

Review

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Review

Impact of COVID-19 on Internet Addiction and Mental Health: A Brief Overview (COVID-19 and Internet Addiction)

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Abstract: Introduction: The new coronavirus SARS Cov2 disease from 2019. (COVID-19), started as a cluster of unexplained pneumonia cases in Wuhan in December 2019, has spread globally and caused a serious public health threat. People were scared due to the COVID-19 cases that were rapidly increasing all over the world and the quick changes in how people lived. The COVID-19 pandemic has affected various aspects of life, one of which is the increased use of the internet, especially social media platforms. Past research has clearly linked a pandemic with signs of stress, depression, anxiety, and suicide thoughts, as well as with excessive internet use. The findings of research conducted around the world indicate that the higher the level of stress associated with the COVID-19 pandemic in an individual, the greater the tendency to develop an addiction to the internet. The aim of this paper was to provide a brief overview of the available scientific findings on the impact of the COVID-19 pandemic on mental health and internet addiction. **Methods:** A sweep through available literature was performed using the database Medline via the PubMed interface for articles written in English, using keywords and MeSH terms "Internet addiction", "mental health" and "COVID-19". **Results:** With insight into the scientific literature on COVID-19, mental health, and internet addiction, we have concluded that during the COVID-19 pandemic, time spent on the internet increased. **Conclusion:** Additionally, due to reduced social activities, above mentioned consequently led to internet addiction and thus to psychological distress, increased loneliness and depression.

Keywords: COVID-19; distress; internet addiction; depression

INTRODUCTION

The new coronavirus disease 2019 (COVID-19), started as a cluster of unexplained pneumonia cases in Wuhan in December 2019., spread globally and caused a serious public health threat. Many nations have implemented limits on population movement and complete or partial lockdowns to halt the spread of disease and prevent health systems from being overburdened (1, 2).

In Serbia, on March 15, 2020., nine days after the first official case of COVID-19 has been reported, government proclaimed a state of emergency. As a result, one of the Europe's strictest pandemic response measures, including a 12-hour curfew and weekend enforcement by the police, strict movement restrictions (especially for those over 65), and border closures, were put into place. All kindergartens, schools, colleges, and cultural institutions were shuttered and closed, and children were forced to spend days, weeks, or even months indoors learning via TV and internet. Sports and training were also put on hold. Social media played a significant role in spreading news and bringing people together when they were at home watching TV, laptops and tablets (2).

The whole world's population was in shock and anguish as a result of the COVID-19 pandemic, and 200 industrialized and underdeveloped nations reported confirmed cases. People were scared and afraid due to the COVID-19 cases that were rapidly increasing all over the world and the quick changes in how people lived. Past research has clearly linked a pandemic with signs of stress, depression, anxiety (1, 2), and suicide thoughts, as well as with excessive internet use (3). Internet access was the sole way to communicate with others throughout the lockdown. Many studies

conducted during the quarantine have suggested that mental health problems have increased since the start of this global epidemic (3).

This paper provides a brief overview of the available scientific findings regarding the impact of the COVID-19 pandemic on mental health and internet addiction.

METHODS

This is a narrative review. A sweep through available literature was performed using the database Medline via the PubMed interface for articles written in English. The keywords and MeSH terms “internet addiction,” “mental health”, and “COVID-19” with the use of the Boolean operators “AND” or “OR” helped to distinguish studies and reports necessary for the examination of the connection between internet addiction and COVID-19. The three keywords were chosen exclusively for the primary literature search. Additionally, to ensure the completeness of the review, a second, more in-depth literature search was performed using the same electronic database with the search inquiries of increased specificity. For this purpose, the following terms and their combinations were widely in use: “depression,” “distress”, “loneliness”, “coronavirus disease 2019” AND “internet addiction” OR “mental health” OR “psychological distress” AND “internet addiction”. We included observational studies, cross-sectional studies, meta-analyses, and systematic reviews published between 2020 and 2022. We reviewed the existing information on the influence of COVID-19 pandemic that can be linked with the internet addiction: depression, anxiety, internet abuse, distress, social isolation, and loneliness.

RESULTS

Table 1 summarizes the characteristics of the most important studies included in this rapid review that examined internet addiction and mental health during the COVID-19 pandemic.

Table 1. Characteristics of the most significant studies examining internet addiction and mental health during the COVID-19 pandemic.

