

3 REVIEW ARTICLE

4 Examining the relationship between
5 nomophobia and depression: a systematic
6 review and meta analysis of 10 studies
7 involving 12,043 participants

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11 ABSTRACT

12 **Background:** This comprehensive review investigates the distinct relationship between nomophobia and
13 depression, aiming to isolate their association. While prior research has explored the collective impact of
14 nomophobia on various psychological problems, this study focuses on highlighting the specific effects of nom-
15 ophobia on depression.

16 **Methods:** A systematic review and meta-analysis were conducted in accordance with the Preferred Reporting
17 Items for Systematic Reviews and Meta-Analyses 2020 statement. Ten studies comprising 12,043 participants
18 were included. A random-effects meta-analysis and linear regression analysis were performed to assess prev-
19 alence rates and the association between moderate to severe nomophobia and depression.

20 **Results:** The pooled prevalence of moderate to severe nomophobia was 63.2% (95% CI: 51.00%-73.86%),
21 while 26.2% of participants (95% CI: 19.37%-34.36%) reported depression. Linear regression analysis revealed
22 no direct linear relationship between moderate to severe nomophobia and depression.

23 **Conclusion:** This study suggests that the link between depression and nomophobia is not direct. Nomophobia
24 may be more closely associated with anxiety-related constructs rather than depressive symptomatology.

25 **Keywords:** Systematic review and meta-analysis, nomophobia, smartphones, anxiety disorder, depression,
26 moderate to severe nomophobia.

27 Introduction

28 Smartphones have become a household staple in every
29 family and the most standard means of communication
30 [1]; it is no surprise that a plethora of psychological and
31 anxiety disorders emerged along with the excessive use
32 of this technology [2]. Nomophobia is an acronym for
33 “No mobile phone phobia” [3]. It is a neo-psychological
34 disorder that is defined as the fear of being disconnected
35 from others [4] or of being unable to communicate with
36 other people by utilizing smartphone applications and
37 services [5]. Recent systematic reviews have reported
38 that the prevalence of nomophobia varies widely across
39 populations, with rates frequently exceeding 60%,
40 particularly among university students [6,7]. These
41 findings highlight the growing global concern regarding
42 excessive smartphone dependence.

Nomophobia correlates with a number of psychological 43
problems as well as poor functioning [6,7]. This 44
condition is associated with insomnia and other sleep 45
problems [8,9], symptoms of depression [10], anger 46
issues [11], stress and anxiety disorders [4,6,10], 47
hyperactivity, and defiance [11], low self-esteem [12], 48

