centers. They are experts in the field and there is only a very small possibility of profit involved in this research. In addition, the researchers use 43 kinds of research done by others with large-scale data. The maximum data scale reaches 56,679 people, thus this is a valid resource.

Samji and the co-authors state that there is a significant increase in the number of participants having depressive and anxious symptoms and there is also a trend of worsening general mental health before the pandemic in *Review: Mental health impacts of the COVID-19 pandemic on children and youth - a systematic review* [20]. Thus, the paper illustrates that the symptoms were more common among older children and adolescents, and those with preexisting mental illness have experienced higher levels of depression and anxiety. As for the factors associated with anxiety, there is concern about the risk of their loved ones contracting COVID-19, and the economic and repercussions of the pandemic to society. The anxiety would lead to an increase in depressive symptoms at the same time. Another special point is that this passage also indicates the anxiety and depression of children and adolescents will also impact the mental health of the young. As previously evaluated, the professor worked together to analyze the paper that had been peer-reviewed in the field of mental health and children and adolescents, thus the paper is very reliable. At the same time, the sample size in this paper is relatively large, which has a higher possibility of including the whole underage population. In conclusion, it is a good source to use.

In *Long-term effects of COVID-19 on mental health: A systematic review*, Bourmistrova, and fellow researchers demonstrate anxiety as a primary outcome with depression as the secondary outcome. In the case of anxiety, 17.52% of the 3431 patients experienced at least mildly severe anxiety, and in severe COVID-19 cases there was an anxiety prevalence of 19.03% out of 309. However, the sensitive analysis indicated that there was a decrease from 20.68% to 11.11% during the 1-3 months or more than three months' follow-up. As for depression, of the 4935 participants, 18.85% of them showed at least mild symptoms of depression, and the depression prevalence in 309 severe COVID-19 patients was 20.39%. The authors are experts in psychology, psychiatry, and neuroscience, so they are familiar with the effect of people's mental state on their physical health, their opinion is quite reliable. The authors plot graphs to standardize the levels of mental disorders (see figure 2), so it is a trustworthy source.

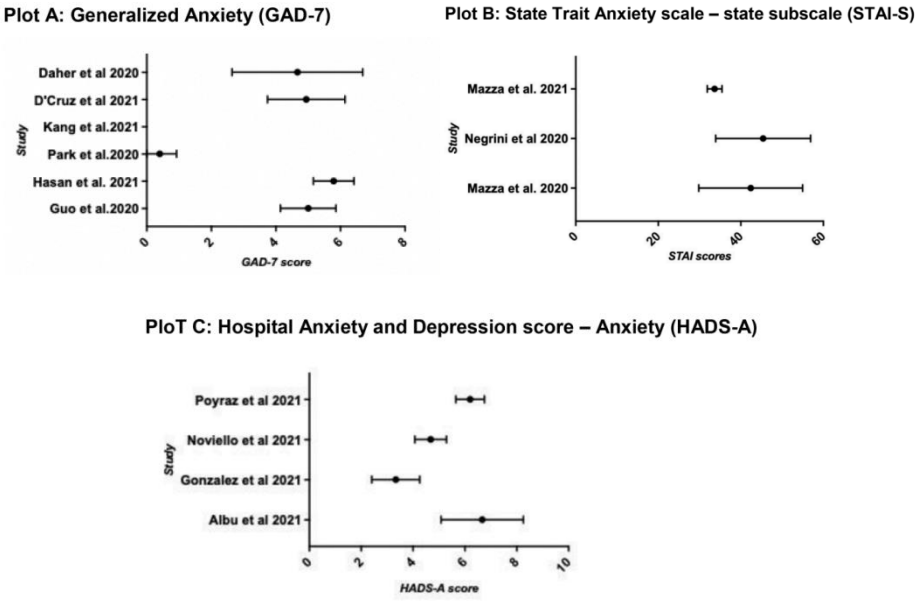

Figure 2. The graphs demonstrate the levels of anxiety in different scholars' studies

