Mental Health of Adolescents in the Strawberry Generation: A Bibliometric Analysis

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ABSTRACT

Background: Basic Health Research (2018) recorded that more than 31 million people aged 15 years and above experience mental health disorders, with more than 19 million experiencing emotional disorders and 12 million depression. Adolescent mental health is an important issue in psychosocial development, especially in the digital era. The Strawberry Generation, which refers to today's teenagers, faces social and digital pressures that can cause stress, anxiety, and depression. Aims: This study aims to assess global research trends in adolescent mental health for the strawberry generation based on the emergence of terms in text data. Methods: A literature review using bibliometric analysis is used to answer the research objectives. Results: This study uses the Google Scholar, Scopus, and PubMed databases to analyze research between 2019 and 2024; the result is 500 journal articles. Results show that in the last 5 years, the trend of adolescent mental health research has had good stability with minor fluctuations. A significant increase occurred in 2020, while 2021 showed a mild decrease. From 2022 to 2024, the number of articles remained relatively stable although there was a slight decrease in 2024 due to the data being collected in August 2024. This stability suggests that the topic continues to receive consistent attention over a long period. Conclusion: Bibliometric analysis highlights increased publications on social media's impact on adolescent mental health but notes limited research with a lack of longitudinal methods; digital platforms like survey apps can aid periodic data collection for deeper long-term studies.

Keywords: Good health, Mental disorder, Mental health, Strawberry generation, Well-being.

INTRODUCTION

Adolescent mental health is a fundamental aspect of individual development that is often a major focus of public health research and practice. In the generation known as the "strawberry generation"—a group of adolescents born between the late 1990s and early 2010s—mental health challenges have become increasingly complex and specific. The term "strawberry generation" is used to describe adolescents who are growing up in a fast-paced, connected digital environment, facing pressures that previous generations have not experienced (Reid *et al.*, 2001).

The strawberry generation is a term that was first used as a "label" for Taiwanese people born after 1981. This term is intended for a generation that "easily" wilts "like strawberries" that physically look exotic but are easily crushed when stepped on or bumped (Bemme and Kirmayer, 2020). The strawberry generation in Indonesia includes Gen Z and Gen Millennials with an age range of 20-34 years (Claretta, Rachmawati and Sukaesih, 2022). Statistics Center data in 2023 stated that the number of millennials in Indonesia aged 20-34 reached 24 percent. This strawberry generation often needs *self-healing*, self-esteem, and *work-life balance* to maintain their mental health (Martuti and Dharin, 2023).

The current mental health condition of adolescents can also be influenced by social media, according to (Wilson and McDarby, 2023) the use of social media (Facebook) has affected the mental health of adolescents in the last 15 years.

Individuals now receive information about social networks through feeds on social media that are more relevant to their lives. The content on the platform includes videos and can be easily accessed using a smartphone. This is what makes social media more exciting and has a bad effect on mental health (Wilson and McDarby, 2023).

Based on data (UNICEF (United Nations Children's Fund), 2021) the general picture of mental health in adolescents aged 10-19 years is caused by two things, namely anxiety and behavioral disorders in children. In adolescents aged 10-19 years, anxiety and depression disorders include around 40% of mental disorders, followed by behavioral disorders 20.1% and hyperactivity disorders due to lack of attention 19.5%. The effects of this anxiety disorder has caused an increase in the percentage of the seriousness of adolescents aged 13-15 years thinking about attempting suicide, in women by 4.8% in 2007 to 6.2% in 2015 and men by 3.2% in 2007 to 4.0% in 2015. Research by Grace, Tandra, and Merry (2021) shows that there are limitations in understanding mental health, so it is necessary to provide socialization regarding the importance of mental health with activities that can provide an effective understanding of mental health (Claretta, Rachmawati and Sukaesih, 2022).

In 2018, Basic Health Research found that more than 31 million people aged 15 years and over experienced mental health disorders. Of that number, more than 19 million were emotional disorders and more than 12 million were depressed (Wiradimadja, 2020). This supports the idea that Gen Z is not a resilient enough generation. The healthy mental health of adolescents in the strawberry generation is very important in efforts to realize optimal mental health levels for each individual, especially in improving the quality of productive age. The purpose of this study is to provide direction for hot topics and identify research trends related to adolescent mental health in the strawberry generation.

METHODS

Bibliometric analysis is a method used to determine research trends related to adolescent mental health in the strawberry generation. Bibliometrics is a quantitative research method that is used to explore patterns, trends, and relationships in scientific publications (Hertinjung *et al.*, 2024). An examination of the academic literature on adolescent mental health in the strawberry generation provides important insights into the current state of research.

