

## NARRATIVE REVIEW

# Over-the-counter drug use in suicidal/self-harm behavior: Scoping review

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**Abstract**

**Background and aims:** Minor physical ailments are treated with over-the-counter (OTC) medications. The availability of OTC drugs helps reduce waiting times and ease the suffering of many. Suicidal behavior includes suicidal ideation, attempts, and completed suicides and affects people of all ages, religions, and cultures. This study aims to review use of OTC drugs for self-harm and suicidal attempts.

**Methods:** We reviewed English language publications from the beginning of time to October 2021 on OTC drug use for suicidal behavior.

**Results:** Twenty-seven studies met the eligibility criteria, and 1,816,228 participants were reported in these publications. OTC analgesics and sedatives/hypnotics were frequently used for suicidal behavior. Females and young people mainly were reported to self-harm using OTC medications. An increase in OTC analgesic use for self-harm in adolescents during the school months was reported. Elderly persons use hypnotics more frequently for suicidal attempts. Persons with major psychiatric disorders were reported to use OTC for suicidal behavior.

**Conclusion:** The available information shows that the prevention strategies should focus on OTC analgesics and hypnotic use among women, the young, the elderly, and persons with mental health disorders.

**KEYWORDS**

drug misuse, drug overdose, nonprescription drugs, over-the-counter drugs, suicide

## 1 | INTRODUCTION

Suicide is a worldwide public health issue that affects people of all religions and ages. Suicidal behavior includes suicidal ideation, suicide attempts, and completed suicide.<sup>1</sup> Self-harm is defined as an act of self-injury without explicit suicidal intent and has long-term consequences for the individual.<sup>2</sup> A family history of suicide, traumatic incidents, psychological stressors such as relationship breakdown, socioeconomic

variables, underlying psychiatric diseases including psychoactive substance use, personality traits, loss of social support, previous suicidal attempts, and maladaptive behaviors are all risk factors for suicide.<sup>3-5</sup> According to the World Health Organisation, every year, 700,000 individuals complete suicide, with more than three-fourths in low- and middle-income countries and many more attempt suicide and self-harm.<sup>6</sup> Every suicide is a tragedy that impacts the entire family, community, country, and especially the people left behind.<sup>7,8</sup> Suicide

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affects people of all ages, and suicide is estimated to be the fourth leading cause of death among 15–19-year-olds.<sup>6</sup> The risk factors for suicidal behavior differ from one culture to the next, from era to the next, and from one region to the next.

Pain, coughs, colds, diarrhea, nausea, and other symptoms are treated with over-the-counter (OTC) drugs. Self-medication helps by reducing waiting time, may improve medicine access, and help to reduce the costs of health care.<sup>9</sup> While the availability of OTC medications encourages self-care, it has also contributed to misuse, dependence, and injury.<sup>10</sup> Certain OTC drugs contain active compounds with potential for abuse at higher-than-recommended doses and are becoming increasingly popular.<sup>11</sup> Cough suppressants, sleep aids, and antihistamines are among the most commonly implicated pharmaceuticals, sometimes combined with other recreational psychotropics, prescription medicines, and/or alcohol.<sup>12</sup> Overall, OTC drug abuse may be seen as more socially acceptable, less stigmatizing, and safer than illegal drug abuse, owing to their likely lack of detection in conventional drug testing.<sup>13</sup> In the United States, between 2000 and 2018, OTC analgesics were involved in 27.5% of 1,677,435 cases of self-poisoning among people aged 10–25.<sup>14</sup> The consequences of this might include severe morbidity or death, and the danger of OTC drugs in the context of suicidal behavior needs to be explored further.

In low and middle income countries, mental health services and the availability of psychiatrists are limited. Many individuals with mental health disorders first seek help from faith healers, and alternative system practitioners and use nonprescription medications.<sup>15</sup> Therefore, there is potential for unreasonable use and suicidal/self-harm-related problems of OTCs that need attention and regulation.

