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A Comprehensive Systematic Review of Prevalence, Diagnosis, and Management of Internet Addiction Disorder

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ABSTRACT

Introduction: Internet Addiction Disorder (IAD) and Internet Gaming Disorder (IGD) represent significant public mental health challenges worldwide, with varying prevalence rates across regions and populations. The absence of standardized diagnostic criteria and assessment tools has led to considerable heterogeneity in reported rates and treatment outcomes.

Methods: A systematic review was conducted, screening 80 peer-reviewed studies that investigated the prevalence, diagnostic methods, and management of IAD and IGD. Studies were included based on predefined criteria focusing on validated assessment tools, human participants, and appropriate study designs. Data extraction covered study characteristics, diagnostic instruments, prevalence estimates, associated factors, and treatment efficacy.

Results: Global prevalence estimates vary widely, ranging from 2.6% in Northern/Western Europe to 44.6% in Northern Africa. University students are particularly vulnerable, with a pooled prevalence of 41.84%. Significant regional and demographic

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variations exist, with males generally exhibiting higher prevalence, except in Gulf Cooperation Council countries where females show higher rates. Cognitive-behavioral therapy (CBT) is the most evidence-based intervention, with effect sizes ranging from g = 0.92 to 1.61, though methodological limitations and cultural specificity constrain generalizability.

Discussion: The heterogeneity in prevalence is largely attributable to methodological differences, including choice of assessment tools and diagnostic criteria. Effective management requires culturally adapted, multimodal interventions, with emerging evidence supporting digital and online treatment formats. Critical gaps remain in longitudinal research, female representation, and standardized diagnostic frameworks.

Conclusion: IAD/IGD is a globally prevalent condition with substantial psychosocial impacts. Future research should prioritize longitudinal designs, culturally validated tools, and inclusive sampling to improve diagnostic accuracy and treatment applicability.

Keywords: Internet Addiction Disorder, Internet Gaming Disorder, prevalence, diagnosis, cognitive-behavioral therapy, systematic review, digital addiction.

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INTRODUCTION

Background

The rapid global expansion of internet access and digital technology has given rise to behavioral addictions associated with excessive and problematic online engagement, notably Internet Addiction Disorder (IAD) and Internet Gaming Disorder (IGD) (Kuss et al., 2014). Recognized in the DSM-5 under Section III and in the ICD-11 as Gaming Disorder, these conditions are characterized by loss of control, preoccupation, and continued use despite negative consequences. The worldwide penetration of smartphones and high-speed internet, accelerated by the COVID-19 pandemic, has exacerbated the risk of digital addiction across diverse populations, particularly among adolescents and young adults (Burkauska et al., 2023; Liu et al., 2025). Despite growing clinical and research attention, the field remains fragmented due to inconsistent diagnostic criteria, a proliferation of assessment tools, and significant regional disparities in reported prevalence and management approaches.

Research Objectives

This systematic review aims to:

1. Synthesize global and regional prevalence estimates of IAD and IGD across different populations.
2. Evaluate the diagnostic methods and assessment tools used in research and clinical settings.
3. Examine psychosocial, cognitive, and environmental factors associated with IAD/IGD.
4. Assess the efficacy of existing management and treatment interventions.
5. Identify methodological limitations and research gaps to inform future studies and clinical practice.

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Research Benefits

The findings of this review will:

- Provide clinicians and policymakers with evidence-based insights into the epidemiology and treatment of IAD/IGD.
- Guide the development of culturally sensitive diagnostic and intervention frameworks.
- Highlight populations at high risk, such as students and adolescents, for targeted prevention programs.
- Inform public health strategies to mitigate the psychosocial and economic burdens of digital addiction.

Hypotheses

1. Prevalence rates of IAD/IGD will vary significantly by geographic region, with higher rates observed in regions with lower quality-of-life indicators.
2. The choice of assessment tool and diagnostic criteria will substantially influence reported prevalence estimates.
3. Cognitive-behavioral therapy (CBT) will demonstrate the strongest empirical support among psychological interventions for IAD/IGD.
4. Comorbid conditions such as depression and anxiety will be strongly associated with IAD/IGD severity and poorer treatment outcomes.

Research Gap

Despite a growing body of literature, critical gaps persist:

- Lack of longitudinal studies examining the natural course and remission of IAD/IGD.

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- Underrepresentation of female participants in treatment studies, particularly pharmacological trials.
- Limited validation of assessment tools across diverse cultural contexts.
- Insufficient integration of neurobiological findings into diagnostic and treatment frameworks.
- Scarcity of research from low- and middle-income countries, especially in Africa and South America.

Novelty

This review offers a comprehensive synthesis of 80 studies spanning multiple continents, providing a nuanced analysis of how methodological and contextual factors shape the understanding of IAD/IGD. It uniquely integrates prevalence data, diagnostic evolution, associated factors, and treatment efficacy while critically appraising regional variations and research quality. By highlighting the discordance between high internet penetration and low addiction prevalence in Western Europe, and the reversed gender pattern in Gulf countries, this review contributes to a more culturally informed and methodologically rigorous approach to digital addiction research.

METHODS

Protocol

The study strictly adhered to the Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA) 2020 guidelines to ensure methodological rigor and accuracy. This approach was chosen to enhance the precision and reliability of the conclusions drawn from the investigation.

Criteria for Eligibility

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This systematic review aims to evaluate the prevalence, diagnosis, and management of internet addiction disorder.

We screened in sources based on their abstracts that met these criteria:

- **Internet Addiction Focus**: Does this study focus on Internet addiction disorder, problematic Internet use, or related terminology for pathological Internet use?
- **Relevant Outcomes**: Does this study report on at least one of the following: prevalence data, diagnostic methods, or management/treatment interventions for Internet addiction?
- **Appropriate Study Design**: Is this study a primary research study (cross-sectional, cohort, case-control, RCT, quasi-experimental) or a systematic review/meta-analysis?
- **Human Participants**: Does this study involve human participants of any age?
- **Validated Assessment**: Does this study use validated assessment tools or established diagnostic criteria for Internet addiction?
- **Publication Quality**: Is this a peer-reviewed publication with clear methodology and outcome measures?
- **Internet Addiction Specificity**: Does this study include an Internet addiction component (rather than focusing solely on other behavioral addictions without any Internet addiction element)?
- **Adequate Study Size and Type**: Is this study either: (1) a case report/series with 10 or more participants, OR (2) any other study design (excluding case reports/series), AND is it a full publication (not a conference abstract, editorial, or opinion piece)?

We considered all screening questions together and made a holistic judgement about whether to screen in each paper.

