



Supplementary Material

Article Title: Internet Addiction and Its Relationship With Suicidal Behaviors: A Meta-Analysis of Multinational Observational Studies

Author(s): Yu-Shian Cheng, MD; Ping-Tao Tseng, MD; Pao-Yen Lin; Tien-Yu Chen, MD; Brendon Stubbs; Andre F. Carvalho; Ching-Kuan Wu, MD; Yen-Wen Chen, MD; and Ming-Kung Wu, MD

DOI Number: 10.4088/JCP.17r11761

List of Supplementary Material for the article

1. [Table 1](#) PRISMA Checklist of Current Meta-Analysis
2. [Table 2](#) The Excluded Articles and Reasons
3. [Table 3](#) Newcastle-Ottawa Scales of Recruited Studies
4. [Table 4](#) Full Results of Statistical Analysis for Sensitivity Test, Meta-Regression and Subgroup Analysis
5. [Figure 1](#) Whole Flowchart of Current Meta-Analysis
6. [Figure 2A](#) Funnel Plot of Meta-Analysis of Prevalence Rate of Suicidal Plan
7. [Figure 2B](#) Funnel Plot of Meta-Analysis of Adjusted Odds Ratio of Suicidal Ideation
8. [Figure 2C](#) Funnel Plot of Meta-Analysis of Adjusted Odds Ratio of Suicidal Attempt

Disclaimer

This Supplementary Material has been provided by the author(s) as an enhancement to the published article. It has been approved by peer review; however, it has undergone neither editing nor formatting by in-house editorial staff. The material is presented in the manner supplied by the author.

© Copyright 2018 Physicians Postgraduate Press, Inc.

Supplementary Table 1: PRISMA checklist of current meta-analysis

Section/Topic	#	Checklist Item	Reported Page #
TITLE			
Title	1	Identify the report as a systematic review, meta-analysis, or both.	1
ABSTRACT			
Structured summary	2	Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number.	4-5
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known.	6-7
Objectives	4	Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).	8-9
METHODS			
Protocol and registration	5	Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration	10-1

information including registration number.

Eligibility criteria	6	Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale.	10-1
Information sources	7	Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.	10-1
Search	8	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.	10
Study selection	9	State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis).	10-1
Data collection process	10	Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators.	10-1
Data items	11	List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made.	12-1
Risk of bias in individual studies	12	Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis.	10-1
Summary measures	13	State the principal summary measures (e.g., risk ratio, difference in means).	11-1
Synthesis of results	14	Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I^2) for each meta-analysis.	11-1
Risk of bias across studies	15	Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within	13-1

		studies).	
Additional analyses	16	Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified.	12-1
RESULTS			
Study selection	17	Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram.	15-1
Study characteristics	18	For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citations.	15-17 t 1
Risk of bias within studies	19	Present data on risk of bias of each study and, if available, any outcome level assessment (see item 12).	15-1
Results of individual studies	20	For all outcomes considered (benefits or harms), present, for each study: (a) simple summary data for each intervention group (b) effect estimates and confidence intervals, ideally with a forest plot.	16-18, t 1
Synthesis of results	21	Present the main results of the review. If meta-analyses done, include for each, confidence intervals and measures of consistency.	16-18, fi 2
Risk of bias across studies	22	Present results of any assessment of risk of bias across studies (see Item 15).	19-2
Additional analysis	23	Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression [see Item 16]).	15-17, fi 3
DISCUSSION			
Summary of evidence	24	Summarize the main findings including the strength of evidence for each main outcome; consider their relevance to key groups	23-2

(e.g., healthcare providers, users, and policy makers).

Limitations	25	Discuss limitations at study and outcome level (e.g., risk of bias), and at review-level (e.g., incomplete retrieval of identified research, reporting bias).	29-3
Conclusions	26	Provide a general interpretation of the results in the context of other evidence, and implications for future research.	31
<hr/>			
FUNDING			
Funding	27	Describe sources of funding for the systematic review and other support (e.g., supply of data); role of funders for the systematic review.	32
<hr/>			

From: Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLoS Med 6(6): e1000097
doi:10.1371/journal.pmed1000097

Supplementary Table 2: The excluded articles and reasons

Commentary (n=1)

1. Tam P. Commentary on 'The association between problematic internet use and depression, suicidal ideation and bipolar disorder in Korean adolescents'. *The Australian and New Zealand journal of psychiatry* 2013;47(2):185-6. doi: 10.1177/0004867412469690

Duplicated data samples from the recruited study (Kaess, M. (2014)) (n=2)

2. Strittmatter E, Kaess M, Parzer P, et al. Pathological Internet use among adolescents: Comparing gamers and non-gamers. *Psychiatry Res* 2015;228(1):128-35. doi: 10.1016/j.psychres.2015.04.029
3. Fischer G, Brunner R, Parzer P, et al. [Depression, deliberate self-harm and suicidal behaviour in adolescents engaging in risky and pathological internet use]. *Prax Kinderpsychol Kinderpsychiatr* 2012;61(1):16-31. doi: 10.13109/prkk.2012.61.1.16

Duplicated data samples from the recruited study (Kim, B.S. (2016)) (n=1)

4. Kim K, Lee H, Hong JP, et al. Poor sleep quality and suicide attempt among adults with internet addiction: A nationwide community sample of Korea. *PLoS One* 2017;12(4):e0174619. doi: 10.1371/journal.pone.0174619

Lack of control (n=1)

5. Lee D, Seo JY, Lee CS, et al. Allergic diseases, excessive Internet use and suicidal ideation in Korean adolescents. *Compr Psychiatry* 2015;62:100-4. doi: 10.1016/j.comppsy.2015.06.012

No definite diagnosis of internet addiction (n=1)

6. Strittmatter E, Parzer P, Brunner R, et al. A 2-year longitudinal study of prospective predictors of pathological Internet use in adolescents. *Eur Child Adolesc Psychiatry* 2016;25(7):725-34. doi: 10.1007/s00787-015-0779-0

Not related to suicide and internet addiction (n=13)

7. Dieris-Hirche J, Bottel L, Bielefeld M, et al. Media use and Internet addiction in adult depression: A case-control study. *Computers in Human Behavior* 2017;68:96-103.
8. Zhao F, Zhang ZH, Bi L, et al. The association between life events and

- internet addiction among Chinese vocational school students: The mediating role of depression. *Computers in Human Behavior* 2017;70:30-38.
9. Durkee T, Carli V, Floderus B, et al. Pathological Internet Use and Risk-Behaviors among European Adolescents. *Int J Environ Res Public Health* 2016;13(3) doi: 10.3390/ijerph13030294
 10. Hokby S, Hadlaczky G, Westerlund J, et al. Are Mental Health Effects of Internet Use Attributable to the Web-Based Content or Perceived Consequences of Usage? A Longitudinal Study of European Adolescents. *JMIR Ment Health* 2016;3(3):e31. doi: 10.2196/mental.5925
 11. Kaess M, Parzer P, Brunner R, et al. Pathological Internet Use Is on the Rise Among European Adolescents. *The Journal of adolescent health : official publication of the Society for Adolescent Medicine* 2016;59(2):236-9. doi: 10.1016/j.jadohealth.2016.04.009
 12. Wartberg L, Brunner R, Kriston L, et al. Psychopathological factors associated with problematic alcohol and problematic Internet use in a sample of adolescents in Germany. *Psychiatry research* 2016;240:272-7. doi: 10.1016/j.psychres.2016.04.057
 13. Seko Y, Kidd SA, Wiljer D, et al. On the Creative Edge: Exploring Motivations for Creating Non-Suicidal Self-Injury Content Online. *Qual Health Res* 2015;25(10):1334-46. doi: 10.1177/1049732315570134
 14. Sueki H, Yonemoto N, Takeshima T, et al. The impact of suicidality-related internet use: a prospective large cohort study with young and middle-aged internet users. *PloS one* 2014;9(4):e94841. doi: 10.1371/journal.pone.0094841
 15. Do YK, Shin E, Bautista MA, et al. The associations between self-reported sleep duration and adolescent health outcomes: what is the role of time spent on Internet use? *Sleep Med* 2013;14(2):195-200. doi: 10.1016/j.sleep.2012.09.004
 16. Kim Y, Lee WN, Jung JH. Changing the stakes: A content analysis of Internet gambling advertising in TV poker programs between 2006 and 2010. *Journal of Business Research* 2013;66:1644-50.
 17. Odaci H, Celik CB. Who are problematic internet users? An investigation of the correlations between problematic internet use and shyness, loneliness, narcissism, aggression and self-perception. *Computers in Human Behavior* 2013;29:2382-87.
 18. Durkee T, Kaess M, Carli V, et al. Prevalence of pathological internet use among adolescents in Europe: demographic and social factors. *Addiction*

2012;107(12):2210-22. doi: 10.1111/j.1360-0443.2012.03946.x

19. Jon DI, Choi H, Hong HJ, et al. P.7.d.003 Suicidal behaviour and internet use in adolescent depression. *European Neuropsychopharmacology* 2012;22(Supplement 2):s433-s34.

