BOLEK, Monika, DOBRZENIECKI, Krzysztof, BŁASZCZYSZYN, Katarzyna, HOPEJ, Natalia, MUC, Katarzyna and TUREK, Kacper. The impact of climate change on mental health of children and adolescents. Quality in Sport. 2024;16:52387. eISSN 2450-3118.
https://dx.doi.org/10.12775/QS.2024.16.52387
https://apcz.umk.pl/QS/article/view/52387

The journal has been 20 points in the Ministry of Higher Education and Science of Poland parametric evaluation. Annex to the announcement of the Minister of Higher Education and Science of 05.01.2024. No. 32553.
Has a Journal's Unique Identifier: 201398. Scientific disciplines assigned: Economics and finance (Field of social sciences); Management and Quality Sciences (Field of social sciences).
Punkty Ministerialne z 2019 - aktualny rok 20 punktów. Załącznik do komunikatu Ministra Szkolnictwa Wyższego i Nauki z dnia 05.01.2024 r. Lp. 32553. Posiada Unikatowy Identyfikator Czasopisma: 201398.
Przypisane dyscypliny naukowe: Ekonomia i finanse (Dziedzina nauk społecznych); Nauki o zarządzaniu i jakości (Dziedzina nauk społecznych).

The authors declare that there is no conflict of interests regarding the publication of this paper.
Received: 10.06.2024. Revised: 30.06.2024. Accepted: 03.07.2024. Published: 11.07.2024.

The impact of climate change on mental health of children and adolescents

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Abstract:
Climate change can affect the mental health of children and adolescents. This age group is considered particularly vulnerable to this impact because they are in a period of cognitive and emotional development, during which they are still developing their coping skills. Children and teenagers with pre-existing mental health disorders, such as depression or anxiety, are especially at risk.

It is important for parents, medical personnel, and others working with children and adolescents to have the necessary knowledge to help them cope with these challenges. This publication aims to present the current state of knowledge regarding the impact of climate change on the mental health of children and adolescents. Both the direct and indirect effects of these changes will be analyzed, along with strategies for coping with them. By understanding the potential risks, it is possible to develop effective psychological support strategies to minimize the negative impact of climate change on children and adolescents.

Keywords: mental health, environmental health, climate change

Introduction

Climate change can affect mental health through several mechanisms. Firstly, mental health can be impacted directly through the experience of natural disasters such as hurricanes, floods, and wildfires. Experiencing these events can lead to substantial stress and, consequently, trigger mental health disorders such as post-traumatic stress disorder, anxiety disorders, and depressive disorders (1–3).

Secondly, the increasing awareness of the impact of ongoing climate changes on future functionality can negatively affect the mental health of children and adolescents. Long-term stress associated with eco-anxiety, defined as the chronic fear of environmental destruction, and a sense of uncertainty regarding the future, significantly impacts the mental health of young individuals (3,4).

Thirdly, climate change influences mental health through indirect mechanisms, leading to migration and displacement, which disrupt social stability and a sense of security, further burdening the psychological well-being of children and adolescents. Moreover, chronic health problems related to air pollution, lack of access to clean water, and food insecurity elevate levels of stress and anxiety among young people (1,3,4).

Mental health is a vital component of overall health and forms the foundation for an individual's effective functioning in society. Childhood and adolescence are critical periods for the proper development of cognitive, social, and emotional skills. According to WHO, 10% of children and adolescents worldwide experience mental disorders, and suicide is the fourth leading cause of death in the 15-19 age group (1,5).

According to a meta-analysis of 192 epidemiological studies, the majority of psychiatric disorders begin in childhood. Young people with depression and anxiety disorders are at increased risk of deteriorating health in the face of climate change-related disasters. The impact of these problems during childhood negatively affects the entire course of adulthood, consequently reducing the quality of life (2,3,6).

Method

An analysis was conducted on research papers found on PubMed, Web of Science, Embase, and Google Scholar, utilizing search terms that included the following keywords: mental health, children and adolescents, climate change, global warming, environmental health, PTSD, depression, anxiety, extreme weather, temperature rise, eco-anxiety, famine, migration.