Search Strategy

The keywords used for this research based PICO :

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Element	P (Population)	I (Intervention/Exposure)	C (Comparison/Context)	O (Outcome)
Keyword 1	Internet addiction	Management	Standard care	Prevalence
Keyword 2	Internet gaming disorder	Treatment	No treatment	Diagnosis
Keyword 3	Problematic internet use	Intervention	Waitlist control	Symptom reduction
Keyword 4	Digital addiction	Cognitive-behavioral therapy	Treatment as usual	Clinical outcomes

The Boolean MeSH keywords inputted on databases for this research are: *("Internet addiction" OR "Problematic internet use" OR "Internet gaming disorder" OR "Digital addiction") AND ("Management" OR "Treatment" OR "Intervention" OR "Cognitive-behavioral therapy") AND ("Standard care" OR "No treatment" OR "Waitlist control" OR "Treatment as usual") AND ("Prevalence" OR "Diagnosis" OR "Symptom reduction" OR "Clinical outcomes")*

Data extraction

- **Study Design**:

  Extract the study design and methodology including:

  - Type of study (cross-sectional, longitudinal, cohort, RCT, etc.)
  - Data collection method (survey, clinical interview, online questionnaire, etc.)
  - Study duration and follow-up periods (if applicable)
  - Sampling method and strategy used

- **Population Characteristics**:

  Extract detailed information about the study population including:

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- Sample size and demographics (age, gender, education level)
- Population type (university students, general population, clinical sample, etc.)
- Geographic location (country, region, urban/rural)
- Recruitment setting (schools, clinics, online, community)
- Inclusion and exclusion criteria applied

- **Diagnostic Methods**:

  Extract comprehensive details about how internet addiction was assessed including:

  - Specific diagnostic tool or scale used (e.g., Young's Internet Addiction Test, Chen Internet Addiction Scale)
  - Version of the tool and number of items
  - Cut-off scores and severity categories applied
  - Language and cultural adaptations made
  - Validation status of the tool in the study population
  - Whether clinical diagnosis was also used alongside screening tools

- **Prevalence Findings**:

  Extract all prevalence data reported including:

  - Overall prevalence rate with confidence intervals
  - Prevalence by severity levels (mild, moderate, severe)
  - Prevalence by subgroups (gender, age groups, regions, etc.)
  - Prevalence of different types (generalized internet addiction vs. internet gaming disorder)
  - Comparison with other populations or time periods if reported

- **Associated Factors**:

  Extract factors associated with internet addiction including:

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- Demographic correlates (age, gender, socioeconomic status)
- Psychosocial factors (depression, anxiety, loneliness, family structure)
- Environmental factors (internet penetration, life satisfaction, pollution)
- Behavioral factors (internet usage patterns, time spent online)
- Statistical significance and effect sizes where reported

- **Management Approaches**:

  Extract information about any management, treatment, or intervention approaches including:

  - Type of intervention (psychotherapy, medication, behavioral, educational)
  - Intervention details (duration, frequency, delivery method, components)
  - Outcomes measured and results achieved
  - Effectiveness data and statistical significance
  - Recommendations for prevention or management provided by authors
  - Note if study was purely epidemiological with no management component

- **Geographic Context**:

  Extract geographical and cultural context information including:

  - Specific countries and regions studied
  - Cultural or regional factors discussed as influencing results
  - Cross-national comparisons made
  - Internet infrastructure and penetration rates mentioned
  - Regional differences in prevalence or management approaches identified

- **Study Quality**:

  Extract indicators of study quality and limitations including:

  - Sample representativeness (random sampling vs. convenience sampling)

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- Response rate and participation details
- Potential sources of bias identified by authors
- Study limitations acknowledged
- Conflicts of interest or funding sources
- Use of validated instruments and standardized procedures

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Table 1. Article Search Strategy

Database	Keywords	Hits
Pubmed	*("Internet addiction" OR "Problematic internet use" OR "Internet gaming disorder" OR "Digital addiction") AND ("Management" OR "Treatment" OR "Intervention" OR "Cognitive-behavioral therapy") AND ("Standard care" OR "No treatment" OR "Waitlist control" OR "Treatment as usual" AND "Prevalence" OR "Diagnosis" OR "Symptom reduction" OR "Clinical outcomes")*	3
Semantic Scholar	*("Internet addiction" OR "Problematic internet use" OR "Internet gaming disorder" OR "Digital addiction") AND ("Management" OR "Treatment" OR "Intervention" OR "Cognitive-behavioral therapy") AND ("Standard care" OR "No treatment" OR "Waitlist control" OR "Treatment as usual") AND ("Prevalence" OR "Diagnosis" OR "Symptom reduction" OR "Clinical outcomes")*	250
Springer	*("Internet addiction" OR "Problematic internet use" OR "Internet gaming disorder" OR "Digital addiction") AND ("Management" OR "Treatment" OR "Intervention" OR "Cognitive-behavioral therapy") AND ("Standard care" OR "No treatment" OR "Waitlist control" OR "Treatment as usual") AND ("Prevalence" OR "Diagnosis" OR "Symptom reduction" OR "Clinical outcomes")*	115
Google Scholar	*("Internet addiction" OR "Problematic internet use" OR "Internet gaming disorder" OR "Digital addiction") AND ("Management" OR "Treatment" OR "Intervention" OR "Cognitive-behavioral therapy") AND ("Standard care" OR "No treatment" OR "Waitlist control" OR "Treatment as usual") AND ("Prevalence" OR "Diagnosis" OR "Symptom reduction" OR "Clinical outcomes")*	1,630
Wiley Online Library	*("Internet addiction" OR "Problematic internet use" OR "Internet gaming disorder" OR "Digital addiction") AND ("Management" OR "Treatment" OR "Intervention" OR "Cognitive-behavioral therapy") AND ("Standard care" OR "No treatment" OR "Waitlist control" OR "Treatment as usual") AND ("Prevalence" OR "Diagnosis" OR "Symptom reduction" OR "Clinical outcomes")*	82

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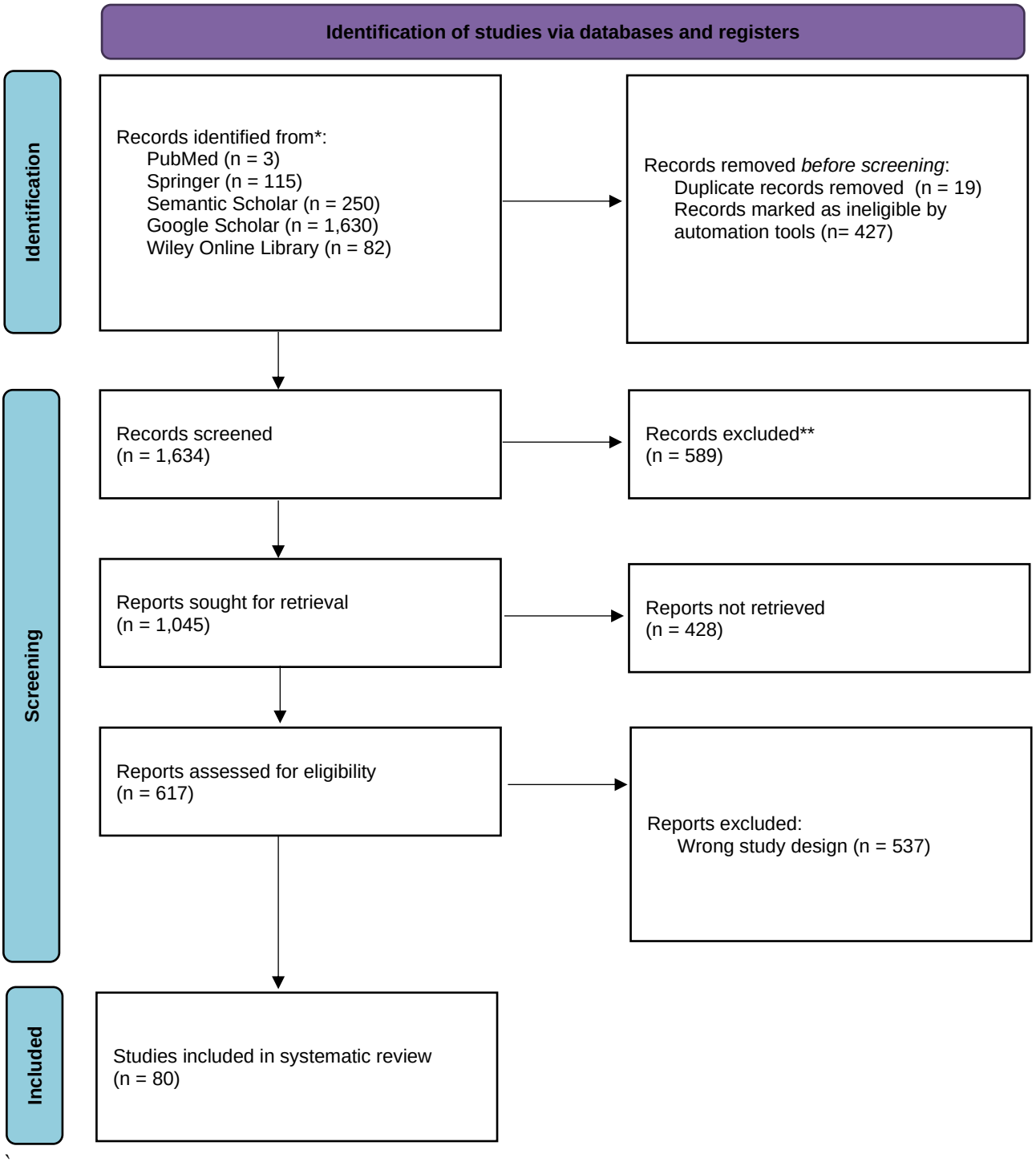


