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Prevalence of internet addiction disorder in medical students: a systematic review and meta-analysis

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ADMINISTRATIVE INFORMATION

Support - University of Macau (MYRG2019-00066-FHS; MYRG2022-00187-FHS).

Review Stage at time of this submission - Preliminary searches.

Conflicts of interest - None declared.

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Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 26 October 2024 and was last updated on 26 October 2024.

INTRODUCTION

Review question / Objective The inclusion criteria were made adhered to the PICOS acronym: Participants (P): medical students; Interventions (I): not applicable; Comparisons (C): not applicable; Outcome (O): the prevalence of internet addiction disorder (IAD) or available data that could yield the prevalence of IAD based on standardized scales such as the Young Internet Addiction Test (IAT-20) questionnaire. Study design (S): cross-sectional epidemiological or cohort studies (only baseline data from cohort studies were extracted) with available/accessible data and a description of sampling methods published in English language journals. To minimize the bias and heterogeneity caused by instruments, only studies that used the IAT-20, the most widely used instrument on IAD, were included.

Condition being studied Prevalence of internet addiction disorder in medical students.

METHODS

Search strategy Two researchers independently searched the Web of Science, PubMed, PsycINFO and Embase databases from their inception to April 17, 2024, using the following search terms: ("Prevalence" OR "epidemiology") AND ("College student" OR "university student" OR "undergraduate student" OR "Medical Students" OR "Student, Medical" OR "Medical Student" OR "nursing students" OR "Pupil Nurses" OR "Student, Nursing" OR "Nurses, Pupil" OR "Nurse, Pupil" OR "Pupil Nurse" OR "Nursing Student" OR "Adolescents" OR "Adolescent" OR "Adolescence" OR "Teens" OR "Teen" OR "Teenager" OR "Youth") AND ("Internet Addiction Disorder" OR "Addiction Disorder, Internet" OR "Addiction Disorders, Internet" OR "Disorder, Internet Addiction" OR "Disorders, Internet Addiction" OR "Internet Addiction Disorders" OR "Internet Addiction" OR "Addiction, Internet" OR "Addictions, Internet" OR "Internet Addictions" OR "Social Media Addiction" OR "Addiction, Social Media" OR "Addictions,

Social Media” OR “Media Addiction, Social” OR “Media Addictions, Social” OR “Social Media Addictions” OR “Smartphone Addiction” OR “Addiction, Smartphone” OR “Addictions, Smartphone” OR “Smartphone Addictions” OR “Internet Gaming Disorder” OR “Disorder, Internet Gaming” OR “Disorders, Internet Gaming” OR “Gaming Disorder, Internet” OR “Gaming Disorders, Internet” OR “Internet Gaming Disorders” OR “Internet addiction” OR “problematic Internet use” OR “pathological Internet use” OR “Internet dependent” OR “compulsive Internet use” OR “excessive Internet use” OR “Internet overuse” OR “heavy Internet use”).

Participant or population Participants (P): medical students.

Intervention Not applicable.

Comparator Not applicable.

Study designs to be included Cross-sectional epidemiological or cohort studies (only baseline data from cohort studies were extracted) with available/accessible data and a description of sampling methods published in English language journals.

Eligibility criteria Exclusion criteria were as follow: (1) studies involving special populations such as those in continuing education programs; (2) studies that utilized only certain items of standardized scale; (3) participants with psychiatric disorders (e.g., drug addiction and gaming addiction disorder). If a dataset was involved in multiple papers, only the one with the complete information was included (Bai et al., 2023). The reference lists of relevant review articles were also checked for additional studies.

Information sources Two researchers will independently retrieve relevant literature in PubMed, Web of Science, Embase, and PsycINFO databases. This meta-analysis will be conducted based on the Preferred Reporting Items for Systematic Review and Meta-Analyses (PRISMA) and Metaanalysis of Observational Studies in Epidemiology (MOOSE) recommendations.

Main outcome(s) The prevalence of internet addiction disorder (IAD) or available data that could yield the prevalence of IAD among medical students based on standardized scales such as the Young Internet Addiction Test (IAT-20) questionnaire.

Quality assessment / Risk of bias analysis Given that all studies included in this meta-analysis were cross-sectional, we employed an 8-item assessment instrument to evaluate study quality. The total quality score ranged from 0 to 8, categorized as “low quality” (0-3), “moderate quality” (4-6), and “high quality” (7-8). Supplementary Table S1 shows the study quality assessment results. Egger's test was utilized to evaluate publication bias.

Strategy of data synthesis R (version 4.4.1, The R Foundation, Vienna, Austria) with meta package was used for all data analyses. A random-effects model was applied to calculate the pooled prevalence of IAD with the corresponding 95% confidence intervals (95% CIs). In addition, the I² statistic was employed to assess study heterogeneity, with values exceeding 50% indicating high heterogeneity. Subgroup and meta-regression analyses were performed to explore the sources of the heterogeneity. Subgroup analyses was conducted when there were three or more studies in each subgroup, categorical by: cut-off values of IAT-20, income levels by country (upper middle income vs. lower middle income as per World Bank standards) (The World Bank Group, 2024), geographic region (e.g. East Asia & Pacific, Middle East & North Africa, South Asia), COVID-19 pandemic context (before vs. during), sampling method (nonprobability sampling vs. probability sampling), and study quality assessment (moderate quality vs. high quality). Meta-regression analyses were carried out on continuous variables, including sample size, mean age (year), total scores of IAT-20, proportion of males, father's education status, mother's education status, proportion of unmarried status, urban residency, smoking, prevalence of anxiety, depression, and sleep problem, and study quality scores.

Subgroup analysis Data were extracted in different categories, including study characteristics (e.g., the first author, publication year, title, study site by country, survey time, study design, sampling method (e.g., cluster, random, stratified, convenient), assessment method (e.g., interview, online, self-administered questionnaire), COVID-19 pandemic (before or during), study quality assessment), and participant characteristics (e.g., mean age (years), proportion of males, father's education status, mother's education status, proportion of unmarried status, urban residency, smoking, prevalence of anxiety, depression and sleep problem). Internet addiction related data included the sample size (total/male/female), number of participants with IAD (total/male/female) and IAT-20 cut-off value and total scores.

Sensitivity analysis The "leave-one-out" method was employed for sensitivity analysis to assess the consistency of preliminary results. A significance level of $p < 0.05$ (two-tailed) was established.

Language restriction Only English articles are included in this meta-study.

Country(ies) involved Macau, China.

Keywords internet addiction; medical students; meta-analysis; prevalence.

Contributions of each author

Author 1 - Zhen Gui - ZHEN GUI will participate in the entire research process and draft the manuscript, and will participate in literature retrieval, screening, reading the full text and data analysis.

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Author 2 - Xin Liu - will participate in the literature retrieval, screening and reading of the full text.

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Author 3 - Yu-Tao Xiang - will be involved in the guidance of whole study, including study design, study process and data analysis guidance, manuscript revision, etc.

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