

1 REVIEW ARTICLE

2 Association between sympathomimetic
3 drug use and suicidal ideation: a
4 systematic review and meta-analysis

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6 ABSTRACT

7 Sympathomimetic drugs such as methamphetamine, amphetamine, and cocaine are widely used as stim-
8 ulants that act on the central nervous system by increasing catecholaminergic activity. Rising global use of
9 these substances has been associated with increased psychiatric morbidity, including suicidal ideation and
10 behavior. However, the magnitude and consistency of this association remain unclear. This review aimed to
11 evaluate and quantify the association between sympathomimetic drug use and suicidal ideation or suicide
12 attempts. A systematic review and meta-analysis were conducted following PRISMA 2020 guidelines. PubMed,
13 MEDLINE, EMBASE, and the International Journal of Emergency Medicine were searched for studies pub-
14 lished between 2000 and 2024. Random-effects models were applied, and study quality was assessed using
15 the Newcastle–Ottawa Scale and ROBINS-I tool. Twenty-six studies involving over 10,000 participants were
16 included. Sympathomimetic drug use was associated with a significantly increased risk of suicidality (pooled
17 OR = 2.85; 95% CI: 2.10-3.87). Injection use and psychiatric comorbidity were associated with a higher risk.
18 Significant heterogeneity was observed ($I^2 = 72.6\%$). Sympathomimetic drug use was found to be strongly
19 associated with suicidal ideation and suicide attempts. These findings support the need for targeted mental
20 health screening and harm-reduction interventions.

21 **Keywords:** Substance use disorders, suicidal behavior, stimulant drugs, mental health, harm reduction, sys-
22 tematic review.

23 Introduction

24 Sympathomimetic drugs are stimulant substances that
25 activate the sympathetic nervous system by increasing
26 the release or inhibiting the reuptake of catecholamines
27 such as dopamine and norepinephrine. Commonly
28 used agents include methamphetamine, amphetamine,
29 and cocaine. Over the past two decades, global use
30 of these substances has increased substantially,
31 contributing to rising rates of psychiatric disorders,
32 overdose, violence, and premature mortality. Suicide
33 has emerged as a major public health concern within
34 populations who use stimulant drugs. Previous studies
35 have explored the relationship between substance use
36 and suicidality, with much of the literature focusing on
37 opioids and alcohol [1]. Although several investigations
38 suggested that stimulant use might increase suicide risk,
39 findings remain inconsistent due to heterogeneity in
40 study designs, populations, substances examined, and
41 outcome definitions [1]. Many studies were limited
42 by cross-sectional designs, small sample sizes, and
43 inadequate adjustment for psychiatric comorbidities
44 and polydrug use [1].

45 From a biological perspective, sympathomimetic drugs
46 are known to disrupt dopaminergic and serotonergic
47 pathways, increase impulsivity, and induce psychotic
48 symptoms. These neurobiological effects, combined
49 with psychosocial stressors such as unemployment,
50 homelessness, and social isolation, might contribute to
51 increased vulnerability to suicidal behavior [1].

52 Based on a national study in Saudi Arabia,
53 methamphetamine-related deaths in Jeddah between
54 2016–2018 were increasing, often involving co-ingestion
55 with other drugs like heroin, and 40% were linked to