Figure 1. Article search flowchart

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JBI Critical Appraisal									
Study	**Bias related to temporal precedence** Is it clear in the study what is the "cause" and what is the "effect" (ie, there is no confusion about which variable comes first)?	**Bias related to selection and allocation** Was there a control group?	**Bias related to confounding factors** Were participants included in any comparisons similar?	**Bias related to administration of intervention/exposure** Were the participants included in any comparisons receiving similar treatment/ care, other than the exposure or intervention of interest?	**Were there multiple measurements of the outcome, both pre and post the intervention/exposure?**	**Were the outcomes of participants included in any comparisons measured in the same way?**	**Were outcomes measured in a reliable way?**	**Bias related to participant retention** Was follow-up complete and, if not, were differences between groups in terms of their follow-up adequately described and analyzed?	**Statistical conclusion validity** Was appropriate statistical analysis used?
Lu Li et al., 2018	✓	✓	✓	✗	✓	✗	✓	✓	✓
Cecilia Cheng et al., 2014	✓	✓	✓	✗	✓	✗	✓	✓	✓
Shi-qiu Meng et al., 2022	✓	✓	✓	✗	✓	✗	✓	✓	✓

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X. Ye et al., 2023	✓	✓	✓	✗	✓	✗	✓	✓	✓
K. Wölfling et al., 2019	✓	✓	✓	✗	✓	✗	✓	✓	✓
Shiqi Li et al., 2021	✓	✓	✓	✗	✓	✗	✓	✓	✓
Jan Dieris-Hirche et al., 2021	✓	✓	✓	✗	✓	✗	✓	✓	✓
J. Lau et al., 2017	✓	✓	✓	✗	✓	✗	✓	✓	✓
A. Bischof et al., 2022	✓	✓	✓	✗	✓	✗	✓	✓	✓
Frida André et al., 2023	✓	✓	✓	✗	✓	✗	✓	✓	✓
J. Hong et al., 2020	✓	✓	✓	✗	✓	✗	✓	✓	✓
Jan Dieris-Hirche et al., 2023	✓	✓	✓	✗	✓	✗	✓	✓	✓
Jiejie Fu et al., 2025	✓	✓	✓	✗	✓	✗	✓	✓	✓
D. Kuss et al., 2014	✓	✓	✓	✗	✓	✗	✓	✓	✓

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D. Kuss et al., 2014a	✓	✓	✓	✗	✓	✗	✓	✓	✓
Yuan-Chien Pan et al., 2020	✓	✓	✓	✗	✓	✗	✓	✓	✓
Ashwini Tadpatrikar et al., 2024	✓	✓	✓	✗	✓	✗	✓	✓	✓
D. X. Chia et al., 2020	✓	✓	✓	✗	✓	✗	✓	✓	✓
J. Joseph et al., 2021	✓	✓	✓	✗	✓	✗	✓	✓	✓
A. Al-Khani et al., 2021	✓	✓	✓	✗	✓	✗	✓	✓	✓
Raquel Lozano-Blasco et al., 2022	✓	✓	✓	✗	✓	✗	✓	✓	✓
Yuan Gao et al., 2022	✓	✓	✓	✗	✓	✗	✓	✓	✓
Zhandos Salpynov et al., 2024	✓	✓	✓	✗	✓	✗	✓	✓	✓
Tran Quang Duc et al., 2024	✓	✓	✓	✗	✓	✗	✓	✓	✓
Shahin Salarvand et al.,	✓	✓	✓	✗	✓	✗	✓	✓	✓

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2022									
V. Carli et al., 2012	✓	✓	✓	✗	✓	✗	✓	✓	✓
Aishwarya Aggarwal et al., 2019	✓	✓	✓	✗	✓	✗	✓	✓	✓
Xin Liu et al., 2025	✓	✓	✓	✗	✓	✗	✓	✓	✓
Raquel Lozano-Blasco et al., 2022a	✓	✓	✓	✗	✓	✗	✓	✓	✓
F. Endomba et al., 2022	✓	✓	✓	✗	✓	✗	✓	✓	✓
E. Zewde et al., 2022	✓	✓	✓	✗	✓	✗	✓	✓	✓
K. Zajac et al., 2020	✓	✓	✓	✗	✓	✗	✓	✓	✓
G. Sepede et al., 2016	✓	✓	✓	✗	✓	✗	✓	✓	✓
Gayan Ariyadasa et al., 2022	✓	✓	✓	✗	✓	✗	✓	✓	✓
C. L. L. Chiang et al., 2022	✓	✓	✓	✗	✓	✗	✓	✓	✓
Ameer Hamza et al., 2025	✓	✓	✓	✗	✓	✗	✓	✓	✓

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Yu-Shian Cheng et al., 2020	✓	✓	✓	✗	✓	✗	✓	✓	✓
M. Moreno et al., 2011	✓	✓	✓	✗	✓	✗	✓	✓	✓
Jun Liu et al., 2017	✓	✓	✓	✗	✓	✗	✓	✓	✓
Ya-song Du et al., 2010	✓	✓	✓	✗	✓	✗	✓	✓	✓
I. Melca et al., 2023	✓	✓	✓	✗	✓	✗	✓	✓	✓
Şerife İnci Şalvarlı et al., 2019	✓	✓	✓	✗	✓	✗	✓	✓	✓
Alexander Winkler et al., 2013	✓	✓	✓	✗	✓	✗	✓	✓	✓
Yao-jun Shao et al., 2018	✓	✓	✓	✗	✓	✗	✓	✓	✓
Ruoyu Zhou et al., 2024	✓	✓	✓	✗	✓	✗	✓	✓	✓
Daniel L. King et al., 2017	✓	✓	✓	✗	✓	✗	✓	✓	✓
J. Joseph et al., 2022	✓	✓	✓	✗	✓	✗	✓	✓	✓