Not suicide risk in real world (n=1)

20. Stieger S, Burger C, Bohn M, et al. Who commits virtual identity suicide? Differences in privacy concerns, Internet addiction, and personality between Facebook users and quitters. *Cyberpsychology, behavior and social networking* 2013;16(9):629-34. doi: 10.1089/cyber.2012.0323

Review article (n=5)

21. Diomidous M, Chardalias K, Magita A, et al. Social and Psychological Effects of the Internet Use. *Acta Inform Med* 2016;24(1):66-8. doi: 10.5455/aim.2016.24.66-68
22. Saliceti F. Internet Addiction Disorder (IAD). *Procedia - Social and Behavioral Sciences* 2015;191:1372-76.
23. Carli V, Durkee T, Wasserman D, et al. The association between pathological internet use and comorbid psychopathology: a systematic review. *Psychopathology* 2013;46(1):1-13. doi: 10.1159/000337971
24. Ko CH, Yen JY, Yen CF, et al. The association between Internet addiction and psychiatric disorder: a review of the literature. *Eur Psychiatry* 2012;27(1):1-8. doi: 10.1016/j.eurpsy.2010.04.011
25. Freeman CB. Internet Gaming Addiction. *The Journal for Nurse Practitioners* 2008:42-47.

No raw data available (n=149)

26. Reed P, Romano M, Re F, et al. Differential physiological changes following internet exposure in higher and lower problematic internet users. *PLoS One* 2017;12(5):e0178480. doi: 10.1371/journal.pone.0178480 [published Online First: 2017/05/26]
27. Na E, Lee H, Choi I, et al. Comorbidity of Internet gaming disorder and alcohol use disorder: A focus on clinical characteristics and gaming patterns. *The American journal on addictions* 2017;26(4):326-34. doi: 10.1111/ajad.12528 [published Online First: 2017/03/23]
28. Kim BN, Park S, Park MH. The Relationship of Sexual Abuse with Self-Esteem, Depression, and Problematic Internet Use in Korean Adolescents. *Psychiatry investigation* 2017;14(3):372-75. doi:

10.4306/pi.2017.14.3.372 [published Online First: 2017/05/26]

29. Bhandari PM, Neupane D, Rijal S, et al. Sleep quality, internet addiction and depressive symptoms among undergraduate students in Nepal. *BMC psychiatry* 2017;17(1):106. doi: 10.1186/s12888-017-1275-5 [published Online First: 2017/03/23]
30. Boonvisudhi T, Kuladee S. Association between Internet addiction and depression in Thai medical students at Faculty of Medicine, Ramathibodi Hospital. 2017;12(3):e0174209. doi: 10.1371/journal.pone.0174209
31. Tang CS, Koh YY. Online social networking addiction among college students in Singapore: Comorbidity with behavioral addiction and affective disorder. *Asian journal of psychiatry* 2017;25:175-78. doi: 10.1016/j.ajp.2016.10.027 [published Online First: 2017/03/07]
32. Seyrek S, Cop E, Sinir H, et al. Factors associated with Internet addiction: Cross-sectional study of Turkish adolescents. *Pediatr Int* 2017;59(2):218-22. doi: 10.1111/ped.13117
33. Younes F, Halawi G, Jabbour H, et al. Internet Addiction and Relationships with Insomnia, Anxiety, Depression, Stress and Self-Esteem in University Students: A Cross-Sectional Designed Study. *PLoS One* 2016;11(9):e0161126. doi: 10.1371/journal.pone.0161126 [published Online First: 2016/09/13]
34. Khazaal Y, Chatton A, Rothen S, et al. Psychometric properties of the 7-item game addiction scale among french and German speaking adults. *BMC psychiatry* 2016;16:132. doi: 10.1186/s12888-016-0836-3 [published Online First: 2016/05/11]
35. Harper C, Hodgins DC. Examining Correlates of Problematic Internet Pornography Use Among University Students. *Journal of behavioral addictions* 2016;5(2):179-91. doi: 10.1556/2006.5.2016.022 [published Online First: 2016/05/10]
36. Kim NR, Hwang SS, Choi JS, et al. Characteristics and Psychiatric Symptoms of Internet Gaming Disorder among Adults Using Self-Reported DSM-5 Criteria. *Psychiatry investigation* 2016;13(1):58-66. doi: 10.4306/pi.2016.13.1.58 [published Online First: 2016/01/15]
37. Choi SW, Kim DJ, Choi JS, et al. Comparison of risk and protective factors associated with smartphone addiction and Internet addiction. *Journal of behavioral addictions* 2015;4(4):308-14. doi: 10.1556/2006.4.2015.043 [published Online First: 2015/12/23]
38. Wegmann E, Stodt B, Brand M. Addictive use of social networking sites can be explained by the interaction of Internet use expectancies, Internet

- literacy, and psychopathological symptoms. *Journal of behavioral addictions* 2015;4(3):155-62. doi: 10.1556/2006.4.2015.021 [published Online First: 2015/11/10]
39. Baggio S, Dupuis M, Studer J, et al. Reframing video gaming and internet use addiction: empirical cross-national comparison of heavy use over time and addiction scales among young users. *Addiction* 2016;111(3):513-22. doi: 10.1111/add.13192 [published Online First: 2015/10/10]
 40. Senormanci O, Saracli O, Atasoy N, et al. Relationship of Internet addiction with cognitive style, personality, and depression in university students. *Compr Psychiatry* 2014;55(6):1385-90. doi: 10.1016/j.comppsy.2014.04.025 [published Online First: 2014/06/04]
 41. Gamez-Guadix M. Depressive symptoms and problematic internet use among adolescents: analysis of the longitudinal relationships from the cognitive-behavioral model. *Cyberpsychol Behav Soc Netw* 2014;17(11):714-9. doi: 10.1089/cyber.2014.0226 [published Online First: 2014/11/19]
 42. Scimeca G, Bruno A, Cava L, et al. The relationship between alexithymia, anxiety, depression, and internet addiction severity in a sample of Italian high school students. *TheScientificWorldJournal* 2014;2014:504376. doi: 10.1155/2014/504376 [published Online First: 2014/11/18]
 43. Lee JY, Park EJ, Kwon M, et al. The Difference in Comorbidities and Behavioral Aspects between Internet Abuse and Internet Dependence in Korean Male Adolescents. *Psychiatry investigation* 2014;11(4):387-93. doi: 10.4306/pi.2014.11.4.387 [published Online First: 2014/11/15]
 44. Lee JY, Shin KM, Cho SM, et al. Psychosocial risk factors associated with internet addiction in Korea. *Psychiatry investigation* 2014;11(4):380-6. doi: 10.4306/pi.2014.11.4.380 [published Online First: 2014/11/15]
 45. Tang J, Zhang Y, Li Y, et al. Clinical characteristics and diagnostic confirmation of Internet addiction in secondary school students in Wuhan, China. *Psychiatry and clinical neurosciences* 2014;68(6):471-8. doi: 10.1111/pcn.12153 [published Online First: 2014/06/13]
 46. Tonioni F, Mazza M, Autullo G, et al. Is Internet addiction a psychopathological condition distinct from pathological gambling? *Addict Behav* 2014;39(6):1052-6. doi: 10.1016/j.addbeh.2014.02.016 [published Online First: 2014/03/19]
 47. Yang SJ, Stewart R, Lee JY, et al. Prevalence and correlates of problematic internet experiences and computer-using time: a two-year longitudinal

- study in korean school children. *Psychiatry investigation* 2014;11(1):24-31. doi: 10.4306/pi.2014.11.1.24 [published Online First: 2014/03/08]
48. Huang AC, Chen HE, Wang YC, et al. Internet abusers associate with a depressive state but not a depressive trait. *Psychiatry and clinical neurosciences* 2014;68(3):197-205. doi: 10.1111/pcn.12124 [published Online First: 2013/12/10]
 49. Yau YH, Potenza MN, White MA. Problematic Internet Use, Mental Health and Impulse Control in an Online Survey of Adults. *Journal of behavioral addictions* 2013;2(2):72. [published Online First: 2013/12/03]
 50. Sasmaz T, Oner S, Kurt AO, et al. Prevalence and risk factors of Internet addiction in high school students. *European journal of public health* 2014;24(1):15-20. doi: 10.1093/eurpub/ckt051 [published Online First: 2013/06/01]
 51. Gamez-Guadix M, Orue I, Smith PK, et al. Longitudinal and reciprocal relations of cyberbullying with depression, substance use, and problematic internet use among adolescents. *J Adolesc Health* 2013;53(4):446-52. doi: 10.1016/j.jadohealth.2013.03.030 [published Online First: 2013/06/01]
 52. Zhang HX, Jiang WQ, Lin ZG, et al. Comparison of psychological symptoms and serum levels of neurotransmitters in Shanghai adolescents with and without internet addiction disorder: a case-control study. *PLoS One* 2013;8(5):e63089. doi: 10.1371/journal.pone.0063089 [published Online First: 2013/05/10]
 53. Romano M, Osborne LA, Truzoli R, et al. Differential psychological impact of internet exposure on Internet addicts. *PLoS One* 2013;8(2):e55162. doi: 10.1371/journal.pone.0055162 [published Online First: 2013/02/15]
 54. Cho SM, Sung MJ, Shin KM, et al. Does psychopathology in childhood predict internet addiction in male adolescents? *Child psychiatry and human development* 2013;44(4):549-55. doi: 10.1007/s10578-012-0348-4 [published Online First: 2012/12/18]
 55. Jang MH, Ji ES. Gender differences in associations between parental problem drinking and early adolescents' internet addiction. *Journal for specialists in pediatric nursing : JSPN* 2012;17(4):288-300. doi: 10.1111/j.1744-6155.2012.00344.x [published Online First: 2012/09/27]
 56. Wei HT, Chen MH, Huang PC, et al. The association between online gaming, social phobia, and depression: an internet survey. *BMC psychiatry* 2012;12:92. doi: 10.1186/1471-244x-12-92 [published Online First:

2012/07/31]

57. Khoshakhlagh H, Faramarzi S. The relationship of emotional intelligence and mental disorders with internet addiction in internet users university students. *Addiction & health* 2012;4(3-4):133-41. [published Online First: 2012/07/01]
58. Khazaal Y, Chatton A, Horn A, et al. French validation of the compulsive internet use scale (CIUS). *The Psychiatric quarterly* 2012;83(4):397-405. doi: 10.1007/s11126-012-9210-x [published Online First: 2012/03/01]
59. Tonioni F, D'Alessandris L, Lai C, et al. Internet addiction: hours spent online, behaviors and psychological symptoms. *General hospital psychiatry* 2012;34(1):80-7. doi: 10.1016/j.genhosppsych.2011.09.013 [published Online First: 2011/11/01]
60. Christakis DA, Moreno MM, Jelenchick L, et al. Problematic internet usage in US college students: a pilot study. *BMC medicine* 2011;9:77. doi: 10.1186/1741-7015-9-77 [published Online First: 2011/06/24]
61. Tsitsika A, Critselis E, Louizou A, et al. Determinants of Internet addiction among adolescents: a case-control study. *TheScientificWorldJournal* 2011;11:866-74. doi: 10.1100/tsw.2011.85 [published Online First: 2011/04/26]
62. Dong G, Lu Q, Zhou H, et al. Precursor or sequela: pathological disorders in people with Internet addiction disorder. *PLoS One* 2011;6(2):e14703. doi: 10.1371/journal.pone.0014703 [published Online First: 2011/03/02]
63. Lam LT, Peng ZW. Effect of pathological use of the internet on adolescent mental health: a prospective study. *Archives of pediatrics & adolescent medicine* 2010;164(10):901-6. doi: 10.1001/archpediatrics.2010.159 [published Online First: 2010/08/04]
64. Yen JY, Ko CH, Yen CF, et al. Psychiatric symptoms in adolescents with Internet addiction: Comparison with substance use. *Psychiatry and clinical neurosciences* 2008;62(1):9-16. doi: 10.1111/j.1440-1819.2007.01770.x [published Online First: 2008/02/22]
65. Ha JH, Yoo HJ, Cho IH, et al. Psychiatric comorbidity assessed in Korean children and adolescents who screen positive for Internet addiction. *The Journal of clinical psychiatry* 2006;67(5):821-6. [published Online First: 2006/07/18]
66. Ybarra ML, Alexander C, Mitchell KJ. Depressive symptomatology, youth Internet use, and online interactions: A national survey. *J Adolesc Health* 2005;36(1):9-18. doi: 10.1016/j.jadohealth.2003.10.012 [published Online First: 2005/01/22]

67. Hoare E, Milton K, Foster C, et al. Depression, psychological distress and Internet use among community-based Australian adolescents: a cross-sectional study. *BMC public health* 2017;17(1):365. doi: 10.1186/s12889-017-4272-1 [published Online First: 2017/04/30]
68. Derbyshire KL, Lust KA, Schreiber LR, et al. Problematic Internet use and associated risks in a college sample. *Compr Psychiatry* 2013;54(5):415-22. doi: 10.1016/j.comppsy.2012.11.003 [published Online First: 2013/01/15]
69. Bener A, Bhugra D. Lifestyle and depressive risk factors associated with problematic internet use in adolescents in an Arabian Gulf culture. *Journal of addiction medicine* 2013;7(4):236-42. doi: 10.1097/ADM.0b013e3182926b1f [published Online First: 2013/05/15]
70. Dalbudak E, Evren C, Aldemir S, et al. The severity of Internet addiction risk and its relationship with the severity of borderline personality features, childhood traumas, dissociative experiences, depression and anxiety symptoms among Turkish university students. *Psychiatry Res* 2014;219(3):577-82. doi: 10.1016/j.psychres.2014.02.032 [published Online First: 2014/07/16]
71. Lim JA, Gwak AR, Park SM, et al. Are adolescents with internet addiction prone to aggressive behavior? The mediating effect of clinical comorbidities on the predictability of aggression in adolescents with internet addiction. *Cyberpsychol Behav Soc Netw* 2015;18(5):260-7. doi: 10.1089/cyber.2014.0568 [published Online First: 2015/04/23]
72. Dalbudak E, Evren C, Aldemir S, et al. The impact of sensation seeking on the relationship between attention deficit/hyperactivity symptoms and severity of Internet addiction risk. *Psychiatry Res* 2015;228(1):156-61. doi: 10.1016/j.psychres.2015.04.035 [published Online First: 2015/05/13]
73. Lehenbauer-Baum M, Klaps A, Kovacovsky Z, et al. Addiction and Engagement: An Explorative Study Toward Classification Criteria for Internet Gaming Disorder. *Cyberpsychol Behav Soc Netw* 2015;18(6):343-9. doi: 10.1089/cyber.2015.0063 [published Online First: 2015/06/16]
74. Chou WP, Ko CH, Kaufman EA, et al. Association of stress coping strategies with Internet addiction in college students: The moderating effect of depression. *Compr Psychiatry* 2015;62:27-33. doi: 10.1016/j.comppsy.2015.06.004 [published Online First: 2015/09/08]
75. Morrison CM, Gore H. The relationship between excessive Internet use and depression: a questionnaire-based study of 1,319 young people and

- adults. *Psychopathology* 2010;43(2):121-6. doi: 10.1159/000277001 [published Online First: 2010/01/30]
76. Bahrainian SA, Alizadeh KH, Raeisoon MR, et al. Relationship of Internet addiction with self-esteem and depression in university students. *Journal of preventive medicine and hygiene* 2014;55(3):86-9. [published Online First: 2015/04/24]
 77. Jelenchick LA, Eickhoff J, Zhang C, et al. Screening for Adolescent Problematic Internet Use: Validation of the Problematic and Risky Internet Use Screening Scale (PRIUSS). *Academic pediatrics* 2015;15(6):658-65. doi: 10.1016/j.acap.2015.07.001 [published Online First: 2015/11/10]
 78. Ivezaj V, Potenza MN, Grilo CM, et al. An exploratory examination of At-Risk/Problematic Internet Use and disordered eating in adults. *Addict Behav* 2017;64:301-07. doi: 10.1016/j.addbeh.2015.11.015 [published Online First: 2016/01/05]
 79. Lee TK, Roh S, Han JH, et al. The relationship of problematic internet use with dissociation among South Korean internet users. *Psychiatry Res* 2016;241:66-71. doi: 10.1016/j.psychres.2016.04.109 [published Online First: 2016/05/09]
 80. Wu XS, Zhang ZH, Zhao F, et al. Prevalence of Internet addiction and its association with social support and other related factors among adolescents in China. *Journal of adolescence* 2016;52:103-11. doi: 10.1016/j.adolescence.2016.07.012 [published Online First: 2016/08/22]
 81. Nie J, Zhang W, Liu Y. Exploring depression, self-esteem and verbal fluency with different degrees of internet addiction among Chinese college students. *Compr Psychiatry* 2017;72:114-20. doi: 10.1016/j.comppsy.2016.10.006 [published Online First: 2016/11/05]
 82. Wang HR, Cho H, Kim DJ. Prevalence and correlates of comorbid depression in a nonclinical online sample with DSM-5 internet gaming disorder. *Journal of affective disorders* 2017;226:1-5. doi: 10.1016/j.jad.2017.08.005 [published Online First: 2017/09/25]
 83. Alavi SS, Alaghemandan H, Maracy MR, et al. Impact of addiction to internet on a number of psychiatric symptoms in students of isfahan universities, iran, 2010. *International journal of preventive medicine* 2012;3(2):122-7. [published Online First: 2012/02/22]
 84. Alavi SS, Maracy MR, Jannatifard F, et al. The effect of psychiatric symptoms on the internet addiction disorder in Isfahan's University students. *Journal of research in medical sciences : the official journal of*

