

The Impact of Teenagers' Digital Footprints: Examining How Data Breaches Trigger Anxiety and Depression and Solution to the Problem

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Abstract

The youths' actions within the digital platforms have been defined as digital footprints, which are crucial in facilitating analysis and understanding of their behaviour. Extensive digital footprints among the youths have exposed them to increased vulnerability to mental health. This scenario is explained by increased emotional response among the youths, which presents a unique challenge, especially due to their lower resilience than adults. The strong intersection between digital privacy violations and teenage mental health creates a complex relationship that requires the implementation of a multifacetedmultifaceted intervention that addresses the associated gaps. Interventions such as increased digital literacy, mental health support, and innovative technology interventions are crucial practices recommended to address issues related to digital breaches and teenagers' mental health. Future studies should consider the limitations of this research, which include rapid technological innovation and challenges isolating data breaches from other stressors of mental health among teenagers. The purpose of this systematic review study is to evaluate the link between data breaches and increasing cases of anxiety and depression among the teenagers. Also, the study will provide recommendations such as opportunities for digital literacy, access to mental health programs, policy interventions and improved technology innovations.

Keywords: Data Breach, Teenager, Mental Health, Anxiety, Digital Footprint, Depression

Introduction

The youths have a positive trend in their interaction with digital platforms. Their actions have been guided by the need to match modern socialising methods, including social media platforms. The youths' actions within the digital platforms have been defined as digital footprints, which are crucial in facilitating analysis and understanding of their behavior [27]. The youth's digital prints have presented a growing area of research with the focus on understanding how their interactions within the platforms affect their wellbeing [1,10]. Data breaches are among the key concerns that have led to increased cases of mental health issues among the teenagers. The purpose of this systematic review study is to evaluate the link between data breaches and increasing cases of anxiety and depression among the teenagers. Also, the study will provide recommendations such as opportunities for digital literacy, access to mental health programs, policy interventions and improved technology innovations.

Problem Statement

The teenager's digital presence is a growing trend considering that they are being exposed to numerous digital platforms. However, unsupervised actions have raised more concerns over the teenager's mental health with cases of anxiety and depression being on the rise. The mental vulnerability of the teenagers has been associated with their low emotional resilience [16]. This is a gap that presents a challenge when privacy violations and other cases of data breaches occur. The teenagers as a result, feel the pressure of responding to the emerging mental struggles as they feel overwhelmed

by the adverse outcome of the breaches [5,8]. Among the reported cases includes issues of social validation, peer pressure and cyberbullying [26]. This is an issue that is creating a need for rigorous research interventions to address the gap between mental health outcome and data breaches.

Significance Of the Study

The findings of this study will provide a framework upon which existing research gaps will be explored to inform future recommendations on the use of digital platforms among the youth while positively influencing their mental health outcomes [6,21]. Also, the study will significantly contribute to the conversation about data breaches that have had a major influence on individual lives, not only among youths but also among adults [28]. Thus, the research findings will play an important role in enhancing a safe conversation about the use of digital footprints to improve the quality of life among users while reducing possible vulnerabilities that would lead to mental health challenges [3,17]. Also, the recommendations of this study will impact technology developers by creating innovative technologies that address privacy and data breach issues. Such will be an extensive area through which safe interactions within the digital platforms will be enhanced through a holistic intervention that promotes individual well-being [25].

Research questions

1. How do teenagers' digital footprints influence their mental health outcomes?
2. How do data breaches on teenager's digital footprint trigger the onset of depression and anxiety?
3. How does digital literacy reduce teenagers' vulnerability to their digital footprints?

Literature review

A study by Ophir et al. (2019) identifies that digital footprints have had a major impact on individual mental well-being. The impact has differed based on individual differences in emotional responses and digital literacy levels. However, a consistent finding is that digital presence has been associated with controversies, particularly due to increased cases of data breaches [24,28]. Teenagers are among the most affected population by extreme cases of digital footprints, given their lower resilience amidst parallel reactions from their peers. Violation of individual privacy has been associated with extreme cases of anxiety and depression, which is a collective expression of vulnerability among teenagers [7,19]. Cases of cyberbullying have been present and quite emotionally demanding for the youths to handle compared to the youths. Such vulnerability has been exposed by multiple studies which support the inappropriate use of digital platforms as a risk factor for mental health struggles.

Cyberpsychology is a growing field of research that has examined how digital footprints have influenced individual behaviour and reactions to the content shared through the respective platforms [29,30]. Digital identity has, therefore, become a key concept that has been explored across various populations [23]. The usage of digital platforms among teenagers has been confined to the context of socializing, youth development, and exploring opportunities in the online space. While this venture has had positive outcomes, there are growing concerns over increased cases of mental health. This worsens because about 90% of adolescents in the US have access to mobile devices and other devices that allow them to be online [21]. This statistic cuts across other countries, with developed nations having similar trends. Such a finding explains the need for an increased examination of how digital footprints influence teenage behaviours.