## 2 | METHODS AND MATERIALS

### 2.1 | Search strategy

Two consultant psychiatrist authors conducted a literature search separately for English-language studies that mentioned: “over-the-counter medications used for self-harm or completed or attempted suicide.” Searches were conducted via PubMed, Scopus, Google Scholar, and Semantic Scholar using the following keywords, “non-prescription” [Title/Abstract] OR “over the counter” [Title/Abstract], AND “suicide” [Title/Abstract] OR “suicidal” [Title/Abstract] OR “self-harm” [Title/Abstract].

### 2.2 | Eligibility criteria

Quantitative research designs published in peer-reviewed English journals investigating a link between OTC drugs and completed or attempted suicide or self-harm were considered from the beginning of time to October 31, 2021. Qualitative research, commentary, correspondence, viewpoints, editorials, reviews, and dissertations were excluded. All the papers in the review were evaluated by two

authors who are consultant psychiatrists for eligibility and relevance. Papers not reporting about the use of OTC concerning suicidal and/or self-harm behavior were not included. Also, reports with incomplete data and repetitions of previous publications were excluded. Figure 1 shows the shortlisting process.

### 2.3 | Data extraction

We identified and reviewed twenty-seven original papers from 11 countries, including Algeria, Canada, Denmark, Japan, Korea, Namibia, Norway, Spain, South Africa, the United Kingdom, and the United States. Data such as the publication year, country of study, type of harm, the number affected, age category, category of drug, and drug name were collected by two authors who are psychiatrists using standard extraction tables. If there is a dispute, an arbitration mechanism was activated, and a third reviewer was required to participate in the discussion to reach a consensus.

## 3 | RESULTS

### 3.1 | Study selection process

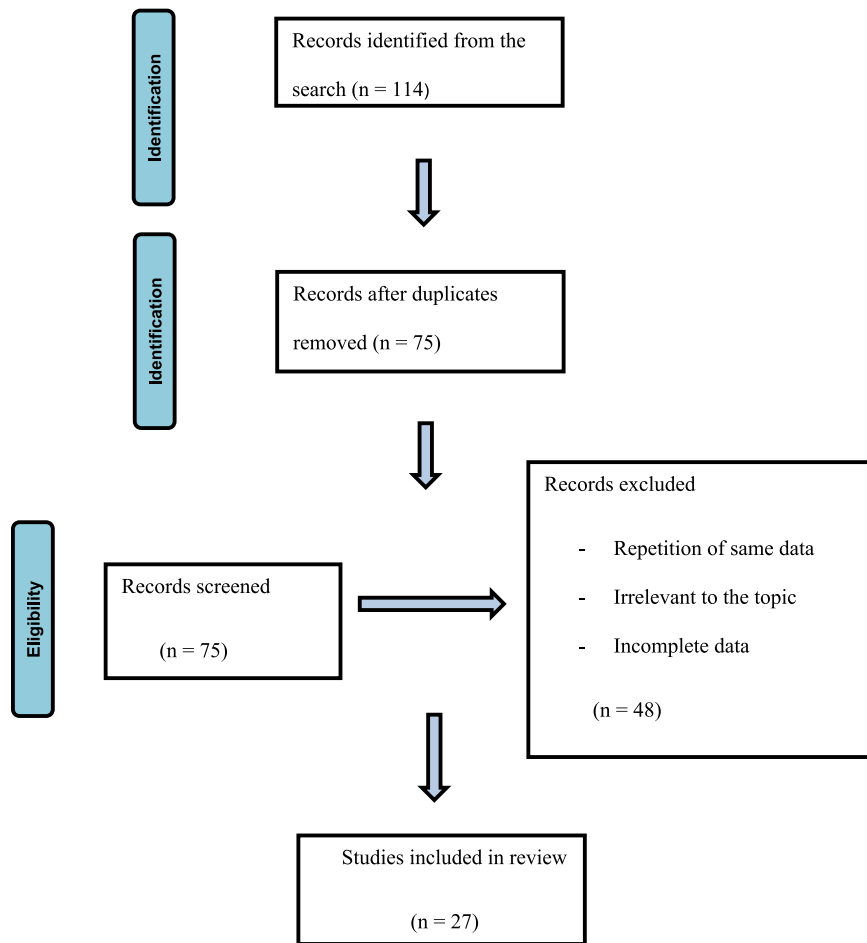
A total of 114 potentially relevant documents were identified through the search, and after removing duplicates, 75 articles remained. Forty-eight articles were excluded due to not meeting the eligibility criteria, as shown in Figure 1. Twenty-seven articles were screened and selected for review. Reasons for exclusion included repeated publications, studies not relevant to the theme, and studies with incomplete results.