- Isfahan University of Medical Sciences* 2011;16(6):793-800. [published Online First: 2011/11/18]
85. Hirao K. Difference in mental state between Internet-addicted and non-addicted Japanese undergraduates. *International journal of adolescent medicine and health* 2015;27(3):307-10. doi: 10.1515/ijamh-2014-0030 [published Online First: 2014/11/22]
86. Wolfling K, Beutel ME, Koch A, et al. Comorbid internet addiction in male clients of inpatient addiction rehabilitation centers: psychiatric symptoms and mental comorbidity. *The Journal of nervous and mental disease* 2013;201(11):934-40. doi: 10.1097/nmd.0000000000000035 [published Online First: 2013/11/02]
87. Yang CY, Sato T, Yamawaki N, et al. Prevalence and risk factors of problematic Internet use: a cross-national comparison of Japanese and Chinese university students. *Transcultural psychiatry* 2013;50(2):263-79. doi: 10.1177/1363461513488876 [published Online First: 2013/05/11]
88. Jang MH, Kim MJ, Choi H. Influences of parental problem drinking on internet addiction among early adolescents: a multiple-mediation analysis. *Journal of addictions nursing* 2012;23(4):258-70. doi: 10.1097/JAN.0b013e31826f69ac [published Online First: 2012/12/01]
89. Guo J, Chen L, Wang X, et al. The relationship between Internet addiction and depression among migrant children and left-behind children in China. *Cyberpsychol Behav Soc Netw* 2012;15(11):585-90. doi: 10.1089/cyber.2012.0261 [published Online First: 2012/09/26]
90. Lee HW, Choi JS, Shin YC, et al. Impulsivity in internet addiction: a comparison with pathological gambling. *Cyberpsychology, behavior and social networking* 2012;15(7):373-7. doi: 10.1089/cyber.2012.0063 [published Online First: 2012/06/06]
91. Mueller A, Mitchell JE, Peterson LA, et al. Depression, materialism, and excessive Internet use in relation to compulsive buying. *Compr Psychiatry* 2011;52(4):420-4. doi: 10.1016/j.comppsy.2010.09.001 [published Online First: 2011/06/21]
92. Ni X, Yan H, Chen S, et al. Factors influencing internet addiction in a sample of freshmen university students in China. *Cyberpsychology & behavior : the impact of the Internet, multimedia and virtual reality on behavior and society* 2009;12(3):327-30. doi: 10.1089/cpb.2008.0321 [published Online First: 2009/05/19]
93. Hanprathet N, Manwong M, Khumsri J, et al. Facebook Addiction and Its Relationship with Mental Health among Thai High School Students.

- Journal of the Medical Association of Thailand = Chotmaihet thangphaet* 2015;98 Suppl 3:S81-90. [published Online First: 2015/09/22]
94. Hopley AA, Nicki RM. Predictive factors of excessive online poker playing. *Cyberpsychol Behav Soc Netw* 2010;13(4):379-85. doi: 10.1089/cyber.2009.0223 [published Online First: 2010/08/18]
 95. Deng YX, Hu M, Hu GQ, et al. [An investigation on the prevalence of internet addiction disorder in middle school students of Hunan province]. *Zhonghua liu xing bing xue za zhi = Zhonghua liuxingbingxue zazhi* 2007;28(5):445-8. [published Online First: 2007/09/20]
 96. Malak MZ, Khalifeh AH. Anxiety and depression among school students in Jordan: Prevalence, risk factors, and predictors. 2017 doi: 10.1111/ppc.12229
 97. Stockdale L, Coyne SM. Video game addiction in emerging adulthood: Cross-sectional evidence of pathology in video game addicts as compared to matched healthy controls. *Journal of affective disorders* 2018;225:265-72. doi: 10.1016/j.jad.2017.08.045 [published Online First: 2017/08/26]
 98. Sigerson L, Li AY, Cheung MW, et al. Psychometric properties of the Chinese Internet Gaming Disorder Scale. *Addict Behav* 2017;74:20-26. doi: 10.1016/j.addbeh.2017.05.031 [published Online First: 2017/05/31]
 99. Arcelus J, Bouman WP, Jones BA, et al. Video gaming and gaming addiction in transgender people: An exploratory study. *Journal of behavioral addictions* 2017;6(1):21-29. doi: 10.1556/2006.6.2017.002 [published Online First: 2017/02/16]
 100. Tran BX, Huong LT, Hinh ND, et al. A study on the influence of internet addiction and online interpersonal influences on health-related quality of life in young Vietnamese. *BMC public health* 2017;17(1):138. doi: 10.1186/s12889-016-3983-z [published Online First: 2017/02/02]
 101. Banyai F, Zsila A, Kiraly O, et al. Problematic Social Media Use: Results from a Large-Scale Nationally Representative Adolescent Sample. 2017;12(1):e0169839. doi: 10.1371/journal.pone.0169839
 102. Khazaal Y, Chatton A, Achab S, et al. Internet Gamblers Differ on Social Variables: A Latent Class Analysis. *Journal of gambling studies* 2016 doi: 10.1007/s10899-016-9664-0 [published Online First: 2016/12/29]
 103. Tan Y, Chen Y, Lu Y, et al. Exploring Associations between Problematic Internet Use, Depressive Symptoms and Sleep Disturbance among Southern Chinese Adolescents. *Int J Environ Res Public Health* 2016;13(3) doi: 10.3390/ijerph13030313 [published Online First: 2016/03/18]

104. Lai CM, Mak KK, Watanabe H, et al. The mediating role of Internet addiction in depression, social anxiety, and psychosocial well-being among adolescents in six Asian countries: a structural equation modelling approach. *Public health* 2015;129(9):1224-36. doi: 10.1016/j.puhe.2015.07.031 [published Online First: 2015/09/08]
105. Bezinovic P, Rovis D, Roncevic N, et al. Patterns of internet use and mental health of high school students in Istria County Croatia: cross-sectional study. *Croatian medical journal* 2015;56(3):297-305. [published Online First: 2015/06/20]
106. Kiraly O, Griffiths MD, Urban R, et al. Problematic internet use and problematic online gaming are not the same: findings from a large nationally representative adolescent sample. *Cyberpsychol Behav Soc Netw* 2014;17(12):749-54. doi: 10.1089/cyber.2014.0475 [published Online First: 2014/11/22]
107. Yang L, Sun L, Zhang Z, et al. Internet addiction, adolescent depression, and the mediating role of life events: finding from a sample of Chinese adolescents. *International journal of psychology : Journal internationale de psychologie* 2014;49(5):342-7. doi: 10.1002/ijop.12063 [published Online First: 2014/09/03]
108. Chang FC, Chiu CH, Lee CM, et al. Predictors of the initiation and persistence of internet addiction among adolescents in Taiwan. *Addict Behav* 2014;39(10):1434-40. doi: 10.1016/j.addbeh.2014.05.010
109. Kim JH, Griffiths SM, Lau CH, et al. Pathological Internet use and associated factors among university students in Hong Kong. *Hong Kong medical journal = Xianggang yi xue za zhi* 2013;19 Suppl 9:9-11. [published Online First: 2014/01/30]
110. Tang J, Yu Y, Du Y, et al. Prevalence of internet addiction and its association with stressful life events and psychological symptoms among adolescent internet users. *Addict Behav* 2014;39(3):744-7. doi: 10.1016/j.addbeh.2013.12.010 [published Online First: 2014/01/07]
111. Liu TC, Desai RA, Krishnan-Sarin S, et al. Problematic Internet use and health in adolescents: data from a high school survey in Connecticut. *The Journal of clinical psychiatry* 2011;72(6):836-45. doi: 10.4088/JCP.10m06057 [published Online First: 2011/05/04]
112. Cheung LM, Wong WS. The effects of insomnia and internet addiction on depression in Hong Kong Chinese adolescents: an exploratory cross-sectional analysis. *Journal of sleep research* 2011;20(2):311-7. doi: 10.1111/j.1365-2869.2010.00883.x [published Online First: 2010/09/08]

113. Ko CH, Yen JY, Chen CS, et al. Predictive values of psychiatric symptoms for internet addiction in adolescents: a 2-year prospective study. *Arch Pediatr Adolesc Med* 2009;163(10):937-43. doi: 10.1001/archpediatrics.2009.159 [published Online First: 2009/10/07]
114. Yen CF, Ko CH, Yen JY, et al. Multi-dimensional discriminative factors for Internet addiction among adolescents regarding gender and age. *Psychiatry and clinical neurosciences* 2009;63(3):357-64. doi: 10.1111/j.1440-1819.2009.01969.x [published Online First: 2009/07/02]
115. Ko CH, Yen JY, Liu SC, et al. The associations between aggressive behaviors and internet addiction and online activities in adolescents. *J Adolesc Health* 2009;44(6):598-605. doi: 10.1016/j.jadohealth.2008.11.011 [published Online First: 2009/05/26]
116. Mythily S, Qiu S, Winslow M. Prevalence and correlates of excessive Internet use among youth in Singapore. *Annals of the Academy of Medicine, Singapore* 2008;37(1):9-14. [published Online First: 2008/02/13]
117. Ha JH, Kim SY, Bae SC, et al. Depression and Internet addiction in adolescents. *Psychopathology* 2007;40(6):424-30. doi: 10.1159/000107426
118. Yen JY, Ko CH, Yen CF, et al. The comorbid psychiatric symptoms of Internet addiction: attention deficit and hyperactivity disorder (ADHD), depression, social phobia, and hostility. *The Journal of adolescent health : official publication of the Society for Adolescent Medicine* 2007;41(1):93-8. doi: 10.1016/j.jadohealth.2007.02.002 [published Online First: 2007/06/20]
119. Barrault S, Varescon I. Cognitive distortions, anxiety, and depression among regular and pathological gambling online poker players. *Cyberpsychol Behav Soc Netw* 2013;16(3):183-8. doi: 10.1089/cyber.2012.0150 [published Online First: 2013/02/01]
120. Koronczai B, Kokonyei G, Urban R, et al. The mediating effect of self-esteem, depression and anxiety between satisfaction with body appearance and problematic internet use. *The American journal of drug and alcohol abuse* 2013;39(4):259-65. doi: 10.3109/00952990.2013.803111 [published Online First: 2013/07/12]
121. Blachnio A, Przepiorka A, Pantic I. Internet use, Facebook intrusion, and depression: Results of a cross-sectional study. *Eur Psychiatry* 2015;30(6):681-4. doi: 10.1016/j.eurpsy.2015.04.002 [published Online First: 2015/05/13]

