

## Population Size Estimation of Tramadol Misusers in Urban Population in Iran: Synthesis of Methods and Results

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### Original Article

#### Abstract

**Background:** Estimating the population who use drugs is essential for planning, monitoring, and evaluation of substance use prevention and treatment. This study aims to estimate the population who misuse tramadol in urban population in Iran.

**Methods:** We used the wisdom of the experts (WOTE) and network scale-up (NSU) methods to calculate the population of tramadol misusers in 10 provincial capitals of Iran, in 2016. The WOTE was conducted among pharmacists in drugstores and the personnel of traditional medicinal herbs stores. They guessed the best estimation of tramadol misusers population in their cities. The NSU method was conducted among the general population and participants were questioned about ever and daily, non-medical use of tramadol during last 12 months in their network. The median of the methods was used to calculate the proportion of the adult population (15-49 years old).

**Findings:** The population size of tramadol misusers in studied cities was 83300 [95% uncertainty limits (UL): 47960-256220]. This corresponded to 6.6 per 1000 (95% UL: 3.88-20.30) of the 15-49-year-old population. The projected number of tramadol misusers for all 31 provincial capitals was 118290 (95% UL: 68100-36310840) and 212440 (95% UL: 122310-653410) for all urban areas. NSU also estimated the number of people who misuse tramadol on daily basis. These numbers were 52000 (95% UL: 19940-176570) for studied cities, 73840 (95% UL: 28320-250740) for all 31 provincial capital cities, and 132610 (95% UL: 50860-450310) for all urban areas in Iran.

**Conclusion:** This study presents information on high prevalence of tramadol misuse in urban population. We need national control measures and demand reduction programs to control tramadol misuse.

**Keywords:** Tramadol; Prescription drug misuse; Population; Network scale-up; Wisdom of the experts; Iran

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## Introduction

Drug abuse and high recovery costs for drug users are considered as the public health concerns around the world especially in developing countries.<sup>1,2</sup> Tramadol is an opioid-like painkiller, which was first used to relieve post-operative and chronic pains.<sup>3</sup> This drug now is known as the most widely-used drug in the world.<sup>4</sup> Tramadol is prescribed at the doses of 50, 100, 200, 400, and 500 mg<sup>5</sup> and is administered by various methods including oral, intramuscular, subcutaneous, and intravenous.<sup>6</sup>

Economic conditions of drug users as well as the increased drug prices lead to using cheaper drugs.<sup>7</sup> In recent years, Iranian society has experienced an increase in the number of youth and their economic difficulties and unemployment. Unemployment,<sup>8</sup> less reaction to tramadol use from the society,<sup>9</sup> and the current wrong belief about tramadol's effectiveness on sexual function<sup>10</sup> have increased its consumption by the youth.<sup>11</sup>

Tramadol is associated with adverse effects on various organs of the body, including nervous system, digestive system, cardiovascular system, and genital and renal tracts.<sup>12</sup> Nausea, dizziness, constipation, vomiting, drowsiness, and headache are known as the most common side effects of tramadol.<sup>13</sup> Its effects on users' judgment and performance can result in several complications such as devastation, unintended damages, violence, and traffic accidents.<sup>10</sup> Cognitive problems have been observed in tramadol users, especially when people take other medications in addition to tramadol.<sup>14</sup>

Tramadol users tend to consume other substances such as cigarettes, opium, alcohol, ecstasy, and cannabis, and in fact, tramadol consumption increases the risk for using other substances.<sup>15</sup> It has been reported that young consumers tend to use drugs compared to other illegal activities and it is more common in those with initiation of multiple substances use at an early age.<sup>16</sup>

Since the identification of drug users provides the basis for drug management planning and development in communities, this study, due to the high prevalence of tramadol use and the resulted public health concerns in Iran, was conducted with the aim of determining the

prevalence of tramadol use in Iran through the network scale-up (NSU) and wisdom of the experts (WOTE) methods from pharmacy staff and medicinal herbs sellers perspectives and the information available in pharmacies.

## Methods

This cross-sectional study was carried out in 10 provinces of Iran using NSU and WOTE methods. In each province, the capital and another city were randomly selected. Data collection was done from 21 May to 20 December, 2016. In each province, a trained researcher supervised the process, selection, and performance of the interviewers. Data were collected using four questionnaires, including NSU method, information available in pharmacies, information of those who referred to the pharmacies, and tramadol sales information in medicinal herbs stores.