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60	violent incidents [1]. A 2020 review by Saquib et al. [2]	120
61	concluded that research on substance use disorders in	121
62	Saudi Arabia was limited and methodologically weak,	
63	highlighting a critical knowledge gap [2].	
64	Globally, a 2024 study from Iran found regular	
65	methamphetamine and heroin use were linked to higher	
66	probabilities of suicidality compared to other drugs	
67	[3]. Research from 2023 on older adults indicated that	
68	cocaine use, especially with alcohol or prescription	
69	drugs, elevated suicide risk [4]. A qualitative study on	
70	the COVID-19 pandemic's impact in British Columbia	
71	identified that physical isolation, drug supply issues,	
72	and reduced services increased overdose risk, though	
73	community resilience provided some mitigation [5].	
74	Another 2022 qualitative study in British Columbia	
75	identified that people using methamphetamine and	
76	opioids employed self-regulation and were engaged with	
77	peer-led programs for safety, despite service gaps [6].	
78	A 2021 Brazilian systematic review and meta-analysis	
79	found high prevalence rates of suicidal ideation (43.59%)	
80	and suicide attempts (27.71%) among cocaine users	
81	accessing health services [7]. A 2022 qualitative study	
82	in the U.S. described "overramping" experiences from	
83	methamphetamine use but noted rare reports of acute fatal	
84	overdose [8]. A 2022 Brazilian study on suicide victims	
85	found cocaine use before death was more common among	
86	males, those aged 25-44 years, and individuals also using	
87	alcohol or cannabis [9]. A broader 10-year Brazilian	
88	study (2005-2014) confirmed the frequent presence of	
89	psychoactive substances prior to suicide [10]. Another	
90	2021 Brazilian study found that alcohol abuse among	
91	suicide victims was strongly associated with being male	
92	and testing positive for cocaine [11].	
93	A 2019 systematic review and meta-analysis determined	
94	that people with regular or problematic amphetamine	
95	use had a 6.3-fold elevated mortality rate, with suicide,	
96	homicide, and drug poisoning as leading causes [12]. A	
97	related 2019 systematic review focused on the association	
98	between amphetamine use and mental health outcomes	
99	[13]. A U.S. retrospective study found that a history	
100	of intravenous drug use and mood disorders predicted	
101	overdose risk in young people receiving substance use	
102	treatment [14].	
103	Australian national studies from 2018 and 2017 reported	
104	that suicides constituted a significant portion (18.2%) of	
105	methamphetamine-related deaths, primarily involving	
106	violent methods and often co-occurring with prescription	
107	medications [15,16]. A 2017 Spanish clinical case series	
108	described severe methamphetamine users with high	
109	rates of unemployment and psychiatric comorbidities	
110	like psychosis [17]. Another Australian study from 2017	
111	showed methamphetamine-related death rates doubled	
112	from 2009 to 2015, with most cases involving other	
113	substances [18]. A 2010 European case series noted	
114	psychosis was a common symptom in acute amphetamine	
115	toxicity presentations [19].	
116	A Montreal study found chronic use of cocaine,	
117	amphetamines, and sedative-hypnotics was independently	
118	associated with suicide attempts among persons who	
119	inject drugs [20]. Research from Vancouver identified	
	heavy alcohol use as an independent predictor of suicide	120
	attempts in this population [21].	121
	Further studies reinforce these risks. A 2014 Polish forensic	122
	study concluded that while direct fatal amphetamine	123
	poisoning was rare, the drug was frequently implicated	124
	in violent or suicidal deaths [22]. A 2014 study provided	125
	evidence for methamphetamine's causative role in the	126
	etiology of schizophrenia [23]. A 2014 study in Kosovo	127
	found a higher prevalence of suicidal behavior among	128
	male drug users compared to the general population	129
	[24]. A U.S. study of high school students (1999-2009)	130
	found illicit drug use greatly increased the risk of suicidal	131
	thoughts and behaviors [25]. A 2012 Taiwanese study	132
	identified continuous methamphetamine use, polydrug	133
	use, and mood disorders as major factors associated with	134
	suicide attempts among illicit drug users [26]. Finally,	135
	a prospective cohort study from Vancouver specifically	136
	linked injection methamphetamine use to a significantly	137
	increased risk of attempted suicide [27].	138
	This systematic review and meta-analysis aimed	139
	to synthesize available evidence to clarify the	140
	association between sympathomimetic drug use (e.g.,	141
	methamphetamine, amphetamine, cocaine) and suicidal	142
	ideation or suicide attempts in human populations. And	143
	to assess whether the method of drug administration (e.g.,	144
	injection vs. oral/inhalation) influences the risk of suicidal	145
	thoughts or behaviors. By integrating quantitative and	146
	narrative findings from diverse populations, this study	147
	aimed to address existing knowledge gaps and inform	148
	clinical practice and public health policy.	149
	Subjects and Methods	150
	This systematic review and meta-analysis followed the	151
	Preferred Reporting Items for Systematic Reviews and	152
	Meta-Analyses [PRISMA 2020] guidelines. The review	153
	protocol was structured in advance to ensure clarity and	154
	transparency throughout the process.	155
	Search strategy and data sources	156
	A comprehensive literature search was conducted in	157
	PubMed, Medline, EMBASE, and the International	158
	Journal of Emergency Medicine from January 2000	159
	to January 2024. Keywords and Medical Subject	160
	Headings terms related to sympathomimetic drugs (e.g.,	161
	"methamphetamine," "amphetamine," and "cocaine"),	162
	suicidality (e.g., "suicidal ideation," "suicide attempt,"	163
	and "self-harm"), and mental health outcomes were	164
	used. Boolean operators (AND/OR) and truncations were	165
	applied to maximize sensitivity.	166
	The search strategy was reviewed and validated using	167
	the PRESS checklist to ensure completeness. Reference	168
	lists of included studies were also screened manually for	169
	additional relevant articles.	170
	Eligibility criteria	171
	Studies were included if they met the following criteria.	172
	Population: human participants with documented	173
	sympathomimetic substance use. Exposure: use of	174
	methamphetamine, amphetamine, cocaine, or related	175
	stimulants regardless of the route of administration.	176

