

(REVIEW ARTICLE)



Internet addiction and psychological impact on adolescents: A scoping review

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Abstract

Background: Extensive engagement of young people with the internet can lead to the development of addictive behaviors. The purpose of this scoping review is to study the psychological effects of internet addiction on adolescents.

Methods: The data were collected in three databases. The search retrieved 25 empirical studies that were divided into four categories: depression and anxiety, suicide, emotional and behavioral effects, school bullying and cyberbullying. The bibliography was searched based on a series of selection and exclusion criteria: a) articles of the last 5 years (2017-2022), b) articles that include primary empirical studies (quantitative and qualitative methodology), c) articles in which adolescents participate and d) articles published in Greek or the English language. The exclusion criteria were: a) articles that were meta-analyses, b) articles that did not present primary empirical findings (bibliographic reviews), c) articles that did not involve adolescents, d) case studies consisting of a small sample and e) articles that were published in a language other than English and Greek.

Results: Searching for articles in the four databases led to the retrieving of 920 articles. The outcomes measured in this scoping review include 25 primary empirical studies.

Conclusions: The review showed the aggravating role that internet addiction has in the manifestation of other forms of psychopathology in adolescents, the negative effects that cyber addiction has on the emotional state of adolescents, the effects that this form of addiction has on adolescent behavior and the psychological effects experienced by young people need to be taken seriously by professionals working with teens who are addicted to the internet.

Key words: Scoping review; Internet addiction; Adolescents; Consequences; Mental health; Psychological impact

1. Introduction

In modern times, the use of the internet is becoming more and more widespread in the daily lives of people. The use of online media facilitates the life of individuals as it makes possible the satisfaction of their interests and the fulfillment of goals concerning their academic, personal and social life [1]. Adolescents belong to the portion of the population with a strong preoccupation with the internet. In the digital world, young people have the opportunity to gather information, interact with other people and build their personal identity which is one of the most critical psychological processes that take place during puberty. However, the widespread use of the internet poses significant risks which are mainly related to addiction [2]. Internet addiction is a serious psychological phenomenon that manifests itself in adolescents worldwide. Young people exhibit compulsive behaviors in the digital world that affect their emotional functionality. In

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this way, adolescents spend many hours online, find it difficult to break free from them, withdraw socially and experience unpleasant feelings. This means that internet addiction is turning into a modern form of psychopathology that burdens mental health [3].

Initially the study focused on the use of the internet by adolescents and the addiction they develop to it. In more detail, the definition and characteristics of this form of addiction are presented, emphasizing the types that appear. References are also made to the clinical picture, differential diagnosis and epidemiology of dysfunctional internet use. The following is an overview of the etiological factors associated with the development of Internet addictive behaviors. These factors relate to personal / psychological characteristics, family environment and school context. Also a part is dedicated to the consequences that internet addiction has on teenagers. In particular, the effects of the phenomenon on physical and mental health, social life and school life and functionality are examined. The purpose of the literature review is to study and record the psychological effects of internet addiction on adolescents. In this context, an attempt is made to achieve a series of objectives which shape the research questions. The first goal is to examine the impact that problematic internet use has on adolescents' mental health. The second goal is to investigate the effects of internet addiction on adolescent behavior. The third goal is related to highlighting the effects of internet addiction on the emotional state of adolescents.

2. Methodology

In the present work, the methodological approach of the scoping bibliographic review is utilized. This method involves the study, recording and description of available scientific findings in relation to a subject. Carrying out such reviews contributes positively to the synthesis and presentation of all studies related to the respective subject [4]. This review was conducted as a postgraduate program's dissertation and the topic of the study has been approved by the assembly of the Medical School of the National and Kapodistrian University of Athens. The following research questions therefore arise:

- Is internet addiction related to the onset of mental disorders in adolescents?
- Does internet addiction affect adolescents' emotional state and development?
- Does internet addiction affect teens' behavior?

The data collected in the present bibliographic review are scientific articles that are part of the modern international literature. The search of studies was conducted independently by two researchers. The articles were searched in the following databases: Pubmed, Elsevier, Wiley Online Library and Google Scholar. These specific medical databases were chosen by the researchers, due to the fact that they constitute reliable, and high-quality databases for academic research, especially in quantitative science studies. The search used the keywords: "internet addiction AND depression AND adolescents", "internet addiction AND self-esteem AND adolescents", "internet addiction AND anxiety AND adolescents", "internet addiction AND psychological impact AND adolescents", "addiction to internet AND depression AND teenagers", "internet addiction AND stress AND teenagers", "internet addiction AND psychological effects AND teenagers". The bibliography was searched based on a series of selection and exclusion criteria. The selection criteria were: a) articles of the last 5 years (2017-2022), b) articles that include primary empirical studies (quantitative and qualitative methodology), c) articles in which adolescents participate and d) articles published in Greek or the English language. The studies should not have been protocols, pilot studies, or parts of any research, while they should have been published from 01/01/2017 to 20/03/2022 in the Greek, which is the native language of the researchers or English, because it is the global academic language that choose many international scholarly journals.