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P. Markey et al., 2017	✓	✓	✓	✗	✓	✗	✓	✓	✓
Rafael Richard Clorado de Sá et al., 2023	✓	✓	✓	✗	✓	✗	✓	✓	✓
K. Ioannidis et al., 2019	✓	✓	✓	✗	✓	✗	✓	✓	✓
Yu-Shian Cheng et al., 2018	✓	✓	✓	✗	✓	✗	✓	✓	✓
Matthew W. R. Stevens et al., 2018	✓	✓	✓	✗	✓	✗	✓	✓	✓
Yuan-Wei Yao et al., 2017	✓	✓	✓	✗	✓	✗	✓	✓	✓
E. Ostinelli et al., 2021	✓	✓	✓	✗	✓	✗	✓	✓	✓
H. Koo et al., 2014	✓	✓	✓	✗	✓	✗	✓	✓	✓
V. Santos et al., 2016	✓	✓	✓	✗	✓	✗	✓	✓	✓
Jian-ping Lu et al., 2022	✓	✓	✓	✗	✓	✗	✓	✓	✓

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Julius Burkauska et al., 2023	✓	✓	✓	✗	✓	✗	✓	✓	✓
Jun Wang et al., 2022	✓	✓	✓	✗	✓	✗	✓	✓	✓
Chuan-Hsin Chang et al., 2022	✓	✓	✓	✗	✓	✗	✓	✓	✓
N. Sugaya et al., 2019	✓	✓	✓	✗	✓	✗	✓	✓	✓
K. Young et al., 2013	✓	✓	✓	✗	✓	✗	✓	✓	✓
Sunah Kim et al., 2019	✓	✓	✓	✗	✓	✗	✓	✓	✓
Yinan Ji et al., 2021	✓	✓	✓	✗	✓	✗	✓	✓	✓
I. Zeidi et al., 2020	✓	✓	✓	✗	✓	✗	✓	✓	✓
Lovin Gopali et al., 2023	✓	✓	✓	✗	✓	✗	✓	✓	✓
Claudia Fiscarina et al., 2020	✓	✓	✓	✗	✓	✗	✓	✓	✓
S. Ayub et al., 2023	✓	✓	✓	✗	✓	✗	✓	✓	✓

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Zhenhe Zhou et al., 2012	✓	✓	✓	✗	✓	✗	✓	✓	✓
C. Ko et al., 2014	✓	✓	✓	✗	✓	✗	✓	✓	✓
Vega González-Bueso et al., 2018	✓	✓	✓	✗	✓	✗	✓	✓	✓
Maísa Gelain Marin et al., 2020	✓	✓	✓	✗	✓	✗	✓	✓	✓
S. Mohammadi et al., 2023	✓	✓	✓	✗	✓	✗	✓	✓	✓
Yuan-Wei Yao et al., 2021	✓	✓	✓	✗	✓	✗	✓	✓	✓
Karina Saruhanjan et al., 2020	✓	✓	✓	✗	✓	✗	✓	✓	✓
Samantha Schlossarek et al., 2024	✓	✓	✓	✗	✓	✗	✓	✓	✓
Young-Ran Yeun et al., 2016	✓	✓	✓	✗	✓	✗	✓	✓	✓
M. Sharma et al., 2022	✓	✓	✓	✗	✓	✗	✓	✓	✓

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Weilun Chung et al., 2021	✓	✓	✓	✗	✓	✗	✓	✓	✓
Wen Li et al., 2017	✓	✓	✓	✗	✓	✗	✓	✓	✓

RESULTS

Characteristics of Included Studies

This systematic review encompasses 80 sources examining the prevalence, diagnosis, and management of internet addiction disorder (IAD) and related conditions including internet gaming disorder (IGD). The included studies span multiple continents and employ diverse methodological approaches.

Study	Primary Focus
Lu Li et al., 2018	Prevalence in Chinese university students
Cecilia Cheng et al., 2014	Global prevalence across 31 nations
Shi-qiu Meng et al., 2022	Global prevalence of digital addiction subtypes
X. Ye et al., 2023	Depression and IA correlation in adolescents
K. Wölfling et al., 2019	CBT treatment efficacy
Shiqi Li et al., 2021	Self-control and IA relationship
Jan Dieris-Hirche et al., 2021	Online intervention for IUD
J. Lau et al., 2017	Remission predictors
A. Bischof et al., 2022	Stepped care approach
Frida André et al., 2023	Relapse prevention for IGD
J. Hong et al., 2020	Physical exercise intervention

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Jan Dieris-Hirche et al., 2023	Webcam-based telemedicine
Jiejie Fu et al., 2025	Approach bias modification
D. Kuss et al., 2014	Epidemiological research synthesis
D. Kuss et al., 2014a	Epidemiological research synthesis
Yuan-Chien Pan et al., 2020	GIA and IGD prevalence
Ashwini Tadpatrikar et al., 2024	Prevalence in Indian adults
D. X. Chia et al., 2020	Prevalence in Southeast Asia
J. Joseph et al., 2021	Prevalence in Indian college students
A. Al-Khani et al., 2021	Prevalence in Gulf countries
Raquel Lozano-Blasco et al., 2022	Prevalence in young adults
Yuan Gao et al., 2022	IGD prevalence and risk factors
Zhandos Salpynov et al., 2024	Prevalence in medical students
Tran Quang Duc et al., 2024	Prevalence in Asian college students
Shahin Salarvand et al., 2022	Prevalence in Iranian students
V. Carli et al., 2012	PIU and comorbid psychopathology
Aishwarya Aggarwal et al., 2019	IGD in medical students
Xin Liu et al., 2025	Global prevalence in university students
Raquel Lozano-Blasco et al., 2022a	IA in adolescents
F. Endomba et al., 2022	Prevalence in Africa

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E. Zewde et al., 2022	Prevalence in African students
K. Zajac et al., 2020	Treatment evidence
G. Sepede et al., 2016	fMRI studies in young adults
Gayan Ariyadasa et al., 2022	Educational intervention
C. L. L. Chiang et al., 2022	IGD prevalence in medical students
Ameer Hamza et al., 2025	Prevalence in Pakistani adolescents
Yu-Shian Cheng et al., 2020	Delay discounting in IA
M. Moreno et al., 2011	PIU in US youth
Jun Liu et al., 2017	Treatment interventions
Ya-song Du et al., 2010	Group CBT for adolescents
I. Melca et al., 2023	IA and mental disorders in medical students
Şerife İnci Şalvarlı et al., 2019	IGD and impulsivity
Alexander Winkler et al., 2013	Treatment efficacy
Yao-jun Shao et al., 2018	Prevalence in Chinese college students
Ruoyu Zhou et al., 2024	IGD prevalence by diagnostic criteria
Daniel L. King et al., 2017	Treatment quality assessment
J. Joseph et al., 2022	PIU in Indian adolescents
P. Markey et al., 2017	IGD prevalence validation
Rafael Richard Clorado de Sá et al., 2023	Pharmacological treatments
K. Ioannidis et al., 2019	Cognitive deficits in PIU
Yu-Shian Cheng et al., 2018	IA and suicidality
Matthew W. R. Stevens et al.,	CBT for IGD