Authors	Year	Country	Aim of the study	Study design	Population (sample size)	Relevant measures of mental health	Relevant measures of internet addiction	The most significant results
Kumar et al.	2022	India	to know the impact of Internet addiction during COVID-19 on anxiety and sleep quality among college students of Bhubaneswar city	web-based cross-sectional, questionnaire study	Students (n = 475)	Generalised Anxiety disorder score; The Pittsburgh Sleep Quality Index	Patterns of internet use; Youngs Internet Addiction Test	- Students' excessive internet usage leads to anxiety, and affects mental health. - Females were highly addicted than males.
Gao et al.	2020	China	to assess the prevalence of mental health problems	cross-sectional study	Citizens aged≥18 years old (n = 4872)	WHO-Five Well-Being Index (WHO-5); Generalized anxiety	Demographics and social media exposure (SME)	- More than 80% of participants reported frequently exposed to social media.

		and examine their association with social media exposure			disorder scale (GAD-7)		- There was a high prevalence of mental health problems (depression, anxiety and combination of depression and anxiety), which positively associated with frequently social media exposure during the COVID-19 outbreak.
Lebni et 2020 al.	Iran	to investigate internet addiction and its effects on the mental health of university students	descriptive-analytical study	Students (n = 447)	Goldberg General Health Questionnaire 28	Young's Internet Addiction Test	- Excessive use of the Internet by students leads to anxiety, depression and negative mental health, which affects their academic performance - Significant predictors of students' vulnerability to Internet addiction were the critical reason for using the Internet, faculty, depression, the central place for using the Internet, and somatic symptoms.
Onukwuli et al. 2022	Nigeria	to determine the prevalence and associated factors of internet addiction amongst	cross sectional study	Adolescents (n = 851)	structured self – administered questionnaire	Young's Internet Addiction Test (IAT)	- The prevalence of internet addiction was 88.1% (24.9% had mild, 59.6% had moderate, while 3.6% had severe addiction) and a good proportion

			the adolescent s in pandemic				of the respondents (81.1%) perceived addiction as bad. - The predictors of addiction were the male gender, early adolescent age group and duration of internet use.
Lin	2020	Taiwan	to examine the prevalence of Internet addiction and identify the psychosoci al risk factors during the COVID-19 outbreak	cross-sectional	High school students (n = 1060)	Depression Anxiety Stress Scale (DASS)	The Chen Internet Addiction Scale (CIAS) - The prevalence of Internet addiction was found to be 24.4%. - High impulsivity, high virtual social support, older in age, low subjective well-being, low family function, and alexithymia were independent predictors of Internet addiction.
Siste et al.	2020	Indone sia	to assess the impact of COVID-19 on Internet addiction (IA) prevalence and analyzed the correlated factors during quarantine and pandemic	online survey	Adults (n = 4734)	Symptoms Checklist- 90; Pittsburgh Sleep Quality Index	Internet Addiction Diagnostic Questionnaire (KDAI) - The prevalence of Internet addiction during the COVID-19 pandemic was 14.4%. - Online duration increased by 52% compared to before the pandemic. - Increased daily online duration, specific motivations, types of application, and having

					confirmed/suspected COVID-19 cases within the household were predictive of Internet addiction.	
Sarialioğlu et al. 2021	Turkey	to determine the relationship between the levels of loneliness adolescents feel during the pandemic, and their respective levels of internet addiction	descriptive-correlational study	Adolescents (n = 482)	UCLA loneliness scale-short form (ULS-SF)	Internet addiction scale for adolescents (IASA)
						- It was found that family income, mothers' education status, fathers' education status, the duration of Internet use before and during the pandemic, and the total score of loneliness had statistically significant effects on the total score of Internet addiction. - For adolescents as the level of loneliness increases the level of Internet addiction increases as well.
Hamami et al. 2021	Indonesia	to investigate the relationship between stress and internet addiction in college students	survey-based correlational quantitative study	College students (n = 81)	Perceived Stress Scale-10 modified for COVID-19	Internet Addiction Test
						- There was a significant positive relationship between stress due to the COVID-19 pandemic and internet addiction among students. - The higher the level of stress related to the COVID-19 pandemic in an individual, the

							higher the tendency for internet addiction.
Dong et al. 2020	China	to assess Internet use characteristics and objectively examine the potential psychological factors associated with Internet addiction (IA) during the COVID-19 epidemic	cross-sectional, anonymized, self-reported survey	Children and adolescents (n = 2050)	Young's Internet Addiction Test (IAT); Questions regarding demographic information and Internet use characteristics	Depression, Anxiety, and Stress Scale (DASS-21)	- Internet usage had grown during the COVID-19 epidemic, including the frequency and duration of recreational Internet use, and the frequency of stay-up Internet use. - Female gender, age, depression, and stress were significantly correlated with excessive Internet use.
Jain et al. 2020	India	to explore the association of internet addiction with depression and insomnia	cross-sectional study	Subjects who had been using internet for past 6 months (n = 954)	PHQ-9; Insomnia Severity Index (ISI)	Internet addiction Test (IAT)	- Internet addiction was predominantly associated with depression and insomnia. - Several parameters including graduation level, time spent per day on line, place of internet use, smoking and alcohol had significant association with internet addiction.