The exclusion criteria were

- Articles that were meta-analyses,
- Articles that did not present primary empirical findings (bibliographic reviews),
- Articles that did not involve adolescents,
- Case studies consisting of a small sample and
- Articles that were published in a language other than English and Greek.

Searching for articles in the four databases led to the retrieving of 920 articles. The articles were studied at title level and 100 of them were selected. The 820 articles were rejected because they were not relevant to the subject under study. More specifically, the effect of psychological factors on the occurrence of internet addiction was examined, and not vice versa. The remaining 100 articles were studied at summary level. Of these, 51 were rejected. Of the remaining

49, 25 were selected, which are the results of the scoping review. The strategic study of the literature is presented in the flow chart (Figure 1).

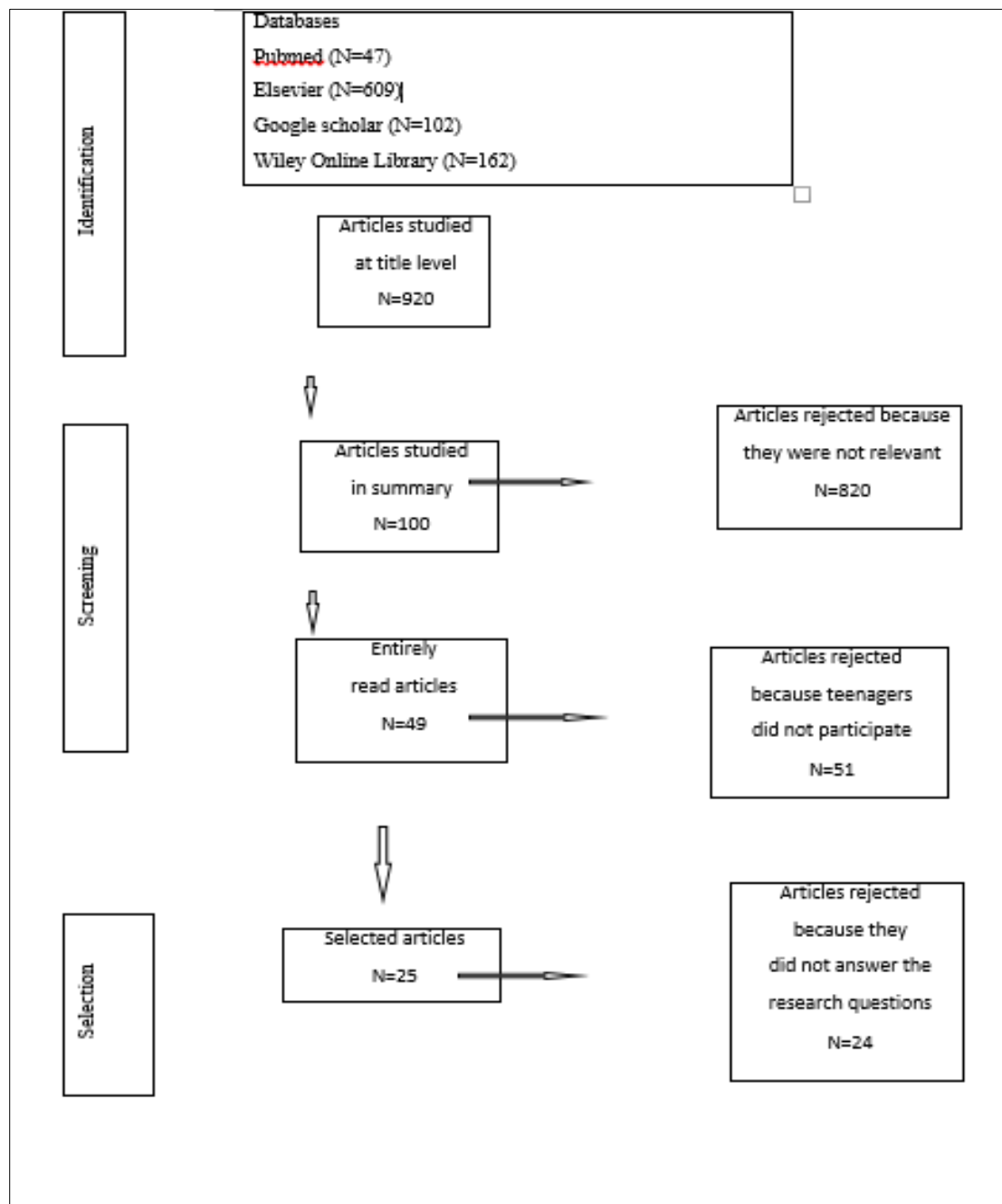


Figure 1 Flow chart according to the method-proposal PRISMA

To assess the quality of the studies, given that the studies are descriptive, the Newcastle–Ottawa Scale assessment tool was used. The evaluation was carried out by the two authors of this paper. This scale is a tool used to assess the quality of descriptive studies included in a systematic review and/or meta-analysis. Applying the tool, each study is judged on eight specific elements, which are categorized into three groups; elements related to the selection and composition of study samples, the comparability of groups for cases where patient-control studies are included, and the assessment of either exposure or the outcome of interest for case-control or cohort studies respectively.