Another academic paper states that children and adolescents are more likely to experience high rates of depression and anxiety during and after a pandemic. [14] This paper is written by professionals who specialize in nursing and hospital work. Thus, their opinions are relatively reliable. The work has been peer-reviewed by Int. J. Environ. Res. Public Health is a peer-reviewed, trans-disciplinary journal focused on publishing content related to health promotion and disease prevention (MDPI.com) in the same year, meaning other scholars agree on the ideas of the authors. In addition, they analyze experimental randomized and non-randomized controlled trials, observational studies, and qualitative studies using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines, and in the 5828 studies they conducted, they found 18 academic resources very supportive, saying that the pandemics caused stress, worry, helplessness, social and risky behavioral problems among children and adolescents. They studied a large number of works and used strict criteria to analyze them, so their opinion is relatively valid.

Nearchou and his colleagues point out that the COVID-19 pandemic has an impact on youth mental health and is particularly associated with depression and anxiety in adolescent cohorts. The authors are in the field of psychology and medicine, so they are experts in the field and their argument is quite reliable. The authors also use the guidelines of PRISMA and they collect data from 8 databases, their data has a relatively large scale which means a relatively strong validity. However, this paper has not been peer-reviewed, so the opinions from the work are not as reliable as the previous one.

In *Anxiety and Depression in Chinese Students During the COVID-19 Pandemic: A Meta-Analysis*, Zhang and the co-authors state that there was an overall high prevalence of anxiety in Chinese students and a high prevalence of depression among those in high-risk areas during the COVID-19 pandemic. This paper is written by Chinese in the Department of Psychology at Southwest University, they are professionals in the field but it is not clear whether they are professors, teachers, or school students, so the authority of their opinion remains to be studied. But the work has been reviewed by people from other universities, including Worku Animaw Temesgen, Bahir Dar University, Ethiopia, Steward Mudenda, and University of Zambia, Zambia, though these universities are not very famous big universities around the world. This paper has be chosen to be viewed by other academic institution, it is quite reliable in this perspective. In addition, this paper referenced a few other academic papers, so the data is quite valid.

Ma and the co-authors point out in Prevalence of mental health problems among children and adolescents during the COVID-19 pandemic: A systematic review and meta-analysis that both adolescents and children's levels of anxiety and depression rose during the pandemic, and adolescents exhibited a higher prevalence of depression and anxiety compared to children. This literature is slightly different from the previously reviewed academic resources in that it points out that adolescents have been affected more than children have. The argument of this paper is quite reliable because the literature came from several academic platforms such as PubMed, Web of Science, PsycINFO, and two Chinese academic databases (China National Knowledge Infrastructure and Wanfang). However, this resource has a limitation in that all the resources are from China, so it has a low generalisability.

DDS and the co-authors in The Mental Health Effects Prevalence in Children and Adolescents during the COVID-19 Pandemic: A Systematic Review believed that the rates of anxiety and depression both had a significant soar before and during the pandemic, respectively from 17.6% to 43.7% and from 6.3% to 71.5%. The authors are from the medical field so they have relatively high authority and they find a large scale of identified studies (2873 studies) so the accuracy of the paper is quite high. But this paper had no record of being peer reviewed so the reliability in the field still needs to be considered.

3. Discussion/ Development

3.1. Effects

3.1.1. Positive Effects

After the study and analysis of the paper (Impact of COVID-19 on Mental Health in Adolescents: A Systematic Review) and (Review: Mental Health Impacts of the COVID-19 Pandemic on Children and Youth - a Systematic Review), the reasons for the reduction of anxiety and depression symptoms in children and adolescents are listed below:

First of all, the country or society's strong support, active actions, and effective measures for COVID-19 have alleviated psychological anxiety and depression in children and adolescents. For example, in the early stage of the outbreak, most Chinese were panicking and worried about the current situation. Everyone was scared by the large number of COVID-19 deaths that were reported in the daily news. Unfortunately, that was during the Spring Festival holiday, which made the situation worse. With more and more cities blocked, a large number of people were forced to be stranded, leading to a lot of chaos. Children and adolescents who were in chaotic social environments may have developed symptoms of depression and anxiety. When the Chinese government began to take a series of measures, such as building square hospitals, sending volunteers "big white(大白)" to the outbreak areas to help local people through difficult times, carrying out community grid management rules, everything was gradually back in order and improvements could be seen in children and teenagers' anxiety and depression symptoms.