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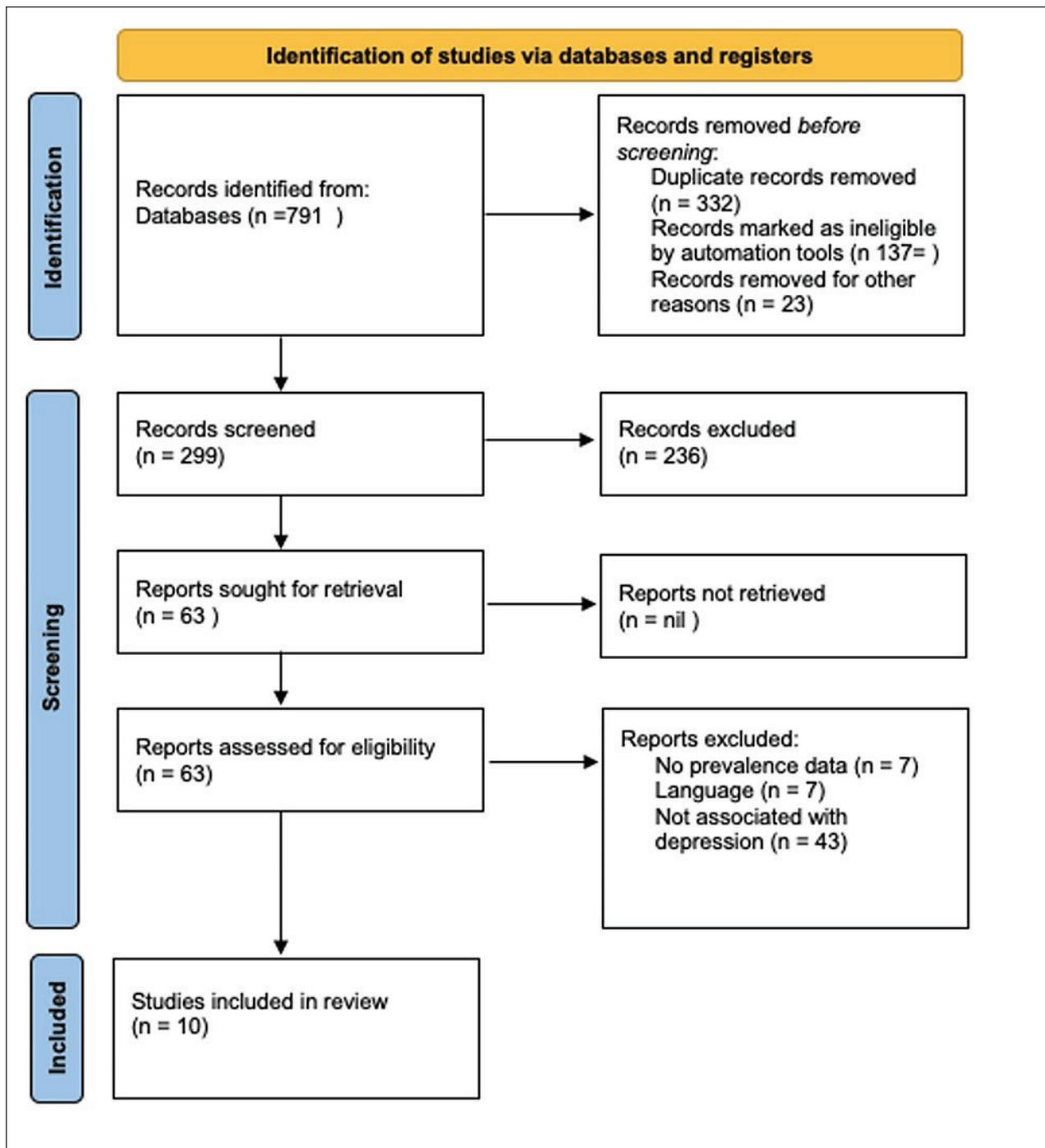


Figure 1. PRISMA 2020 flow diagram for study selection.

164 [11.08; 13.60]; 95% PI [19.26%; 86.83%]. Neither age
165 nor sex explained heterogeneity in nomophobia. Detailed
166 results are shown in Table 2.

167 Using the NMP-Q to measure Nomophobia, the raw
168 prevalence estimates for moderate to severe nomophobia
169 varied from 28% to 83%. The forest plot of the meta-
170 analysis of nomophobia disturbances in all populations
171 using the NMP-Q is shown in Figure 3.

172 According to a (leave-one-out) sensitivity analysis, no
173 study had an effect on the global prevalence estimate of
174 more than 2%.

175 A subgroup analysis of moderate to severe Nomophobia
176 by population was performed. This yielded that the
177 general population and university students scored almost
178 the same prevalence of moderate to severe nomophobia,
179 with the general population being slightly higher, with a
180 prevalence of ($K = 3$) 67.5% 95% CI [55.43%; 77.46%]
181 $\tau^2 = 0.18$ $\tau = 0.43$, and ($K = 6$) 66.6% 95% CI [48.48%;
182 80.85%] $\tau^2 = 0.86$; $\tau = 0.92$, respectively. On the other
183 hand, school students scored the lowest prevalence of (K
184 = 1) 27.8% 95% CI [25.48%; 30.20%]. A statistically
185 significant difference between populations was observed
186 ($p = 0.0001$).