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2018	
Yuan-Wei Yao et al., 2017	Neural alterations in IGD
E. Ostinelli et al., 2021	Depression in IGD
H. Koo et al., 2014	Risk and protective factors
V. Santos et al., 2016	Treatment with anxiety disorders
Jian-ping Lu et al., 2022	Addiction symptom network
Julius Burkauska et al., 2023	PIU during COVID-19
Jun Wang et al., 2022	Health risk behaviors association
Chuan-Hsin Chang et al., 2022	Treatment efficacy comparison
N. Sugaya et al., 2019	Bio-psychosocial factors in children
K. Young et al., 2013	CBT-IA outcomes
Sunah Kim et al., 2019	Psychological interventions
Yinan Ji et al., 2021	Risk and protective factors in China
I. Zeidi et al., 2020	GCBT effectiveness
Lovin Gopali et al., 2023	IGD during COVID-19
Claudia Fiscarina et al., 2020	IGD measurement tools
S. Ayub et al., 2023	Treatment in children and adolescents
Zhenhe Zhou et al., 2012	Cognitive biases in IGA
C. Ko et al., 2014	Depression and IA trajectory
Vega González-Bueso et al., 2018	CBT with parent psychoeducation
Maísa Gelain Marin et al., 2020	IA and attention in adolescents

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S. Mohammadi et al., 2023	White matter changes in IGD
Yuan-Wei Yao et al., 2021	Decision-making deficits
Karina Saruhanjan et al., 2020	Internet-based intervention
Samantha Schlossarek et al., 2024	Screening tools evaluation
Young-Ran Yeun et al., 2016	Psychosocial interventions for children
M. Sharma et al., 2022	Multimodal psychotherapy
Weilun Chung et al., 2021	Probability discounting
Wen Li et al., 2017	Mindfulness-based intervention

The included studies represent diverse geographic regions including Asia (predominantly China, South Korea, and India), Europe, the Middle East, Africa, and North America . Study designs range from large-scale meta-analyses incorporating hundreds of thousands of participants to smaller randomized controlled trials testing specific interventions . The majority of prevalence studies employed cross-sectional designs , while treatment studies increasingly utilized randomized controlled trial methodology .

Diagnostic Methods and Assessment Tools

Assessment Instruments

A substantial limitation in the field is the absence of a gold standard for internet addiction classification, with at least 21 different assessment instruments identified across studies . The most commonly utilized tools include:

Instrument	Items	Scoring	Cut-off Criteria	Validation Status
Young's	20	5-point Likert	20-39 average,	Good internal

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Instrument	Items	Scoring	Cut-off Criteria	Validation Status
Internet Addiction Test (IAT)		scale	40-69 potentially problematic, 70-100 problematic	consistency (α = 0.84-0.93)
Young's Diagnostic Questionnaire (YDQ)	8	Yes/No	Score of 5 or more indicates pathology	Widely used but variable validation
Chen Internet Addiction Scale (CIAS)	26	4-point Likert scale	57/58 for screening, 63/64 for diagnosis	Good internal consistency (α = 0.79-0.93)
Assessment of Internet and Computer Game Addiction Scale (AICA-S)	14	5-point Likert scale	Score of 7 points for addictive use	Validated in clinical and epidemiological surveys
Game Addiction Scale for Adolescents (GASA)	7	Continuous 7-35	Categories of engaged, problem, and addicted gamers	Developed specifically for adolescents
Compulsive Internet Use Scale (CIUS)	14	5-point Likert scale	Score of 21 for inclusion in stepped care	Strong evidence base

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Instrument	Items	Scoring	Cut-off Criteria	Validation Status
Generalized Problematic Internet Use Scale (GPIUS)	29	5-point scale	Variable across studies	Strong recommendation for use

The variability in assessment tools significantly impacts reported prevalence rates. Studies using different instruments yield substantially different estimates; for example, prevalence rates using the YDQ-8 (8.4%) differ from those using CIAS-26 (14.0%) in the same population . The Internet Addiction Test remains the most validated tool with 17 validation studies, though it exhibits variable cut-off scores and item numbers across adaptations .

Diagnostic Criteria Evolution

The diagnostic landscape has evolved with the DSM-5's inclusion of Internet Gaming Disorder in Section III and the ICD-11's recognition of Gaming Disorder . Meta-analytic findings demonstrate significant differences in prevalence rates based on diagnostic criteria, with DSM-5 criteria yielding 7.9% prevalence compared to 3% using ICD-11 criteria . Only two screening measures are based on current DSM-5 criteria for Internet Gaming Disorder .

Studies applying strict DSM-5 criteria consistently report lower prevalence rates than those using broader screening instruments. When distress criteria are applied alongside symptom endorsement, prevalence estimates drop from 2.4% to between 0.3% and 1% . This suggests that many individuals who meet symptom thresholds may not experience clinically significant impairment.

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Prevalence Findings

Global Prevalence Estimates

Prevalence estimates vary considerably based on population, region, diagnostic criteria, and assessment methods:

Population	Prevalence Rate	95% CI	Source
Global general population (IA)	14.22%	12.90-15.65%	Meng et al., 2022
Global general population (GIA)	7.02%	6.09-8.08%	Pan et al., 2020
Global general population (IGD)	2.47%	1.46-4.16%	Pan et al., 2020
Global general population (pooled IGD)	6.7%	5.7-7.7%	Zhou et al., 2024
University students globally	41.84%	35.89-48.02%	Liu et al., 2025
Asian college students	24.3%	19.8-29.5%	Duc et al., 2024
Chinese university students	11.3%	10.1-12.5%	Li et al., 2018
Chinese college students	11%	9-13%	Shao et al., 2018
Indian college students	19.9% (cut-off 50) 40.7% (cut-off 40)	19.3-20.5% 38.7-42.8%	Joseph et al., 2021

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Population	Prevalence Rate	95% CI	Source
Indian adults	58.34% (any level)	49.34-67.07%	Tadpatrikar et al., 2024
Iranian university students	31.51%	26.47-36.55%	Salarvand et al., 2022
Southeast Asian population	20.0% (IA) 10.1% (gaming)	14.5-27.0% 7.3-13.8%	Chia et al., 2020
Gulf Cooperation Council countries	33%	Not reported	Al-Khani et al., 2021
African students	34.53%	26.83-42.23%	Zewde et al., 2022
African population	40.3%	32.2-48.7%	Endomba et al., 2022
Medical students globally	29%	19-41%	Salpynov et al., 2024
Medical students (IGD)	6.2%	3.1-12.1%	Chiang et al., 2022
Adolescents and young adults (IGD)	9.9%	8.6-11.3%	Gao et al., 2022
School-going adolescents India (moderate PIU)	21.5%	17.0-26.8%	Joseph et al., 2022

Regional Variations

Substantial geographic variation exists in prevalence rates. The highest prevalence has been consistently reported in the Middle East (10.9%) , while Northern and Western Europe

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demonstrate the lowest rates (2.6%) . Asian countries, particularly those in Southeast Asia, show elevated prevalence rates compared to Western nations .