Secondly, even though lockdown brings great inconvenience to the lives of children and adolescents, such as limiting the scope of their daily activities and affecting their daily schooling, it does create an opportunity for family reunion. Busy parents who usually spend little time at home can now have a lot of quality time with their children, and communication between them became more frequent and effective. "The presence of parent-child discussion lowered the risk of meeting the threshold of depressive, anxiety, and stress symptoms." These improvements obviously have positive effects on the mental health of children and adolescents, as is seen in figure 3 --- all the symptoms percentage with parent-child discussion is lower than that without such discussion. (Tang et al. 2020) (Fegert et al. 2020)

Table 2
Means, standard deviations, and percentages met threshold for depression, anxiety, and stress.

	Depression		Anxiety		Stress		Total
	% (N)	M (SD)	% (N)	M (SD)	% (N)	M (SD)	M (SD)
Total	19.7% (857)	4.86 (8.16)	24.9% (1080)	5.18 (7.89)	15.2% (659)	6.68 (8.93)	16.73 (23.83)
Sex							
Male	20.4% (451)	5.10 (8.50)	24.6% (445)	5.19 (8.08)	15.5% (343)	6.81 (9.17)	17.10 (24.61)
Female	19.1% (406)	4.63 (7.78)	25.2% (464)	5.17 (7.69)	14.9% (316)	6.55 (8.67)	16.35 (23.00)
Grade[a]							
Primary	17.3% (172)	4.33 (7.81)	20.7% (206)	4.41 (7.39)	13.0% (129)	6.09 (8.43)	14.83 (22.82)
Junior Secondary	19.2% (581)	4.79 (8.07)	24.7% (747)	5.16 (7.84)	14.9% (449)	6.59 (8.90)	16.55 (23.58)
Senior Secondary	32.2% (104)***	7.22 (9.53)***	39.3% (127)***	7.73 (9.24)***	25.1% (81)***	9.35 (10.20)***	24.30 (27.64)***
Perceived beneficial[b]							
No	23.4% (490)	5.64 (8.64)***	28.3% (592)	5.79 (8.42)***	18.2% (382)	7.52 (9.49)***	18.95 (25.39)***
Yes	16.3% (367)	4.15 (7.61)	21.7% (488)	4.61 (7.33)	12.3% (233)	5.90 (8.31)	14.66 (22.10)
Parent-Child Discussion[c]							
No	26.8% (178)	6.66 (10.11)***	31.0% (206)	6.55 (9.59)***	20.2% (134)	7.83 (10.35)***	21.04 (29.06)***
Yes	18.5% (679)	4.54 (7.71)	23.8% (874)	4.93 (7.52)	14.3% (525)	6.48 (8.64)	15.95 (22.68)

Figure 3. The difference in children's and adolescents' levels of depression and anxiety regarding whether having a parent-child discussion

Thirdly, exercise and entertainment have also made a substantial contribution to reducing anxiety and depression levels in children and adolescents. During the lockdown, people's attention were turned to the internet, and online live streaming became popular. For example, on TikTok in China, there was a blogger who takes people of all ages to do aerobics every day.(see figure 4) This not only diverted the attention of children and teenagers away from the terrifying pandemic, but also make them realize the importance of having a habit of regular exercising which enables them to keep fit while benefiting from the entertainment through lifting their mood. This is beneficial for both the physical and psychological health of children and adolescents and will have some positive effect on their mental health level (Okuyama et al. 2021)(Thygesen et al. 2022).

Figure 4. Screenshots of Tik Toks from (刘耕宏) who demonstrated aerobic exercises to do at home during the pandemic (刘畊宏肥油咔咔掉 9 月 27 日抖音燃情好物季的主页 - 刘畊宏健身内容官方账号 - 抖音 (douyin.com))

Finally, there is another possibility that the paper does not mention. Maybe the reduction in symptoms of children and adolescents' anxiety and depression was just because hospitals and medical institutions' staff were supporting countries and regions where the pandemic had a great impact on the caring treatment of COVID-19 patients, meaning that there were not enough staff for the needs of testing anxiety and depression. Possibly there was a large number of children and adolescents with anxiety or depression who were under lockdown, staying at home, and no one went to the hospital or medical facility for anxiety or depression tests, resulting in a reduction of anxiety and depression symptoms.