**WOTE:** The 'WOTE' method is based on the assumption that the central tendency in the response of a population on the number of population members approximates or is proportional to the actual number of members in that population.<sup>17</sup> This method has two hypotheses: 1. people in a large sample tend to have unique information or views about the target population and 2. when subjects in a sample are asked a similar question, individual responses in the sample and in general are not influenced by others, and each person tends to reject others by his/her responses. Using WOTE, some questions can be added to the measurement tool for assessing biological behavior; for example, participants are asked about their estimation of how many tramadol users can be observed in a particular place. Descriptive statistics such as mean, range, and interquartile range (IQR) can be used for these questions.<sup>18</sup> In this study, WOTE was examined from the perspective of pharmacy staff and medicinal herbs sellers.

**Pharmacies survey:** In each province, the list of available pharmacies was first provided from the Vice-Chancellor in Food and Drug Affairs and in each province, 40 to 60 pharmacies were randomly selected from existing pharmacies (two-thirds from the province and one-third from the city). In some cases, when in the selected city, there were not enough number of pharmacies, the rest were selected from the capital city. The

tramadol sales information form consisted of 14 questions, including the number of purchased tramadol entered into the pharmacy in different doses and forms over the 12 months through the drug supply chain or out the supply chain, the number and percentage of those with misuse of tramadol, the most important groups of people with misuse of tramadol, and the most important benefit of misuse of tramadol. Misuse of tramadol is considered as using without physician's prescription, different doses, or treatment over longer periods than prescribed.

To collect the information, the researcher first randomly considered different places in the front of the pharmacies and was available there at random times asking questions. The form of information of those who referred to the pharmacies included 14 questions, including availability of tramadol among the purchased drugs, purchasing tramadol for oneself or for another person, purchasing tramadol with or without a prescription, duration of tramadol use and its dose over the past one month, its doses, the commercial name, and the pharmaceutical company providing tramadol. This form was answered in each province by 200 people (140 subjects in the capital city and 60 subjects in the selected city).

**Medicinal herbs sellers' survey:** The list of number of medicinal herbs sellers in each province was first prepared from their Labor Union. The information was collected from 20 medicinal herbs sellers in the province and 10 medicinal herbs sellers in the selected city, which were selected randomly and added to the form. The form of tramadol sales information by medicinal herbs sellers included 16 questions, including selling tramadol in combination with various spices and herbal medicines, different ways of preparing tramadol by medicinal herbs sellers (pharmacies, illegal drug trade, or indirect purchasing), the average number of tramadol purchased and entered the stores in different doses and forms [tablets (50 and 100 mg), capsules (50 mg), and ampoule (50 mg)] each month through the drug supply chain or out of the chain, the average percentage and number of tramadol monthly sales value in each store, the number and percentage of those with misuse, and the most important groups of people with misuse from medicinal herbs sellers' perspective.

**NSU method:** The NSU method form included questions regarding recreational and long-term use of tramadol-containing compounds, diphenoxylate, and codeine-containing compounds. This form was completed by the citizens in the overcrowded areas of the province, at least at 7 areas of the capital city by 140 subjects (70 female subjects and 70 male subjects) and in the selected city by 60 subjects (30 male subjects and 30 female subjects). The NSU method can be used for estimating the size of hidden populations. This method does not require a direct communication with drug users. In other words, we do not need to be directly connected to tramadol users and a random sample from the studied population is sufficient.<sup>19</sup> An indirect estimation of the number of drug users can be achieved by selecting a random sample of the population and asking about the number of drug users in their social network. The  $M/C = E/T$  formula in the NSU method was employed to estimate the considered subgroup (tramadol users). T is the total number of subjects to which the estimation is referred, C represents the social and active social network of the people, and M is the number of known drug users. Accordingly, E is the estimated subgroup (tramadol users).<sup>20</sup> According to a recent study in Kerman, Iran, the social network of Iranian people has been estimated as 308 people<sup>21</sup> and T is the total population of the province and selected city, which is calculated based on the 2011 National Census.

