



Metabolic Risks to Digital Dependency: A Bibliometric Analysis of Screen Time and Health Outcomes among Indian Youth

Dr. Vihas Vijay,

Assistant Professor,

Amity Business School, Amity University Bengaluru, Karnataka, India

Mr. P. Pushparaj,

Assistant Professor,

Amity Business School, Amity University Bengaluru, Karnataka, India

Abstract

The issue of digital dependence has become a topical public health concern in Indians adolescents, especially given the blistering increase in the volume of mobile data and transformational effects of the COVID-19 pandemic. The current investigation contains a bibliometric evaluation of 343 publications included in Scopus and published between 1991 and 2026 and at the intersection of screen time, digital addiction, and metabolic health outcomes. After using VOSviewer to map the science, a significant rise in the research output was noted in 2013 with the highest number of published papers in 2025 (63). India has a preminence in the contribution to this field and has contributed 267 publications. The analysis has identified five major thematic groups, which are metabolic and academic effects, sleep disturbances, rural-urban health disparities, media epidemiology, and psychological effects. Although the available literature provides a clear connection between screen exposure excess and metabolic syndrome, it is observed that there is a substantial lack in longitudinal studies and intervention-oriented studies. These results underline the necessity of detailed policy frameworks intended to govern the digital use and ensure the physical health of the younger generation.

Keywords: Screen time; digital dependence; adolescent; metabolic risks; bibliometric review.

1. Introduction

The past decades have seen a massive change in the digital face of India whereby limited connectivity has evolved to high levels of digital integration. India has one of the largest online populations across the globe with some 600 million internet users (Sandhu & Barn, 2023). This fast growth has produced a generation of young people who can be called Google generation, they use digital tools in almost every sphere of their lives (Nain & Chaudhary, 2022). However, there are physiological and psychological consequences of such extensive connectivity. Approximately 24.6 percent of Indian adolescents show evidence of problematic internet use (Gupta et al., 2022; Singh et al., 2020), and systematic reviews prove that almost a quarter of school-age children are affected by moderate to severe internet addiction (Joseph et al., 2022).

The COVID-19 pandemic increased those trends making screen time an inability to engage in education and social interaction (Sandhu and Barn, 2023). This abrupt change increased the perceived stress and aggravated the depressive and isolated symptoms in the minds of the students. The Indian Academy of Pediatrics, in turn, developed focused recommendations that could reduce the number of the physical and emotional issues related to excessive use of digital devices (Gupta et al., 2022).

In spite of all these efforts, the academic community still does not have a single framework that would outline the development of this phenomenon. The current bibliometric, spanning the years 1991-2026 attempts to address the gap by offering the quantitative information that can inform future policy relating to the health of the population and parental interventions.

2. Background and Literature Review

Digital behaviours and the physical health have been seen to evolve in the form of preliminary anxieties about the notion of internet addiction in the early 2000s (Nalwa and Anand, 2003) to something much more sophisticated: a sense of a metabolic disruption. The empirical evidence demonstrates the existence of a dose-response relationship, according to which every extra hour spent at the screen significantly increases the chances of developing metabolic syndrome among children (Jahangiry et al., 2022). In the Indian setting, the rising cases of overweight and obese teenagers are highly associated with city living, which is defined by the use of screens and reduced physical activities. The COVID-19 pandemic became a catalyst, causing an immediate transition of the education process and social interaction to the digital platform. The shift resulted in poor quality of sleep over half of the surveyed teens and a major increase in depressive symptoms (Moitra and Madan, 2022). Bibliometric studies carried out worldwide indicate that the body of research concerning the topic of digital addiction has shifted the focus to the narrower psychological measurements of health-related consequences, such as the state of sleep hygiene and anxiety (Gull & Ruth Sravani, 2024). However, India is a distinct case because of the so-called rural paradox, when the level of digitalization is high, but the access to health-promoting infrastructure is harshly limited. Understanding these intricacies is critical in coming up with health intervention that is localized.

3. Data and methods

We performed a systematic search of the Scopus database in February 2026. The use of inclusion and exclusion criteria was based on the available literature to find scholarly articles relevant to the current study (Nanda and Banerjee, 2021). In line with the previous bibliometric assessments of the metabolic risk and digital dependence, we filtered out editorials, monographs, conference proceedings, book chapters, and other non-refereed publications. The emphasis was made on English-language, peer-reviewed articles, as they have a significant impact on the intellectual community and can be considered a reliable source (Mihalache and Michalache, 2016). In determining the best search terms, we conducted a thorough search of articles that are highly related to our subject matter, and these are the commonly used key words with high prevalence with respect to digital overuse among teenagers. These methodological guidelines are generally acceptable in the empirical research community and are usually utilized in various studies.

In the initial stage, the literature survey was carried out to investigate the topic of smartphone addiction by searching the term. It was initiated by the analysis of titles and keywords that were used by researchers and then the evaluation of abstracts of potentially relevant manuscripts. This method allowed us to experience the nature of their studies because the terms chosen by professionals point to the main investigation outcomes. Whenever we came across any alternative keywords in relation to our original query, the same was carefully recorded and included in further search. In the end, we have found a list of commonly used keywords, which demonstrated a specific trend. Using the Boolean operators OR and And, we came up with the following final search query: “(“screen time” OR “digital media” OR “smartphone addiction” OR “mobile use” OR “electronic media” OR “internet addiction”) AND (child* OR adolescent* OR youth OR teen* OR infant* OR toddler* OR pediatric* OR “school-aged” OR minor*) AND (India*)”. This search might not be exhaustive, but we are sure that most relevant articles have been picked up by the algorithm.

We searched titles, keywords and abstracts systematically in accordance with the established bibliometric review methodologies. There were no restrictions regarding the date of publication in our search parameters because our goal was to examine the whole range of studies regarding metabolic risk and digital dependence. The preliminary stage returned 426 records in Scopus database (see Table 1). We selected 352 potential relevant manuscripts after accepting non-academic, non-peer-reviewed publications, non-journal articles, and non-English publications. After filtering out irrelevant articles (n = 9), we finally settled on a final collection of 343 journal articles.