3.1.2. No Effects

There is no literature showing that the COVID-19 pandemic had no statistical effect on anxiety and depression in children and adolescents, which means that the pandemic in some ways, has some effect on the mental health of children and adolescents. The influence of it on mental health is positive or negative.

3.1.3. Negative Effects

Most of the papers that have been learned show that COVID-19 has increased anxiety and depression in children and adolescents. There are several reasons why the literature states that COVID-19 causes anxiety and depression in children and adolescents:

First, the supporting data for these papers are general and rigorously suggest that anxiety and depression conditions do increase in children and adolescents (DDS et al. 2021).

Secondly, the number of children and adolescents who may go to hospitals or medical institutions for anxiety and depression-related tests during the pandemic decreased, but there are still a certain number of cases of anxiety and depression, so the anxiety and depression rate did increase.

Finally, children and adolescents who come to hospitals and medical institutions for medical treatment usually think that they have some related symptoms of anxiety and depression after some consideration. In addition, children and adolescents who came to the hospital before the pandemic had signs of anxiety and depression or had a less positive judgment of their mental health, and their anxiety and depression were more likely to break out in the extremely depressed social environment of the epidemic.

3.2. Project Research Population

3.2.1. Children and Adolescents

For the target group of this EPQ discussion, children and adolescents, it can also be subdivided. Because children are those who go from birth to adolescence, generally unable to make important decisions on their own, adolescents are those going through a transition period to adulthood (the World Health Organization defines them as minors aged 10-19). Therefore, there are some differences between children and adolescents in the anxiety and depression of the target population.

On the one hand, children can be naive and ignorant, and they do not fully understand what happens in the wider society. Their fears are mostly affected by the atmosphere around them and the anxiety of their families. They have faced an unknown fear in this pandemic.

On the other hand, adolescents have been able to understand that the outbreak of COVID-19 has led to the change in their lives. Adolescents have already formed some of their social values and their judgment on things. They look at statistics all the time and get worried and helpless. What they can do is take good care of themselves and help their families within their capacity. They face a known fear at the same time. This sense of powerlessness can change their psychological condition (DDS et al.2021).

Fazio and the researchers had evidence suggesting that children and adolescents illustrate different conditions of anxiety and depression during the pandemic. The paper pointed out that “almost half of the total number of children had symptoms of anxiety and depression. 1/3 of adolescents had these mental problems” which indicates that in different maturity stages and age groups, the levels of influence on children and adolescents by COVID-19 were not the same.

3.3. Causes

Because most of the resources show that children and adolescents' anxiety and depression symptoms during the COVID-19 pandemic have a negatively increase, the symptoms of anxiety and depression in children and adolescents may not or not entirely be caused by the coronavirus or the pandemic. There may be other reasons directly leading to the increase of the symptoms. Thus some possible causes that lead to children and adolescents' anxiety and depression are enumerated below:

3.3.1. Corona Virus, COVID-19 Lockdown and Other COVID-19 Restrictions

The academic resources (Liu et al. 2020) suggest that the increase in anxiety and depression in children and adolescents during the COVID-19 pandemic may be caused by the coronavirus itself, lockdown, or other related restrictions.

First of all, the coronavirus itself is a lower respiratory tract infection virus, infection will lead to fever, loss of taste, limb fatigue, and other symptoms. After children or adolescents are infected with COVID-19, physical discomfort, mental concern about their bodies, and fear of the unknown future will make them uneasy. At the same time, their immune system resistance and physical and psychological suffering will damage the mental health of children and adolescents, making them more prone to anxiety or depression.