**Synthesis and extrapolation:** We used NSU method and WOTE for the best estimate of the number of tramadol misusers in each province. The number of tramadol users was determined based on the 15-49 years old population. The median percentage of each city was applied to obtain the best estimate. The estimated median of the 10 provinces was the best estimate for all provinces in Iran. The same approach was used to estimate the minimum and maximum estimation of the studied provinces and all provinces of Iran. Using median, and maximum and minimum ratio of these provinces, the number of tramadol users in the cities throughout Iran was estimated.<sup>22</sup>

The subjects were informed about the research objectives, process, effectiveness for the community and individuals, and confidentiality of the information followed by obtaining the informed consent from participants. The subjects

were also informed that they were free to withdraw from the study at any stage. This study was approved by the Ethics Committee of Kerman University of Medical Sciences (approval code: IR.KMU.REC.1394.445).

## Results

**WOTE estimation:** From the pharmacists' point of view, 5.67 people (71560 people) per 1000 population aged 15-49 years had tramadol abuse [95% uncertainty limits (UL): 2.61-9.25]. According to the medicinal herbs sellers, this ratio was obtained as 8.1 people (102230 people) per 1000 population aged 15-49 years (95% UL: 5.50-27.35). According to pharmacists, Khuzestan province with the prevalence of 49.6 people per 1000 population showed the highest rate of tramadol abuse followed by Isfahan with 21.9 people per 1000 population, and Tehran with 10.7 people per 1000 population. Based on the medicinal herbs sellers, Fars (35.3 people per 1000 population), Isfahan and Kermanshah (20.2 people per 1000 population), and Tehran (12.9 people per 1000 population) were found to have the higher rates of tramadol abuse compared to other provinces (Table 1).

**NSU estimation:** The results showed that 4.12 people (52000 people) per 1000 population aged 15-49 years had tramadol abuse in 10 provinces (95% UL: 1.58-13.99). It was estimated that there were 73840 and 132610

individuals in the provinces and in the total cities of Iran with long-term use, respectively. In addition, 6.25 people (78880 people) per 1000 population had recreational use in 10 provinces (95% UL: 3.48-22.36). There were 112010 and 201170 individuals with long-term tramadol use in the provinces and cities, respectively. Mazandaran (11.59 people per 1000 population), Kermanshah (8.66 people per 1000 population), and Hormozgan (5.08 people per 1000 population) had the most frequent users of tramadol. Recreational users were more found in Mazandaran (19.0 people per 1000 population), Kermanshah (10.79 people per 1000 population), and Khorasan Razavi (9.7 people per 1000 population) (Table 2).

**Synthesis and extrapolation of estimates:** Using the median of the methods (NSU estimation and pharmacy and medicinal herbs sellers' perspective), 83300 people (6.6 per 1000 population aged 15-49 years) were found to misuse tramadol in 10 provinces (95% UL: 47.960-256.220). It was estimated that there are 118290 people in 31 provinces of Iran and 212440 in cities who had misuse of tramadol. Accordingly, it was estimated that about 7 people per 1000 population aged 15-49 years in Iran had misuse of tramadol (95% UL: 4-20).

The most important tramadol users in Iran from the pharmacy technicians (280 people, 55.5%) and medicinal herbs sellers' perspective (166 people, 54.2%) were young people.

**Table 1.** Estimation of the number of misuse of tramadol from the pharmacists and medicinal herbs sellers' perspective in the past 12 months

