

Effectiveness of Internet-based self-help interventions for anxiety among adolescents and young adults: a systematic review and meta-analysis

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Corresponding author:

Yan B

yb2023@gzhmu.edu.cn

Author Affiliation:

Guangzhou Medical University.

Yan, B¹; Lin, YQ²; Xu, M³; Wang, HX⁴; Xie, Y⁵; Liu, JY⁶; Lu, Y⁷; Hu, J⁸.

ADMINISTRATIVE INFORMATION

Support - None.

Review Stage at time of this submission - The review has not yet started.

Conflicts of interest - None declared.

INPLASY registration number: INPLASY2023120067

Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 17 December 2023 and was last updated on 17 December 2023.

INTRODUCTION

Review question / Objective To evaluate the effectiveness and influential factors of Internet-based self-help intervention on anxiety symptoms among adolescents and young adults.

Population: (1) Adolescent and young adult population (aged between 10-24 years). (2) Study subjects with anxiety symptoms. Subjects Should be screened by relevant scales (e.g., SAS-A, GAD-7, etc.) or diagnosed by a clinician using a specific tool, such as the Diagnostic and Statistical Manual of Mental Disorders (DSM-5).

Intervention: Internet-based self-help interventions (interventions that use multimedia content on the Internet to carry out activities such as reading written materials, listening to audio materials, watching videos, completing games, etc., to help with issues related to personal development or treatment).

Comparison: Treated as usual, waiting list group (negative control), placebo group (negative control).

Outcome: The change in the severity of anxiety in each group will be derived by comparing anxiety scale scores at pre-intervention, just after intervention, and post-intervention follow-up. Scales that are widely used with good reliability and authority, such as the SAS-A, GAD-7, etc., were used.

Study design: Randomized controlled trials (RCT).

Rationale Anxiety in adolescent and young adult populations have become a prevalent public health problem. In recent years, with rapid advances in Internet technology, mobile applications such as web pages and software have been widely developed to provide more interventions and tools for people with anxiety. The increasing number of RCT studies of Internet-based self-help interventions providing interventions for anxiety

delivers an opportunity to examine the effectiveness of Internet-based self-help interventions for anxiety in adolescents and young adults.

Condition being studied Anxiety affects the quality of life and social functioning of sufferers. According to WHO, 301 million people suffered from anxiety in 2019, including 58 million children and adolescents. Therefore, the problem of anxiety in the adolescent and young adult population should be taken seriously. With the continuous development of Internet technology, Internet-based self-help intervention has gradually become a new type of intervention to solve the anxiety problems among adolescents and young adults.

METHODS

Search strategy

(1) English databases: PubMed, Embase, Cochrane Review, Scopus, PsycINFO, PsycNET.

(2) Chinese databases: China Knowledge Network Institution (CNKI), Wanfang Database, Weipu Database, China Biomedical literature database(CBM).

(3) Gray literature sources: International Clinical Trials Registry Platform (ICTRP), Clinical Trials.gov, PsycEXTRA, ProQuest Dissertations & Theses Global.

In addition to this, after the articles were screened, the reference list of each included article was tracked to identify other articles related to the topic of this study. The timeframe for the search was from the creation of each database to January 17, 2024.

For the search strategy, PubMed was presented as an example:

#1: "Computer Communication Networks [MeSH]" OR "Internet-based intervention [MeSH]" OR "Internet[MeSH]"

#2: "Internet*" OR "web" OR "webs" OR "online*" OR "app" OR "apps" OR "mobile*" OR "smartphone*" OR "computer*" OR "tele*" OR "remote" OR "social media" OR "email*" OR "e-mail*" OR "electronic mail*" OR "digital*" OR "e-mental*" OR "e-psycho*" OR "mhealth" OR "eHealth" OR "m-health" OR "e-Health"(note: all terms in [title/abstract])

#3: #1 OR #2

#4: "Self Care [MeSH]" OR "Self-Management[MeSH]"