122. Fernandez-Villa T, Alguacil Ojeda J, Almaraz Gomez A, et al. Problematic Internet Use in University Students: associated factors and differences of gender. *Adicciones* 2015;27(4):265-75. [published Online First: 2015/12/27]
123. Wu AM, Li J, Lau JT, et al. Potential impact of internet addiction and protective psychosocial factors onto depression among Hong Kong Chinese adolescents - direct, mediation and moderation effects. *Compr Psychiatry* 2016;70:41-52. doi: 10.1016/j.comppsy.2016.06.011 [published Online First: 2016/09/15]
124. Chi X, Lin L, Zhang P. Internet Addiction Among College Students in China: Prevalence and Psychosocial Correlates. *Cyberpsychol Behav Soc Netw* 2016;19(9):567-73. doi: 10.1089/cyber.2016.0234 [published Online First: 2016/09/17]
125. Yeh YC, Wang PW, Huang MF, et al. The procrastination of Internet gaming disorder in young adults: The clinical severity. *Psychiatry Res* 2017;254:258-62. doi: 10.1016/j.psychres.2017.04.055 [published Online First: 2017/05/10]
126. Sarda E, Begue L, Bry C, et al. Internet Gaming Disorder and Well-Being: A Scale Validation. *Cyberpsychol Behav Soc Netw* 2016;19(11):674-79. doi: 10.1089/cyber.2016.0286 [published Online First: 2016/11/11]
127. Schou Andreassen C, Billieux J, Griffiths MD, et al. The relationship between addictive use of social media and video games and symptoms of psychiatric disorders: A large-scale cross-sectional study. *Psychology of addictive behaviors : journal of the Society of Psychologists in Addictive Behaviors* 2016;30(2):252-62. doi: 10.1037/adb0000160 [published Online First: 2016/03/22]
128. Lee BW, Stapinski LA. Seeking safety on the internet: relationship between social anxiety and problematic internet use. *Journal of anxiety disorders* 2012;26(1):197-205. doi: 10.1016/j.janxdis.2011.11.001 [published Online First: 2011/12/16]
129. Yen JY, Yen CF, Wu HY, et al. Hostility in the real world and online: the effect of internet addiction, depression, and online activity. *Cyberpsychol Behav Soc Netw* 2011;14(11):649-55. doi: 10.1089/cyber.2010.0393 [published Online First: 2011/04/12]
130. Beutel ME, Brahler E, Glaesmer H, et al. Regular and problematic leisure-time Internet use in the community: results from a German population-based survey. *Cyberpsychol Behav Soc Netw* 2011;14(5):291-6. doi: 10.1089/cyber.2010.0199 [published Online First: 2010/11/12]

131. Schmit S, Chauchard E, Chabrol H, et al. [Evaluation of the characteristics of addiction to online video games among adolescents and young adults]. *L'Encephale* 2011;37(3):217-23. doi: 10.1016/j.encep.2010.06.006 [published Online First: 2011/06/28]
132. Evren C, Dalbudak E, Evren B, et al. High risk of Internet addiction and its relationship with lifetime substance use, psychological and behavioral problems among 10(th) grade adolescents. *Psychiatria Danubina* 2014;26(4):330-9. [published Online First: 2014/11/08]
133. AJ VANR, Kuss DJ, Griffiths MD, et al. The (co-)occurrence of problematic video gaming, substance use, and psychosocial problems in adolescents. *Journal of behavioral addictions* 2014;3(3):157-65. doi: 10.1556/jba.3.2014.013 [published Online First: 2014/10/16]
134. Ahmadi J, Amiri A, Ghanizadeh A, et al. Prevalence of Addiction to the Internet, Computer Games, DVD, and Video and Its Relationship to Anxiety and Depression in a Sample of Iranian High School Students. *Iranian journal of psychiatry and behavioral sciences* 2014;8(2):75-80. [published Online First: 2014/07/24]
135. Jung YE, Leventhal B, Kim YS, et al. Cyberbullying, problematic internet use, and psychopathologic symptoms among Korean youth. *Yonsei medical journal* 2014;55(3):826-30. doi: 10.3349/ymj.2014.55.3.826 [published Online First: 2014/04/11]
136. van der Aa N, Overbeek G, Engels RC, et al. Daily and compulsive internet use and well-being in adolescence: a diathesis-stress model based on big five personality traits. *Journal of youth and adolescence* 2009;38(6):765-76. doi: 10.1007/s10964-008-9298-3 [published Online First: 2009/07/29]
137. June KJ, Sohn SY, So AY, et al. [A study of factors that influence Internet addiction, smoking, and drinking in high school students]. *Taehan Kanho Hakhoe chi* 2007;37(6):872-82. [published Online First: 2007/11/10]
138. Gedam SR, Shivji IA, Goyal A, et al. Comparison of internet addiction, pattern and psychopathology between medical and dental students. *Asian journal of psychiatry* 2016;22:105-10. doi: 10.1016/j.ajp.2016.06.007 [published Online First: 2016/08/16]
139. Cao F, Su L, Liu T, et al. The relationship between impulsivity and Internet addiction in a sample of Chinese adolescents. *Eur Psychiatry* 2007;22(7):466-71. doi: 10.1016/j.eurpsy.2007.05.004 [published Online First: 2007/09/04]
140. Goel D, Subramanyam A, Kamath R. A study on the prevalence of internet

- addiction and its association with psychopathology in Indian adolescents. *Indian journal of psychiatry* 2013;55(2):140-3. doi: 10.4103/0019-5545.111451 [published Online First: 2013/07/05]
141. King DL, Delfabbro PH, Zwaans T, et al. Clinical features and axis I comorbidity of Australian adolescent pathological Internet and video game users. *The Australian and New Zealand journal of psychiatry* 2013;47(11):1058-67. doi: 10.1177/0004867413491159
 142. Lin MP, Ko HC, Wu JY. Prevalence and psychosocial risk factors associated with internet addiction in a nationally representative sample of college students in Taiwan. *Cyberpsychol Behav Soc Netw* 2011;14(12):741-6. doi: 10.1089/cyber.2010.0574 [published Online First: 2011/06/10]
 143. Yeh YC, Ko HC, Wu JY, et al. Gender differences in relationships of actual and virtual social support to Internet addiction mediated through depressive symptoms among college students in Taiwan. *Cyberpsychology & behavior : the impact of the Internet, multimedia and virtual reality on behavior and society* 2008;11(4):485-7. doi: 10.1089/cpb.2007.0134 [published Online First: 2008/08/30]
 144. Ko CH, Yen JY, Chen CS, et al. Psychiatric comorbidity of internet addiction in college students: an interview study. *CNS spectrums* 2008;13(2):147-53. [published Online First: 2008/01/30]
 145. Barke A, Nyenhuis N, Kroner-Herwig B. The German version of the Generalized Pathological Internet Use Scale 2: a validation study. *Cyberpsychol Behav Soc Netw* 2014;17(7):474-82. doi: 10.1089/cyber.2013.0706 [published Online First: 2014/04/20]
 146. Yu H, Cho J. Prevalence of Internet Gaming Disorder among Korean Adolescents and Associations with Non-psychotic Psychological Symptoms, and Physical Aggression. *American journal of health behavior* 2016;40(6):705-16. doi: 10.5993/ajhb.40.6.3 [published Online First: 2016/10/26]
 147. Laconi S, Andreoletti A, Chauchard E, et al. [Problematic Internet use, time spent online and personality traits]. *L'Encephale* 2016;42(3):214-8. doi: 10.1016/j.encep.2015.12.017 [published Online First: 2016/02/02]
 148. Weinstein A, Dorani D, Elhadif R, et al. Internet addiction is associated with social anxiety in young adults. *Annals of clinical psychiatry : official journal of the American Academy of Clinical Psychiatrists* 2015;27(1):4-9. [published Online First: 2015/02/20]
 149. Chang FC, Chiu CH, Miao NF, et al. The relationship between parental mediation and Internet addiction among adolescents, and the