For each of the elements that are checked, and if they are judged positive during the evaluation, a point is awarded. The total points that each study accumulates serve to make a summary evaluation of each study. Points are awarded in such a way that the maximum total point a study can receive is nine. This specific evaluation method emerged as the result

of a collaboration between the University of Newcastle, Australia and the University of Ottawa, Canada, applying the Delphi process to define variables and extract data. The scale was then piloted in a series of systematic reviews to make the necessary changes and refine the method [33].

In addition, research practices regarding the evaluation of studies are based on empirical data, and focus on classification systems, which are ranked according to the validity of the methodological approach of each study [34]. Thus, the classification system according to how strong the data is can arise by design, is formulated as follows:

- Level 1: data from meta-analyses of clinical trials
- Level 2: data from experimental design studies
- Level 3: data from quasi-experimental design studies
- Level 4: data from descriptive or qualitative studies
- Level 5: data from case studies
- Level 6: data from the views of experts in a field

Regarding the assessment of the possibility of errors, based on the above-mentioned scale, group elements related to the samples of the studies (calculation and randomization of the sample), the data collection procedures (valid measurement tools), the statistical methods applied, the detailed description of the findings of the studies, reference to any limitations, and the generalizability of the results.

The variables selection process was based on the PRISMA method for systematic reviews (Figure 1). In terms of the characteristics of the articles, we extracted data such as authorship, year, title, country, and methods such as sample size, aim, study designs, measurement tools, as well as the main findings and conclusions.

3. Results

The results of the scoping review include 25 primary empirical studies that examine the psychological effects of Internet addiction on adolescents. The countries that participated in the studies were: Estonia, China, India, Iran, Lebanon, Spain, Taiwan, Israel, Australia, Germany, United Kingdom, Turkey, Greece as well as the total sample studied amounted to 110393 adolescents. The study of empirical studies led to the formation of four categories, as they are presented in Table 1.

As mentioned above in the methodology chapter, the included studies of the present scoping review were assessed for quality based on the Newcastle-Ottawa scale [33]. According to the evaluation results, the majority of the studies were judged to be of moderate quality, with 17 of the 25 studies receiving a 5/9, while the remainder received a higher rating, and were of high quality. The biggest issue for the moderate rating given by the majority of studies came from the study design (observational/contemporary design studies), which inherently prohibits repeated measurements over time, does not contain a comparison group, and cannot investigate the cause-and-effect relationship. The studies that received a higher score, and were therefore judged to be of higher quality, were those that were cohort studies, and therefore carried out repeated measurements over time. Regarding the level of data obtained, and based on study design all studies were categorized at level 4, given that all studies were descriptive (contemporary and cohort studies). The detailed evaluation results are presented in Table 2.

With regard to the probability of error in the included studies, the results showed that while the probability of error in most areas assessed was low, some critical areas had a high probability of error. More specifically, all of the studies (100%) used valid assessment tools for the variables under consideration, while the statistical methods used, the reporting of results and the limitations of the studies were clearly defined. Despite these strengths of the studies, only 16% performed a sample calculation before conducting the study, while 56% did not randomly select the sample. Based on the last two data, the generalization of the results to the entire population is automatically limited. The results are presented in detail in Figure 2.

The first category of articles includes empirical studies focusing on the effects of cyber addiction on depression and anxiety. The development of symptoms of anxiety and depression in the context of internet addiction is a common clinical picture, which is observed worldwide. This category includes eight studies that study both the relationship between addiction-depression/anxiety and the factors that mediate its occurrence. The second category of articles includes empirical studies that highlight the negative effects of internet addiction on the occurrence of suicidal ideation and suicide in adolescents. The category includes six studies whose main purpose was to investigate the role of dysfunctional internet use in the suicidal ideation of young people. The study of the empirical research collected led to

the emergence of an additional psychological impact that internet addiction has. This impact concerns the involvement of adolescents in incidents of bullying. This third category includes three studies that confirm the link between cyber addiction and bullying. The fourth and final category of articles includes empirical studies that highlight the negative effects of online addiction on adolescent psycho-emotional functionality and behavior. This includes 9 studies that examined adolescents' well-being, self-esteem, behavior, and emotional well-being.