Table 1. Characteristics of included studies.

SN	Study	Country	Population	Sample (N)	Male:Female	Age (Years)	Tool	Moderate NOM	Severe NOM	Depression cases	NOS (Stars)
1	Farooqui et al. [19]	India	University students	145	46:54%	19	NMP-Q	87	32	4	6
2	Farchakh et al. [8]	Lebanon	General	2,260	41:59%	28	NMP-Q	1,089	349	792	8
3	Bano et al. [20]	Saudi Arabia	General	230	47:54%	22	NMP-Q	113	78	158	6
4	Copaja-Corzo et al. [21]	Peru	University students	3,139	39:61%	22	NMP-Q	1,052	1,040	1,343	8
5	Sharma et al. [10]	India	School students	1,386	67:33%	16	NMP-Q	303	82	269	7
6	Kubrusly et al. [22]	Brazil	University students	292	40:60%	22	NMP-Q	156	35	98	8
7	Coenen and Görlich [23]	Germany	General	807	10:90%	25	NMP-Q	399	33	57	8
8	Copaja-Corzo et al. [24]	Peru	University students	3,139	39:61%	22	NMP-Q	807	233	1,343	8
9	Kundu et al. [25]	India	University students	338	50:50%	21	NMP-Q	208	55	19	6
10	Sasidharan et al. [26]	India	University students	307	52:48%		NMP-Q	152	59	146	8

Abbreviations: NMP-Q, Nomophobia Questionnaire; NOS, Newcastle–Ottawa Scale.

Notes: *K*: Represents the number of included studies. *N*: Represents the number of included samples of the included studies. *I*²: Refers to the percentage of variation across samples due to heterogeneity rather than chance. τ : Under the presumption that these genuine effect sizes are normally distributed, tau is an estimate of the standard deviation of the distribution of true effect sizes. The prediction interval is computed using tau. τ^2 : Describes the extent of variation among the effects observed in different samples (between-sample variance). *H*: Describes confidence intervals of heterogeneity. It is more broadly characterized by the method of moments. As an inherited technique from meta-analysis, it is utilized in meta-regression. *Q* is Cochran’s *Q* test, it is non-parametric statistical test to verify whether *k* treatments have identical effects in the analysis of two way randomized block.