### 3.2 | Study characteristics

Twenty-seven articles included in the review have all been peer-reviewed and received as original articles. As shown in Table 1, 12 of the articles were conducted in the United States, 2 articles each from Canada, the Republic of Korea, and Norway. Japan, Hong Kong, the United Kingdom, Namibia, South Africa, Algeria, Spain, Denmark, and Lebanon had one article. The total number of participants included in the review was 1,816,228. Out of the 27 articles reviewed, 8 studies were patients with comorbid psychiatric disorders and 3 with comorbid medical conditions, while 16 studies did not mention any specific comorbidity.

Of the 27 studies included in the review, 5 focused on the child, adolescent, and youth population.<sup>14,23,24,26,41</sup> As shown in Table 1, 15 publications reported mixed-aged groups. A predominantly female population was analyzed in 13 studies, with 3 reporting all women.<sup>15,24,25</sup> In 8 studies, the type of harm was stated as completed suicide, 10 as attempted suicide, 4 as self-harm, and 3 as mixed (suicide/attempted suicide). Analgesics use was mentioned by 11 publications, especially paracetamol, as the OTC used for harm. Five mentioned antihistamines,

**FIGURE 1** Selection of studies in relevance to OTC drugs and suicidal behavior. OTC, over the counter



and eight studies mentioned a combination of analgesic and anti histamine.

## 4 | DISCUSSION

Twenty-seven reports were identified in this scoping review, which included OTC medications and suicidal behavior. More than half (15) of the studies examined the use of medications for suicide and attempted suicide<sup>14-16,21-27,29,30,34,37-39</sup> followed by poisoning and deliberate self-harm<sup>28,33,36</sup> Based on this review, analgesics and antihistamine overdoses are the most frequently used for suicide attempts and suicide, and it panned across all age groups.<sup>15,35,38,39</sup> The review found acetaminophen, acetylsalicylic acid, and diphenhydramine as the commonest analgesics and antihistamines used and more common among female adolescents.<sup>16,19</sup>

Analgesics such as acetaminophen, ibuprofen, and acetylsalicylic acid (aspirin) have long been used to treat pain, fevers, and other common maladies. However, because these medications are readily available, they can be taken in large quantities resulting in death.<sup>15,16,23,36,38</sup> A study from South Africa reported that OTC analgesics, particularly acetaminophen, are the leading method used in self-harm.<sup>36</sup> Imposing restrictions on the quantity sold per packet should be considered in all countries. The majority of the antihistamines reported were first-generation

antihistamines. Misuse of first-generation antihistamines may be motivated by being sedatives, and initiation of use may be in the context of insomnia.<sup>42</sup>

Harm related to acute poisonings during pregnancy can threaten the mother's life and have possible life-long implications for the fetus due to teratogenicity. According to an American study, approximately half of all poisoning suicide attempts among pregnant women caused by nonopioid analgesics purchased over-the-counter were intentional and not due to lack of awareness.<sup>25</sup> It appears from reports that mood disorders may be related to poisoning in pregnant women, and early screening for mood symptoms, and advice on keeping the home environment safe must be a priority for field maternal health workers.<sup>30,43</sup> Most studies found OTC drug use for self-harm was predominantly seen among women<sup>22,23,44</sup> and health education targeting young females in academic institutions and workplaces could be a successful method to minimize future poisonings.<sup>45</sup>

Comorbid psychiatric illnesses such as depression, schizophrenia, substance use disorders, generalized anxiety disorder, and bipolar affective disorder were associated with OTC drug use for suicidal behavior.<sup>17,21,28,30,32,33,36,46</sup> Since not all suicidal behaviors are motivated by a desire to die; mental health institutions should educate people with mental illnesses, particularly young people, about OTC usage and toxicity.<sup>47,48</sup> The threat of potential harm is more in countries with poor drug dispensing regulations.<sup>49</sup> As a