- association with cyberbullying and depression. *Compr Psychiatry* 2015;57:21-8. doi: 10.1016/j.comppsy.2014.11.013
150. Ko CH, Liu TL, Wang PW, et al. The exacerbation of depression, hostility, and social anxiety in the course of Internet addiction among adolescents: a prospective study. *Compr Psychiatry* 2014;55(6):1377-84. doi: 10.1016/j.comppsy.2014.05.003
 151. Berner JE, Santander J, Contreras AM, et al. Description of internet addiction among Chilean medical students: a cross-sectional study. *Academic psychiatry : the journal of the American Association of Directors of Psychiatric Residency Training and the Association for Academic Psychiatry* 2014;38(1):11-4. doi: 10.1007/s40596-013-0022-6 [published Online First: 2014/01/17]
 152. Dalbudak E, Evren C. The relationship of Internet addiction severity with Attention Deficit Hyperactivity Disorder symptoms in Turkish University students; impact of personality traits, depression and anxiety. *Compr Psychiatry* 2014;55(3):497-503. doi: 10.1016/j.comppsy.2013.11.018 [published Online First: 2014/01/01]
 153. Tao Z. The relationship between Internet addiction and bulimia in a sample of Chinese college students: depression as partial mediator between Internet addiction and bulimia. *Eating and weight disorders : EWD* 2013;18(3):233-43. doi: 10.1007/s40519-013-0025-z [published Online First: 2013/06/14]
 154. Dalbudak E, Evren C, Aldemir S, et al. Relationship of internet addiction severity with depression, anxiety, and alexithymia, temperament and character in university students. *Cyberpsychol Behav Soc Netw* 2013;16(4):272-8. doi: 10.1089/cyber.2012.0390 [published Online First: 2013/02/01]
 155. Koc M, Gulyagci S. Facebook addiction among Turkish college students: the role of psychological health, demographic, and usage characteristics. *Cyberpsychol Behav Soc Netw* 2013;16(4):279-84. doi: 10.1089/cyber.2012.0249 [published Online First: 2013/01/05]
 156. Muller KW, Ammerschlager M, Freisleder FJ, et al. [Addictive internet use as a comorbid disorder among clients of an adolescent psychiatry - prevalence and psychopathological symptoms]. *Zeitschrift fur Kinder- und Jugendpsychiatrie und Psychotherapie* 2012;40(5):331-7; quiz 38-9. doi: 10.1024/1422-4917/a000190 [published Online First: 2012/08/08]
 157. Barrault S, Varescon I. [Psychopathology in online pathological gamblers: a preliminary study]. *L'Encephale* 2012;38(2):156-63. doi:

- 10.1016/j.encep.2011.01.009 [published Online First: 2012/04/21]
158. Hetzel-Riggin MD, Pritchard JR. Predicting problematic Internet use in men and women: the contributions of psychological distress, coping style, and body esteem. *Cyberpsychol Behav Soc Netw* 2011;14(9):519-25. doi: 10.1089/cyber.2010.0314 [published Online First: 2011/02/24]
159. Li D, Liau A, Khoo A. Examining the influence of actual-ideal self-discrepancies, depression, and escapism, on pathological gaming among massively multiplayer online adolescent gamers. *Cyberpsychol Behav Soc Netw* 2011;14(9):535-9. doi: 10.1089/cyber.2010.0463 [published Online First: 2011/02/22]
160. Stieger S, Burger C. Implicit and explicit self-esteem in the context of internet addiction. *Cyberpsychol Behav Soc Netw* 2010;13(6):681-8. doi: 10.1089/cyber.2009.0426 [published Online First: 2010/12/15]
161. Xiuqin H, Huimin Z, Mengchen L, et al. Mental health, personality, and parental rearing styles of adolescents with Internet addiction disorder. *Cyberpsychol Behav Soc Netw* 2010;13(4):401-6. doi: 10.1089/cyber.2009.0222 [published Online First: 2010/08/18]
162. Dowling NA, Brown M. Commonalities in the psychological factors associated with problem gambling and Internet dependence. *Cyberpsychol Behav Soc Netw* 2010;13(4):437-41. [published Online First: 2010/06/26]
163. Peng W, Liu M. Online gaming dependency: a preliminary study in China. *Cyberpsychol Behav Soc Netw* 2010;13(3):329-33. [published Online First: 2010/06/19]
164. Canan F, Ataoglu A, Nichols LA, et al. Evaluation of psychometric properties of the internet addiction scale in a sample of Turkish high school students. *Cyberpsychol Behav Soc Netw* 2010;13(3):317-20. [published Online First: 2010/06/19]
165. Lam LT, Peng ZW, Mai JC, et al. Factors associated with Internet addiction among adolescents. *Cyberpsychology & behavior : the impact of the Internet, multimedia and virtual reality on behavior and society* 2009;12(5):551-5. doi: 10.1089/cpb.2009.0036 [published Online First: 2009/07/22]
166. Mitchell KJ, Sabina C, Finkelhor D, et al. Index of problematic online experiences: item characteristics and correlation with negative symptomatology. *Cyberpsychology & behavior : the impact of the Internet, multimedia and virtual reality on behavior and society* 2009;12(6):707-11. doi: 10.1089/cpb.2008.0317 [published Online First:

2009/07/14]

167. Kim J, LaRose R, Peng W. Loneliness as the cause and the effect of problematic Internet use: the relationship between Internet use and psychological well-being. *Cyberpsychology & behavior : the impact of the Internet, multimedia and virtual reality on behavior and society* 2009;12(4):451-5. doi: 10.1089/cpb.2008.0327 [published Online First: 2009/06/12]
168. Ceyhan AA, Ceyhan E. Loneliness, depression, and computer self-efficacy as predictors of problematic internet use. *Cyberpsychology & behavior : the impact of the Internet, multimedia and virtual reality on behavior and society* 2008;11(6):699-701. doi: 10.1089/cpb.2007.0255 [published Online First: 2008/12/17]
169. van den Eijnden RJ, Meerkerk GJ, Vermulst AA, et al. Online communication, compulsive Internet use, and psychosocial well-being among adolescents: a longitudinal study. *Developmental psychology* 2008;44(3):655-65. doi: 10.1037/0012-1649.44.3.655 [published Online First: 2008/05/14]
170. Ozcan NK, Buzlu S. Internet use and its relation with the psychosocial situation for a sample of university students. *Cyberpsychology & behavior : the impact of the Internet, multimedia and virtual reality on behavior and society* 2007;10(6):767-72. doi: 10.1089/cpb.2007.9953 [published Online First: 2007/12/19]
171. te Wildt BT, Putzig I, Zedler M, et al. [Internet dependency as a symptom of depressive mood disorders]. *Psychiatrische Praxis* 2007;34 Suppl 3:S318-22. doi: 10.1055/s-2007-970973 [published Online First: 2007/10/27]
172. Sun P, Unger JB, Palmer PH, et al. Internet accessibility and usage among urban adolescents in Southern California: implications for web-based health research. *Cyberpsychology & behavior : the impact of the Internet, multimedia and virtual reality on behavior and society* 2005;8(5):441-53. doi: 10.1089/cpb.2005.8.441 [published Online First: 2005/10/20]
173. Oh WO. Factors influencing internet addiction tendency among middle school students in Gyeong-buk area. *Taehan Kanho Hakhoe chi* 2003;33(8):1135-44. [published Online First: 2004/08/18]
174. Davis RA, Flett GL, Besser A. Validation of a new scale for measuring problematic internet use: implications for pre-employment screening. *Cyberpsychology & behavior : the impact of the Internet, multimedia and virtual reality on behavior and society* 2002;5(4):331-45. doi:

10.1089/109493102760275581 [published Online First: 2002/09/10]

Supplementary Table 3: Newcastle-Ottawa Scales of recruited studies

Author (year)	Country	Design	Newcastle-OttawaScale			
			Selection	Comparability	Outcome	Total (quality)
Kim, D.J. (2017)	Korea	Cross-sectional questionnaire study	2	2	1	5(high quality)
Kim, K. (2017)	Korea	Cross-sectional questionnaire study	2	2	1	5(high quality)
Seyrek, S. (2017)	Turkey	Cross-sectional questionnaire study	2	1	1	4(high quality)
Bousono Serrano, M. (2017)	Spain	Cross-sectional questionnaire study	2	1	1	4(high quality)
Pearcy, B.T. (2017)	Australia	Cross-sectional questionnaire study	2	2	1	5(high quality)
Alpaslan, A.H. (2016)	Turkey	Cross-sectional questionnaire study	2	0	1	3(low quality)
Kim, B.S. (2016)	Korea	Cross-sectional questionnaire study	2	2	1	5(high quality)
Lee, S.Y. (2016)	Korea	Cross-sectional questionnaire study	2	2	1	5(high quality)
Liu, H.C. (2016)	Taiwan	Cross-sectional questionnaire study	2	2	1	5(high quality)

Strittmatter, E. (2016)	Germany	Cohort study	2	2	2	6(high quality)
Wu, C.Y. (2015)	Taiwan	Cross-sectional questionnaire study	2	0	1	3(low quality)
Strittmatter, E. (2015)	Europe	Cross-sectional questionnaire study	2	2	1	5(high quality)
Senormanci, O. (2014)	Turkey	Cross-sectional questionnaire study	2	2	1	5(high quality)
Kaess, M. (2014)	Multiple country	Cross-sectional questionnaire study	2	2	1	5(high quality)
Estevez Gutierrez, A. (2014)	Spain	Cross-sectional questionnaire study	1	0	1	2(low quality)
Lin, I.H. (2014)	Taiwan	Cross-sectional questionnaire study	2	2	1	5(high quality)
Park, S. (2013)	Korea	Cross-sectional questionnaire study	2	2	1	5(high quality)
King, D.L. (2013)	Australia	Cross-sectional questionnaire study	2	1	1	4(high quality)
Fischer, G. (2012)	Germany	Cross-sectional questionnaire study	2	1	1	4(high quality)
Tsouvelas, G. (2011)	Greece	Cross-sectional questionnaire study	2	0	1	3(high quality)