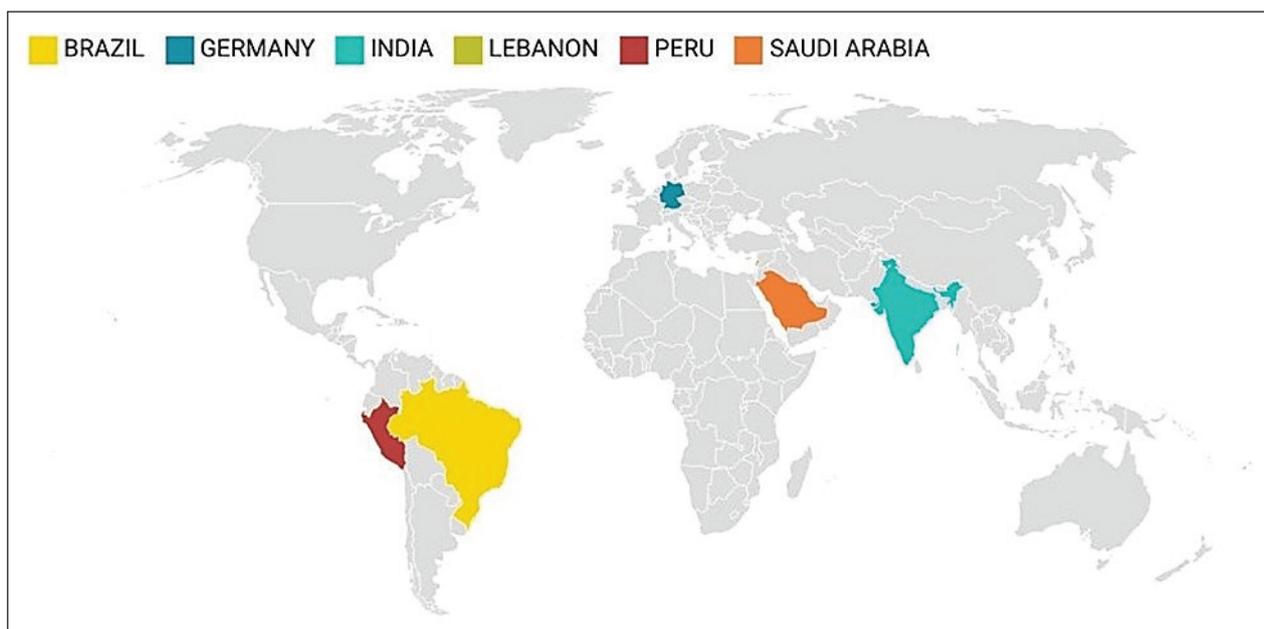


Figure 2. Distribution of studies worldwide.

187 **Depression**

188 A random effects meta-analysis of all the available studies
 189 evaluated depression and Nomophobia in the studies (*K*
 190 = 10, *N* = 12043). The overall pooled prevalence rate
 191 of depression was 26.2% (95% CI: 19.37%-34.36%),
 192 with statistically significant evidence of between-study

heterogeneity $\tau^2 = 0.3653$ [0.3521; 3.4753]; $\tau = 0.6044$ 193
 [0.5934; 1.8642]; $I^2 = 98.7\%$ [98.4%; 99.0%; *H* = 8.93 194
 [7.86; 10.14]. Neither age nor sex explained heterogeneity 195
 in depression. The detailed results are shown in Table 2. 196

Using the DASS-21, HDRS, BDI, and HSCL-25 to 197
 measure Nomophobia, the raw prevalence estimates 198

Table 2. A meta-analysis of nomophobia.

Analysis	K	N	Random effects model		Heterogeneity					Moderators		Publication bias		
			Pooled results [95% CI]	Forest plot	I^2	τ	τ^2	H	Q	Cochran's Q p Value ^d	Age (Years)	Sex (%Male)	Egger's test	Peter's test
Nomophobia														
All studies	10	12,043	67.44% [51.45%; 59.74%]	Figure 4	98.8%	1.3637	1.0526	12.27	928.96	0.001	-	-	NS	NS
University students	6	7,360	66.59% [48.48%; 80.85%]	Not Shown	99.4%	0.9297	0.8643	-	862.71	0.001	-	-	NS	NS
General population	3	3,297	67.44% [55.53%; 77.46%]		97%	0.4340	0.1883	-	65.98	-	-	-	NS	NS
School students	1	1,386	27.78% [25.48%; 30.20%]		-	-	-	-	0	-	-	-	NS	NS