Direct effects of climate change on mental health

Most studies focus on the direct effects of climate change on mental health, particularly those arising after experiencing extreme weather events such as floods, earthquakes, hurricanes, and fires. Natural disasters can exacerbate existing mental health disorders in children, increase the frequency and severity of relapses, and lead to the onset of new disorders. These events can trigger a range of negative emotions, including fear, overwhelm, stress, anger, helplessness, and hopelessness. Other serious consequences include post-traumatic stress disorder (PTSD), depression, separation anxiety, psychotic disorders, social phobia, anxiety disorders, panic attacks, sleep disturbances, learning difficulties, behavioral problems, substance abuse, symptoms of shock and trauma, and even suicidal thoughts and attempts. The risk of these outcomes is influenced by various factors such as past mental health disorders, individual coping and adaptation abilities, socioeconomic status, gender, degree of exposure to the events, and social and family support after the event (1,3,7–9).

Few studies focus exclusively on children and adolescents. In a study involving teenagers after Hurricane Mitch in 1998 in Nicaragua, results showed many serious implications such as PTSD and depressive reactions (10). Besides PTSD, children exposed to natural disasters are more susceptible to developing anxiety and depression. Anxiety can stem from concerns about future events, personal and familial safety, and uncertainty about the future. Depression can result from the loss of loved ones, homes, or life stability. Research conducted after the California wildfires showed that children who lost homes or witnessed destruction had higher rates of depression and anxiety compared to their peers (11). Studies indicate that children who survived Hurricane Katrina had significantly higher rates of PTSD and depression compared to those who were not exposed to the event (12).

Research demonstrated that, compared to adults, children and adolescents were more vulnerable to trauma caused by environmental disasters (13,14). These studies highlight the potential sensitivity of children and adolescents to climate change-induced disasters. After the L'Aquila earthquake in the region of Abruzzo, Italy, 1839 children and adolescents were assessed, revealing a PTSD prevalence (according to the Child Behavior Checklist) of 8.4% in the epicenter, 4.0% in the surrounding area, and 2.2% in the unaffected zone (15). The impact of trauma on development is long-lasting, although symptom peaks occur within the first year after the disaster (13).

According to an Icelandic study, children exposed to a volcanic eruption had greater risk of developing anxiety disorders. Mental health issues continued for a duration of three years (16). Among children who experienced a hurricane in Puerto Rico, 18 months after the disaster, rates of depression, social phobia, and separation anxiety were more common than PTSD (17).

Climate change and related extreme weather events can also lead to sleep disorders and problems with daily functioning. Children may experience difficulty sleeping, nightmares, and issues with concentration and learning. The loss of routine and stability, along with living in temporary shelters, can further exacerbate these problems (18).

In a meta-analysis by Rubens et al., an increased prevalence of mental disorders, including depression, panic attacks, anxiety disorders, and aggressive behavior, was demonstrated following disasters (19). Importantly, the consequences of exposure to natural disasters extend beyond childhood and adolescence. Maclean et al., assessing 27,129 cases from a national epidemiological survey in the USA, found a higher likelihood of anxiety and depression in adulthood among those who experienced natural disaster before turning five (20).

Temperature rise

There is more data and research on the relationship between high temperatures and the mental health of adults than children and adolescence. A study involving 20,000 adults found no significant correlation between mental health and average temperature; however, it did show a correlation between mental health and temperature fluctuations (21).

Conversely, Majeed and Lee indicated that high temperatures associated with climate change can independently affect the mental health of children (3). What is more, children's ability to learn may be impaired due to high temperatures. The optimal temperature for learning is around 20ºC. In a study in Costa Rica, where classroom temperatures were reduced from 30ºC to 25ºC, academic performance in language skills and logical thinking significantly improved (22).