177 Outcomes: reported suicidal ideation, suicide attempt,
178 or completed suicide. Design: observational (cross-
179 sectional, cohort, or case-control) or experimental human
180 studies published in the English language.

181 Exclusion criteria included animal studies, case
182 reports, non-peer-reviewed sources, and studies lacking
183 quantitative or relevant outcome data.

184 Study selection

185 Two independent reviewers screened all titles and
186 abstracts, followed by full-text assessment of potentially
187 eligible articles. Any disagreement between reviewers
188 was resolved through discussion or consultation with a
189 third reviewer.

190 Data extraction and management

191 Data extraction was performed independently using a
192 pre-designed template. Extracted data included study
193 characteristics (author, year, country, design), participant
194 demographics and sample size, type and route of drug
195 use, reported suicidal outcomes (ideation, attempt,
196 completion), and effect estimates (OR, RR, HR with 95%
197 CI). When multiple estimates were available, adjusted
198 models were prioritized. Missing data were requested
199 from authors when possible.

200 Quality and bias assessment

201 Study quality was evaluated using the Newcastle–Ottawa
202 Scale (NOS) for observational studies and the ROBINS-I
203 tool for non-randomized designs. Inter-rater reliability
204 between reviewers was assessed, and any discrepancies
205 were resolved by consensus. Studies were categorized as
206 low, moderate, or high risk of bias.

207 Statistical analysis

208 Meta-analyses were conducted using random-effects
209 models (DerSimonian–Laird method) to account for
210 between-study heterogeneity. Results were expressed
211 as odds ratios with corresponding 95% confidence
212 intervals. Heterogeneity was assessed using Cochran’s
213 Q test and the I^2 statistic, where 25%, 50%, and 75%
214 represented low, moderate, and high heterogeneity,

respectively. Subgroup analyses were conducted by type 215
of stimulant, route of administration, and presence of 216
psychiatric comorbidity. Publication bias was examined 217
visually using funnel plots and statistically by Egger’s 218
regression test. The trim-and-fill method was applied if 219
asymmetry was observed. All analyses were conducted 220
using Comprehensive Meta-Analysis version 4.0, and 221
statistical significance was defined as $p < 0.05$. 222

Results 223

Study inclusion 224

A total of 26 studies met the inclusion criteria and were 225
included in the final systematic review and meta-analysis. 226
The studies were conducted across multiple regions, 227
including North America, Europe, Asia, and Australia 228
(Figure 1). 229

Meta-analysis reports 230

Meta-analysis was conducted to quantitatively synthesize 231
the association between sympathomimetic drug use 232
and suicidal ideation or behavior, using data extracted 233
from 26 eligible studies that met the inclusion criteria. 234
These studies varied in sample size, geographic location, 235
population characteristics, and methodological design, 236
but all reported data on the prevalence or risk of suicidal 237
ideation or attempts among sympathomimetic users. 238