This study uses a literature review method with bibliometric analysis to answer the research objectives. Bibliometrics is a statistical analysis of books, articles, or other scientific publications. Conducting bibliometric analysis can use data on the number and authors of scientific publications and articles and citations in them which aim to measure the output of individuals or research teams, institutions, and countries, identify national and international networks, and map the development of new fields of science and technology (Hertinjung *et al.*, 2024). Bibliometrics are useful for evaluating and mapping the research of a researcher, research organization, and country over some time. Bibliometrics is also known as *Scientometrics* (Herawati, Utami and Karlina, 2022).

The literature study uses inclusion and exclusion criteria. The inclusion criteria used were original articles related to all research designs, open access, full-text papers, and articles published in journals between 2019 and 2024. The exclusion criteria are case reports, reviews, no outcome data, and inaccessible (closed access). Articles that do not meet the criteria will be excluded from the source data.

The topic of mental health, particularly in the strawberry generation of adolescents, has high urgency due to the high prevalence of mental disorders, the challenges of the digital age, and the far-reaching social impact. More in-depth and targeted research can help create more effective and relevant interventions to support adolescent mental health in the future.

The first step in conducting a bibliometric analysis is to systematically collect relevant scientific publications. The collection of publications is done using a *reference application manager*, namely *Harzing's Publish or Perish* (PoP), to find out the condition of citation distribution from a source. *Google Scholar,*

Scopus, and *PubMed* metadata from reputable international and national journals are synchronized into source data. The stages in bibliometric analysis begin with collecting articles related to the title study using *Publish or Perish* (PoP). Furthermore, data was processed and analyzed using Mendeley with the main checking criteria being abstract and *keywords*.

The article search in the PoP application uses the keyword *"Adolescent Mental Health for Strawberry Generation"* with the period of 2019-2024. Article searches were conducted on August 10, 2024. The selection of the Google Scholar database as a source of article data collection is based on easy access to article searches and the number of articles obtained is more with free access facilities. The maximum search for articles allowed in the Google Scholar database is 1000 articles. Scopus and PubMed are based on searching for reputable international journals. This study used 500 articles. Then information is obtained in the citation metrics section which displays complete quantitative data related to the search results of related journals. The data collected from the search results from PoP will be stored in the form of RIS (research information systems) files and then the data will be analyzed using the VosViewer application.

In the next stage regarding the visualization of article data in the form of networks, the VoSViewer application was used. VoSViewer software was used to analyze publication trends regarding strawberry generation and its influence on adolescent mental health. The output of data processing is in the form of network visualization, overlay visualization, and density visualization. The network visualization map is used to see the relationship and cluster of research themes related to the keywords used. Overlay visualization is used to identify the year theme-related research was conducted. Meanwhile, density visualization was utilized to analyze the research theme, which is still rarely researched.

RESULTS AND DISCUSSION

This study aims to identify research trends and co-authorship on the research topics and the extent to which teenagers who are part of the strawberry generation experience mental health issues. This objective is achieved through analysis of bibliometrics with the help of PoP and VosViewer devices, while data were obtained from the Google Scholar, Scopus, and PubMed databases which were then exported to Mendeley. Based on the results of the bibliometric analysis, it will display several pieces of information,: 1) Data analysis of citations from PoP, 2) Study trends of mental health over the past five years (2019-2024), 3) Networked research on mental health in the strawberry generation, 4) Related research clusters.

Here is the table description:

Table 1. Citation Data Metrics

Publication years	: 2019-2024
Citation years	: 5 (2019-2024)
Papers	: 500
Citations	: 10,707
Cites/year	: 2,141.40
Cites/paper	: 21.41
Cites/author	: 5,893.68
Papers/author	: 309,05
Author/paper	: 2.43
h-index	: 42
g-index	: 98
hI norm	: 29
hI annual	: 5.80
hA-index	: 26
Paper with ACC > =1,2,5,10,20 : 253,196,123,62,33	