Table 1 Psychological effects of adolescent internet addiction

Title	Purpose	Sample	Methodology	Results-Findings
Depression and anxiety				
Internet Addiction and Anxiety Among Greek Adolescents: An Online Survey Yfanti et al., 2018 Greece [5] Cross-sectional study	Investigation of the dysfunctional use of the internet in adolescents 13-15 years old, as well as the study of its effects on anxiety symptoms	131 teenagers	Quantitative with scales: a) Internet Addiction Diagnostic Questionnaire of Young, b) Revised Children's Manifest Anxiety Scale	Adolescents who were addicted to the internet had higher levels of anxiety compared to those without addiction
Bidirectional predictions between Internet addiction and probable depression among Chinese adolescents Lau et al., 2018 China [6] Cohort study	Investigating the relationship between internet addiction and depression	8286 teenagers	Quantitative with scales: a) Chen Internet Addiction Scale, b) Centre for Epidemiological Studies-Depression	The initial internet addiction worked predictably in the manifestation of moderate level of depressive symptoms
Social networking sites addiction and adolescent depression: A moderated mediation model of rumination and self-esteem Wang et al., 2018 China [7] Cross-sectional study	Study of the effects of social media addiction on adolescent depression, taking into account the role of self-esteem and cognitive chewing	365 teenagers	Quantitative with scales: a) Facebook Intrusion Questionnaire. Ruminative, b) Response Scale, c) Centre for Epidemiological Studies Depression Scale, d) Rosenberg Self-Esteem Scale	Positive correlation between depression and internet addiction
Longitudinal associations between problematic social media use and depressive symptoms in adolescent girls Raudsepp & Kais (2019), Estonia [8] Cohort study	Study of the relationships between problematic social media use and depressive symptoms in a sample of girls	397 girls in puberty	Quantitative with scales: a) Bergen Social Media Addiction Scale, b) Centre for Epidemiological Depression Scale	Positive correlation between dysfunctional social media use and depressive symptoms

<p>Internet addiction and depression in Chinese adolescents: a moderated mediation model</p> <p>Chi et al., (2019), China[9]</p> <p>Cross-sectional study</p>	<p>Investigate the mechanisms underlying the relationship between internet addiction and depression</p>	532 teenagers	<p>Quantitative with scales:</p> <p>a) Young and De Abreu's, b) Centre for Epidemiologic Studies Depression Scale, c) Positive Youth Development Scale, d) Child and Conceptual model, e) Adolescent Mindfulness Measure</p>	<p>Positive relationship between internet addiction and depression</p> <p>Adolescent development was the mediating factor in the relationship between addiction and depression</p>
<p>Internet addiction and its relationships with depression, anxiety, and stress in urban adolescents of Kamrup District, Assam</p> <p>Saikia et al., 2019, India [10]</p> <p>Cross-sectional study</p>	<p>Study of the relationship between internet addiction, anxiety, depression, stress</p>	440 teenagers	<p>Quantitative with scales:</p> <p>a) Young's Internet Addiction Scale, b) Depression Anxiety Stress Scales-21</p>	<p>Positive correlations between addiction and problematic internet use with anxiety, depression and stress</p>
<p>Mobile phone addiction and psychological distress among Chinese adolescents: The mediating role of rumination and moderating role of the capacity to be alone</p> <p>Lian et al., 2021 China, [11]</p> <p>Cross-sectional study</p>	<p>Investigating the effects of internet addiction on the psychological burden of adolescents, taking into account the role of chewing gum and the ability to live alone</p>	754 teenagers	<p>Quantitative with scales:</p> <p>a) Mobile Phone Addiction Index, b) Anxiety Stress Scale-21, c) Ruminative Response Scale, d) Capacity to be alone scale</p>	<p>Positive correlation of problematic internet use with depression and anxiety</p>
<p>Internet gaming disorder, psychological distress, and insomnia in adolescent students and their siblings: An actor-partner interdependence model approach</p> <p>Lin et al., 2021, Iran [12]</p> <p>Cross-sectional study</p>	<p>Study of the effect of problematic internet use on depression, anxiety and sleep problems of adolescents and their siblings</p>	320 twins of teenagers and their siblings	<p>Quantitative with scales:</p> <p>a) Gaming Disorder Scale-Short Form, b) Depression Anxiety Stress Scale-21, c) Insomnia Severity Index</p>	<p>Online gambling addiction has been linked to anxiety, depression and insomnia among teens and their siblings</p>
Suicide				
<p>Association between problematic Internet use, sleep disturbance, and</p>	<p>Study of the correlation between internet addiction,</p>	20000 teenagers	<p>Quantitative with scales:</p>	<p>Internet addiction has been linked to an increased risk of suicidal</p>