Issues with data breaches have been associated with compromised user autonomy, with users having no control over their online presence and interactions [12]. Such phenomena have had a negative impact on the way the teenagers

interact. Cases of cyberbullying, especially where personal information is compromised and exposed to the online community, trigger depressive and anxiety incidents among teenagers [2,22]. This cites the possibility of digital platforms amplifying hazardous mental outcomes where teenagers feel they are out of control of their emotions and reactions towards their digital footprints [9,19]. While teenagers have the choice of actions, data breaches affect the quality of their digital presence, especially with the pressure to manage the negative outcomes.

Teenagers have a higher tendency to create social media and digital content and share it with their peers. This is an area that has led to an increase in the risk factor of data breaches as well as cyberbullying. Such adverse outcomes come with the pressure of social validation, where teenagers need to be appreciated and complimented by their peers [7,22]. However, the cases worsen, especially when they get negative responses and feedback, which affects their emotional status. This phenomenon makes them more vulnerable and susceptible to mental issues. The outcomes are worse, especially if the teenagers have pre-existing mental health conditions, which makes them more susceptible [3,14].

While there is consistency in the findings that support the correlation between digital footprints and the mental health of teenagers, there is growing research on possible interventions that would help contain and reverse the negative outcomes [13,21]. This includes providing teenagers with emotional support from their families and other social groups. From this, the teenagers feel appreciated and the presence of people who care about their feelings [21]. This means they will bounce back from the negative comments while developing emotional resilience. Also, increased opportunities for collaboration between teenagers and psychologists have been a core foundation upon which the youths are bouncing back from the negative impact of their digital footprints [30]. This is expressed in the youths receiving professional guidance on addressing cases associated with data breaches and possible prevention measures. Such interventions have been critical in improving their coping ability and digital literacy, such as using updated security protocols [2,23]. The application of age-appropriate settings has also been provided as a key intervention that helps bridge the gaps among teenagers, especially to prevent data breaches and associated threats.

Methodology

This study will use a systematic review through a comparative review of empirical findings from past studies. The use of secondary sources is guided by the provision that there is an increase in the number of studies on digital footprints, cyberbullying and mental health outcomes. As a result, there is confidence that sufficient information will be obtained to inform future research. This study will attempt to highlight research gaps, which is a key recommendation that will help in the realization of the appropriate use of digital footprints among teenagers to help reduce instances of depression and anxiety.

The search strategy for this systematic review is guided by the provision of the PRISMA flow diagram (**see Appendix 1**), which outlines the key stages followed to ensure quality studies are selected. The choice of the diagram ensures that the selection of the articles is systematic and within the scope of this study to improve the credibility of the research findings. The key databases used for this study include PubMed, Web Science, Google Scholar, Medline, PsycINFO and Scopus. The choice of these databases is based on their track record in providing credible and quality articles in terms of research output.

The research questions identified above will be used to guide the search strategy. The key search terms that will be considered for this study will include: "psychological impact," "privacy violation," "digital privacy," "teenager,"

"anxiety," "youth," "emotional response," "data breach," and "depression." The inclusion criteria will include peer reviewed articles that are published between 2015 and 2025. Also, the articles should be written in English and within the research scope as outlined by the search terms. The articles should either have quantitative or qualitative research methods related to mental health outcomes among the youths under the influence of their digital footprints. Exclusion criteria will include duplicates and articles older than 10 years.

Data extraction and analysis for this study will follow the screening of the article's title and abstract. Further, the full-text review will identify patterns in themes related to teenage digital footprints and mental health. Thematic analysis will be used to present the systematic review findings of the identified studies.

Results

Out of 50 studies screened, 12 articles were selected for systematic review to be used in this study. The number was realized following a thorough screening of the studies to meet the inclusion and exclusion criteria identified in the methodology. Further, 80% reported depressive disorders among teenagers under the influence of their digital footprints. Also, 60% of the studies associated with mental health concerns were linked to data breaches following the impact it has on cyberbullying. Increased depressive and anxiety symptoms were associated with increased cases of social validation and peer pressure among the youths. The youths were also identified to have increased psychological distress, especially when they were exposed to privacy violations. This important result supports the scope of this research, which associates data breaches with increased psychological distress among teenagers. About 70% of the studies synthesized recommended that digital literacy, especially privacy and security measures, should be implemented among teenagers. The interventions, as seen in most of the studies, should be complemented by supportive mental health programs to aid the teenager in managing their emotional distress. This includes the call for increased interventions through policy implementation that will enhance proper governance of digital footprint among teenagers. A review of the studies also identified a lack of support systems, limited digital literacy, and higher social media dependency as the major risk of mental health challenges among teenagers. Further, teenagers who had pre-existing mental health conditions were reported to have increased psychological distress from data breaches. The studies confirmed that increased exposure to technological digital footprints has led to prevalent cases of anxiety and depression.