Region	Prevalence Rate	Notes
Middle East	10.9% (95% CI: 5.4-16.3%)	Highest global prevalence
Northern Africa	44.6% (95% CI: 32.9-56.7%)	Higher internet penetration
Sub-Saharan Africa	31.0% (95% CI: 25.2-37.1%)	Lower internet penetration
Eastern/Central China	10.7%	Higher than northern/western regions
Northern/Western China	8.1%	Lower prevalence
Northern/Western Europe	2.6% (95% CI: 1.0-4.1%)	Lowest global prevalence despite high internet penetration
Asia (IGD)	7.5% (95% CI: 6.3-8.6%)	Higher than Europe
Europe (IGD)	2.6% (95% CI: 1.6-3.7%)	Lower prevalence

Within China, regional differences reflect socioeconomic disparities, with eastern areas showing higher prevalence (13%) compared to mid-western areas (9%), attributed to earlier internet adoption and higher economic development in coastal regions .

Prevalence by Demographic Subgroups

Gender differences are consistently reported, with males showing higher prevalence across most studies:

Subgroup	Finding	Statistical Significance

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Subgroup	Finding	Statistical Significance
Males vs. Females (China)	13.7% vs. 6.6%	Q = 64.04, p < 0.001
Males vs. Females (college)	16% vs. 8%	Significant
Males vs. Females (university)	OR: 1.32 (95% CI: 1.19-1.46)	p < 0.05
Males vs. Females (GCC)	24% vs. 48%	p = 0.05
Urban vs. Rural (China)	15.4% vs. 11.4%	Significant
Urban vs. Rural (Africa)	OR: 2.32 (95% CI: 1.19-4.53)	I^2 = 59.39%

Notably, in Gulf Cooperation Council countries, females showed significantly higher prevalence than males (48% vs. 24%) , representing a reversal of the typical pattern observed elsewhere. Age effects demonstrate that younger populations are consistently at higher risk, with prevalence inversely proportional to age in adolescent samples .

Temporal Trends and COVID-19 Impact

An increasing trend in digital addiction prevalence has been documented over the past two decades, with dramatic worsening during the COVID-19 pandemic . University student prevalence increased from 37.6% before the pandemic to 54.1% during it . However, meta-analysis of IGD specifically during COVID-19 found a prevalence rate of 8.00%, with no clear evidence of increased prevalence when comparing pre-pandemic to pandemic periods .

Prevalence by Addiction Subtype

Different forms of digital addiction show varying prevalence rates:

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Subtype	Prevalence	95% CI
Smartphone addiction	26.99%	22.73-31.73%
Social media addiction	17.42%	12.42-23.89%
Internet addiction (general)	14.22%	12.90-15.65%
Cybersex addiction	8.23%	5.75-11.66%
Game addiction	6.04%	4.80-7.57%

Internet gaming disorder specifically shows lower prevalence (2.47%) than generalized internet addiction (7.02%) , suggesting that broader internet use patterns are more commonly problematic than gaming specifically.

Associated Factors

Psychosocial Correlates

Depression and anxiety demonstrate consistent associations with internet addiction across studies:

Factor	Association	Effect Size/OR	Source
Depression	Positive correlation	Moderate correlation (P = 0.0002)	Multiple studies
Anxiety	Positive correlation	Moderate correlation (P = 0.022)	Carli et al., 2012
ADHD symptoms	Strong correlation	100% of studies found significant association	Carli et al., 2012

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Factor	Association	Effect Size/OR	Source
Impulsivity	Positive correlation	r = 0.371 (95% CI: 0.311-0.427)	32 of 33 studies
Self-control (restraint)	Negative correlation	r = -0.362 (95% CI: -0.414 to -0.307)	Li et al., 2021
Loneliness	Positive association	Medium effect size	Multiple studies
Suicidal ideation	Elevated risk	OR = 2.952	Cheng et al., 2018
Suicidal attempts	Elevated risk	OR = 2.811	Cheng et al., 2018

Depression comorbidity affects approximately one-third of individuals with IGD (pooled event rate: 0.32, 95% CI: 0.21-0.43) . The prospective evidence indicates that depression and hostility worsen during the addiction process, while remission from internet addiction is associated with decreased depression, hostility, and social anxiety .

Cognitive and Neurobiological Factors

Meta-analytic evidence demonstrates consistent cognitive deficits in problematic internet use:

Cognitive Domain	Effect Size (Hedge's g)	95% CI
Inhibitory control (Stroop)	0.53	0.19-0.87
Inhibitory control (stop-signal)	0.42	0.17-0.66
Inhibitory control (go/no-go)	0.51	0.26-0.75
Decision-making	0.49	0.28-0.70

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Cognitive Domain	Effect Size (Hedge's g)	95% CI
Working memory	0.40	0.20-0.82
Delay discounting	1.10	0.57-1.64

Neuroimaging studies reveal functional and structural alterations in fronto-striatal and fronto-cingulate regions . The most relevant abnormalities during resting state are localized in the superior temporal gyrus, limbic, medial frontal, and parietal regions . Individuals with IGD show hyperactivation in the anterior and posterior cingulate cortices and caudate during reward and executive function tasks .

Environmental and Behavioral Factors

Environmental factors show complex relationships with prevalence:

Factor	Relationship	Finding
Life satisfaction	Inverse	β = -0.1939, p = 0.0218
Pollution	Positive	β = 0.1960, p = 0.0207
Traffic commute time	Positive	β = 0.3249, p = 0.0001
Daily internet use >4 hours	Positive	OR = 2.25 (95% CI: 1.20-4.21)
Economic development	Variable	Higher prevalence in developed regions

Notably, internet penetration rate does not directly predict addiction prevalence; Northern and Western Europe have high penetration rates but low addiction prevalence , suggesting that quality of life factors may be more determinative than access alone.

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Management Approaches

Cognitive-Behavioral Therapy

Cognitive-behavioral therapy (CBT) represents the most extensively studied intervention approach:

Study	Intervention Type	Duration	Effect Size	Key Outcomes
Wölfling et al., 2019	Manualized CBT (STICA)	15 weekly group + 8 individual sessions	d = 1.19 (AICA-S)	69.4% remission vs. 23.9% control
Stevens et al., 2018	CBT meta-analysis	Variable	g = 0.92 (IGD symptoms)	High efficacy for symptoms and depression
Du et al., 2010	Group CBT (school-based)	8 sessions	d = 1.08-1.35	Improved time management and emotional symptoms
Young et al., 2013	CBT-IA	12 weekly sessions	Not reported	95% managed symptoms; 78% sustained at 6 months
André et al., 2023	Relapse prevention (CBT-based)	5-7 sessions	Mean difference -9.9 vs. -5.1	Superior to treatment as usual

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CBT demonstrates high efficacy in reducing IGD symptoms (g = 0.92) and depression (g = 0.80), with moderate efficacy for anxiety (g = 0.55) . However, effectiveness in reducing actual time spent gaming remains unclear, and treatment gains at follow-up are often nonsignificant .

Combined and Multimodal Interventions

Studies examining combined approaches show enhanced outcomes:

Combination	Effect	Key Finding
CBT + Physical exercise	Enhanced depression reduction	More pronounced effects on depression and internet addiction than CBT alone
CBT + Parent psychoeducation	Reduced dropout	13.33% dropout with psychoeducation vs. 53.33% without
Pharmacotherapy + CBT/MLC	Most effective	Superior to either approach alone

Meta-analytic evidence from 124 studies involving 5,601 participants found a pooled standardized mean difference of 1.399 (95% CI: 1.272-1.527), indicating highly effective treatment of internet addiction when combining pharmacotherapy with CBT or multi-level counseling .