TABLE 1 Studies reporting over-the-counter drug use and suicidal behavior

Author	Study	Country	Type of harm	Number affected	Age category	Category of drug	Name of the drug	Males/females	OTC/all medications
Wogoman et al. <sup>15</sup>	Acute intoxication with guaifenesin, diphendramine, and chlorpheniramine	United States	Suicide	1	48 years	Expectorant, antihistamine	Guaifenesin, diphendramine, and chlorpheniramine	Female	100.0%
Townsend et al. <sup>16</sup>	Substances used in deliberate self-poisoning 1985–1997: trends and associations with age, gender, repetition and suicide intent	United Kingdom	Suicide attempt	4339	15–34 years	Analgesic	Acetaminophen (Paracetamol)	1977/3140	
Goodwin and Hasin <sup>17</sup>	Sedative use and misuse in the United States	United States	Suicidal ideation, suicidal plan, suicidal attempt	419 (7.1%)		Sedatives		Male [OR = 0.61 (0.44, 0.86)]	7.1%
Lo et al. <sup>18</sup>	Patient characteristics associated with nonprescription drug use in intentional overdose	Canada	Suicide Attempted suicide	28	Mean 35 years (SD 9)	Analgesic, NSAID	Acetaminophen, acetylsalicylic acid, codeine, and others	Males, N = 20 (71.4%)/females, N = 8 (28.6%)	29.4%
Hon et al. <sup>19</sup>	Review of children hospitalised for ingestion and poisoning at a tertiary centre	Hong-Kong	Suicide Attempted suicide	65	Mean 14.9 years (SD, 1.7)	Antipyretics, unspecified cough medicine/antihistamines, miscellaneous		Female 56 (86%)	40.0%
Ikealumba and Couper <sup>20</sup>	Suicide and attempted suicide: the Rehoboth experience	Namibia	Suicide and suicide attempt	8		Multiple	Aspirin, paracetamol, ibuprofen, diclofenac		
Parellada et al. <sup>21</sup>	Is attempted suicide different in adolescents and adults?	Spain	Suicide attempt	22	Mean 39.8 years (SD 15.4)	Analgesic, antipyretic, anti-inflammatory			
Lund et al. <sup>22</sup>	A one-year observational study of all hospitalised and fatal acute poisonings in Oslo: epidemiology, intention and follow-up	Norway	Suicide attempt	Possible suicide attempt, N = 344/definite suicide attempt, N = 151		Analgesics, antihistamines, other	Paracetamol and other	Females (65%)	46%

TABLE 1 (Continued)

Author	Study	Country	Type of harm	Number affected	Age category	Category of drug	Name of the drug	Males/females	OTC/all medications
Liu et al. <sup>23</sup>	Sociodemographic predictors of suicide mean in a population-based surveillance system: findings from the National Violent Death Reporting system	United States	Suicide	2840 (estimated)				Females, OR = 2.12 (SD 1.66–2.72)	N = 13.8%
Arnestad et al. <sup>24</sup>	Suicide due to cyclizine overdose	Norway	Suicide	1	22 years	Antihistamines	Cyclizine	Female	N = 100%
Zelner et al. <sup>25</sup>	Acute poisoning during pregnancy: observations from the Toxicology Investigators Consortium	United States	Suicide	32		Analgesics	Acetaminophen, NSAIDs	All females	
Sheridan et al. <sup>26</sup>	Adolescent suicidal ingestion: national trends over a decade	United States	Suicide attempt	Acetaminophen, N = 68512; ibuprofen, N = 56,480; antihistamine, N = 31,968	13–19 years	NSIAD, analgesic, antihistamines	Acetaminophen, ibuprofen, diphenhydramine and other	Female predominance overall	Acetaminophen, N = 7.5%; N = 10.9 (in combination with other agents); ibuprofen, N = 8.95%; antihistamine, N = 5%
Hatting and Hansen <sup>27</sup>	Intentional suicide with cyclizine	Denmark	Suicide	1		Antihistamines	Cyclizine		
El Majzounb et al. <sup>28</sup>	Characteristics of patients presenting post-suicide attempt to an Academic Medical Center Emergency Department in Lebanon	Lebanon	Suicide, suicide attempt	29	22–49	Analgesic other	Acetaminophen	Females (71.4%)	27.90%
Lim and Lee <sup>29</sup>	Characteristics of drugs ingested for suicide attempts in the elderly	Korea	Suicide attempt	87	More than 65 years				9.1%
Shenai et al. <sup>30</sup>	Foetal outcomes in intentional over-the-counter medication overdoses in pregnancy	United States	Suicide attempt	3	19 years, 36 years, 33 years	Multiple	Diphenhydramine, acetylsalicylic acid, acetaminophen	Three females	