DISCUSSION

MENTAL HEALTH AND COVID-19

The COVID-19 pandemic's severity presents new concerns for mental health. According to the World Health Organization, mental health is a condition of wellbeing in which a person may fulfill their potential, manage everyday stress, work efficiently, and give back to the community. As successful functioning within one's own family, positive interactions with others, and expressing life happiness are attributes of a person who is mentally healthy, it follows that mental health is more

than merely the absence of mental illness. A fully lived existence for a human being includes being sad, ill, furious, or unhappy; those with good mental health experience these emotions frequently. Yet, mental health is frequently seen as having only positive effects, characterized by feelings of contentment and control over one's environment (4).

Mental health is a concept that describes how we think, feel, and act when confronted with various situations in life (5). Since depression, anxiety, and stress are considered as fundamentally negative indices of mental health and some of the main health problems, research into their existence, causes, and treatments has gained interest. Dysphoria, pessimism, a sense of self- and life-devaluation, social weariness, and anhedonia are all signs of depression in a person. Anxiety is characterized by elevated levels of physiological arousal, self-perceived anxiety, and a sense of helplessness. When one or more risky occurrences take place, the organism enters a state of negative stress, which is characterized by increased levels of arousal and strongly negative mental thoughts. Typically, those who are predisposed to anxiety also frequently exhibit depressive symptoms, and vice versa. Depression and anxiety are also correlated with stress (6).

People encountered a number of situations because of the COVID-19 pandemic that not only altered their own lives but also the lives of those they love. Until then, people had not been accustomed to situations like closing their homes, excluding themselves from social interactions, losing close friends, and general uncertainty. Their mental health may suffer significantly because of ongoing pandemic stress. Stress encompasses physiological and psychological responses to environmental stressors, and people frequently have no control over these stress-inducing factors (4).

In reaction to the COVID-19 epidemic, there has been a global quarantine response that has been linked to social isolation, loneliness, and anxiety. Especially in vulnerable individuals, panic, and fear of disease, combined with lockdown and physical isolation, may result in social isolation, loss of income, loneliness, inactivity, restricted access to basic services, greater exposure to food, alcohol, narcotics and online gambling, and significantly reduced family and social support (7). The COVID-19 pandemic was accompanied by a significant prevalence of mental health issues, which was strongly correlated with frequent social media use, according to a Chinese study (8).

The COVID-19 pandemic is associated with incredibly significant levels of stress, which in many cases may cross the threshold of clinical importance, according to studies assessing stress, anxiety, and depression during quarantine brought on by the spread of SARS-CoV-2. These studies have revealed the presence of severe psychological distress and psychopathological factors (9).

INTERNET ADDICTION AND COVID-19

The term "internet addiction" (IA) refers to a compulsive behavior linked to any online activity that interferes with daily living and stresses out social interactions. The American Psychiatric Association defines IA as a disorder associated with mood disturbances over a 2-month period and offers seven diagnostic criteria (at least three criteria over 2 months), including tolerance, mobility symptoms, time spent online longer than anticipated, a persistent tendency to impulse control behavior, spending time on online-related activities, reduced social activity and employment, fun in the effects of internet use, and continued use (10).

Internet addiction occurs as a result of excessive use of the internet. According to Shek et al. (11), "problematic internet use" is another term for internet addiction, which is the incapacity of a person to control their use of the internet. Over the world, it has emerged as a grave health issue. According to research, one in eight Americans experience problematic internet use (12). 2.4% of Chinese people (13), 10.4% of Taiwanese people (14), 1.5% and 8.2% of Americans and Europeans (15), and 3.2% of UK people reported having an internet addiction (16).