Pharmacological Interventions

Pharmacological treatments have been evaluated primarily in South Korean samples:

Medication	IGD Symptom Reduction	Study Design
Bupropion	15.4-23.6%	Open-label and RCT

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Medication	IGD Symptom Reduction	Study Design
Methylphenidate	Variable	Clinical trials
SSRIs	Variable	Clinical trials

All pharmacological studies reported reduced symptoms of IGD from pre- to post-treatment, with reductions ranging from 15.4% to 51.4% . However, nearly all participants were male (98.6%) and from South Korea, limiting generalizability . A risk of bias assessment indicated only four studies had low risk of bias .

Online and Digital Interventions

Emerging evidence supports webcam-based and digital interventions:

Intervention	Effect Size	Outcome
OMPRIS (webcam-based)	d = 0.92	Mean AICA-S reduction from 12.1 to 6.8 vs. 12.6 to 11.0 in control
Stepped care approach	Under evaluation	App-based + telephone + online therapy
Internet-based intervention	Protocol stage	7 sessions with eCoach support

Alternative Interventions

Intervention Type	Effect Size	Key Findings
Sports intervention	SMD = -1.70 (95% CI: -2.14 to -1.26)	Particularly effective for withdrawal symptoms
Group counseling	SMD = -1.37 (95% CI: -1.89 to -0.85)	Effective across multiple IA dimensions

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Intervention Type	Effect Size	Key Findings
Mindfulness (MORE)	Significant reduction	Craving and maladaptive cognitions reduced; gains maintained at 3 months
Approach bias modification	Significant group × time interaction	Reduced gaming cravings and enhanced executive control
Educational intervention	$\chi^2 = 9.026$, $p = 0.003$	Effective for prevention among adolescents

Psychosocial interventions for school-aged children show large effects for reducing internet addiction (SMD = -1.19; 95% CI: -1.52 to -0.87) and improving self-control (SMD = 0.29; 95% CI: 0.11 to 0.47) . Parent-involved counseling (SMD = -2.92; 95% CI: -4.30 to -1.54) and self-control training programs (SMD = -2.62; 95% CI: -4.07 to -1.17) demonstrate particularly strong effects .

Remission Without Formal Intervention

Longitudinal evidence indicates that internet addiction may remit without formal intervention. In a 12-month follow-up of Hong Kong secondary students, the incidence of remission was 59.29 per 100 person-years . Significant predictors of remission included:

- Lower baseline severity (ORa = 0.95)
- Higher self-esteem (ORa = 1.03)
- Lower depression (ORa = 0.72)
- Higher self-efficacy for reducing internet use (ORa = 1.13)
- Improvements in psychosocial health over time

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Synthesis

Reconciling Prevalence Heterogeneity

The wide range of reported prevalence rates (0.8% to 26.7%) reflects systematic methodological differences rather than random variation. Three key factors explain the majority of heterogeneity:

Assessment Instrument Effects: Studies using the 26-item Chen Internet Addiction Scale yield prevalence estimates approximately 67% higher (14.0%) than those using the 8-item Young Diagnostic Questionnaire (8.4%) in the same Chinese university population . The choice of cut-off score within a single instrument produces dramatic differences; Indian college student prevalence is 19.9% at a Y-IAT cut-off of 50 but doubles to 40.7% at a cut-off of 40 . This suggests that apparent prevalence differences between populations may largely reflect measurement choices rather than true differences in addiction rates.

Diagnostic Criteria Stringency: When DSM-5 criteria requiring both symptom endorsement and functional impairment are applied, prevalence drops substantially. In a large multinational sample, 2.4% endorsed five or more DSM-5 symptoms, but only 0.3-1% also reported distress . The difference between DSM-5 (7.9%) and ICD-11 (3%) criteria-based prevalence estimates further illustrates how conceptualization affects case identification.

Population and Context Effects: University students consistently show higher prevalence than general populations (41.84% vs. 14.22%) , likely reflecting both age-related vulnerability and selection effects in high-stress academic environments. Medical students show intermediate rates (29%) , possibly reflecting competing academic demands that limit internet use time. The apparent paradox of higher prevalence in lower-income countries despite lower internet penetration may reflect that those with access are higher-intensity users, or that alternative coping resources are less available.

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Understanding Regional Variations

The inverse relationship between national quality of life indicators and internet addiction prevalence suggests that problematic internet use may function as an escape mechanism from adverse life circumstances. This explains why:

- High-income, high-penetration Northern/Western European countries show low prevalence (2.6%) despite widespread internet access
- The Middle East shows the highest regional prevalence (10.9%) , potentially reflecting social restrictions and limited alternative recreational options
- African prevalence is higher in Northern Africa (44.6%) where internet penetration is greater (67-74%) compared to sub-Saharan Africa (31.0% prevalence, 29% penetration)

Cultural factors modulate these relationships. The stronger association between self-control deficits and internet addiction in East Asian versus Western samples may reflect cultural emphasis on long-term goals and self-regulation in collectivist societies, making failures of control more distressing and potentially more likely to escalate into problematic use patterns.

Treatment Effect Interpretation

The consistently large effect sizes reported for psychological interventions (g = 0.92-1.61) require contextualization. Several factors inflate apparent treatment efficacy:

Comparison Conditions: Most studies compare active treatment to waitlist controls rather than active placebos . The waitlist condition in the Wölfling et al. trial still showed 23.9% remission , suggesting substantial natural recovery that active treatment accelerates rather than creates.

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Short-Term Outcomes: Treatment gains are significant at post-test but often nonsignificant at follow-up . The Young et al. CBT-IA study reported 95% symptom management at 12 weeks but only 78% sustained recovery at 6 months , indicating decay of approximately 17 percentage points.

Sample Characteristics: Treatment studies predominantly involve male participants in Asian countries , limiting generalizability. The concentration of pharmacological research in South Korea with 98.6% male samples means medication effects in females and other populations remain essentially unknown.

Outcome Selection: Studies measuring symptom severity consistently report larger effects than those measuring behavioral outcomes like time spent online . CBT shows unclear effectiveness in reducing actual gaming time despite reducing distress , raising questions about whether interventions address the behavior or merely the perception of the behavior as problematic.

Implications for Specific Populations and Contexts

Adolescents: Age shows an inverse relationship with internet addiction , with children showing higher risk for associated suicidal ideation (OR = 3.77) than adults (OR = 1.96) . Prevention programs using selective approaches and parent involvement show the strongest effects for school-aged children . The natural trajectory includes substantial spontaneous remission , suggesting that brief, early interventions may be more appropriate than intensive treatment for most cases.

Clinical Populations: Comorbidity is the norm rather than exception. Depression affects approximately one-third of individuals with IGD , ADHD shows strong associations , and suicidality risk is elevated even after controlling for depression . Treatment planning should address comorbid conditions; studies show worse outcomes for patients with comorbid depression .

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Online Interventions: The COVID-19 pandemic accelerated development of digital treatments. Webcam-based interventions demonstrate efficacy comparable to in-person treatment (d = 0.92) , potentially addressing access barriers that leave most affected individuals untreated .

DISCUSSION

The findings of this systematic review underscore the complex and multifaceted nature of Internet Addiction Disorder (IAD) and Internet Gaming Disorder (IGD). The extensive heterogeneity in prevalence rates—ranging from 0.8% to 58.34%—is not merely a reflection of true epidemiological variation but is heavily influenced by methodological inconsistencies, regional contexts, and cultural factors (Meng et al., 2022; Tadpatrikar et al., 2024). This discussion synthesizes key insights regarding prevalence determinants, diagnostic challenges, associated factors, treatment efficacy, and overarching implications for research and practice.