suicidal behaviour in Chinese adolescents Guo et al., 2018, China [13] Cross-sectional study	sleep disorders and suicidal ideation		a) Young's Internet Addiction Test, b) Pittsburgh Sleep Quality Index	ideation and suicide attempts
Internet addiction among adolescents may predict self-harm/suicidal behaviour: a prospective study Pan & Yeh, 2018 Taiwan, [14] Cohort study	Study of the effect of internet addiction on suicidal ideation and self-harming behaviours	1735 teenagers	Quantitative with scales: a) Chen Internet Addiction Scale, b) Pittsburgh Sleep Quality Index, c) Beck's Depression Inventory-II, d) Beck's Anxiety Inventory, e) World Health Organization Quality of Life-Short Version	Adolescents who were addicted to the Internet had 2.41 (95% CI: 1.16-4.99, $p = 0.018$) more self-harm and suicide behaviours than adolescents who were not addicted
The effect of sleep disturbances and internet addiction on suicidal ideation among adolescents in the presence of depressive symptoms Sami et al., 2018 Israel, [15] Cross-sectional study	Understanding how sleep disorders are related to suicidal ideation including the presence of depression and dysfunctional internet use	631 teenagers	Quantitative with scales: a) Child and Adolescent Sleep Checklist, b) Internet Addiction Test, c) Patient Health Questionnaire 9-modified for adolescents, d) Generalized Anxiety Disorder 7	Internet addiction has had a clear positive effect on adolescent suicidal ideation
Internet addiction and poor quality of life are significantly associated with suicidal ideation of senior high school students in Chongqing, China Wang et al., 2019, China [16] Cross-sectional study	Investigating the effects of internet addiction on quality of life and suicidal ideation	31531 teenagers	Quantitative with scales: a) Chinese Symptom Checklist-90-R, b) Chinese Young's IA Test, c) Chinese Six-item QOL, d) SCL-90-R	Adolescents who were addicted to the Internet had a higher level of suicidal ideation than those who were not
Adolescents' problematic internet and smartphone use is related to suicide ideation: Does emotional intelligence make a difference? Arrivillaga et al., 2020 Spain [17]	Study of the correlation between the problematic use of smart phones and internet addiction with suicidal ideation	2196 teenagers	Quantitative with scales: a) Internet Addiction Test Smartphone Addiction Scale-Short Version, b) Wong and Law Emotional	Positive correlation of problematic internet use and smart phones with suicidal ideation

Cross-sectional study			Intelligence Scale, c) Frequency of Suicidal Ideation Inventory	
Association between internet addiction and suicidal ideation, suicide plans, and suicide attempts among Chinese adolescents with and without parental migration Peng et al., 2021 China [18] Cross-sectional study	Study of the effects of internet addiction and parental migration on adolescent suicidal behaviours	15232 teenagers	Quantitative with scales: a) Young's Internet Addiction Test, b) University of California Los Angeles Loneliness Scale, c) Resilience Scale for Chinese Adolescents, d) Goleman's Emotional Intelligence Inventory, e) Adolescent Social Support Scale	Internet addiction has been significantly associated with the increased presence of suicidal ideation, suicide plans and suicide attempts
Emotional and behavioural effects				
Testing longitudinal relationships between Internet addiction and well-being in Hong Kong adolescents: cross-lagged analyses based on three waves of data Yu & Shek, 2018 China [19] Cohort study	Study of the relationship between internet addiction and adolescent well-being	3328 adolescents	Quantitative with scales: a) Internet Addiction Test, b) Satisfaction with Life Scale, c) Chinese Hopelessness Scale	The presence of internet addiction in the first measurement was associated with low life satisfaction and despair in the second measurement. The presence of internet addiction in the second measurement was associated with low life satisfaction in the third measurement
Compulsive internet use and the development of self-esteem and hope: A four-year longitudinal study Donald et al., 2019, Australia [20] Cohort study	Study of the relationship between internet addiction and self-esteem and hope	2809 teenagers	Quantitative with scales: a) Compulsive Internet Use Scale, b) Rosenberg Self-Esteem scale, c) Children's Hope Scale	The pathological use of the internet has led to a decrease in adolescents' sense of hope and self-esteem
A longitudinal study on psychosocial causes and consequences of Internet gaming disorder in adolescence Wartberg et al., 2019, Germany [21]	Investigating the timeless correlations between online gambling addiction and the mental health of adolescents and parents	1095 teenagers	Quantitative with scales: a) Internet Gaming Disorder Scale, b) Reynolds Adolescent Adjustment Screening Inventory,	Internet gambling addiction in the first measurement predicted the emotional burden of teens in the second measurement

Cohort study			c) Strengths and Difficulties Questionnaire, d) Patient Health Questionnaire, e) Generalized Anxiety Disorder Scale-2	
Impact of problematic internet use on the self-esteem of adolescents in the selected school, Kerala, India Mathew & Krishnan, 2020 India [22] Cross-sectional study	Study of the degree of internet addiction and self-esteem of adolescents	60 teenagers	Quantitative with scales: a) Internet Addiction Test, b) State Self-Esteem Scale	Negative correlation between internet addiction and self-esteem
Internet addiction and emotional and behavioral maladjustment in Mainland Chinese adolescents: cross-lagged panel analyses Zhu et al., 2021, China [23] Cohort study	Exploring how internet addiction is related to adolescent depression and delinquency	310 adolescents	Quantitative with scales: a) Chinese Internet Addiction Test, b) Center for Epidemiological Studies-Depression-Scale	Internet addiction has had a significant impact on the delinquency of adolescent boys over time
Social media use and emotional and behavioural outcomes in adolescence: Evidence from British longitudinal data McNamee et al., 2021, United Kingdom, [24] Cohort study	Study of the timeless correlations found between social media use and the behavioural and emotional outcomes of adolescents in the United Kingdom	23000 teenagers	Quantitative with scales: a) Strengths and Difficulties Questionnaire, b) General Health Questionnaire	Addiction to social media has led to reduced self-esteem and enhanced hyperactivity, distraction and antisocial behaviour
Internet addiction and psychosocial problems among adolescents during the COVID-19 pandemic: A cross-sectional study Ozturk & Ayaz-Alkaya, 2021, Turkey [25] Cross-sectional study	Study of internet addiction and psychosocial problems of adolescents	1572 teenagers	Quantitative with scales: a) Symptom Checklist, b) Parent-Child Internet Addiction Test.	Positive correlation between internet addiction and adolescents' psychosocial problems
Association of problematic internet use with depression,	Exploring the association between problematic internet	1103 adolescents	Quantitative with scales:	Problematic internet use has been associated with higher levels of