#5: "self-help*" OR "self-management*" OR "self-car*" OR "self-guid*" OR "self-serv*" OR "self-treatment*" OR "self-therap*" OR "self-support*" OR "self-assist*" (note: all terms in [title/abstract])

#6: #4 OR #5

#7: "Anxiety [MeSH]" OR "Anxiety Disorders[MeSH]" OR "Panic Disorder [MeSH]" OR "agoraphobia [MeSH]" OR "Mutism [MeSH]"

#8: "anxi*" OR "Anxiety Disorders" OR "Generalized Anxiety Disorder" OR "GAD" OR "social anxiety disorder" OR "SAD" OR "panic disorder" OR "PD" OR "Panic Attack" OR "agoraphobia" OR "separation anxiety disorder" OR "specific phobias" OR "selective mutism" OR "worr*" OR "phobi*" OR "panic*" OR "low mood" (note: all terms in [title/abstract])

#9: #7 OR #8

#10: "adolescent [MeSH]" OR "Young Adult[MeSH]" OR "Child[MeSH]" OR "Students[MeSH]"

#11: "adolescent*" OR "teenager*" OR "young" OR "youth*" OR "child*" OR "student*" OR "juvenile*" (note: all terms in [title/abstract])

#12: #10 OR #11

#13: randomized controlled trial [publication type]

#14: controlled clinical trial [publication type]

#15: "randomized controlled trial [MeSH]" OR clinical trials as topic [MeSH: noexp]

#16: "randomi*" [title/abstract] OR "RCT" [title/abstract]

#17: placebo [title/abstract]

#18: trial* [title]

#19: animals [mesh] NOT humans [mesh]

#20: (#13 OR #14 OR #15 OR #16 OR #17 OR #18) NOT #19

#21: #3 AND #6 AND #9 AND #12 AND #20.

Participant or population Subjects aged 10-24 years who were diagnosed with anxiety at baseline either by a clinician (e.g., using DSM) or measured by a validated instrument (e.g., SAS-A, GAD-7, etc.).

Intervention It has been described in "Review question/ objective--intervention".

Comparator It has been described in "Review question/ objective--intervention".

Study designs to be included Randomized controlled trial (RCT).

Eligibility criteria Inclusion Criteria:(1) Subjects aged 10-24 years. These subjects were diagnosed with anxiety by a clinician (e.g., using DSM) or

measured by a validated instrument (e.g., SAS-A, GAD-7, etc.);(2) Only the WHO-described anxiety types were included in this study; Otherwise, it was categorized as mixed anxiety types/not mentioned;(3) Self-help intervention was delivered by Internet, such as web-based platforms (websites, email addresses, etc.), mobile applications, or the use of online courses or online modules;(4) Reported the measured score of the anxiety scale;(5) The study design was a randomized controlled trial (RCT).Exclusion criteria:(1) The study had no control group, or the control group was related to an Internet-based self-help intervention;(2) The data on outcome was not available even when we tried to obtain the data by sending e-mails or other means. (e.g. The targeted authors did not reply to our seeking help e-mail and we were unable to get further data.)(3) Removing duplicate publications and flagging the studies identified only as protocols, abstracts, or reviews to check for RCTs that may have been missed;(4) Non-Chinese or non-English literature (recorded in the Annex if published in other languages).

Information sources It was described in "Search strategy". Besides, we will contact the authors of the included studies to get further information (e.g. contacting them by e-mail), if necessary.

Main outcome(s) The scores measured by an anxiety scale at each stage: before the intervention (pre-intervention/ baseline), just after the intervention, and post-intervention follow-up. Scales that are widely used with good reliability and authority, such as the SAS and GAD, were used.

Data management Two trained researchers will extract information independently. The two researchers will import related literature into NoteExpress 3.2 software, screen out duplicates and irrelevant literature, perform initial screening based on inclusion and exclusion criteria, read the titles and abstracts, and screen again by reading the full text to obtain the final included literature.