Table 1 describes that during the 5-year final, there are several 500 articles relevant with the keywords "Adolescent Mental Health for the Strawberry Generation" having paper, abstract, and keywords displayed in the Google Scholar, Scopus, and PubMed databases. The total number of citations from all articles is 10,707 with an average per year of 2,141.40, and the average citations per paper is 21.41. The average h-index owned by each author is 42, with the number quoted highest being 98.
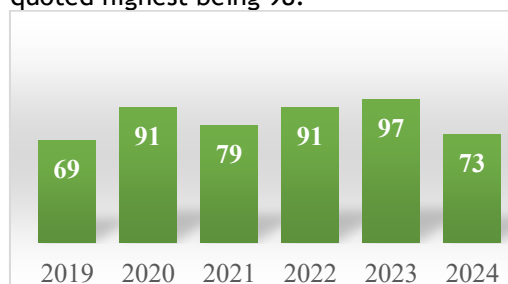
Figure 1. Research Trends of Adolescent Mental Health for Strawberry Generation

The trend of research developments on *"Adolescent Mental Health for the Strawberry Generation"* is shown in Figure 1 which experienced quite significant changes. The graph shows a trend where related research from 2021 will peak in 2023. However, the research figures for 2024 are still uncertain, because this data collection was carried out in August 2024, so it remains to be confirmed whether there will be an additional amount of study concerning analysis of trends in *Adolescent Mental Health for Strawberry Generation* in the last five years.
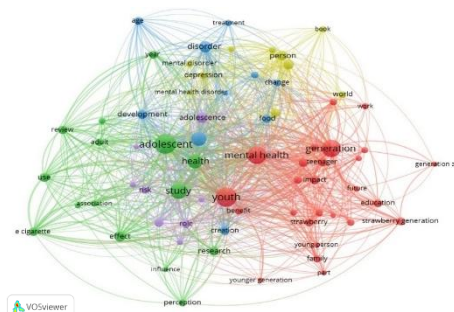

Figure 2. Network Visualization of Networks between Research Topic Adolescent Mental Health for the Strawberry Generation.

Network between topics found based on study of adolescent mental health especially in the strawberry generation. The number of topics found was 500 articles from 2019 to 2024. Bibliometric analysis was carried out by visualizing. The structure of the network of relationships between research keywords with the help of *VosViewer software* can be seen in Figure 2 which shows the results from processed keywords mapping. This displays the picture in detail and the cluster section provides a general overview and insight. Each circle represents a keyword which often appears, and the size of the circle depends on the topic related to the article.

All research themes related to adolescent mental health, especially those occurring in the strawberry generation, are grouped into five main clusters with different colors, namely red, green, blue, yellow, and purple. Each color has similarities that can be checked in the section *'items'* on *VosViewer*. The five clusters with their respective topics appearing based on color are *mental health, generation, youth* (round red), *adolescent* (round green), *child* (round blue), *person* (round yellow), *and adolescence* (purple round). In addition, it appears that network visualization shows the relationship between issues in studies, starting from popular issues to less popular issues, so that they can be used as proposals for further research.

In visualization Figure 2, the size of the circle shows the keywords that stand out with those used more having a big size circle. There are the topic*s mental health, generation, youth, and adolescence.* Circles with small size and distance link show that the issue still seldom appears and connections are weak with the main keywords so that it is possible to do further research.
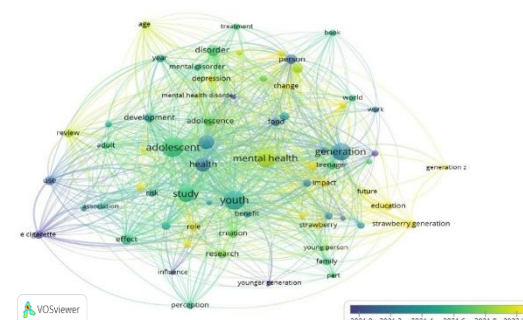

Figure 3. Visualization of Research Trends Overlay Based on Keywords

Based on the visualization above, it shows that the yellow circles indicate the topics It indicates that the topic of research on adolescent mental health is recent.

Bringing up the words "*Adolescent Mental Health for Strawberry Generation*" and then processing with VosViewer, there are five groups or clusters. Based on the results of item analysis on the VosViewer software, the five clusters are mental health, youth, generation, adolescent, health, effect, child, and disorder. The cluster grouping can be seen in Table 2 following.