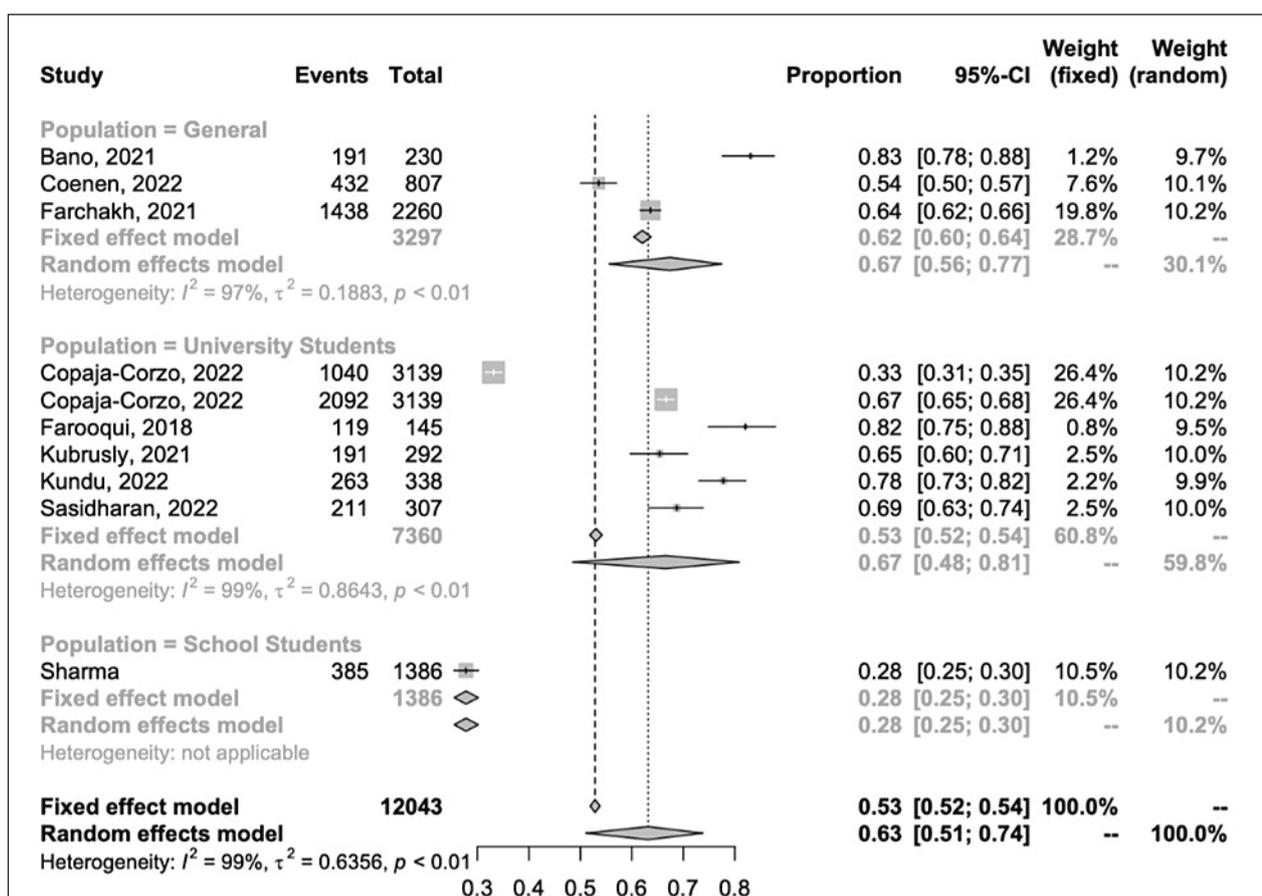


Figure 3. Forest plot of the prevalence of nomophobia.

199 for depression varied from 3% to 69%. The forest plot
 200 of the meta-analysis of depression in all populations
 201 using DASS-21, HDRS, BDI, and HSCL-25 is shown in
 202 Figure 4. The studies by Bano et al. [20] and Sasidharan
 203 et al. [26] reported the highest rates of depression at 69%
 204 and 48%, respectively.

205 According to a (leave-one-out) sensitivity analysis, no
 206 study had an effect on the global prevalence estimate of
 207 more than 1%.

**Relationship between moderate to severe
 nomophobia and depression**

208
 209
 210 A linear regression analysis of Nomophobia and
 211 depression yielded no direct linear relationship between
 212 the two, as described in the Radial plot Figure 5, and
 213 was found to be statistically insignificant (p value =
 214 0.8171).