<p>impulsivity, anger, aggression, and social anxiety: Results of a national study among Lebanese adolescents</p> <p>Haddad et al., 2021 Lebanon [26]</p> <p>Cross-sectional study</p>	<p>use, depression, impulsivity, anger, aggression and social phobia</p>		<p>a) Internet Addiction Test, b) BARRAT Impulsiveness Scale, c) Buss-Perry scale, d) Liebowitz Social Anxiety Scale, e) Adolescent Depression Rating Scale</p>	<p>depression, impulsivity, aggression, hostility, anger and social anxiety</p>
<p>School and cyberbullying</p>				
<p>Bullying victimization among Lebanese adolescents: the role of child abuse, internet addiction, social phobia and depression and validation of the Illinois bully scale</p> <p>Malaeb et al., 2020 Lebanon [27]</p> <p>Cross-sectional study</p>	<p>Analysis of factors related to school bullying and victimization and weighting of the Illinois Bully Scale questionnaire</p>	<p>1810 teenagers</p>	<p>Quantitative with scales: a) The Illinois Bully scale, b) Internet Addiction Test, c) Adolescent Depression Rating Scale, d) Child Abuse Self-report Scale</p>	<p>The presence of mild to moderate internet addiction was associated with the young person's involvement in bullying as a victim</p>
<p>The impact of adolescent internet addiction on sexual online victimization: The mediating effects of sexting and body self-esteem</p> <p>Tamarit et al., 2021, Spain [28]</p> <p>Cross-sectional study</p>	<p>Analysis of the interaction between internet addiction / social media, body self-esteem and risky online sexual behaviours</p>	<p>1763 teenagers</p>	<p>Quantitative with scales: a) Scale of Addiction-Adolescent Risk to Social Networks and Internet, b) Escala de Autoestima Corporal, c) Sexting Scale, d) Sextortion Scale</p>	<p>Internet addiction has had a predictive effect on the online sexual victimization of adolescents</p>
<p>Cybergossip and Problematic Internet Use in cyberaggression and cybervictimisation among adolescents</p> <p>Cebollero-Salinas et al., 2022, Spain [29]</p> <p>Cross-sectional study</p>	<p>Analysis of the effect of problematic internet use and internet gossip on cyber victimization and aggression</p>	<p>1013 teenagers</p>	<p>Quantitative with scales: a) Adolescents Cybergossip Questionnaire, b) Internet-Related Experiences, c) Cyberbullying Scale</p>	<p>Internet addiction has had the highest impact on cyberbullying in boys and adolescents 12-14 years old</p>

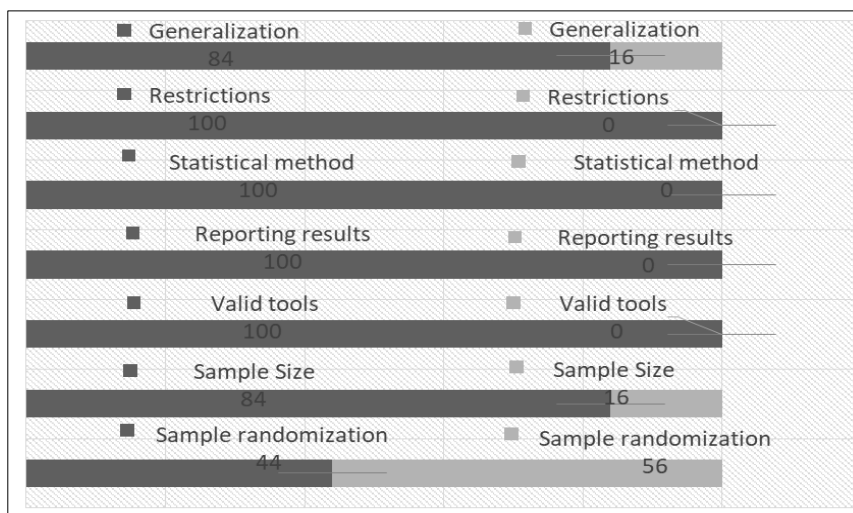


Figure 2 Evaluation of the probability of the existence of an error in a percentage ratio

Table 2 Results of quality assessment of studies based on the Newcastle-Ottawa Scale