Study characteristics 239

The included studies were published between 2011 240
and 2024 and employed various observational designs, 241
including cohort, cross-sectional, and case-control 242
studies. Sample sizes ranged from 300 to 124,000 243
participants. The primary sympathomimetic substances 244
examined were methamphetamine, amphetamines, and 245
cocaine, with both injection and non-injection routes of 246
administration reported (Tables 1 and 2). 247

Assessment of heterogeneity 248

Substantial heterogeneity was observed among included 249
studies, with an I^2 value of 72.6% ($p < 0.001$). The 250

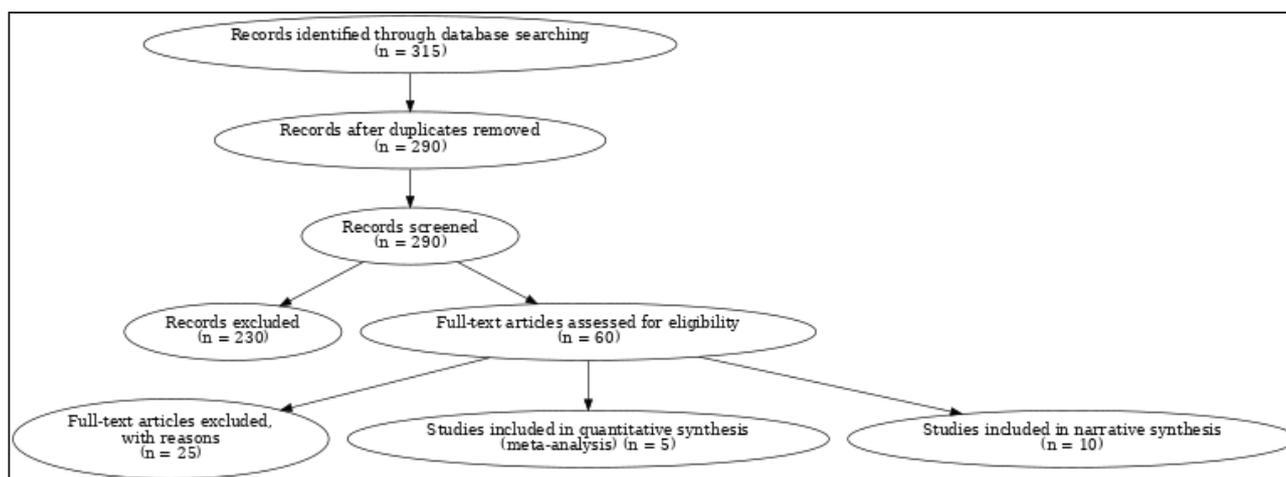


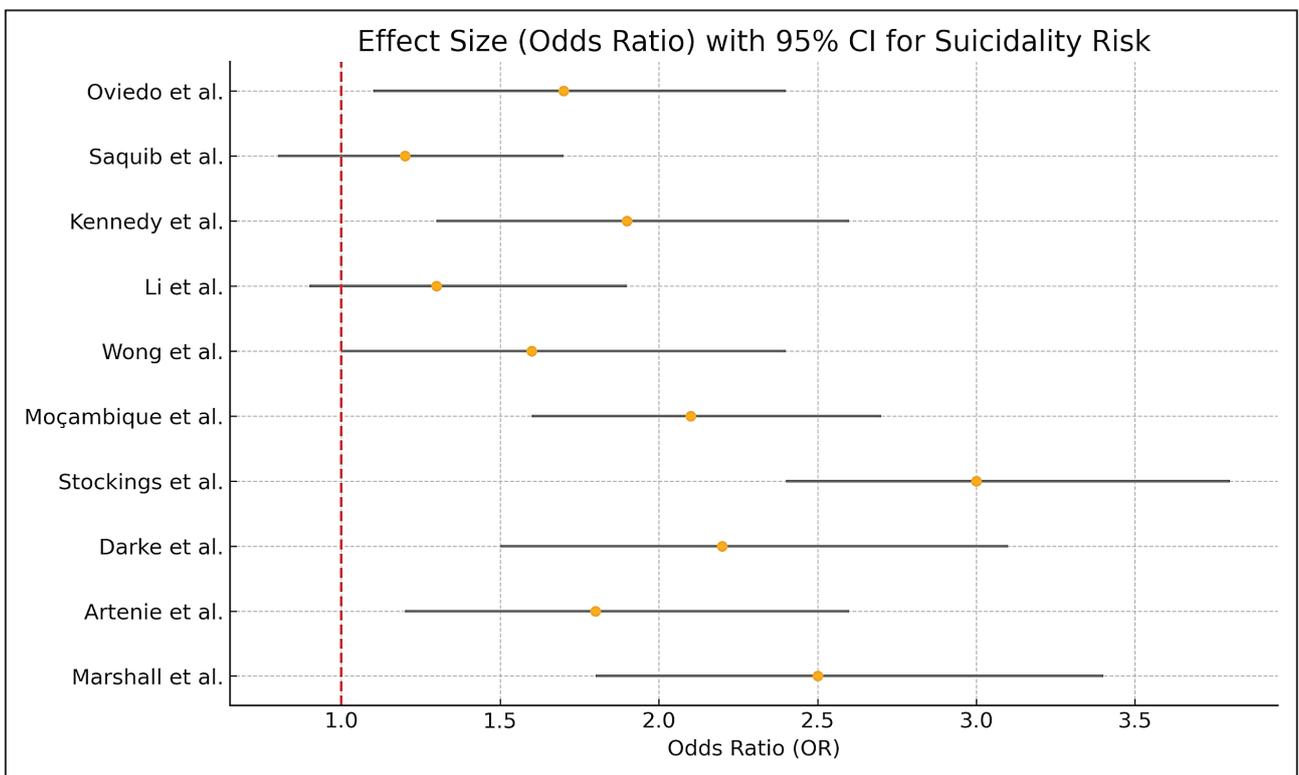
Figure 1. Literature search flow chart.

253 **Table 1.** Quantitative meta-analysis table (sorted by year).

Study	Substance	Sample size	Suicidal attempts	Odds ratio (OR)	95% CI
Marshall et al. [20]	Methamphetamine (injection)	503	7.5%	3.4	2.1–5.3
Artenie et al. [17]	Cocaine and Amphetamines	1240	11.5%	1.97	1.4–2.6
Darke et al. [23]	Methamphetamine	300	18.2%	1.6	1.3–2.1