Table 1. Search criteria and article selection

Criteria	Exclude	Include
Date: 4 th February 2026 Source: Scopus Database Search Term: TITLE-ABS-KEY ("screen time" OR "digital media" OR "smartphone addiction" OR "mobile use" OR "electronic media" OR "internet addiction") AND (child* OR adolescent* OR youth OR teen* OR infant* OR toddler* OR pediatric* OR "school-aged" OR minor*) AND (India*)	-	426
Document Type: Articles	74	352
Source Type: Journal	00	352
Language: English	00	352
Content screening: Include articles if "Titles, abstracts, and keywords" indicate relevance to the scope of the study	09	343

The current study employed bibliometric analysis to conduct an ambitious review of the available body of literature, outlining the previous studies and steps forward in the empirical contribution to the field of scholarly research (Choi et al., 2022). Application of bibliometric framework is essential to the classification and measurement of collaborative processes, and to explaining the research practice of individual authors, journals, publishers, countries, and organizations (Drago et al., 2023).

Bibliometric techniques are particularly effective when they can be used to determine the gaps in the current research, the latest developments, and new themes in a specified field of study (Paul and Criado, 2020). VOSviewer, which is a common tool in analyzing and visualizing relational data between authors, journals, countries, and co-citations, was used as the analytical part of this paper (Lopez-Medina et al., 2021). The cluster analysis was also performed to identify the categories according to the specific attributes of the users and the subcategories where the representatives of one category demonstrated strong interrelations, whereas the clusters themselves were characterized by the great heterogeneity (Shiau and Dwivedi, 2013). In order to have an accurate classification of the research papers, a hierarchical clustering analysis was carried out.

4 Bibliometric analysis and interpretation

4.1 Publication trends of metabolic risks and digital dependency research

The trajectory shown in Figure 1 demonstrates that the first twenty-year period (1991-2012) was characterized by the state of stagnation with periodical and insignificant academic production. During this 22 year span the publication rate had been in the low single digits and the publication usually produced one or two articles annually. This is probably in line with the fact that the inclusion of digital technologies and access to the internet was also restricted in India at this time, and thus the topic of digital overuse serves as a residual field of research, but not an important object of public health. Nevertheless, the year of 2013 can be considered as a turning point, which is supported by the growth of publications by nine-fold. The overall tendencies of the academic literature are increasing during the period of 2013-2019 (seven to nineteen publications per year). This boom is linked with the intensive growth of low-cost mobile internet, as the introduction of Reliance Jio in 2016 or the mass usage of smartphones in the Indian family. It is at this period that the academic fraternity started appreciating the developmental impact of this digital revolution and the volume of research began to grow in a slow but steady fashion. The largest jump was observed since 2020 when the COVID-19 pandemic started. The years are 2020 (n = 23), 2021 (n = 34), and 2022 (n = 45), where the number of publications is significantly increasing. This influx may be linked to the forced digitalisation of the educational process and socialisation under lockdown conditions, which led to the raised issues of screen time, cyberchondria, and cyber dependence into the limelight of the research on pediatrics and psychology in India.

Remarkably, the year 2025 will be the peak of scientific production as the number of articles will be the highest in the whole dataset (63 articles). This tendency also suggests that the interest in the topic remains rather high in the aftermath of the pandemic but instead, it has become more acute, with researchers exploring the long-term, residual impact of the new normal on child development. This result was slightly decreasing in 2023 (n = 33) and then returned to 2024 (n = 40) and a significant rise again in 2025. This trend indicates the maturity of the field, which will shift to reactive studies during the pandemic period to more all-embracing, longitudinal studies. The number of articles of 2026 is seven. Despite this being an incomplete year, it highlights the overall trend of further momentum of scholarly publication, which means that the issue of digital overuse is an important and dynamic topic of concern in academia.

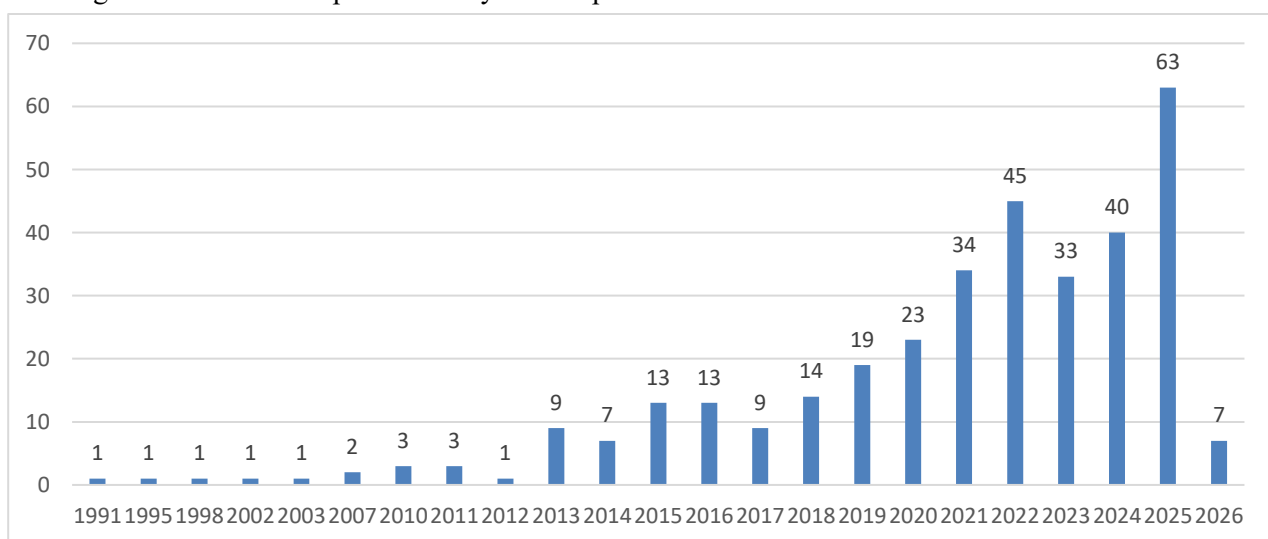


Fig. 1 Year-wise publication of articles

4.2 Top articles on metabolic risks and digital dependency research

Table 2 presents the most commonly addressed academic literature on the subject of metabolic risks and digital dependence. The article by Guess et al. (2020) has received the most citations in the Scopus database with 485 items, compared to 314 citations in the study by Nalwa and Anand (2003).