Study	Sample selection				Comparability		Outcome			Final score X/9	Level of evidence 1-6
	Study group representativeness	Control group selection	Exposure measurement	Absence of pre-study factor	Main factor	Additional factors	Evaluation	Sufficient follow up	Eligibility to follow up		
8	*	-	*	-	*	*	*	*	*	7/9	4
9	*	-	*	-	*	*	*	-	-	5/9	4
6	*	-	*	-	*	*	*	*	*	7/9	4
7	*	-	*	-	*	*	*	-	-	5/9	4
10	*	-	*	-	*	*	*	-	-	5/9	4
11	*	-	*	-	*	*	*	-	-	5/9	4
12	*	-	*	-	*	*	*	-	-	5/9	4
5	*	-	*	-	*	*	*	-	-	5/9	4
13	*	-	*	-	*	*	*	-	-	5/9	4
17	*	-	*	-	*	*	*	-	-	5/9	4
16	*	-	*	-	*	*	*	-	-	5/9	4
14	*	-	*	*	*	*	*	*	*	8/9	4
15	*	-	*	-	*	*	*	-	-	5/9	4
18	*	-	*	-	*	*	*	-	-	5/9	4
22	*	-	*	-	*	*	*	-	-	5/9	4
20	*	-	*	-	*	*	*	*	*	7/9	4
19	*	-	*	-	*	*	*	*	*	7/9	4
21	*	-	*	-	*	*	*	*	*	7/9	4
23	*	-	*	-	*	*	*	*	*	7/9	4
24	*	-	*	-	*	*	*	*	*	7/9	4
25	*	-	*	-	*	*	*	-	-	5/9	4
26	*	-	*	-	*	*	*	-	-	5/9	4
27	*	-	*	-	*	*	*	-	-	5/9	4
28	*	-	*	-	*	*	*	-	-	5/9	4
29	*	-	*	-	*	*	*	-	-	5/9	4

Symbols: * = 1 is assigned 1 point, - = no point is assigned

4. Discussion

Internet addiction during adolescence is a psychological phenomenon that has negative effects on mental health and development. According to the results of the review, addiction is associated with anxiety, depression, suicide, bullying and the appearance of behavioral problems.

The first research question that was attempted to be answered from the present literature review, concerned the effects of adolescents' internet dependence on the occurrence of mental disorders. A review of modern empirical studies has shown that adolescents who are addicted to the Internet have a high risk of developing depression, anxiety disorders and suicidal ideation. Regarding the depressive disorder, data were recorded regarding the aggravating role of addiction as a disorder, but also specific types of it and in particular the dysfunctional use of social media in the manifestation of this form of psychopathology. More specifically, the widespread use of the internet has been significantly associated with the onset of depressive symptoms in adolescents [7, 8]. This finding is also found in other studies. In a recent systematic review of Keles and his colleagues, as in the present, addiction to social media during adolescence contributes to the onset of depressive psychopathology. Adolescents are in a constant search for their personal identity in which they may not realize the negative consequences of problematic use of social media. Trying to socialize digitally can lead to depressive symptoms in real life [30].

Furthermore, the findings of the scoping review showed that internet addiction as a mental disorder is positively related to depression in young people. Malfunctioning of the internet seems to increase the risk of developing depressive symptoms [6]. Research that took place in Chinese adolescents was to investigate the mechanisms underlying the relationship between internet addiction and depression. The research sample consisted of 532 teenagers studying in public secondary schools. The research results showed a positive relationship between internet addiction and depression. In this positive correlation there is a mediating factor, the smooth/positive development of adolescents. This relationship is mediated by smooth/positive adolescent development. Findings show that problematic internet use could lead to depression, but there were aggravating and protective mediating factors in this relationship [9].

Another study that confirms the negative effect that internet addiction has on suicidal ideation in teenagers is that of Wang and his colleagues. The statistical analysis carried out showed that 11.5% of the participants showed suicidal ideation and 28.4% internet addiction. It was also found that students with internet addiction showed a higher level of suicidal ideation compared to those who were not addicted. than those who do not have the specific clinical picture. The researchers pointed out that the significant and high presence of suicidal ideation in adolescents who were addicted to the Internet compared to those who were not, was not affected by depression, quality of life and other clinical factors. Therefore, adolescents with problematic internet use experienced negative consequences that were associated with an increased risk of suicidal ideation [16].

The next finding of this scoping review was the effects of cyber addiction on the depiction of adolescent clinical stress expressed by the finding of a positive correlation between addiction and stress. That is, teenagers who are addicted to the internet also show high anxiety [5, 10, 12]. In this relationship, as well as in the depression-addiction relationship, there were mediating factors. The factor that seemed to enhance the positive relationship between addiction and stress, was the ability of adolescents to be alone [11]. Adolescents who experience psychological problems are more likely to experience the negative effects that problematic internet use has on their anxiety. In essence, this group of minors faces psychological problems, which lead to the emergence of different forms of psychopathology when they become addicted to the digital world [31].