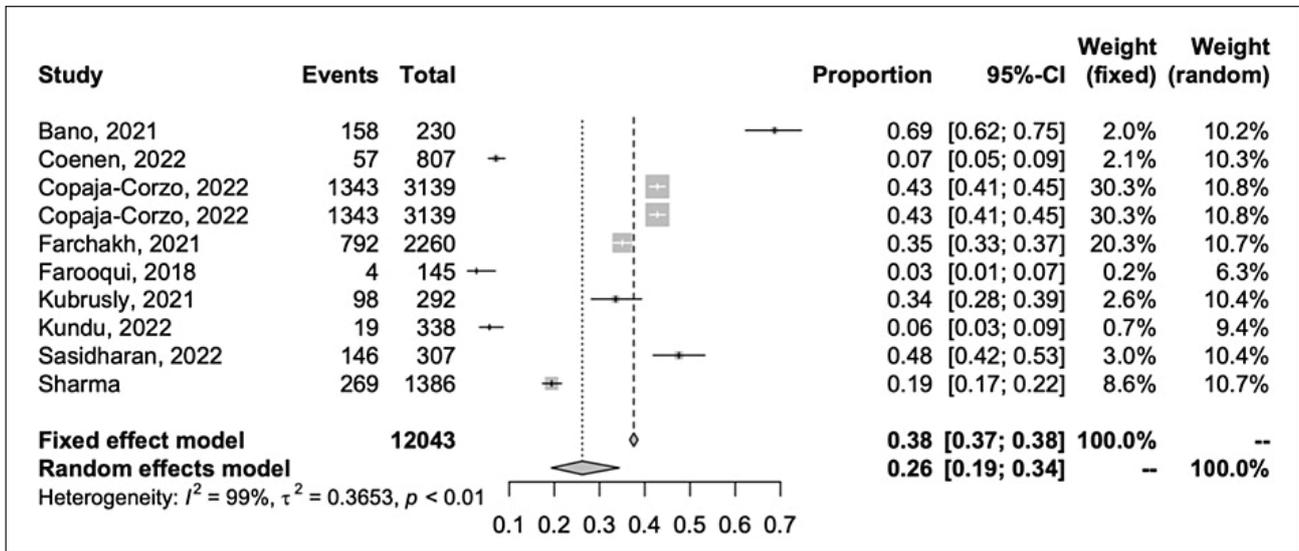


Figure 4. Forest plot of the prevalence of depression.