Stockings et al. [12]	Amphetamines	124,000	11.3%	2.9	2.2–3.8
Moçambique et al. [7]	Cocaine	2252	27.7%	2.0	1.5–2.7

254 **Table 2.** Narrative summary of additional studies (sorted by year).

Study	Substance	Finding summary	Suicidal mention
Wong et al. [27]	Multiple drugs	Higher risk with multiple substances	Yes
Xiao et al. [26]	Methamphetamine	Schizophrenia risk, not suicide-focused	No
Kennedy et al. [21]	Alcohol + Illicit	Heavy alcohol linked to suicide	Yes
Saquib et al. [2]	Various (Saudi)	Weak SUD data, Suicide not quantified	No
Oviedo Peñuela et al. [16]	Shabu (Meth)	60% had psychiatric comorbidity	Yes
Al-Asmari [1]	Methamphetamine	21% of deaths were suicides	Yes
Corser et al. [6]	Meth + Opioids	Self-regulation strategies and risks	Yes
Harding et al. [8]	Methamphetamine	Overamping symptoms, not suicide	No
Choi et al. [4]	Cocaine + Elderly	Screening needed due to suicide risk	Yes
Shiraly et al. [3]	Meth, Heroin, Opium	23.6% suicidal thoughts, 6.7% attempts	Yes



255
256 **Figure 2.** Odds ratios with 95% confidence intervals for suicidality risk.