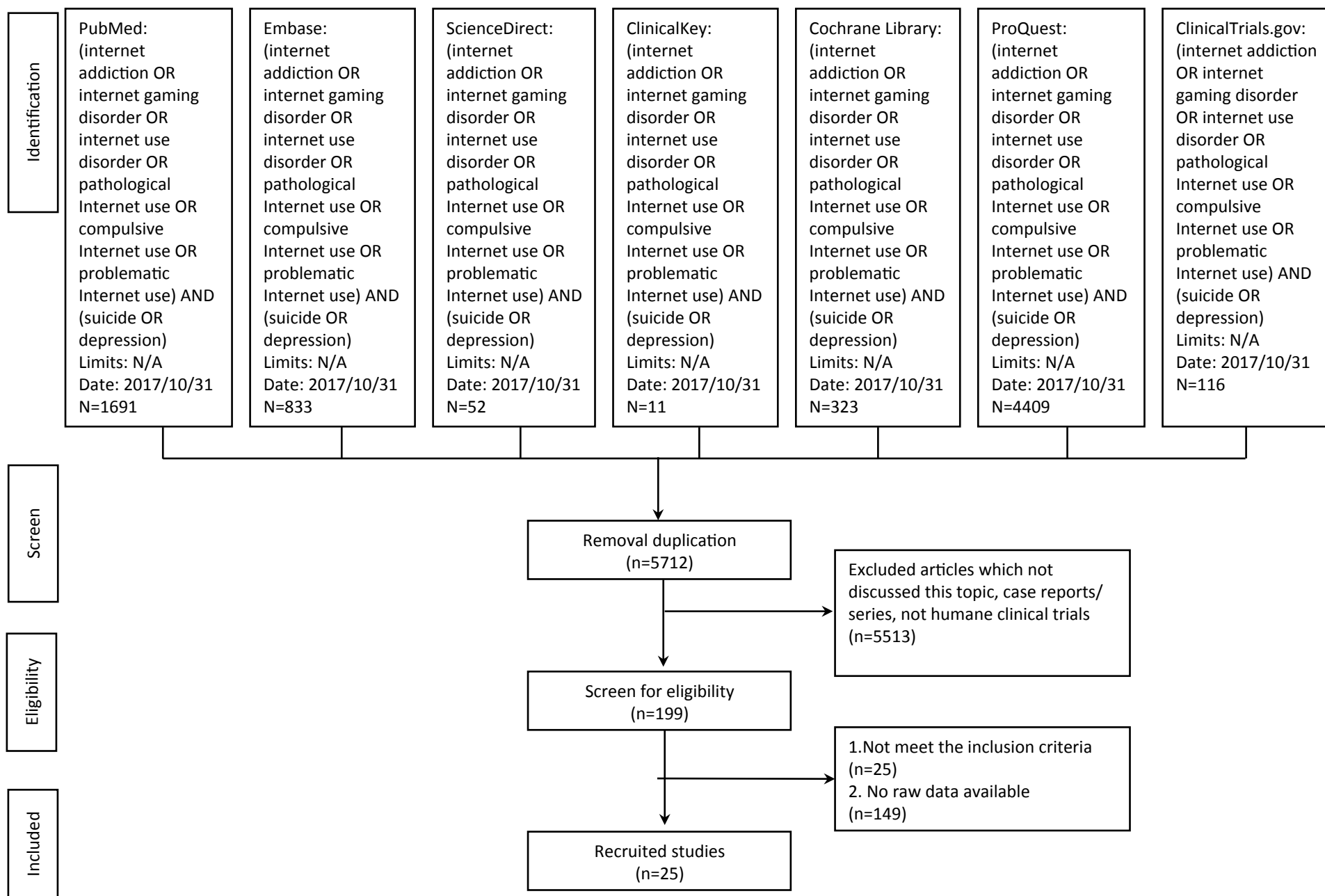
Fu, K.W. (2010)	Hong-Kong	Panel household survey, cohort	3	2	2	7(High quality)
Yang, L.S. (2010)	China	Cross-sectional questionnaire study	2	2	1	5(high quality)
Bakken, I.J. (2009)	Norway	Cross-sectional questionnaire study	2	2	1	5(high quality)
Kim, K. (2006)	Korea	Cross-sectional questionnaire study	2	0	1	3(low quality)
Ryu, E.J. (2004)	Korea	Cross-sectional questionnaire study	2	0	1	3(low quality)

Supplement table 4: full results of statistical analysis for sensitivity test, meta-regression and subgroup analysis

Outcome	Sensitivity test	Meta-regression	Subgroup
Suicidal ideation	No change in result	1. Mean age (p = 0.104) 2. Female proportion (p = 0.725) 3. Percentage of internet gaming activity (p = 0.625)	1. Age groups: Children (≤ 18 years): k = 9, OR = 3.771, 95% CI = 2.802 to 5.075, p < 0.001 Adult (≥ 18 years): k = 5, OR = 1.955, 95% CI = 1.312 to 2.915, p = 0.001 Interaction test (p = 0.010) 2. Types of addiction: Internet gaming: k = 4, OR = 3.033, 95% CI = 2.515 to 3.657, p < 0.001 Internet addiction: k = 15, OR = 2.952, 95% CI = 2.361 to 3.691, p < 0.001 Interaction test (p = 0.857) 3. Different Surveillance periods: Current: k = 4, OR = 2.478, 95% CI = 1.511 to 4.064, p < 0.001 Non-lifetime: k = 11, OR = 3.577, 95% CI = 2.879 to 4.444, p < 0.001 Interaction test (p = 0.183)
			1. Age groups: Children (≤ 18 years): k = 6, Hedges' g = 0.480, 95% CI = 0.178 to 0.781, p = 0.002 2. Different Surveillance periods: Current: k = 3, Hedges' g = 0.508, 95% CI = 0.262 to 0.755, p < 0.001 Non-lifetime: k = 8, Hedges' g = 0.810, 95% CI = 0.392 to 1.229, p < 0.001 Interaction test (p = 0.223)
Suicide Severity	No change in result	1. Mean age (p = 0.796) 2. Female proportion (p = 0.175)	

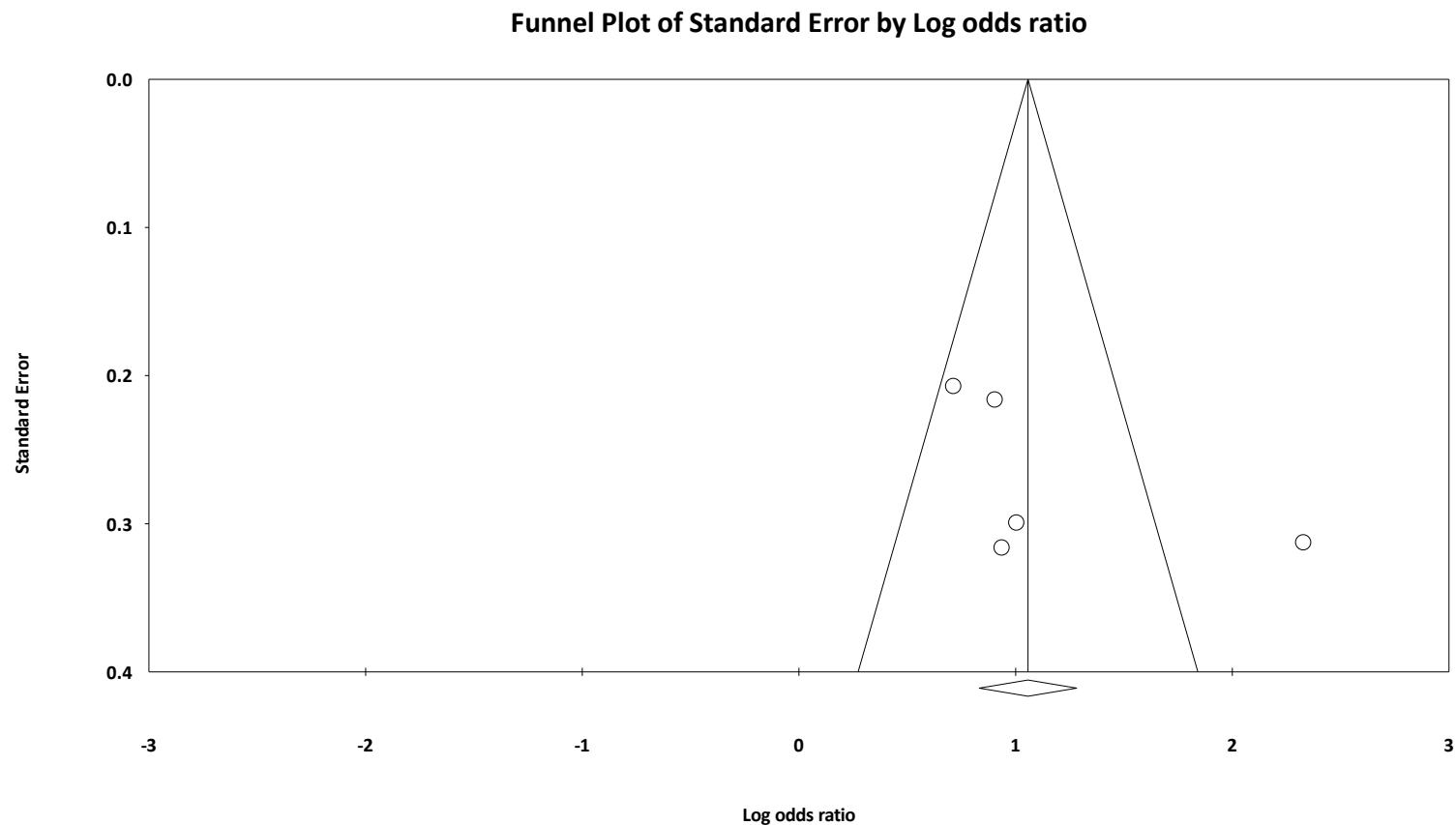
Suicidal planning	No change in result	Not performed	Not performed
			<p>1. Age groups:</p> <p>Children (≤ 18 years): k = 3, OR = 3.547, 95% CI = 1.204 to 10.450, p = 0.022</p> <p>Adult (≥ 18 years): k = 3, OR = 3.251, 95% CI = 1.436 to 7.357, p = 0.005</p> <p>Interaction test (p = 0.899)</p> <p>2. Different Surveillance periods:</p> <p>Lifetime: k = 3, OR = 2.697, 95% CI = 1.374 to 5.297, p = 0.004</p> <p>Non-lifetime: k = 4, OR = 2.742, 95% CI = 2.099 to 3.582, p < 0.001</p> <p>Interaction test (p = 0.899).</p>
Suicidal attempts	No change in result	<p>1. Mean age (p = 0.880)</p> <p>2. Female proportion (p = 0.221)</p>	
Adjusted OR	No change in result	Not performed	Not performed