Moreover, Guess et al. (2020) determined a mean annual citation rate as the highest with 80.83 citations per year, which is 29.00 citations per year better than the citation rate found by Román-Viñas et al. (2016). Considering these findings, it is urgent that adolescents and youngsters in India should be offered specific advice in governmental adolescent health clinics, academic institutions, and families to limit such behaviors and increase physical, psychological, and social health and wellbeing (Davey et al., 2018).

In India, myopia is a significant population health problem, which is linked to the longer time spent on reading and the greater time spent at the computer and gaming screens. In order to reduce the development of myopia in school-aged children, annual ophthalmologic examinations and promotion of outdoor activities are necessary (Saxena et al., 2017).

Table 2. Top articles on metabolic risks and digital dependency research

Authors	Source Title	Title	TC	TC/PY
Guess et al. (2020)	Proceedings of the National Academy of Sciences of the USA	“A digital media literacy intervention increases discernment between mainstream and false news in the United States and India”	485	80.83
Nalwa and Anand (2003)	Cyberpsychology and Behavior	“Internet Addiction in Students: A Cause of Concern”	314	13.65
Román-Viñas et al. (2016)	Int’l J. of Behavioral Nutrition and Physical Activity	“Proportion of children meeting recommendations for 24-hour movement guidelines and associations with adiposity in a 12-country study”	299	29.90
LeBlanc et al. (2015)	PLOS One	“Correlates of total sedentary time and screen time in 9-11 year-old children around the world: The international study of childhood obesity, lifestyle and the environment”	245	22.27
Goel et al. (2013)	Indian J. of Psychiatry	“A study on the prevalence of internet addiction and its association with psychopathology in Indian adolescents”	173	13.31
Balakrishnan and Griffiths (2017)	J. of Behavioral Addictions	“Social media addiction: What is the role of content in YouTube?”	161	17.89
Davey et al. (2018)	J. of Family and Community Medicine	“Predictors and consequences of "Phubbing" among adolescents and youth in India: An impact evaluation study”	143	17.88
Saxena et al. (2017)	PLOS One	“Incidence and progression of myopia and associated factors in urban school children in Delhi: The North India Myopia Study”	139	15.44
Tandon et al. (2021)	JAMA Network Open	“Association of children's physical activity and screen time with mental health during the covid-19 pandemic”	134	26.80
Chopra et al. (2020)	Diabetes and Metabolic Syndrome: Clinical Research and Reviews	“Impact of COVID-19 on lifestyle-related behaviours- a cross-sectional audit of responses from nine hundred and ninety-five participants from India”	130	21.67

Note(s): TC= Total citations. C/Y=Citations per year

4.3 Top journals of metabolic risks and digital dependency research

Table 3 lists the top journals in the field of research on metabolic risk and digital dependency. In terms of the total citation numbers, both the journal articles published in the PLOS One and the Proceedings of the National Academy of Sciences of the United States of America appear on the top of the list with 639 and 485 citations, respectively. Notably, nine articles have been published in the journal under the name of PLOS One, and the indexed journal of Asian Journal of Psychiatry has six publications. The mean citations per document is also greatest in the Proceedings of the National Academy of Sciences of the United States of America with an average of 485.00 citations and is next followed by Cyberpsychology, Behaviour, and Social Networking with an average of 314.00 citations.

The statistics obtained on the Scopus database indicate that, the highest H-index of 896 is obtained on the Proceedings of the National Academy of Sciences of the United States of America and the second ranking is 467 with PLOS one. The Scimago Journal Rank (SJR) is an assessment parameter that summarises the number of citations a journal obtains and the reputation of the citations made to the journal. The author has therefore chosen to give an SJR ranking value. The 2025 SJR rankings with the highest SJR of 3.546 is followed almost by the Proceedings of the National Academy of Sciences of the United States of America with a SJR of 3.414.

Table 3. Top journals of metabolic risks and digital dependency research

Source	TC	TP	TC/TP	H-Index	SJR
PLOS One	639	9	71.00	467	0.803
Proceedings of The National Academy of Sciences of the USA	485	1	485.00	896	3.414
Cyberpsychology and Behavior	314	1	314.00	190	1.330
Int'l J. of Behavioral Nutrition and Physical Activity	306	3	102.00	162	2.394
Indian J. of Psychiatry	215	5	43.00	58	0.518
J. of Family and Community Medicine	214	2	107.00	42	0.459
Asian J. of Psychiatry	211	6	35.17	70	1.126
J. of Behavioral Addictions	204	2	102.00	88	2.260
JAMA Network Open	134	1	134.00	154	3.546
Diabetes and Metabolic Syndrome: Clinical Research and Reviews	130	1	130.00	92	0.986

Note(s): SJR= Scimago Journal & Country Rank 2025. TC = Total Citations. TP = Total Publications. TC/TP= Average citations per article. The journals are listed in this table by total citations.

4.4 Top authors, institutes, and countries of metabolic risks and digital dependency research

Table 4 outlines the main authors, institutions, and countries, which have made contributions to the study of the metabolic risk factors and digital dependency. A review of the mentioned sources has shown that the authors Gues A.M., Lerner M., Lyons B., Montgomery J.M., Nyhan B., Reifler J., and Sircar N. obtained the maximum number of citations, which is 485 sources, which makes them the most prominent scientists in the field. Chaput J.-P., Fogelholm M., and Katzmarzyk P.T. follow them, but their combined number of 370 citation spots speaks volumes of its heavy scholarly impact. The most mentioned institutional organization is the Pennington Biomedical Research Center (United States), which has 1,159 citations. Geographically, India is considered the most contributing country with a total of 267 articles with a total of 4,117 citations. The second country that is the most prolific is the United States which has 64 articles and 2,298 citations.