In addition, the study of the effects of internet addiction on the occurrence of mental disorders, led to findings regarding the disorder of suicidal ideation. This finding can be interpreted if the negative effects of cyber addiction on the psychosocial development of adolescents are taken into account. Young people who become addicted to the internet face problems and conflicts in their interactions in the real world, as a result of which they withdraw from the social context. Social withdrawal and the difficulty of reintegrating into the social network of friends and / or family leads to the desire of adolescents to cause harm to themselves [32].

The second research question of the scoping review concerned the effects of internet addiction on the emotional state and development of adolescents. In this context, research findings were presented regarding the effects of internet addiction on different psycho-emotional characteristics, such as self-esteem. In two empirical studies, cyber addiction had a negative effect on adolescents' self-esteem [20, 22]. Young people with dysfunctional internet use showed low self-esteem. This finding can be interpreted by emphasizing the way in which the widespread use of the internet and in particular the engagement with social media affects the image that people have of themselves.

The third research question that was attempted to answer in the scoping review concerned the effects of cyber addiction on adolescent behavior. A review of the research included in the third category of results revealed data on the behavioral problems of young people who are addicted to the internet. More specifically, adolescents showed externalizing behavioral problems such as delinquency, hyperactivity/distractibility, hostility, impulsivity, aggression, and oppositional behavior [21, 23, 24, 26]. In essence, internet addiction has negatively affected the behaviors that teenagers exhibit in their social environment. The externalizing problems manifested by teenagers with problematic use of the internet are understood through the study of the psychological characteristics that contribute to the appearance of the phenomenon. More specifically, young people who make extensive use of digital media experience difficulties in regulating their emotions and behavior. Difficulties of this kind cause addiction and therefore the inability of individuals to stop using the internet. In addition, barriers to the regulation of emotions and behaviors are also associated with externalizing problems. Consequently, adolescents who become addicted face problems of an emotional nature that are aggravated by online involvement and manifest in externalizing behaviors [11].

Finally, the results of the scoping review include data that show the effects of addiction on the behavior of adolescents and in particular their involvement in the phenomenon of bullying. The three surveys included in this category highlighted the relationship between cyber addiction and adolescent victimization [28, 29]. Adolescents, that is, with problematic use of online media became more often victims of bullying. The victimization concerned both the school and the online environment. This finding shows that the social behaviors of young people are influenced in the context of their extensive involvement with the Internet, resulting in them accepting the aggressive behaviors of other people and the negative effects they cause. This group of adolescents is in a vulnerable psychosocial position which is associated with an increased risk of victimization [28, 29]. Young people who are addicted tend to suffer from social difficulties that cause loneliness, difficulty in social interactions, insecurity and low self-esteem. All of these characteristics are closely linked to victimization both in school and online [27].

In the present bibliographic review there are some limitations which concern its results. The first limitation is found in empirical surveys that met the selection criteria. Studies published in a language other than English and Greek were not included and the literature search period was from 2017 to 2022. The second limitation concerns the type of internet addiction that the studies studied. In the majority of cases the general clinical picture of addiction was examined and in some cases emphasis was placed on specific types, such as that of online games and social media. All studies presented in the work were based on quantitative methodology with data collection using questionnaires. In this way, specific variables were examined without emphasizing the way in which adolescents experience the effects of Internet addiction. However, no results have been found that focus on the psychological effects that other forms of cyber addiction have on adolescents.

Important goal of this review is to highlight the effects of internet addiction on adolescents' emotional state. Achieving this goal can be helpful in the available literature and especially in the Greek in which there is a limited number of systematic reviews. Moreover, the study of the psychological effects of dysfunctional internet use on adolescents is important because it can highlight the needs of this population. Identifying and clarifying all psychological needs can lead to the design and implementation of effective therapeutic interventions. Finally, among the limitations of the present study, it should be mentioned that the determination of the probability of error was carried out with the Newcastle-Ottawa Scale tool. Error determination is primarily performed in clinical trials, so an equivalent tool for descriptive studies does not exist. So the results obtained based on the Newcastle-Ottawa Scale must be treated with skepticism, since their generalizability is questionable.

5. Conclusion

Internet addiction during adolescence is a serious form of psychopathology, which has negative psychological effects on young people. In the present study, a scoping review was conducted which aimed to study the effects of cyber addiction on the mental health, emotional development and behavior of adolescents. The empirical research collected was divided into four categories in order to achieve the objectives. The psychological effects experienced by young people need to be taken seriously by professionals working with teens who are addicted to the internet. This disorder affects the mental health of individuals contributing to the appearance of behavioral and psychological problems. As a result, adolescents need to participate in interventions that meet the full range of their needs, empowering them psychologically, socially and emotionally.

The results of the scoping review on the negative psychological effects of internet addiction on adolescents lead to suggestions with academic and practical dimensions. The study of modern research has highlighted the incomplete scientific findings concerning indigenous adolescents. For this reason, it is proposed to conduct empirical studies by the international scientific community in order to highlight the difficulties experienced by adolescents in every country. In

addition, it is suggested to conduct research in which the qualitative methodology is utilized, so that adolescents can express the way in which they experience internet addiction.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest.

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