Abbreviation: CI: confidence interval; k: number of studies; OR: odds ratio

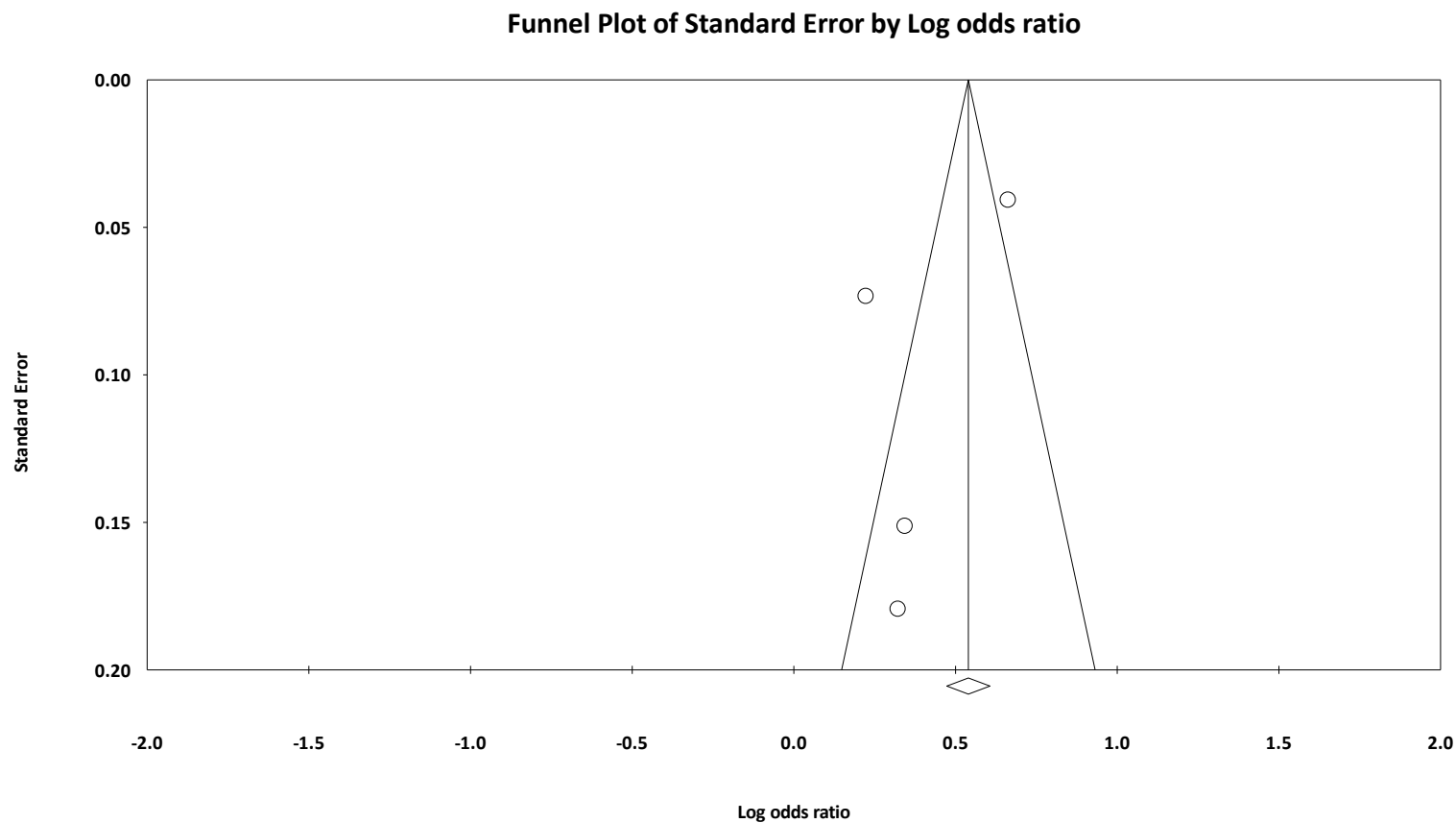


It is illegal to post this copyrighted PDF on any website. ♦ © 2018 Copyright Physicians Postgraduate Press, Inc.

Supplementary Figure 1 Whole flowchart of current meta-analysis

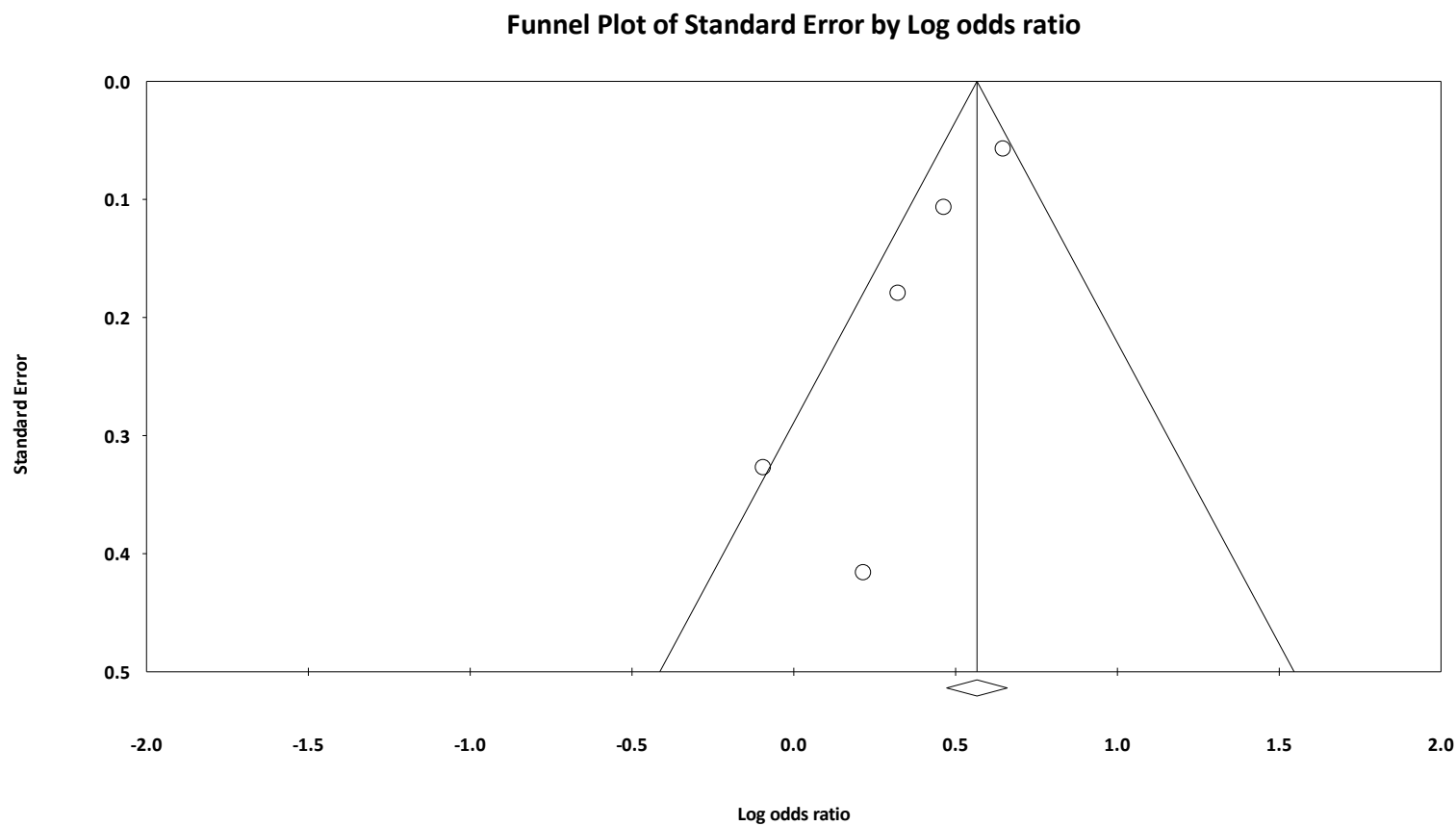


Supplementary Figure 2A Funnel plot of meta-analysis of prevalence rate of suicidal plan



Supplementary Figure 2B Funnel plot of meta-analysis of adjusted odds

ratio of suicidal ideation



Supplementary Figure 2C Funnel plot of meta-analysis of adjusted odds ratio of suicidal attempt