Table 4. Top authors, institutes, and countries of metabolic risks and digital dependency research

Author	TP	TC	Institute	TP	TC	Country	TP	TC
Guess A.M.	1	485	Pennington Biomedical Research Center, US	8	1159	India	267	4117
Lerner M.	1	485	Children's Hospital of Eastern Ontario, Canada	6	604	United States	64	2298
Lyons B.	1	485	Faculty of Sport of University of Porto, Portugal	4	580	United Kingdom	29	1618
Montgomery J.M.	1	485	Helsingin Yliopisto, Finland	4	579	Canada	20	880
Nyhan B.	1	485	Kenyatta University, Kenya	4	579	South Africa	14	786
Reifler J.	1	485	University of Bath, UK	4	579	Finland	11	740
Sircar N.	1	485	University of South Australia, Australia	4	579	Australia	15	725
Chaput J.-P.	5	370	University of Utah, US	1	485	Portugal	9	635
Fogelholm M.	5	370	Ashoka University, India	1	485	Kenya	7	622
Katzmarzyk P.T.	5	370	University of Michigan, US	1	485	Colombia	6	615

Note(s): TC = Total Citations. TP = Total Publications

4.5. Keyword Analysis and Thematic Evolution

This part explicates the intellectual structure of this discipline by examining five key clusters as determined in the co-occurrence analysis of key words in keyword analysis (see Figure 2). These groups constitute the major thematic grounds on which the study on metabolic risks and digital dependency is based.

4.5.1 Metabolic health and Academic performance

The cluster shows the difference in physiological and educational opportunities caused by the digital interaction. The empirical research has determined a close correlation between the long period of screen time, sedentary lifestyles and metabolic health risks. Urbanization and the digital era have significantly increased the occurrence of obesity among children and adolescents especially in the poorer communities. This growth has mostly been driven by a rise in the intake of energy-rich low-cost foods, and the decline in physical activity (Palanivel et al., 2025; Seth & Sharma, 2013). Suganya et al. (2025) also explain that a multifaceted interaction of family income, screen time, and consumption of unhealthy food becomes a critical factor in causing obesity.

The implications of the digital interaction are a delicate terrain in the academic world. Although the positive association between excessive screen time and elevated body mass index (BMI) and various behavioural abnormalities has been established empirically, the interrelationship between screen time and academic performance is a debated subject. Sidiq et al. (2025) and Chandranaik et al. (2024) argue that screen exposure has a negative impact on academic performance, which is mainly caused by broken circadian rhythms, particularly when it is used daily more than two hours or in the last one-hour before bedtime (Sivakumar et al., 2022). On the other hand, Kumar et al. (2024) did not find any statistically significant relationship between academic success and smartphone dependence. In addition, Rajput and Chaudhary (2025) state that the use of the internet, through proper regulation, can positively impact the study practices and expand the access to educational resources, and this fact makes the quality of online materials as important as the time of usage.

4.5.2 Internet use and Sleep quality

The theme is an investigation of the psychological causes and consequences of Problematic Internet Use (PIU). Adolescents are becoming more vulnerable to PIU, and often they use it as a maladaptive coping mechanism to address underlying emotional distress and not a healthy tool to deal with stress (Singh et al., 2022).

Loneliness, low self-esteem, and emotional instability are all examples of psychological antecedents which make it possible to predict this behaviour (Fernandes et al., 2021; Mathew and Krishnan, 2020).

Balhara et al. (2018) note that PIU is mainly linked to the leisure use of the internet such as gaming and use of social media, but educational internet use is at a relatively lower risk. The consequences of PIU are enormous, as they have a

detrimental impact on social anxiety, the quality of life in general, and family bonds (Vadher et al., 2019; Kumar et al., 2019).

One notable finding that can be identified as detrimental to sleep hygiene is a general internet addiction, as well as particular modalities like social media use, which have a high level of associations with poor sleep quality in students, including in the medical and engineering fields (Tahir et al., 2021; Vadher et al., 2019).

As PIU is recognized as an independent disorder, which is manifested by frequent intrusive thoughts (Singh et al., 2022), there is an urgent need to prevent such risks by means of awareness campaigns targeted at parents, students, and schools (Shanthi et al., 2024; Anand et al., 2021).

4.5.3 Health Promotion in Indigenous and Rural Youth

This group examines the concept of the digital paradox, which is common in developing areas, that is, the absence of physical infrastructure and the increased digital connectivity. The lack of necessary resources, including safe walking paths, public transportation, which narrows the possibilities to engage in sports (Joshi-Reddy et al., 2021; Banavali et al., 2021), affects health outcomes in rural and indigenous settings. In turn, city growth in these areas is attributed to less dietary diversity and higher levels of overweight and obesity (Fall et al., 2021). Regardless of such infrastructural shortfalls, the advent of digital addiction is a new phenomenon of concern. According to Dhiman et al. (2025), every four out of ten teenagers living in the rural areas have the symptoms of internet addiction, and the risk of using the Internet is increased in those who use services provided by Facebook and TikTok. This observation implies that, despite the shortage of physical resources, the availability of digital technology is still vast. In order to deal with such differences, Thakur et al. (2016) emphasize the need to increase both human and financial resources in health promotion. The intervention must be culturally oriented, such as the promotion of using traditional drink options as an alternative to bad drinking habits (George et al., 2025).

4.5.4 Digital Media Epidemiology among Indian Adolescents

This theme brings out the epidemiological change in the interaction patterns of the Indian adolescents with the society and their access to information. Influence of digital platforms is transforming cultural identities, which the young tribals and rural youth are being forced to adopt a globalized way of life that does not necessarily relate to traditional ways (Chattopadhyay and Mohanty, 2022). The social media has been a two sided sword in this change. On the one hand, it develops transnational ties and social integration among young adults (Jagganath et al., 2023) and has a positive effect on political participation (Kaur et al., 2018). Conversely, there are a number of threats that are presented by the unregulated use of information. Although social media influences Sexual and Reproductive Health (SRH) knowledge, the positive effect is mostly perceived by educated, urban, and wealthy adolescent females, which means that interventions that would accommodate socioeconomic divergence should be used (Saha et al., 2022). Moreover, too much information seeking may also result in cyberchondria and information overload, which is detrimental to preventive health practices (Bala et al., 2021). According to Mohd Saleem and Jan (2024) such an abysmal level of involvement in the digital world is associated with poor mental health results including depression and anxiety.

4.5.5 Digital Dependency and Psychological Outcomes

The final cluster summarizes the addiction dynamics along with particular contextual elements, in particular the COVID-19 pandemic and offers future remedial measures. The intensity of use, indicated by the length of browsing and money spent, is a strong indicator of addiction as well as depression symptoms. Psychological deficits, such as reduced levels of life satisfaction and anxiety, are often a contributing factor to this type of dependency. COVID -19 served as the trigger; with the shift to online education, screen time dramatically rose, thus adding to stress and anxiety experienced by students and their parents (Harjule et al., 2021; Siddhanta et al., 2024).