(Continues)

TABLE 1 (Continued)

Author	Study	Country	Type of harm	Number affected	Age category	Category of drug	Name of the drug	Males/females	OTC/all medications
Froberg et al. <sup>31</sup>	Temporal and geospatial trends of adolescent intentional overdoses with suspected suicidal intent reported to a state poison control centre	United States	Suicide attempt	6890	Mean 15.9 years (SD 0.27)	OTC analgesics, NSAIDs, antihistamines, cough, and cold preparations	Acetaminophen, acetylsalicylic acid, ibuprofen, other	Female predominance overall	81.70%
Spiller et al. <sup>14</sup>	Suicide attempts by self-poisoning in the United States among 10–25-year-olds from 2000 to 2018: substances used, temporal changes and demographics	United States	Suicide attempt	OTC analgesics, N = 743,091; antihistamines, N = 169,787	10–25 years	Analgesics, antihistamines		Female predominance overall	OTC analgesics 27.5%, antihistamines 6.3%
Mikhail et al. <sup>32</sup>	Over-the-counter drugs and other substances used in attempted suicide presented to emergency departments in Montreal, Canada	Canada	Suicide attempt	85	Mean 33.9 years (SD 14.9)	Analgesics, antihistamines	Acetaminophen, diphenhydramine	Females, N = 65 (76.5%)	47%
Thusius et al. <sup>33</sup>	Intentional or inadvertent acetaminophen overdose-how lethal it is?	United States	Self-harm (overdose)	207	Mean 35 years (SD 15.05)	Analgesic	Acetaminophen	67/140	
Kang <sup>34</sup>	Substances involved in suicidal poisonings in the United States	United States	Suicide attempt	44,101 (acetaminophen); 39,915 (ibuprofen); 27,957 (diphenhydramine)	13–90 years	Analgesics, NSAIDs, antihistamines	Diphenhydramine, ibuprofen, acetaminophen	41,117/211,859	
Hopkins et al. <sup>35</sup>	Suicide-related over-the-counter analgesic exposures reported to the United States poison control centres, 2000–2018	United States	Completed suicide, suicide attempt	5,49,807	Six years and above	Multiple	Acetaminophen, ibuprofen, acetylsalicylic acid and combinations	149,739/399,360	

TABLE 1 (Continued)

Author	Study	Country	Type of harm	Number affected	Age category	Category of drug	Name of the drug	Males/females	OTC/all medications
Pieterse et al. <sup>36</sup>	Methods of deliberate self-harm in a tertiary hospital in South Africa	South Africa	Self-harm	238	Mean 31.5 years (SD 13.9), range 13–82 years	Multiple	Paracetamol (54; 38.3%), other medication unknown or not specified (18; 12.8%), antihistamine (17; 12.0%), NSAIDs (12; 8.5%), paracetamol and codeine prep (10; 7.1%), vitamin compound (10; 7.1%), iron tablets (9; 6.4%), aspirin (6; 4.2%), illicit substance (5; 3.5%)	96/142	*
Chefrat et al. <sup>37</sup>	Acute paracetamol poisonings received at the Oran University Hospital	Algeria	Suicide, accidental poisoning	400	Mean 20 years (SD 10) range, 4 months to 70 years	Analgesics	Paracetamol	99/301	82% suicidal attempts, 12% accidental, 2% therapeutic overdose
Nemanich et al. <sup>38</sup>	Increased rates of diphenhydramine overdose, abuse, and misuse in the United States, 2005–2016	United States	Suicide attempt	124,030	Ten years and above	Antihistamines	Diphenhydramine	Female predominance overall	78.10%
Adachi et al. <sup>39</sup>	Pharmacokinetic modelling of over-the-counter drug diphenhydramine self-administered in overdoses in Japanese patients admitted to hospital	Japan	Suicide	2	21 and 27 years	Antihistamines	Diphenhydramine	Two females	100%
Choi et al. <sup>40</sup>	Lethality-associated factors in deliberate self-poisoning	Korea	Suicide attempt	89	30–50 years				