Prevalence Heterogeneity and Measurement Issues

The wide disparity in reported prevalence is primarily attributable to three interrelated factors: assessment instruments, diagnostic criteria, and population characteristics. Studies utilizing the Chen Internet Addiction Scale (CIAS) reported prevalence approximately 67% higher than those using Young's Diagnostic Questionnaire (YDQ) within the same Chinese university population (Li et al., 2018). Similarly, varying cut-off scores within the same instrument—such as the Young's Internet Addiction Test (IAT)—can double prevalence estimates, as seen in Indian college students (Joseph et al., 2021). This indicates that apparent differences between populations may often reflect measurement artifacts rather than true variation in addiction rates. Furthermore, the stringency of diagnostic criteria significantly impacts case identification; applying DSM-5 criteria that require functional impairment alongside symptom endorsement reduces prevalence estimates dramatically, from 2.4% to as low as 0.3–1% (Zhou et al., 2024). This underscores the

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necessity of adopting standardized, validated, and contextually appropriate tools to ensure comparability across studies and regions.

Regional and Cultural Contexts

Geographic variations in IAD/IGD prevalence reveal intriguing patterns that challenge simplistic assumptions linking internet access to addiction risk. While Northern and Western Europe exhibit high internet penetration rates, they report the lowest global prevalence (2.6%), suggesting that quality-of-life factors—such as social support, recreational alternatives, and mental health services—may serve as protective buffers (Cheng & Li, 2014). Conversely, regions like the Middle East and Northern Africa show elevated prevalence (10.9% and 44.6%, respectively), potentially reflecting limited offline leisure options, social restrictions, or economic stressors (Al-Khani et al., 2021; Endomba et al., 2022). Notably, Gulf Cooperation Council countries exhibit a reversed gender pattern, with females showing higher prevalence than males, which may be attributed to gendered social norms and access constraints (Al-Khani et al., 2021). These findings emphasize that digital addiction often functions as a maladaptive coping mechanism in contexts of psychosocial adversity, rather than a direct consequence of technological access.

Associated Psychosocial and Neurocognitive Factors

The robust associations between IAD/IGD and comorbid mental health conditions—particularly depression, anxiety, ADHD, and impulsivity—highlight the need for integrated treatment approaches (Carli et al., 2012; Ostinelli et al., 2021). Meta-analytic evidence indicates that approximately one-third of individuals with IGD experience comorbid depression, which can both predispose to and exacerbate addictive internet use (Ostinelli et al., 2021). Neurocognitive deficits in inhibitory control, decision-making, and delay discounting further elucidate the underlying mechanisms of IAD/IGD, aligning with neuroimaging findings of alterations in fronto-striatal and reward-processing pathways (Ioannidis et al., 2019; Yao et al., 2017). Environmental factors such as low life satisfaction, urban residence, and prolonged daily internet use (>4 hours)

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also emerge as significant correlates, suggesting that interventions should address both individual vulnerabilities and contextual stressors (Chia et al., 2020; Gao et al., 2022).

Efficacy and Limitations of Management Approaches

Cognitive-behavioral therapy (CBT) remains the most empirically supported intervention for IAD/IGD, demonstrating large effect sizes in reducing symptom severity and comorbid depression (Stevens et al., 2018; Wölfling et al., 2019). However, the interpretation of these effects requires caution due to methodological limitations: most trials employ waitlist controls rather than active comparators, potentially inflating effect sizes; treatment gains often attenuate at follow-up; and outcomes typically focus on symptom reduction rather than behavioral change (e.g., time spent online) (Young, 2013; King et al., 2017). Pharmacological interventions, primarily studied in South Korean male samples, show promise but lack generalizability and carry risks of bias (Rafael et al., 2023). Emerging modalities—such as webcam-based telemedicine, mindfulness-based interventions, and combined approaches integrating physical exercise or parent psychoeducation—offer scalable and accessible alternatives, particularly in the post-pandemic landscape (Dieris-Hirche et al., 2023; Li et al., 2017; González-Bueso et al., 2018).

Critical Appraisal and Future Directions

The evidence base for IAD/IGD is constrained by several recurrent limitations: overreliance on cross-sectional designs, inadequate blinding and randomization in treatment studies, underrepresentation of female and non-Asian populations, and publication bias favoring positive results (King et al., 2017; Zajac et al., 2020). Future research should prioritize longitudinal cohorts to elucidate developmental trajectories and natural remission rates, as spontaneous recovery is not uncommon (Lau et al., 2017). There is also a pressing need for culturally adapted diagnostic tools that account for local norms and expressions of digital overuse. Clinical practice should adopt stepped-care models that match intervention intensity to disorder severity, incorporate family and

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school-based components for younger populations, and leverage digital platforms to enhance accessibility and engagement (Bischof et al., 2022; Ayub et al., 2023).

In summary, while significant progress has been made in understanding IAD/IGD, the field must move toward greater methodological rigor, cultural inclusivity, and translational integration of neurobiological and psychosocial insights. Only through coordinated, multidisciplinary efforts can we develop effective prevention, diagnosis, and treatment strategies that address the global challenge of digital addiction.

CONCLUSION

Summary of Findings

This systematic review consolidates evidence from 80 studies to provide a comprehensive overview of Internet Addiction Disorder (IAD) and Internet Gaming Disorder (IGD). Key findings include:

- **Prevalence:** Estimates vary widely (0.8–58.34%), influenced by assessment tools, diagnostic criteria, and regional contexts. High-risk groups include university students, adolescents, and populations in the Middle East and Africa.
- **Diagnosis:** At least 21 assessment instruments are in use, with no gold standard. DSM-5 and ICD-11 criteria yield lower prevalence than broader screening tools.
- **Associated Factors:** Strong links exist with depression, anxiety, impulsivity, low self-control, and environmental stressors such as low life satisfaction and urban living.
- **Management:** Cognitive-behavioral therapy (CBT) is the most effective intervention, though effect sizes may be inflated by methodological flaws. Pharmacological, digital, and combined approaches show promise but require further validation.

Recommendations

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1. **For Researchers:**
    - Adopt standardized diagnostic criteria and validated tools to ensure cross-study comparability.
    - Conduct longitudinal studies to examine course, predictors, and natural remission.
    - Include diverse samples, particularly females and underrepresented regions.
    - Investigate neurocognitive mechanisms to inform biomarker-based diagnostics.
2. **For Clinicians:**
    - Use culturally adapted screening tools in high-risk settings (e.g., schools, universities).
    - Implement multimodal treatment plans addressing comorbidities and contextual factors.
    - Consider digital therapeutics and stepped-care models to enhance accessibility.
3. **For Policymakers:**
    - Develop public health campaigns targeting adolescents and young adults.
    - Integrate IAD/IGD screening into routine mental health services.
    - Support funding for prevention programs and accessible treatment options.
4. **For Educators and Parents:**
    - Promote digital literacy and healthy online habits from an early age.
    - Encourage offline activities and face-to-face social interactions.
    - Recognize early signs of problematic use and seek professional guidance promptly.

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Addressing IAD/IGD requires a collaborative, evidence-based, and culturally sensitive approach to mitigate its growing impact on global mental health.

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