Secondly, lockdown, as a choice for some countries to stop the transmission route of COVID-19, has also caused a great psychological burden on children and adolescents in addition to effectively controlling the trend of the epidemic. During lockdown, children and adolescents are confined to small home spaces. In the long term, they will inevitably have the desire to go out and play, but this cannot be achieved, so they will feel irritated. Eating every day's fixed dishes and planned and diverse meals, seeing the sealed front door, and the community shuttle busy healthcare workers, all of these suggest again and again that the pandemic is not over yet. There will be more people being sick and more deaths, and this will cause anxiety and depression.

Finally, there are other quarantine measures such as cabin isolation or school isolation, with children and adolescents being forced to leave their homes and stay in narrower, even worse conditions in some unfamiliar places. In isolation in the square or isolation in the school stunt, children and adolescents are on their own without the company of family, they are scared, and tend to resist the strange environment and the new life arrangement makes them feel uncomfortable, these will increase the burden of children and adolescents, leading to anxiety and depression.

3.3.2. Other Causes

After reading the academic resources, the majority of the papers had been discovered indicating increased anxiety and depression among children and adolescents during COVID-19. Although in this period this situation intensified, it doesn't follow that children and adolescent anxiety and depression is caused by the virus itself, It may be caused by the fear of the frightening stunt and the high mortality of the virus, the social chaos, feeling sad for the situation that others were experiencing, the family members' worry or academic performance concerns. (Wang et al. 2020)

First, in the early stages of the pandemic, coronavirus was an unknown danger for all human beings. Children and adolescents watch the number of severe patients and deaths soar every day. Still, they are powerless and fear the high-mortality virus, leading to rising levels of anxiety and depression. (Wang et al. 2020)

Second, in the early stages of the pandemic, China's Lunar New Year holiday coincided. Families were disrupted by the outbreak of the pandemic, and the whole society fell into chaos. During the Spring Festival travel rush, a large number of people were forced to stay. While during that time, children and teenagers were stuck in other places or unable to return to the cities where they usually lived. Most of the children are still in a state of simple panic and fear of not knowing what is happening around them. They are only afraid of the sudden change of travel schedule and the illness of the people around them one after another. Adolescents, on the other hand, are powerless about the chaotic society and can only watch their cities and the people around them, even themselves, slowly turning sick and have an unknown future under the horrible virus. This fear in children and adolescents can also increase their symptoms of anxiety and depression. (Wang et al. 2020)

Third, it is true that children and adolescents would get anxious and depressed by the tragedy of others. Children and adolescents will inevitably hear some very tragic stories in society. For example, during the pandemic, in our Wechat community owner group, I saw an owner who was isolated in a square cabin asking for help in the resident group. He said that his dog had not eaten for several days. He was worried that his dog would starve to death, but he could not get home, which was very painful. The resident is already in poor health condition and has been worried about his beloved pet. When the paramedics opened the door, the dog was lying on the ground and starving. Thanks to the help of the volunteers, the puppy recovered. There are many sad stories like this, the owner and the dog are lucky because they all survived. However, during the pandemic, there were also the old who had passed away but could not be buried in time, and their family members could not seek medical treatment on time. Children and adolescents witness the tragedy around them, but they can do nothing. (Wang et al. 2020)

Furthermore, during the epidemic, children and adolescents also experience their family members infected with the coronavirus. After relatives fall ill, children and adolescents feel worried, at the same time, they have to take the responsibility of taking care of the family. In the process, children and teenagers will suffer psychological worry about relatives' health and physical fatigue will make them feel exhausted, which leads to the increased frequency of anxiety and depression. (Wang et al. 2020)

Finally, during the pandemic, children and adolescents were forced to attend online classes at home, due to the tense situation. The efficiency of learning online is indeed much lower than that in traditional classrooms, therefore, children, especially adolescents, are under huge academic pressure and their possibility of anxiety and depression rises. (Wang et al. 2020)

3.4. Possible Errors

Some uncontrollable factors in research which may lead to errors or biases are as follows:

First, the data studied were not adequately representative. Specifically, the range of these data is not wide enough, and the number of children and adolescents participating in the study is limited. As a result, the data tracked are from groups in certain regions or with certain characteristics, so they are not comprehensive enough. For example, this study was conducted in China, but only a small number of children and adolescents participated in this survey. Among the hundreds of millions of children and adolescents in China, thousands of subjects constitute a too small proportion to represent the situation of children and adolescents in China. In another survey, the researchers only investigated the anxiety and depression of children and adolescents

in the southeast coastal areas of China, which has a certain geographic limitation and could not well represent the whole target population in China. It is also possible that during the survey, the participants had a stable family situation, or other similarities which may lead to bias.