However, there is available literature in the scholarly world that suggests viable interventions. Schick et al. (2022) focus on the significance of culturally competent approaches that should encourage familial warmth and parental control to reduce concomitant depression and substance abuse. Physiological treatments, including yoga, have proven to be effective in improving self-management and mental health, subduing overindulgence in screen-related practices (Mona et al., 2025). Finally, screen time as such is not necessarily bad, on the contrary, a concerted action of policymakers, teachers, and parents is mandatory to make sure that digital activities are balanced and controlled.

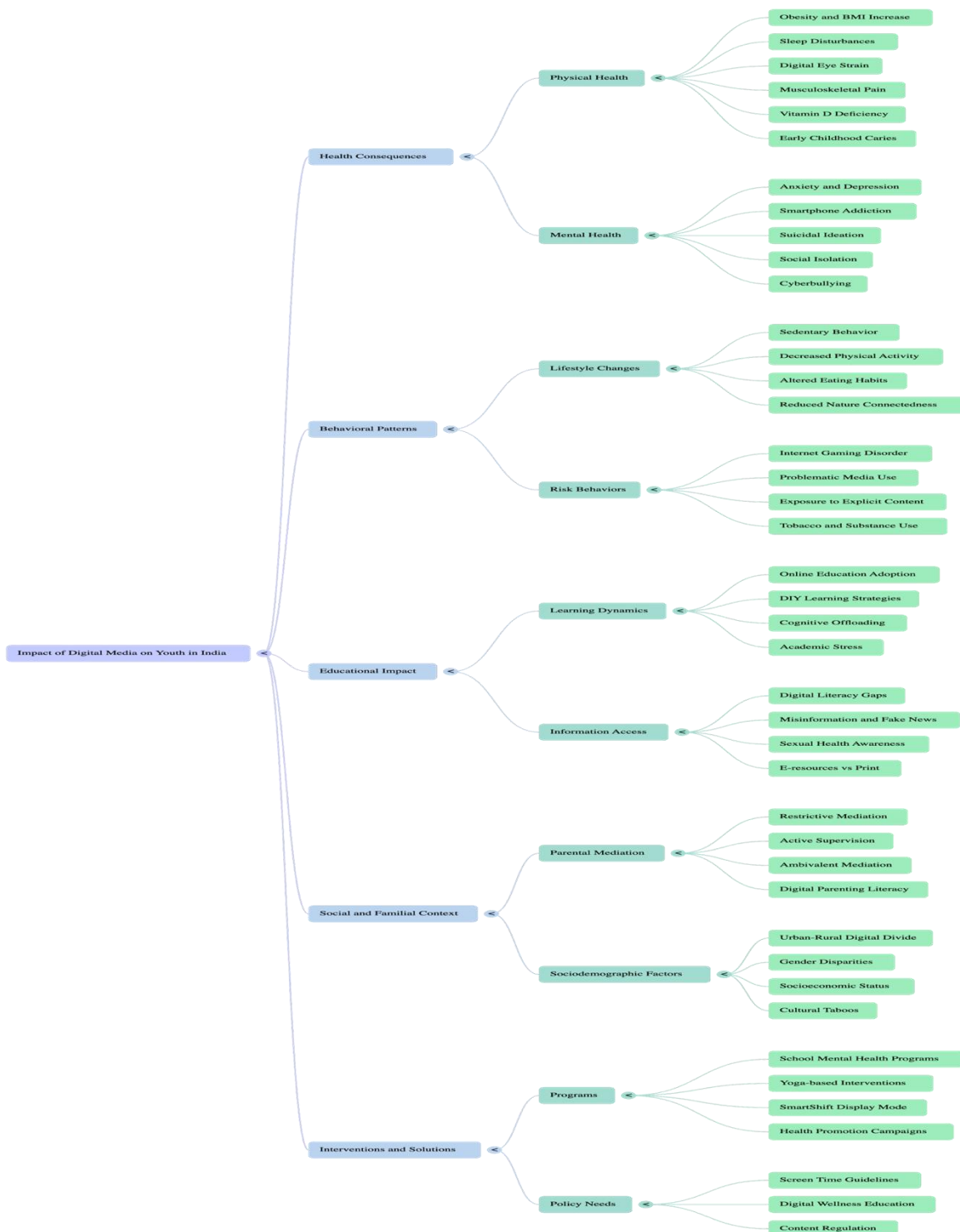


Fig 3. Mind map of the impact of digital media on young Indian kids

5.2 Educational and Social Context

A dual reality is highlighted in the educational impact sub segment of the mind map. Online learning is enabled with the help of digital tools and contributes to self-directed learning; however, screen time may negatively affect academic results, primarily due to disturbed circadian rhythms (Karakose et al., 2022).

Besides, social and family background segment emphasizes the significance of parental mediation. Responsible digital parenting techniques are invaluable, since the unregulated use has been linked with negative consequences on the digital well-being of children (Tan et al., 2025).

The so-called urban-rural digital divide, which is analyzed in the framework of the thematic cluster of the Health Promotion in Indigenous and Rural Youth, is a relevant sociodemographic factor; access to digital tools is preserved even under the conditions of limited access to physical resources, which predetermines the experiences of various groups in the context of digital dependence.

5.3 Research Gaps and Future Directions

In spite of the significant amount of academic research, there are still salient gaps. Longitudinal studies and the introduction of a more representational geography should be immediately given to increase the understanding of developmental patterns related to the use of the internet (Geng et al., 2023; Wang et al., 2025).

Moreover, the research should also be supplemented by additional studies related to the peculiarities of the cultural milieu in India, which evaluates the possible corrective effect of media literacy programs on negative consequences (Sarwatay et al., 2021).

The research work planned in the future must be more diverse in terms of sampling methods and rigorously investigate divergent developmental trajectories associated with problematic internet use (Wang et al., 2025).