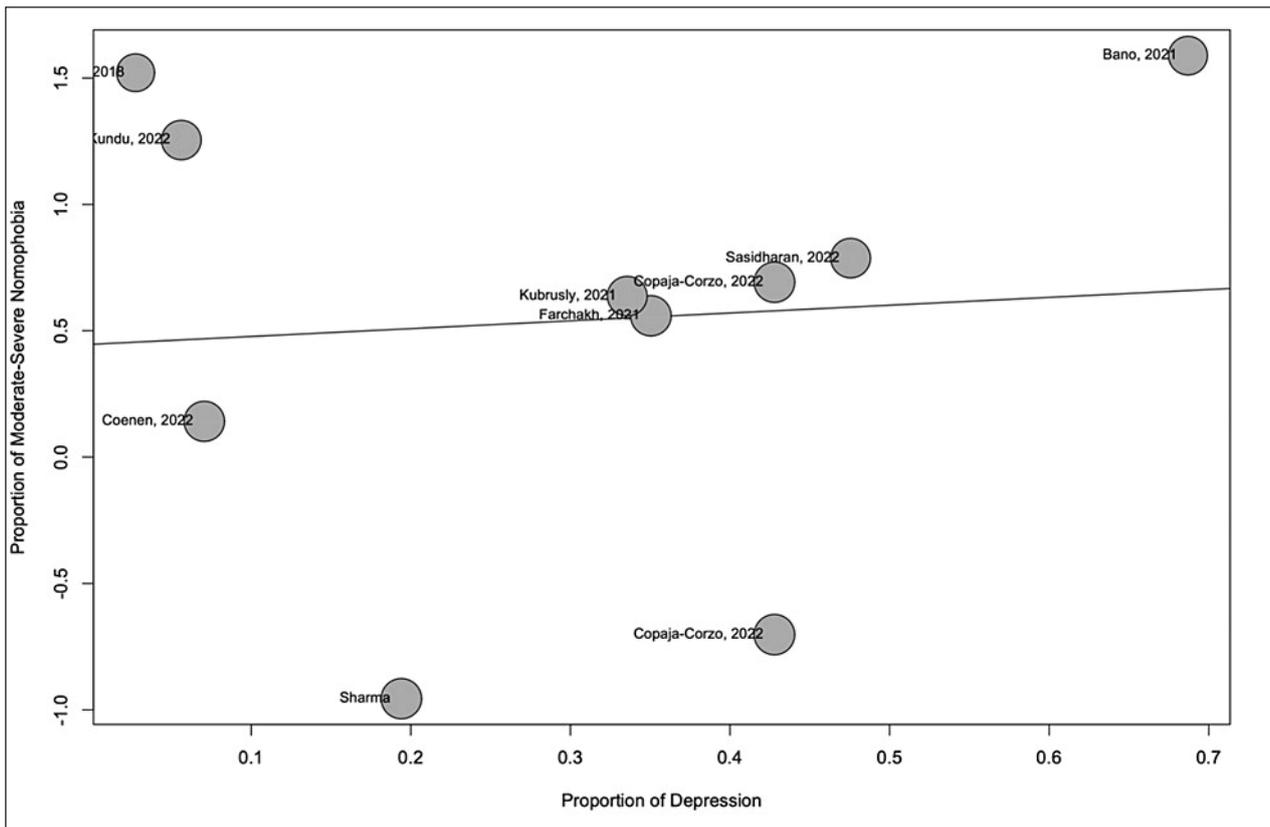


Figure 5. Radial plot of the relationship between depression and nomophobia.

215 Discussion

216 This meta-analysis found an estimated pooled prevalence
 217 of Nomophobia among the selected studies to be nearly
 218 63%, which is more than the average, with no difference
 219 between university students and other populations, and
 220 an estimated one in four suffers from depression among
 221 the included studies; however, the analysis could not
 222 establish a direct association between depression and
 223 nomophobia.

As mobile devices have become widely used, people and
 institutions in the United States and the Western world
 have gained a greater understanding of the potential
 consequences of excessive phone usage on mental health
 and overall well-being [27]. This raised awareness
 may have prompted proactive initiatives to regulate
 phone usage and boost healthier connections with
 technology [27]. This might explain the very few studies
 reporting nomophobia compared to other countries.
 Furthermore, mobile phone usage in the United States has