Note: Empty cells indicate that the information is not mentioned or not accessible.  
Abbreviation: SD, standard deviation.

result, medication usage supervision is another technique for reducing purposeful OTC misuse.

In preventing OTC drug use for suicidal behavior, focusing on younger and older age categories should be prioritized.<sup>14,29</sup> There appears to be an increase in the rate of OTC analgesic use for self-harm in adolescents, and incidents were higher during the school months.<sup>14</sup> Provision of school-based mental health programs to enhance the emotional wellbeing of teens is needed as many decide to harm themselves in the hour before doing so and do not usually tell anyone else.<sup>50,51</sup> The elderly use hypnotics more frequently for suicidal attempts<sup>38</sup>; therefore, suicidal ideation in older patients prescribed OTC hypnotics requires careful assessment by prescribers.<sup>29</sup> Screening for depressive symptoms in primary care, involving the family, and making mental health support available through telepsychiatry should be done to prevent suicides in senior citizens.<sup>52,53</sup>

Suicidal behavior related to OTC drug use is responsible for substantial morbidity and mortality worldwide. The prevention strategies need to focus on OTC analgesics and hypnotics, for women, young, elderly, and persons with mental health disorders. Awareness and education provided to physicians, healthcare staff, and service users would be a starting point for further focused intervention schemes.

OTC use for self-harm may also have regional variations. For example, in India, the second-most populous country globally, even though the OTC has no legal status, all pharmaceuticals not on the list of prescription drugs are deemed nonprescription drugs. The Organization of Pharmaceutical Producers of India's (OPPI) OTC Committee aims to promote responsible self-medication to boost the OTC business. Its goal is to gain regulatory support for concerns such as the accessibility of OTC treatments in the home and raise public and government awareness of the significance of responsible self-medication. The Drug and Magic Remedies Act specifies the number of diseases for which advertising is prohibited.<sup>1</sup> Medication is readily available in India.

Many consumers buy prescriptions directly from community pharmacies because they are more convenient, faster, and less expensive than visiting a doctor's office. Because of the lack of medical follow-up, insufficient information provided to patients by community pharmacists, and, most importantly, inaccurate diagnosis or therapy, the efficacy of self-medication may be limited. If a medication has the potential to be used for suicide because it induces significant side effects in overdose, it should be sold in limited quantities and should reconsider inclusion in the OTC medication. Many pharmaceuticals can have dangerous side effects, especially overdose, but a rare side effect should not rule out OTC status if the possible benefit outweighs the potential harm. Limiting the dosage strengths and pack size of OTC medications can lessen the likelihood of undesired consequences, especially suicide.

OTC medications play a critical role in a patient's ability to make healthcare decisions independently. Healthcare professionals are generally unaware of these nonprescription choices and are not routinely recorded.<sup>54</sup> Excluding information about these medications

could put patients' health at risk. It is crucial to capture OTC medicine use in physicians' and pharmacists' electronic health records.

## 5 | IMPLICATION

Evidence-based medicine and practice save lives and require sensible prescribing. The same concepts should be used in policymaking to reduce suicide and self-harm, particularly among people who use OTC drugs. The goal is to prevent suicidal/self-harm behaviors using OTC medications, especially among vulnerable groups. Restriction on the quantity of OTC sold, public education, and raising the alarm about the possible use of OTC for suicide and potential harm of overdose are needed. Also, country-specific drug dispensing regulations should be updated.

### TRANSPARENCY STATEMENT

The manuscript is an honest, accurate, and transparent account of the study being reported; that no important aspects of the study have been omitted; and that any discrepancies from the study as planned (and, if relevant, registered) have been explained.

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