6. Conclusion

The bibliometric review shown below indicates the urgency of the need to tackle the issue of digital dependency as a metabolic risk factor in the youth population of India. The consequences of overdigitalizing are far-reaching and multi-dimensional, and they have an effect on physical, cognitive, psychosocial, and neurological development in children. To prevent the health of future generations the situation in India should go beyond the registering and embrace the proactive intervention policies. This urgency requires the adoption of school mental health programs, yoga informed programs, and development of national policies that govern the screen time.

By encompassing the concept of digital wellness into the greater context of the public health, India can become better equipped to alleviate the physiological implications of the technological innovations that it brings with it.

References

1. Ali, Z., Janarthanan, J., & Mohan, P. (2024). Understanding Digital Dementia and Cognitive Impact in the Current Era of the Internet: A Review. *Cureus*. <https://doi.org/10.7759/cureus.70029>
2. Anand, N., Sharma, M. K., & Marimuthu, P. (2021). Problematic internet use and its association with psychological stress among adolescents. *Indian Journal of Social Psychiatry*, 37(3), 269-274.
3. Bala, R., Srivastava, A., Ningthoujam, G. D., Potsangbam, T., Oinam, A., & Anal, C. L. (2020). An observational study in Manipur State, India on preventive behavior influenced by social media during the COVID-19 pandemic mediated by cyberchondria and information overload. *Journal of Preventive Medicine and Public Health*, 54(1), 22.
4. Balakrishnan, J., & Griffiths, M. D. (2017). Social media addiction: What is the role of content in YouTube?. *Journal of behavioral addictions*, 6(3), 364-377.
5. Balhara, Y. P. S., Harshwardhan, M., Kumar, R., & Singh, S. (2018). Extent and pattern of problematic internet use among school students from Delhi: Findings from the cyber awareness programme. *Asian journal of psychiatry*, 34, 38-42.
6. Banavali, U., Patil, S., Chavan, R., Sonawane, S., Joglekar, C., Fall, C., ... & Hardy-Johnson, P. (2021). What shapes adolescents' diet and physical activity habits in rural Konkan, India? Adolescents' and caregivers' perspectives. *Public Health Nutrition*, 24(16), 5177-5186.
7. Chattopadhyay, K., & Mohanty, S. (2022). New media and cultural disconnect: A study on the lodha tribal community of India. *Asian Journal of Social Science*, 50(2), 137-146.
8. Choijil, E., Méndez, C. E., Wong, W. K., Vieito, J. P., & Batmunkh, M. U. (2022). Thirty years of herd behavior in financial markets: A bibliometric analysis. *Research in International Business and Finance*, 59, 101506.
9. Chopra, S., Ranjan, P., Singh, V., Kumar, S., Arora, M., Hasan, M. S., Kasiraj, R., Suryansh, Kaur, D., Vikram, N. K., Malhotra, A., Kumari, A., Klanidhi, K. B., & Baitha, U. (2020). Impact of COVID-19 on lifestyle-related behaviours- a cross-sectional audit of responses from nine hundred and ninety-five participants from India. *Diabetes & Metabolic Syndrome: Clinical Research & Reviews*, 14(6), 2021-2030. <https://doi.org/10.1016/j.dsx.2020.09.034>
10. Davey, S., Davey, A., Raghav, S. K., Singh, J. V., Singh, N., Blachnio, A., & Przepiórkaa, A. (2018). Predictors and consequences of "Phubbing" among adolescents and youth in India: An impact evaluation study. *Journal of Family and Community Medicine*, 25(1), 35-42.
11. Dhiman, S., Kaur, N., Gupta, M., & Grover, S. (2025). Internet Addiction Prevalence and Its Psychosocial Factors Among Adolescents in Urban Chandigarh and Rural Kangra District, Himachal Pradesh, India. *Journal of Indian Association for Child and Adolescent Mental Health*, 21(3), 220-227.
12. Drago, C., Gatto, A., & Ruggeri, M. (2023). Telemedicine as technoinnovation to tackle COVID-19: A bibliometric analysis. *Technovation*, 120, 102417.
13. Fernandes, B., Uzun, B., Aydin, C., Tan-Mansukhani, R., Vallejo, A., Saldaña-Gutierrez, A., Nanda Biswas, U., & Essau, C. A. (2021). Internet use during COVID-19 lockdown among young people in low- and middle-income countries: Role of psychological wellbeing. *Addictive Behaviors Reports*, 14, 100379. <https://doi.org/10.1016/j.abrep.2021.100379>