257 pooled analysis demonstrated a significant association
258 between sympathomimetic drug use and suicidal
259 ideation or suicide attempts. The overall pooled odds
260 ratio was 2.85 (95% CI: 2.10-3.87) using a random-
261 effects model. Subgroup analyses showed the following
262 results. Injection use: OR = 3.40 (95% CI: 2.41-4.79),
263 oral or inhalation use: OR = 2.12 (95% CI: 1.51-2.97),

methamphetamine specific use: OR = 3.02 (95% CI: 2.05-4.47), and mixed stimulant use: OR = 2.66 (95% CI: 1.87-3.79) (Figure 2).

Publication bias

Visual inspection of funnel plots suggested asymmetry. Egger’s regression test indicated potential small-study

270 effects (p -value = 0.04). Trim-and-fill analysis did not
 271 materially change the pooled effect estimate.

272 **Robustness and sensitivity**

273 Sensitivity analyses showed that exclusion of individual
 274 studies did not significantly alter the pooled results.
 275 Removal of lower-quality studies reduced heterogeneity
 276 ($I^2 = 61.4\%$) while maintaining statistical significance
 277 (adjusted OR = 2.74, 95% CI: 1.98-3.62). This analysis
 278 indicates a strong and consistent association between
 279 sympathomimetic use and increased risk of suicidality,
 280 especially among users of injectable methamphetamine.
 281 These findings support the implementation of targeted
 282 harm-reduction, mental health screening, and early
 283 intervention strategies in this high-risk population.

284 **Quality assessment using the Newcastle-Ottawa 285 scale and ROBINS-I tool**

286 The quality assessment of the included studies
 287 revealed several notable trends across both quantitative
 288 and narrative analyses. In the quantitative meta-
 289 analysis studies, most demonstrated moderate to high
 290 methodological quality based on the NOS. Selection
 291 bias was generally low due to appropriate participant
 292 recruitment, and comparability was maintained through
 293 control of confounders in several studies. However,
 294 some studies lacked clarity in outcome ascertainment
 295 and follow-up duration, potentially affecting the internal
 296 validity.

297 For the narrative studies, the ROBINS-I tool indicated
 298 varying risk of bias. Several studies presented a moderate
 299 to serious risk due to non-randomized designs and the
 300 absence of control groups. Particularly, observational and
 301 cross-sectional studies lacked adjustment for confounders

and provided limited information about loss to follow-up. 302
 Despite these limitations, many narrative studies offered 303
 valuable insights into trends, sociocultural contexts, and 304
 psychological correlates that enrich the understanding of 305
 suicidality in sympathomimetic drug users (Tables 3 and 306
 4). 307

Overall, while the included studies were sufficient to 308
 support the meta-analysis findings, future research 309
 would benefit from standardized methodologies, better 310
 reporting practices, and longer follow-up periods to 311
 ensure stronger evidence and generalizability (Table 4). 312

313 **Discussion**

314 **Overview of key findings**

315 This systematic review and meta-analysis demonstrated
 316 a significant association between sympathomimetic
 317 drug use and suicidality. Across 26 included studies,
 318 individuals using sympathomimetic substances showed
 319 nearly a threefold increased risk of suicidal ideation or
 320 suicide attempts compared with non-users. Higher effect
 321 estimates were observed among injection users and those
 322 using methamphetamine.

323 **Interpretation of findings**

324 The observed association might be explained by the
 325 neuropsychiatric effects of sympathomimetic drugs.
 326 Chronic exposure to stimulants such as methamphetamine
 327 and cocaine was found to be associated with dysregulation
 328 of dopaminergic and serotonergic pathways, which
 329 played a central role in mood r sivity,
 330 and emotional control. Additionally, stimulant-induced
 331 psychiatric manifestations, including psychosis, anxiety,
 332 agitation, and paranoia might increase vulnerability
 333 to suicidal thoughts and behaviors. Psychosocial and