Second, the data in the studies can only indicate changes in anxiety and depression in children and adolescents during COVID-19, it may be an increase, a decrease, or there is not change. However, these only indicate the anxiety and depression of children and adolescents during this specific period. It cannot distinguish what specific change it is. Sometimes the effects are attributed to the impact of COVID-19 on children and adolescents while they may indeed be caused by various factors other than COVID-19.

Finally, the length of the tracking of the subjects. When researchers began to investigate the impact of COVID-19 on children and adolescents' levels of anxiety and depression, it was already during the pandemic. The data survey before COVID-19 may be insufficient or the subjects were not the same people, this will cause the subjects that the researchers studied didn't complete the whole process, and their experimental data are from data fusion. There is also a matter of timing for the sample investigation during the pandemic. The social situation has been changing, and so will the anxiety and depression of children and adolescents. The test results for both anxiety and depression differ in different times, which can bias the study results. In different regions, the researchers cannot guarantee that the participants had the same mindset when they were studied for anxiety and depression, therefore their results could be different. In addition, it also takes a certain period of time to investigate the subjects, and the same analysis of the data in different times will also lead to bias.

4. Conclusion

Based on the research, it is concluded that the COVID-19 pandemic does increase children's and adolescents' levels of anxiety and depression.

The vast majority of research reports show that there are negative effects. The reasons for these negative effects include but not limited to the following:

The first is the mental pressure brought by society. News and media reports send children and teenagers bad signals that society is in massive chaos, making them live with much stress which leads to anxiety and depression. City control and lockdown limit the range of activities for children and adolescents, confining them in small spaces every day. Living a monotonous life makes them irritable, which leads to anxiety and depression.

The second is family reasons. A member with corona-virus or separation from other family members can strain children and adolescents, exacerbating anxiety and depression.

The third is the change in the personal lives of children and adolescents during the pandemic. Children and adolescents are unable to exercise outdoors or socialize offline, and their daily range is limited to home. In addition, the arrival of online courses has also greatly changed the lives of children and adolescents. Some of them were anxious about learning online because of the efficiency of online courses, leading to deeper anxiety and depression.

Some children and adolescents already had some symptoms of anxiety and depression before COVID-19, and during the pandemic, these symptoms may increase due to the mental stress caused by the above reasons, and some of them cannot get timely treatment, leading to the higher degree of anxiety and depression.

Although the effect of the COVID-19 pandemic on children and adolescents' levels of anxiety and depression is overall negative, there were some positive effects that are worth mentioning. The social support gave children and adolescents strong confidence in the future situation. (Jones et al. 2021) Secondly because of the lockdown, family bonding strengthened a lot. Family members staying with each other every day improves their relationship and allow children and adolescents to understand the importance of family and feel the love and care from it. (Jones et al. 2021) At last, children and adolescence had time to exercise and entertain themselves, which would have a positive effect on the levels of anxiety and depression. (Okuyama et al. 2021) (Thygesen et al. 2022)

Children and adolescents are the hope of social development, so it is crucial to ensure their mental health. Researchers should pay attention to the anxiety and depression of children and adolescents during the pandemic, and strive to improve their mental health. Thus, here are some focuses of further research:

Further research could focus on the long-term impact of COVID-19 pandemic on children and adolescents' levels of anxiety and depression. Since WHO announced the COVID-19 pandemic is over, the research on the whole period of the pandemic can be finished. Further research could also focus on how to reduce the levels of children and adolescents' depression and anxiety after the Covid-19 pandemic. Due to the significant impact the pandemic had on the depression and anxiety levels of children and adolescents, the researchers must pay their attention to the change of the patients and how to help them recover from mental diseases.

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