14. Geng, X., Zhang, Jialin, Liu, Y., Xu, L., Han, Y., Potenza, M. N., & Zhang, Jintao. (2023). Problematic use of the internet among adolescents: A four-wave longitudinal study of trajectories, predictors and outcomes. *Journal of Behavioral Addictions*. <https://doi.org/10.1556/2006.2023.00021>
15. George, C. V., John, B., Hecht, K., Hecht, C., Trevisi, L., Vollmer, L., ... & Shin, S. S. (2025). Beverage Consumption Patterns Among Navajo Children Aged 2–5 Years. *Current Developments in Nutrition*, 9(3), 104493.
16. Goel, D., Subramanyam, A., & Kamath, R. (2013). A study on the prevalence of internet addiction and its association with psychopathology in Indian adolescents. *Indian journal of psychiatry*, 55(2), 140-143.
17. Guess, A. M., Lerner, M., Lyons, B., Montgomery, J. M., Nyhan, B., Reifler, J., & Sircar, N. (2020). A digital media literacy intervention increases discernment between mainstream and false news in the United States and India. *Proceedings of the National Academy of Sciences*, 117(27), 15536-15545.
18. Gull, M., & Ruth Sravani, B. (2024). Do screen time and social media use affect sleep patterns, psychological health, and academic performance among adolescents? evidence from bibliometric analysis. *Children and Youth Services Review*, 164, 107886. <https://doi.org/10.1016/j.childyouth.2024.107886>
19. Gupta, P., Shah, D., Bedi, N., Galagali, P., Dalwai, S., Agrawal, S., John, J. J., Mahajan, V., Meena, P., Mittal, H. G., Narmada, S., Smilie, C., Ramanan, P. V., Evans, Y. N., Goel, S., Mehta, R., Mishra, S., Pemde, H., Basavaraja, G. V., ... Krishnan, G. (2022). Indian Academy of Pediatrics Guidelines on Screen Time and Digital Wellness in Infants, Children and Adolescents. *Indian Pediatrics*, 59(3), 235–244. <https://doi.org/10.1007/s13312-022-2477-6>
20. Han, Y., Qiu, J., Shi, C., Huang, S., Huang, H., Wang, X., Zhu, S., Lu, D., Lu, P., & Zeng, F. (2025). Factors Associated With Digital Addiction: Umbrella Review. *JMIR Mental Health*, 12, e66950–e66950. <https://doi.org/10.2196/66950>
21. Harjule, P., Rahman, A., & Agarwal, B. (2021). A cross-sectional study of anxiety, stress, perception and mental health towards online learning of school children in India during COVID-19. *Journal of Interdisciplinary Mathematics*, 24(2), 411-424.
22. Hussain, S., Khan, A., Arshad, L., & Rubab, E. (2025). Trapped in the Screen: Clinical Insights into Digital Addiction and Mental Health Among Young Adults. *Medtigo Journal of Medicine*, 1(1), 1–5. <https://doi.org/10.63096/medtigo3084234>
23. Jagganath, G., Adegboyega, A. O., Shamala, R., & Harrichurran, P. (2023). Highly Skilled Migrant Youths: Emotional Intimacy through Social Media and Communication Technologies. *Journal of African Films and Diaspora Studies*, 6(3), 63.
24. Jahangiry, L., Aune, D., & Farhangi, M. A. (2022). Screen time and the risk of metabolic syndrome among children and adolescents: A systematic review and dose-response meta-analysis. *Nutrition, Metabolism and Cardiovascular Diseases*, 32(11), 2483–2492. <https://doi.org/10.1016/j.numecd.2022.08.004>
25. Jhala, J., & Sharma, R. (2016). Internet use among adolescents. *Journal of Indian Association for Child and Adolescent Mental Health*, 12(1), 36-59.
26. Joseph, J., Varghese, A., Vijay, V., Dhandapani, M., Grover, S., Sharma, S. K., Singh, M., Mann, S., & Varkey, B. P. (2022). Problematic Internet Use Among School-Going Adolescents in India. *Indian Journal of Community Medicine*, 47(3), 321–327. https://doi.org/10.4103/ijcm.ijcm_1129_21
27. Joshi-Reddy, K., Kamble, V., Kunte, P., Hardy-Johnson, P., Fall, C. H., Barker, M., ... & Kehoe, S. H. (2021). Adolescent diet and physical activity in the context of economic, social and nutrition transition in rural Maharashtra, India: a qualitative study. *Public Health Nutrition*, 24(16), 5299-5308.
28. Karakose, T., Tülübaşı, T., & Papadakis, S. (2022). Revealing the Intellectual Structure and Evolution of Digital Addiction Research: An Integrated Bibliometric and Science Mapping Approach. *International Journal of Environmental Research and Public Health*, 19(22), 14883. <https://doi.org/10.3390/ijerph192214883>
29. Kaur, M., & Verma, R. (2018). Demographics, social media usage, and political engagement in Punjab. *Indian Journal of Marketing*, 48(11), 43-55.
30. Kumar, R., Gupta, A., & Jaiswal, A. (2024). Smartphone addiction and its correlation with academic performance in high school adolescents: An observational study. *Archives of Mental Health*, 25(2), 117-123.
31. Kumar, S., Singh, S., Singh, K., Rajkumar, S., & Balhara, Y. P. S. (2019). Prevalence and pattern of problematic internet use among engineering students from different colleges in India. *Indian Journal of Psychiatry*, 61(6), 578-583.
32. LeBlanc, A. G., Katzmarzyk, P. T., Barreira, T. V., Broyles, S. T., Chaput, J. P., Church, T. S., ... & ISCOLE Research Group. (2015). Correlates of total sedentary time and screen time in 9–11 year-old children around the world: the international study of childhood obesity, lifestyle and the environment. *PloS one*, 10(6), e0129622.
33. López-Medina, T., Mendoza-Avila, I., Contreras-Barraza, N., Salazar-Sepúlveda, G., & Vega-Muñoz, A. (2021). Bibliometric mapping of research trends on financial behavior for sustainability. *Sustainability*, 14(1), 117.
34. Mathew, P. (2020). Impact of problematic internet use on the self-esteem of adolescents in the selected school, Kerala, India. *Archives of psychiatric nursing*, 34(3), 122-128.
35. Mihalache, M., & Mihalache, O. R. (2016). A decisional framework of offshoring: Integrating insights from 25 years of research to provide direction for future. *Decision Sciences*, 47(6), 1103-1149.