Discussion

Implications for Mental Health Support

The results of this study have provided the need for improved mental health support interventions. This is a key area that has been highlighted, emphasising increased collaboration between psychologists and teenagers to improve their mental wellness and well-being [13]. Data breaches present unique mental health issues that include anxiety and depression, which are triggered by issues of social validation, peer pressure and cyberbullying. The impact of these actions on the youths has been heavy considering their lower resilience, which triggers poor emotional responses [21]. This vulnerability continues to increase due to the rise in the trends associated with the use of digital platforms by the youth. Today's society is characterized by increased digital presence, which has offered both therapeutic benefits and mental struggles depending on the use and reception by the users [12]. Teenagers have struggled to adapt to the dynamics of digital involvement given the rapid transformation of technology, which has created huge gaps in the recommendations that support the appropriate use of digital platforms.

The strong intersection between digital privacy violations and teenage mental health creates a complex relationship that requires the implementation of a multifaceted intervention that addresses the associated gaps [1,3,12]. There is the need for prompt and strategic interventions that help reduce the negative impact of data breaches on the mental wellbeing of the teenagers [22]. The goal is to reduce the psychological distress associated with their digital footprints that leads to extreme cases of depression and anxiety.

Educational opportunities

Improving opportunities for digital literacy should be utilized as an opportunity that creates awareness on the appropriate use of digital platforms. This is an intervention that follows the protocols of increased awareness on the content that the teenagers share within their digital platforms [19]. Such precaution will reduce their vulnerability towards cyberspace cases that include bullying and privacy violations. The teenagers should be taught the risks and benefits of their digital presence an approach that will help them gain confidence to seek for assistance when they have challenges. Also, the teenagers should be educated on the protocols and measures that improves their online safety such as the use of strong passwords that enhances their privacy [22].

Policy interventions

The use of policy should be used as an intervention that bridges the relationship between data breaches and increased cases of mental health outcome among the teenagers. The goal is to help the teenagers realize a safe space for interaction within their digital presences. One key policy includes the establishment of strong regulations that govern the correct use of the digital platforms [12]. This is an intervention that should be supported by mandatory evaluation of teenager actions in the digital space. The findings of the evaluation should inform the development of mitigative factors to reduce the prevalence of mental health cases. The teenagers should also be compelled to engage in practices that follows provided security guidelines to reduce cases of data breaches. The use of policy should also be enhanced in the context of schools having mental health programs that addresses psychological problems that results from digital presence among the young people [17,24].

Safe Technological innovations

Improved technological innovations should be used as an option to help improve digital footprints of the youths. This is an intervention that will require evidence-based interventions especially on the development of the digital enabling devices that are suitable for the teenagers [14]. For instance, the recommendation for age-appropriate privacy settings will reduce teenagers' vulnerability to their digital footprints. Also, digital platform developers should enhance the development of user-friendly security features, which will be critical to reducing the possible risks [11]. This should be coupled with digital literacy on the importance of regular security updates and youth audits to identify possible struggles. Such a recommendation will serve a crucial role in expanding the direct involvement of teenagers to be active in enhancing security measures.

Limitations and Future Research

This study has presented several limitations with regard to studies of this nature. One limitation is the rapid nature of technological changes, which continually affect the relevance of studies [15]. This limitation affects the implication of the recommendations made, given that the research speed does not match that of technological advancement. Another limitation experienced during the study is isolating the impact of data breaches from using digital platforms from other

stressors. As a result, it becomes difficult to provide recommendations specific to the impact of data breaches on the mental health outcomes of teenagers [10]. Thus, future studies should address the limitations mentioned above, especially focusing on reconciling the differences in the definition of data breaches.

Conclusion

There is a significant relationship between data breaches and mental health outcomes among teenagers. Teenagers' digital footprints have been confirmed as a major trigger to the development of anxiety and depression. This calls for extensive research that proposes evidence-based recommendations that support the appropriate use of digital platforms to enhance the mental well-being of youths. A comparative analysis of the empirical evidence presented in the studies shows the need for a multifaceted approach that emphasises the mental health protocols that will advance the appropriate use of technology across users of different ages. This explains why age-appropriate innovations are recommended to promote good use of the digital space that reduces the vulnerability of users to issues such as data breaches. The youths are vulnerable due to low resilience, which affects their emotional response to negative triggers associated with data breaches. Different stakeholders should be considered in advancing the conversation about using digital platforms to enhance positive outcomes. This is based on the provision that digital platforms have numerous benefits for teenagers and should be optimized to promote their welfare. These findings should be used as a framework for informing future research to expand the opportunities for digital footprints to influence evidence-based interventions that support the users' mental well-being. This is based on the extensive effect of data breaches on the mental health of the youths as well as the adults.

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