In the occurrence of a pandemic, the rates are 24.4% in Taiwan (17), 88.1% in Nigeria (18), and 14.4% in Indonesia (19). Another study that used six Asian nations found that the Philippines had the highest rate of internet addiction and that this behavior is widespread there (20). During a pandemic, a number of risk factors are linked to internet addiction, including loneliness and fear of missing out, boredom, COVID-19 dread, melancholy, anxiety, and hyperactivity (21). Moreover, it is the cause of insomnia and poor sleep quality (22). Various research indicate that internet addiction reduces self-

confidence, social self-efficacy, and self-esteem (23). As a result of Internet addiction, people often neglect their families, which can lead to various social and psychological difficulties and endanger the emotional, psychological, and mental well-being of each family member (24). Internet addiction among unemployed persons suggests that they are less interested in skill development (25). Academic achievement is also hampered by problematic internet use (26). The percentage of unemployed people may rise because of this.

It has already been noted that excessive and inappropriate internet use is associated with IA. Teenagers and young adults who use the internet excessively are the most prevalent and susceptible internet users (27). Although results are frequently inconsistent, IA is a serious public health concern, particularly in adolescents. Many studies have found a connection between IA and conditions like depression, anxiety, and stress (28). Moreover, the prevalence rate of problematic internet use ranges from 14% to 55% in nine European nations (29). Yet, during the COVID-19 pandemic, internet addiction became more common.

RELATIONSHIP BETWEEN MENTAL HEALTH AND INTERNET ADDICTION IN THE CONTEXT OF THE COVID-19 PANDEMIC

Many people develop mental health issues throughout the course of their lives, which have an impact on how we decide to manage stress, interact with others, and make decisions. People's psychological and social outcomes are described, in part, to the persisting COVID-19 infection and the associated house confinement, lockdown, and social isolation. Not only has this affected people's mental health, but it has also disrupted their sleep patterns and produced negative feelings in society (30). The usage of the internet has also grown exponentially over the years, and since everyone was compelled to stay indoors during the pandemic, it was the only way for people to access entertainment, take online courses, and stay in touch with loved ones who were in distant areas of the country (30). A meta-analytic review conducted by Tokunaga in 2017 determined average correlation of internet habits with loneliness and depression in existing research and explored particular order in which these effects may differ. Cumulative correlations presented loneliness and depression as independent variables related to internet habits in all studies (31).

The COVID-19 pandemic has affected many aspects of life, one of which is the increased use of the internet, especially social media platforms. Individuals who use the internet more frequently may develop internet addiction. The findings of research conducted around the world indicate that the higher the level of stress associated with the COVID-19 pandemic in an individual, the greater the tendency to develop an addiction to the internet (32).

Studies conducted by Jain et al. (33) and Bhandari et al. (34) found a strong positive association between internet addiction and anxiety. Lebni et al. (35), proved the connection between depression and internet addiction, and that unreasonable use of the internet can lead to social isolation and depression through the reduction of family, social and local connectedness. Therefore, depression can occur as a result of internet addiction (35). Numerous studies have shown that the fear of COVID-19 and the extended period of quarantine could make people succumb to anxiety symptoms. Amateur online activities such as online chatting, watching internet series, online shopping, playing games, are often a mechanism to deal with anxiety and improve depressed mood. However, excessive use can exacerbate anxiety and reinforce internet addiction by developing dysfunctional coping mechanisms (35).

Studies has revealed that there is a strong connection between internet addiction and mental health problems, including depression, anxiety, and stress. Internet addiction was more likely to occur in people who were depressed (36). This is feasible given the chaotic nature of life during the COVID-19 pandemic. The participants were more depressed as word spread about the countless deaths brought on by COVID-19. Anxiety is a significant mental health issue. There is a clear link between anxiety and internet addiction, according to studies. News about COVID-19 and its indestructible status may raise the likelihood of anxiety among participants because internet addiction results in more time spent online (37). Stress, another condition affecting mental health, has

been linked favorably to internet addiction because of going through a stressful lockdown due to the COVID-19 outbreak (32).

The internet has drastically affected human behavior and has both positive and negative effects, but its excessive use exposes users to internet addiction. Studies have proven that excessive use of the internet leads to anxiety, depression, and impaired mental health.

CONCLUSION

Having insight into the scientific literature on COVID-19, mental health, and internet addiction, we have concluded that during the COVID-19 pandemic, time spent on the internet increased due to reduced social activities, which consequently led to internet addiction and thus to psychological distress, increased loneliness, and depression.

Internet addiction is a significant issue that has a detrimental effect on mental health. Because of this, early intervention is essential, especially in conditions of increased social stress due to the COVID-19 pandemic.

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