36. Moitra, P., & Madan, J. (2022). Impact of screen time during COVID-19 on eating habits, physical activity, sleep, and depression symptoms: A cross-sectional study in Indian adolescents. *PLOS ONE*, *17*(3), e0264951. <https://doi.org/10.1371/journal.pone.0264951>
37. Mona, M., Kumari, S., Anand, N., & Sharma, M. K. (2025). Development, Validation, and Feasibility of Yoga Intervention Module for Optimizing Safe Use of Screen Time: A Pilot Study. *Advances in mind-body medicine*, *39*(2), 9-16.
38. Nain, H., & Chaudhary, M. (2022). Internet Usage by Young Kids in India. *FWU Journal of Social Sciences*.
39. Nalwa, K., & Anand, A. P. (2003). Internet Addiction in Students: A Cause of Concern. *CyberPsychology & Behavior*, *6*(6), 653–656. <https://doi.org/10.1089/109493103322725441>
40. Nanda, A. P., & Banerjee, R. (2021). Consumer's subjective financial well-being: A systematic review and research agenda. *International Journal of Consumer Studies*, *45*(4), 750-776.
41. Palanivel, S., Subbiah, E., Raghavan, K. S., & Sridhar, S. (2025). Determinants of childhood and adolescent obesity and it's effect on metabolism in South Indian population. *Journal of Pediatric Endocrinology and Metabolism*, *38*(5), 450-457.
42. Paul, J., & Criado, A. R. (2020). The art of writing literature review: what do we know and what do we need to know?. *International business review*, *29*(4), 101717.
43. Rajput, R., & Chaudhary, D. (2025). An investigation into the effects of internet usage on the study habits of secondary school students in India. *E-Learning and Digital Media*, 20427530251379082.
44. Roman-Viñas, B., Chaput, J. P., Katzmarzyk, P. T., Fogelholm, M., Lambert, E. V., Maher, C., ... & ISCOLE Research Group. (2016). Proportion of children meeting recommendations for 24-hour movement guidelines and associations with adiposity in a 12-country study. *International journal of behavioral nutrition and physical activity*, *13*(1), 123.
45. Saha, R., Paul, P., Yaya, S., & Banke-Thomas, A. (2022). Association between exposure to social media and knowledge of sexual and reproductive health among adolescent girls: evidence from the UDAYA survey in Bihar and Uttar Pradesh, India. *Reproductive health*, *19*(1), 178.
46. Saleem, S. M., & Jan, S. S. (2024). A cross-sectional study of mental health effects of excessive screen time and social media use among Indian adolescents and young adults. *Journal of Nature and Science of Medicine*, *7*(3), 210-217.
47. Sandhu, D., & Barn, R. (2023). "The Internet Is Keeping Me from Dying from Boredom": Understanding the Management and Social Construction of the Self Through Middle-Class Indian Children's Engagement with Digital Technologies During the COVID-19 Lockdown. *International Journal on Child Maltreatment: Research, Policy and Practice*, *6*(3), 489–504. <https://doi.org/10.1007/s42448-022-00135-8>
48. Sarwatay, D., Raman, U., & Ramasubramanian, S. (2021). Media Literacy, Social Connectedness, and Digital Citizenship in India: Mapping Stakeholders on How Parents and Young People Navigate a Social World. *Frontiers in Human Dynamics*, *3*. <https://doi.org/10.3389/fhumd.2021.601239>
49. Saxena, R., Vashist, P., Tandon, R., Pandey, R. M., Bhardawaj, A., Gupta, V., & Menon, V. (2017). Incidence and progression of myopia and associated factors in urban school children in Delhi: The North India Myopia Study (NIM Study). *PloS one*, *12*(12), e0189774.
50. Schick, M. R., Nalven, T., Thomas, E. D., Weiss, N. H., & Spillane, N. S. (2022). Depression and alcohol use in American Indian adolescents: The influence of family factors. *Alcoholism: Clinical and Experimental Research*, *46*(1), 141-151.
51. Seth, A., & Sharma, R. (2013). Childhood obesity. *The Indian Journal of Pediatrics*, *80*(4), 309-317.
52. Shanthi, L., Ashwath, J., Raju, M. K., & Ramalingam, S. (2024). Problematic internet use among adolescent school attendees: A school-based study from Tamil Nadu, India. *Indian Pediatrics*, *61*(10), 973-977.
53. Shiau, W. L., & Dwivedi, Y. K. (2013). Citation and co-citation analysis to identify core and emerging knowledge in electronic commerce research. *Scientometrics*, *94*(3), 1317-1337.
54. Siddhanta, S., Bandyopadhyay, D., & Bhowmick, S. (2024). Adolescent Health and Screen Time during a Period of Compulsory Online Education: A Cross Sectional Study from Eastern India. *J Indian Med Assoc*, *122*(3), 43-9.
55. Sidiq, M., Janakiraman, B., Kashoo, F., Jastania, R., Alhusayni, A. I., Alzahrani, A., ... & Alghadier, M. (2025). Screen time exposure and academic performance, anxiety, and behavioral problems among school children. *PeerJ*, *13*, e19409.
56. Singh, B., Singh, P., Singh, U., Jangid, P., & Gupta, R. (2020). Students' Stress and Internet Addiction during the Lockdown in India. *Indian Journal of Private Psychiatry*, *14*(1).
57. Singh, S., Datta, M., Gupta, P., & Batra, S. (2022). Predictors of 'problematic internet use' among adolescents and adults amid the pandemic in India. *Clinical Epidemiology and Global Health*, *15*, 101036.
58. Sivakumar, C. T., Rajan, M., Pasupathy, U., Chidambaram, S., & Baskar, N. (2022). Effect of sleep habits on academic performance in schoolchildren age 6 to 12 years: a cross-sectional observation study. *Journal of Clinical Sleep Medicine*, *18*(1), 145-149.
59. Suganya, M., Vijayalakshmi, R., & Parimala, L. (2025). Association of Cardiometabolic Diseases in Adolescents with Level of Obesity and Lifestyle Pattern at Metropolitan City; Findings from Southern India. *Texila International*

- Journal of Public Health*, 13, 706-712.
60. Tahir, M. J., Malik, N. I., Ullah, I., Khan, H. R., Perveen, S., Ramalho, R., ... & Pakpour, A. H. (2021). Internet addiction and sleep quality among medical students during the COVID-19 pandemic: A multinational cross-sectional survey. *PloS one*, 16(11), e0259594.
 61. Tan, C. Y., Xu, N., Liang, M., & Li, L. (2025). Meta-analysis of associations between digital parenting and children's digital wellbeing. *Educational Research Review*, 48, 100699. <https://doi.org/10.1016/j.edurev.2025.100699>
 62. Tandon, P. S., Zhou, C., Johnson, A. M., Gonzalez, E. S., & Kroshus, E. (2021). Association of children's physical activity and screen time with mental health during the COVID-19 pandemic. *JAMA network open*, 4(10), e2127892-e2127892.
 63. Thakur, J. S., Jaswal, N., Grover, A., Kaur, R., Jeet, G., Bharti, B., & Kaur, M. (2016). Effectiveness of district health promotion model (Hoshiarpur Ambala model): An implementation experience from two districts from Northern part of India. *International Journal of Noncommunicable Diseases*, 1(3), 122-130.
 64. Vadher, S. B., Panchal, B. N., Vala, A. U., Ratnani, I. J., Vasava, K. J., Desai, R. S., & Shah, A. H. (2019). Predictors of problematic Internet use in school going adolescents of Bhavnagar, India. *International Journal of Social Psychiatry*, 65(2), 151-157.
 65. Wang, P., Yuan, X., Gao, T., Wang, X., Xing, Q., Cheng, X., & Ming, Y. (2025). Problematic internet use in early adolescence: gender and depression differences in a latent growth curve model. *Humanities and Social Sciences Communications*, 12(1), 368. <https://doi.org/10.1057/s41599-025-04697-z>.