334 **Table 3. Quantitative studies - NOS and ROBINS-I evaluation.**

Study	NOS Score (0-9)	ROBINS-I bias	Design type	Notes
Marshall et al. [20]	8/9	Low	Cohort	Injection-focused, adjusted confounding
Artenie et al. [17]	7/9	Moderate	Survey-based cohort	Substance-specific, robust N
Darke et al. [15]	7/9	Moderate	Case-control	Controlled analysis, mid-sample size
Stockings et al. [12]	9/9	Low	Meta-analysis	Large dataset, high-quality design
Moçambique et al. [7]	8/9	Low	Cross-sectional	Large sample, clear suicide measures

335 **Table 4. Narrative studies - qualitative evaluation.**

Study	NOS Score (0-9)	ROBINS-I bias	Design type	Notes
Wong et al. [27]	6/9	Moderate	Qualitative/Review	Multi-substance data, generalizable
Xiao et al. [26]	5/9	Serious	Cohort	Focused on schizophrenia, not suicide
Kennedy et al. [21]	7/9	Moderate	Survey	Alcohol emphasis, suicide link
Saquib et al. [2]	5/9	Serious	Review	Weak suicide specificity
Oviedo et al. [16]	6/9	Moderate	Case-series	Psychiatric comorbidity highlighted
Al-Asmari [1]	7/9	Low	Postmortem Study	Suicide death recorded
Corser et al. [6]	6/9	Moderate	Interview-based	Behavioral risk focus
Harding et al. [8]	4/9	Serious	Observational	Overamping focus
Choi et al. [4]	7/9	Low	Cohort	Elderly-focused screening data
Shiraly et al. [3]	8/9	Low	Cross-sectional	Quantified suicidality precisely

336 contextual factors might further contribute to this
337 association. Many sympathomimetic users experience
338 social instability, unemployment, homelessness, and
339 limited access to mental health services, which are
340 independently associated with increased suicide risk. The
341 coexistence of psychiatric comorbidities, particularly
342 depression and schizophrenia, might further amplify this
343 vulnerability.

344 *Comparison with previous studies*

345 Differences between the findings of this meta-analysis
346 and some previous studies might be attributed to
347 methodological and population-related factors. This
348 review included a broader range of sympathomimetic
349 substances and routes of administration, particularly
350 injection use, which has been consistently associated
351 with higher psychiatric risk. In addition, several included
352 studies adjusted for key confounders such as polydrug
353 use and psychiatric comorbidities, strengthening the
354 observed independent association.

355 Variations in study design, outcome definitions,
356 geographic settings, and healthcare access might also
357 explain discrepancies across studies. Regional differences
358 in harm-reduction strategies, social support systems, and
359 stigma surrounding substance use and mental health
360 might influence reported suicidality rates.

361 *Clinical and public health implications*

362 These findings highlighted the importance of integrating
363 routine suicide risk assessment into clinical encounters
364 with individuals using sympathomimetic drugs. Targeted
365 harm-reduction strategies and early mental health
366 interventions might help mitigate suicide risk in this
367 high-risk population.

368 *Limitations*

369 This review had several limitations. Most included studies
370 were observational, primarily cross-sectional or cohort
371 designs, which inherently limited the ability to infer
372 causality between sympathomimetic drug use and suicidal
373 ideation or behavior. There was substantial variability
374 across studies in terms of population demographics, types
375 of substances examined, and how suicidality was defined
376 and measured (e.g., suicidal ideation vs. attempts). This
377 heterogeneity might have introduced inconsistencies
378 in the pooled estimates. High-quality data from the
379 Middle East, including Saudi Arabia, was scarce. Given
380 regional differences in substance use patterns, stigma,
381 and healthcare access, this underrepresentation might
382 affect the applicability of findings to these contexts.
383 The review was limited to studies published in English,
384 which might have excluded relevant findings reported
385 in other languages and introduced language bias.
386 Although quality assessment tools such as the NOS and
387 ROBINS-I were applied, several studies still exhibited
388 moderate to high risk of bias, particularly in areas such as
389 participant selection, confounding control, and outcome
390 ascertainment. Several included studies had relatively
391 small sample sizes, potentially reducing statistical power

and limiting the generalizability of their findings to 392
broader populations. 393