Eco-anxiety

Data from multiple countries indicate that climate change can significantly impact the mental health. Increasingly, research demonstrates that young people are experiencing chronic anxiety related to the effects of climate change, termed eco-anxiety (4,7,23). It has been shown that even observing the effects of climate change through media, without direct

experience, can influence mental health. Awareness of climate change can lead to increased pro-environmental behaviors but may also cause paralyzing fear and denial in some individuals. This can result in panic attacks, sleep disturbances, and obsessive thinking. The awareness of global warming and its consequences can evoke emotions such as guilt, sadness, and anger, contributing to the concept of eco-anxiety (4,24–27).

Individuals experiencing eco-anxiety may suffer significant stress that limits daily functioning and leads to depressive symptoms. In an Australian study involving 600 children aged 10 to 14, 44% of participants expressed concern about the future impact of climate change, and a quarter feared the world would end before they reached adulthood. Learning about climate change without appropriate coping mechanisms can result in feelings of hopelessness and denial (21). The mental health impacts of eco-anxiety on children and adolescents still require further investigation.

The indirect impact of climate change on the mental health of children and adolescents

The indirect impact of climate change on the mental health of children and adolescents is complex and multifaceted. Factors such as economic effects, population migrations, environmental and infrastructure destruction, food shortages, and limited access to drinking water can lead to mental disorders (7,8,18).

Food and water shortages:

Impacts of climate change, such as droughts and floods, can lead to shortages of drinking water and food. This, in turn, can result in malnutrition and dehydration, negatively affecting the physical development of children. For children in their developmental stages, receiving all essential nutrients is crucial for proper growth and development. Food shortages can lead to health consequences such as stunted growth, immune system disorders and poor wound healing. Additionally, the lack of consistent access to drinking water and food has negative implications for mental health. The immense stress associated with the unavailability of these essential life elements can contribute to the development of mental disorders (18,28).

Migration:

Consequences of climate change, such as desertification flooding and landslides, may result in necessity of resettlement, which can be particularly challenging for children and adolescents. Losing home, school, and community can lead to feelings of uncertainty, isolation, anxiety, and depression. Children displaced due to floods, droughts, or other climate change-related events often struggle to adapt to new conditions, resulting in social integration and educational challenges. Due to extreme weather events and long-term climate changes, many

families are forced to migrate. Such experiences can lead to the disruption of social bonds, loss of a sense of belonging, and an increased risk of mental disorders (1,29).

Social and economic factors:

Climate change also has indirect economic effects that can impact the mental health of children and adolescents. Agricultural losses, rising food prices, and infrastructure damage can lead to increased poverty and economic insecurity. Children from families affected by economic difficulties may experience higher levels of stress, anxiety, and decreased self-esteem (1,30).

Physical health:

Somatic and mental health are closely interlinked and interdependent. Chronic somatic diseases can trigger mental disorders. Adverse climate changes that deteriorate the physical health of children and adolescents simultaneously negatively affect their mental health. Experiencing intense chronic stress, through excessive activation of the sympathetic nervous system, can exacerbate mental disorders. Climate change may lead to increased exposure to diseases such as infectious diseases (high temperatures facilitate the spread of vector-borne diseases like malaria, dengue, and tick-borne diseases) or respiratory diseases (such as asthma and other chronic lung conditions) (31,32). Furthermore, recent studies suggest a possible negative impact of air pollution, including higher concentrations of greenhouse gases such as nitrogen dioxide, not only on physical health but also on the incidence of depression in children and adolescents (33).

Conclusions

Climate change, encompassing both the direct effects of extreme weather events and the indirect effects associated with chronic stress, can pose risk factors for the development of mental disorders. Further research on the relationship between climate change and mental health is necessary, along with the development of psychological support strategies for children and adolescents to mitigate the impact of these changes. It is crucial to undertake actions aimed at providing psychological support to young people and developing adaptive strategies (climate education, emotional support, and building psychological resilience) that will help them cope with the challenges posed by climate change.

Disclosure:

Authors' contribution:

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All authors have read and agreed with the published version of the manuscript.

Funding statement:

The study did not receive special funding.

Institutional review board statement:

Not applicable.

Informed consent statement:

Not applicable.

Data availability statement:

Not applicable.

Conflict of interest:

The authors declare no conflict of interest.

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