Quality assessment / Risk of bias analysis Quality assessment/risk of bias analysis: the Cochrane Randomized Trials Risk of Bias Tool (ROB 2.0) will be used. Egger's test will be used to detect publication bias ($\alpha = 0.10$).

Strategy of data synthesis The combined SMD and 95% confidence interval (CI) will be calculated using Comprehensive Meta-Analysis software (CMA 3.0), and $P < 0.05$ was considered statistically significant. In this study, the random effects model was chosen to merge the results ($\alpha =$

0.05), and the merged results were demonstrated by forest plots.

Subgroup analysis (1) Population: 10-19 years (adolescents), 20-24 years (young adulthood).

(2) Type of anxiety:

1) Generalized anxiety disorder; 2) social anxiety disorder; 3) panic disorder; 4) agoraphobia; 5) Separation anxiety disorder; 6) specific phobias; 7) selective mutism; 8) Mixed anxiety or not mentioned.

(3) Type of anxiety scale;

(4) Type of intervention: computer-based, use of mobile devices;

(5) Duration of intervention (months): ≤ 3 , more than 3 and less than 6, > 6 ;

(6) Level of guidance: 0—no guidance provided and included a simple mail-in intervention, 1—intervention with some level of guidance including initial contact with a healthcare professional, 2—intervention with contact time and some form of follow-up;

(7) Reminders for subjects to complete the intervention: yes, no;

(8) Intervention provider: no description, healthcare professional, researcher, other, none;

(9) Duration of follow-up: ≤ 6 months, > 6 months.

(10) Source of subjects: school, clinical, community, mixed sources/not mentioned;

(11) Risk of bias: high, moderate, low;

(12) Inclusion of severe patients: yes, no;

(13) Regular feedback from subjects: yes, no;

(14) Financial incentives: yes, no;

(15) Specific psychological interventions: CBT, non-CBT;

(16) Pilot study: yes, no;

We used CMA 3.0 to calculate the P-value between subgroups ($\alpha = 0.05$).

Sensitivity analysis In this study, sensitivity analysis will be performed using CMA 3.0 software. The sensitivity analysis will be performed by excluding the included study case-by-case.

Language restriction English-written and Chinese written references will fit the criteria. References written in other languages will be recorded in attached files.

Country(ies) involved P.R.China.

Other relevant information (1) Variables for meta-regression analysis:

1) Percentage of gender (%);

2) Mean age of intervened subjects (years);

3) Attrition rate (%);

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- 4) Number of modules (number of subjects in the intervention content);
 - 5) Duration of intervention (weeks);
 - 6) Sample size;
 - 7) Year of publication.

Alpha was 0.10 for one-way meta-regression analysis and 0.05 for multifactor meta-regression analysis.

(2) Evaluation of quality of evidence: GRADE was used to evaluate the quality of evidence.

(3) Heterogeneity: I^2 will be used to reflect the heterogeneity (I^2 over 50% is considered high heterogeneity). Possible sources of heterogeneity will be explored through subgroup analysis and Meta-regression.

The study is currently self-financed by the authors. All authors participated in designing this study and will help to revise the manuscript. All authors participated in designing this study.

Keywords Internet; self-help; anxiety; adolescent; Young Adult; meta-analysis.

Dissemination plans None.

Contributions of each author

Author 1 - Yan B designed the study in detail and will contribute to the quality assessment of references, data analysis, and manuscript drafting.

Author 2 - Lin YQ contributed to the development of inclusion/exclusion criteria, subgroup analysis and search strategy.

Author 3 - Xu M contributed to the development of exclusion criteria, subgroup analysis, quality assessment, and search strategy.

Author 4 - Wang HX participated in modifying the search strategy, exclusion criteria, and meta-regression analysis.

Author 5 - Xie Y participated in modifying the search strategy and meta-regression analysis.

Author 6 - Liu JY participated in modifying the search strategy and inclusion criteria.

Author 7 - Lu Y provided statistical expertise and will help with the quality assessment of included references.

Author 8 - Hu J participated in designing the study and revised this protocol in detail.