Table 2. Cluster Identification

Cluster	Total Item	Most frequent keywords (occurrences)	Keyword
1	26	Mental health (369), youth (365), generation (357), impact (97).	Benefit, community, covid, education, experience, family, future, future generation, generation, generation Z, impact, mental health, parent, part, relationship, school, strawberry, strawberry generation, student, teen, teenager, time, work, young person, young generation, youth.
2	15	Adolescent (475), health (250), effect (150), use (131).	Adolescent, adult, e-cigarette, effect, health, influence, new generation, perception, research, review, study, use, year, young adult.
3	10	Child (242), disorder (161), development (111), food (97).	Age, case study, change, child, creation, development, disorder, food, nutrition, treatment.
4	10	Person (130), life (105), depression (82), mental illness (73).	Anxiety, book, depression, life, mental disorder, mental health disorder, mental illness, person, quality, world.
5	8	Adolescence (127), consumption (97), role (95), risk (80).	Addition, adolescence, adolescent, Canada, consumption, obesity, risk, role

Discussion

Based on the visualization and topic grouping from *VosViewer,* it appears that the mental health condition of adolescents in the last two years cannot be separated from generation. The strawberry generation is known to be weaker than the previous generation (Claretta, Rachmawati and Sukaesih, 2022). The high expectations from the surrounding environment such as family, friends, and society can create pressure to achieve a certain standard in life. Pressure in terms of social expectations and academic achievement affects the emotional stability of adolescents so they often feel anxious and afraid of failing to achieve the expected achievements (Putri *et al.*, 2024).

According to Hongell-Ekholm, Londen, and Fagerlund (2024), mental health problems in adolescents caused by academic achievement pressure can be controlled by using Study with Strength, which is included in the school curriculum. This positive psychology intervention can support adolescents' well-being and personal growth positively. This is in line with the results of research conducted by Alam and Mohanty (2024) which states that handling good psychological constructs within the educational environment can foster students' hope, life satisfaction, and self-esteem and have long-term effects on students' well-being and academic achievement.

Concerns about the cost of living in the strawberry generation are one of the factors that disrupt the mental health of adolescents, this is according to research conducted by Saila Nur Kamilah (2024) which states that high inflation will hurt Generation Z who are just starting their careers and have limited income. So they must have the ability to achieve financial stability and manage personal finances more wisely. According to Razak, Wirawan, Alwi, Lukman, and Jalal (2024), the entrepreneurial readiness of strawberry generation students can be achieved by implementing entrepreneurship education that is strengthened by digital business literacy and financial literacy.

The results of the item analysis on the *VosViewer software* from the five clusters show that the factors influencing adolescents' mental health in the strawberry generation are *mental health, youth, generation, adolescent, health, effect, child, and disorder*. Mental health itself includes stress and anxiety (Rapee *et*

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al., 2019). Stress and anxiety of the strawberry generation are associated with various factors, including social change, the influence of social media, and a lack of understanding of mental health (Rautela, Sharma and Panackal, 2024). They tend to be susceptible to stress and emotional pressure, are easily over-anxious, feel tied, and have difficulty dealing with pressure and challenges. This stress and anxiety can result in depression and mental disorders (Putri *et al.*, 2024).

The use of social media is one of the factors for mental health problems in adolescents (Ivie *et al.*, 2020). Based on the results of research conducted by Boer, Stevens, Finkenauer, de Looze, & van den Eijnden (2021), social media is one of the factors for the decline in adolescent mental health in the strawberry generation. Through the random intercept cross-lagged panel model, it shows that there is a direct unidirectional relationship between the problem of intensive social media use / social media use intensity (SMU) and mental health. Problems in high school are associated with decreased mental health one year later, but not vice versa. This is not in line with the results of research from Marciano, Ostroumova, Schulz, and Camerini (2022), which states that not all types of digital media use have adverse consequences on adolescent mental health. Specifically, face-to-face communication, self-disclosure in the context of online friendships, and positive and humorous online experiences reduced feelings of loneliness and stress.

In some cases, the stress and anxiety of the strawberry generation can result in suicidal tendencies, as shown by a survey that found that 1 in disorder in 12 months. This tendency is associated with complex pressures, including the presence of social media which can affect young people's self-confidence and make them more vulnerable to stress and anxiety (Panjaitan, 2024).

CONCLUSIONS

Bibliometric analysis shows that there has been a significant increase in the number of publications discussing adolescent mental health conditions such as anxiety, depression, and adolescent behavioral disorders resulting from intense exposure to social media. This trend reflects the growing concern regarding social media's role in the strawberry generation's psychological well-being. Bibliometric analysis also reveals limitations in the literature. Many studies focus on a specific country or culture, so the results may not be fully generalizable to the global adolescent population. In addition, some studies still lack longitudinal methodologies that can provide insights into changes in mental health over time. Therefore, digital platforms such as survey apps can be utilized for periodic data collection to support deeper, long-term research.

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