Recommendations 394

Based on the findings of this review, the following 395
recommendations are proposed to mitigate the mental 396
health risks associated with sympathomimetic drug 397
use and reduce suicidality. Introduce standardized 398
screening protocols for suicidal ideation and behavior 399
among stimulant users in clinical and emergency care 400
settings. Increase the availability and accessibility of 401
mental health care, particularly in communities with 402
high rates of substance use and limited healthcare 403
infrastructure. Develop and fund evidence-based harm 404
reduction initiatives, including supervised consumption 405
sites, needle exchange programs, and peer-support 406
services. Launch targeted awareness campaigns to 407
inform the public and healthcare professionals about 408
the psychological risks linked to stimulant use and the 409
importance of early intervention. Encourage the design 410
and funding of longitudinal studies to clarify the causal 411
relationship between stimulant use and suicidality, and 412
to evaluate the efficacy of prevention and treatment 413
programs. Develop prevention strategies tailored to high- 414
risk groups such as adolescents, injection drug users, and 415
individuals with co-occurring psychiatric disorders. If 416
implemented, these multi-level interventions have the 417
potential to significantly reduce suicide risk and improve 418
mental health outcomes among individuals affected by 419
stimulant use. 420

Conclusion 421

This systematic review and meta-analysis provided 422
compelling evidence of a strong and consistent 423
association between sympathomimetic drug use and an 424
elevated risk of suicidal ideation and behavior. Users 425
of methamphetamine, amphetamines, and cocaine, 426
particularly those who inject, face a disproportionately 427
higher risk of suicidality. This risk was further 428
compounded by coexisting psychiatric disorders, socio- 429
economic disadvantages, and inadequate access to 430
mental health care services. The quantitative findings, 431
supported by significant pooled effect sizes, were 432
complemented by narrative evidence that highlighted 433
the lived experiences and complex psychosocial realities 434
of affected individuals. Together, these data revealed 435
not only a clinical concern but a pressing public health 436
challenge. 437

These findings underscore the urgent need for a 438
comprehensive, multi-tiered response that included 439
early screening, targeted mental health interventions, 440
harm-reduction strategies, and broader structural 441
support for vulnerable populations. Future research 442
should aim to clarify causal pathways and evaluate 443
the effectiveness of tailored prevention and treatment 444
programs. 445

List of Abbreviations 446

CI	Confidence intervals	446
HR	Hazard ratio	447
NOS score	Newcastle-Ottawa Scale	448

449	OR	Odds ratios	methamphetamine users. <i>Harm Reduct J.</i> 2022;19:4. https://doi.org/10.1186/s12954-022-00588-7	509 510
450	PRISMA	Preferred Reporting Items for Systematic reviews and Meta-Analyses		
451	ROBINS-I	Risk Of Bias In Non-randomized Studies - of Interventions	9. Abreu LCC, Conceição SDS, Carvalho DSB, Machado AC, Guimarães RM, Alves LSC, et al. Factors associated with cocaine consumption among suicide victims. <i>Int J Environ Res Public Health.</i> 2022;19(21):14309. https://doi.org/10.3390/ijerph192114309	511 512 513 514 515
452				
453	RR	Relative risks	10. Gomes JA, De Souza DM, Oliveira KD, Gallassi AD. Psychoactive substances use before suicide. <i>BMC Psychiatry.</i> 2022;22:467. https://doi.org/10.1186/s12888-022-04082-z	516 517 518 519
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460			16. viedo Peñuela L, Torrens M, Fonseca F, Rossi P. Methamphetamine shabu users. <i>Eur Psychiatry.</i> 2017;41(Suppl 1):S872. https://doi.org/10.1016/j.eurpsy.2017.01.1753	540 541 542 543
461		Consent to participate	17. Artenie AA, Bruneau J, Zang G, Roy E, Jutras-Aswad D. Substance use patterns and attempted suicide. <i>Drug Alcohol Dependence.</i> 2015;147:208–14. https://doi.org/10.1016/j.drugalcdep.2014.11.011	544 545 546 547
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