234	been widespread and prevalent for an extended period,	the scales used, and employed robust statistical modeling	292
235	with a high level of adoption and extensive utilization	to ensure generalizability. This meta-analysis challenges	293
236	for communication, internet access, and various other	the prevailing belief in a direct link between depression	294
237	purposes [27].	and nomophobia. It emphasizes the complex relationship	295
238	In the comparison of the prevalence of nomophobia	between mental health and smartphone dependence,	296
239	among different populations, no significant difference	offering valuable insights. These findings can pave	297
240	was found between populations. Hinting that nomophobia	the way for future research, interventions, and clinical	298
241	affects everyone depending on different factors, for	approaches aimed at assisting individuals dealing with	299
242	example, age, type of usage, and amount of usage of	nomophobia and related psychological issues.	300
243	mobile phones, as reported in a recent cross-sectional		
244	study [24], a recent study suggests that the vast majority	List of Abbreviations	301
245	of nomophobia occurs among adolescents and those of	BDI, Beck depression inventory; CI, Confidence interval;	302
246	social media usage.	DASS-21, Depression anxiety stress scales-21; HDRS,	303
247	The reported depression was found to vary widely among	Hamilton Depression Rating Scale; HSCL-25, Hopkins	304
248	studies. This might be possible, as people with preexisting	symptom checklist-25; I ² , I-squared statistic; NMP-Q,	305
249	depression are more likely to develop nomophobia as a	Nomophobia questionnaire; NOS, Newcastle–Ottawa Scale;	306
250	defense mechanism, as studies have found that excessive	PRISMA, Preferred Reporting Items for Systematic Reviews	307
251	smartphone use and nomophobia may contribute to the	and Meta-Analyses.	308
252	exacerbation of depressive symptoms. To add more, the		
253	self-reported questionnaires used to report depression	Conflict of interests	309
254	might have played a role in this variation.	The authors declare that there is no conflict of interest	310
255	Our study concluded that there is no direct relationship	regarding the publication of this article.	311
256	between depression and nomophobia. In an attempt		
257	to explain this conclusion, Nomophobia is found to	Funding	312
258	be directly linked to anxiety, which makes it more of	None.	313
259	an anxiety issue than it is depressive. In recent years,		
260	advances in smartphone technologies have caused them to	Consent to participate	314
261	become an indispensable part of human life [28]. Despite	Not applicable.	315
262	their benefits when used for their intended purposes,		
263	they still carry a risk of causing various problems for	Ethical approval	316
264	the individual or society when used in a problematic	Not applicable.	317
265	way and excessively [28]. One of these problems is		
266	nomophobia [28]. Studies have shown that nomophobia	Author details	318
267	affects all age groups and is very common, especially	Khalid M. Alghuthayr ¹ , Rakan H. Hamzah ¹ , Othub S. Albalawi ¹ ,	319
268	among the younger generation. In addition, nomophobia	Mohammed A. Binjabr ^{1,2} , Idrees S. Alalawi ¹ , Fatima A.	320
269	carries a threat to both the psychological and physical	Hamidaddin ¹ , Saad M. Alotaibi ¹ , Turki M. Alomar ^{1,3} , Haitham	321
270	health of individuals, which raises the importance of	Jahrami ^{1,4}	322
271	raising public awareness about nomophobia and holding	1. Department of Psychiatry, College of Medicine and Medical	323
272	seminars in schools, universities, and public services.	Sciences, Arabian Gulf University, Manama, Bahrain	324
273	<i>Strengths and limitations</i>	2. King Faisal Specialist Hospital and Research Centre, Riyadh,	325
274	This study is the first meta-analysis to specifically examine	Saudi Arabia	326
275	the independent relationship between nomophobia	3. Ministry of Health, Riyadh, Saudi Arabia	327
276	and depression and was conducted in accordance with	4. Ministry of Health, Manama, Bahrain	328
277	PRISMA 2020 guidelines with a large pooled sample.		
278	Robust statistical methods, including random-effects	<i>Supplementary content (If any) is available online.</i>	329
279	modeling and sensitivity analysis, were applied.		
280	However, high heterogeneity was observed, and different	References	330
281	instruments were used to assess depression across	1. Kim JH, Seo M, David P. Alleviating depression only to	331
282	studies. Most included studies were cross-sectional and	become problematic mobile phone users: can face-to-	332
283	relied on self-reported measures, which limits causal	face communication be the antidote?. <i>Comput Hum</i>	333
284	interpretation and generalizability.	<i>Behav.</i> 2015;51:440–7. https://doi.org/10.1016/j.chb.2015.05.030	334
285	Conclusion		335
286	Based on our meta-analysis, we found no direct	2. Darvishi M, Noori M, Nazer MR, Sheikholeslami S, Karimi	336
287	connection between depression and nomophobia.	E. Investigating different dimensions of nomophobia	337
288	However, a more prominent link was discovered	among medical students: a cross-sectional study. <i>Open</i>	338
289	between nomophobia and anxiety, suggesting a primary	<i>Access Maced J Med Sci.</i> 2019;7:573–8. https://doi.org/10.3889/oamjms.2019.138	339
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291	unique study included all relevant studies, regardless of	3. King ALS, Valença AM, Nardi AE. Nomophobia: the	341
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