Province (population of 15-49 years)	Pharmacies		Medicinal herbs sellers	
	Population estimate (95% UL)	Population estimate per 1000 (95% UL)	Population estimate (95% UL)	Population estimate per 1000 (95% UL)
East Azerbaijan (988670)	600 (300-1000)	0.61 (0.30-1.01)	200 (110-330)	0.20 (0.11-0.31)
Isfahan (1265457)	27700 (12600-48700)	21.90 (10.00-38.50)	25500 (14000-38000)	20.20 (11.10-30.03)
Tehran (5274266)	56400 (29100-93700)	10.70 (5.50-17.80)	68000 (1900-175000)	12.90 (3.60-33.20)
Khorasan Razavi (1773463)	4200 (2800-5000)	2.40 (1.60-2.80)	6750 (2300-11500)	3.80 (1.30-6.50)
Khuzestan (892515)	44300 (630-127500)	49.60 (0.71-142.90)	7000 (5400-8700)	7.80 (6.10-9.80)
Fars (991203)	4600 (1800-8400)	4.64 (1.80-8.50)	35000 (2200-92100)	35.30 (2.20-92.90)
Kerman (397500)	3600 (1400-5700)	9.10 (3.50-14.30)	2700 (750-175000)	6.80 (1.90-44.30)
Kermanshah (559778)	3700 (1900-5600)	6.70 (3.40-10.00)	11300 (7000-16000)	20.20 (12.50-28.60)
Mazandaran (191610)	800 (300-1400)	4.20 (1.60-7.30)	1600 (950-8600)	8.40 (15.00-44.90)
Hormozgan (287141)	1300 (270-3000)	4.53 (0.94-10.50)	1000 (460-1700)	3.50 (1.60-5.90)
Median	71560 (32940-116750)	5.67 (2.61-9.25)	102230 (7050-345200)	8.10 (5.55-27.35)
Estimation of province center	101620 (46780-165790)	-	145180 (99470-490190)	-
Estimation of whole Iran	182500 (84010-297740)	-	260720 (178640-880340)	-

UL: Uncertainty limits

**Table 2.** Estimation of the number of tramadol misusers from the pharmacists and medicinal herbs sellers' perspective in the past 12 months

Province (population of 15-49 years)	Long-term use		Recreational use*	
	Population estimate (95% UL)	Prevalence per 1000 population (95% UL)	Population estimate (95% UL)	Prevalence per 1000 population (95% UL)
East Azerbaijan (988670)	450 (200-4120)	0.46 (0.20-4.17)	1380 (700-18640)	1.40 (0.71-18.85)
Isfahan (1265457)	2760 (1180-13800)	2.18 (0.93-10.90)	5520 (2970-15610)	4.36 (2.35-12.34)
Tehran (5274266)	20680 (6890-72100)	3.92 (1.30-13.67)	39310 (16700-72500)	7.45 (3.17-13.75)
Khorasan Razavi (1773463)	7670 (3290-25380)	4.32 (1.86-14.31)	17200 (3030-52200)	9.70 (1.71-29.43)
Khuzestan (892515)	3350 (2610-15280)	3.75 (2.92-17.12)	4510 (3380-27630)	5.05 (3.79-30.96)
Fars (991203)	4830 (3340-13300)	4.87 (3.37-13.42)	7630 (2720-23500)	7.70 (2.74-23.71)
Kerman (397500)	860 (465-16600)	2.16 (1.16-4.76)	1750 (1200-11100)	4.40 (3.02-45.53)
Kermanshah (559778)	4850 (909-16200)	8.66 (1.63-28.94)	6040 (5130-18100)	10.79 (9.16-32.33)
Mazandaran (191610)	2220 (870-18350)	11.59 (4.54-95.77)	3640 (460-8100)	19.00 (2.40-42.27)
Hormozgan (287141)	1460 (910-15500)	5.08 (3.17-53.98)	850 (460-16380)	2.96 (1.60-57.05)
Median	52000 (19940-176570)	4.12 (1.58-13.99)	78880 (43920-282210)	6.25 (3.48-22.36)
Estimation of province center	73840 (28320-250740)	-	112010 (62370-400758)	-
Estimation of whole Iran	132610 (50860-450310)	-	201170 (112010-719720)	-

\*Using drug once in a while for recreation and special occasions  
UL: Uncertainty limits

According to pharmacy technicians' perspective, young people were the most important group of tramadol users in all provinces of Iran; except for Khuzestan, Isfahan, and Tehran, in which the most important group was addicts and also Hormozgan with the same proportion of young people and addicts. According to the medicinal herbs sellers' perspective, the most important group in all provinces was the youth (Table 3).

The most important cause of tramadol use in Iran was addiction (209 cases, 41.4%) and sexual relationships (161 cases, 31.9%). In all the studied provinces except for Fars, Khorasan Razavi, and Mazandaran in which the most important reasons for tramadol use were sexual relationships followed by addiction, the most important reason for using tramadol was addiction followed by sexual relationships (Table 4).

Three quarters of the medicinal herbs sellers in Iran are provided with tramadol. They provide their tramadol directly from pharmacies (19%) and via illegal drug trade or indirect purchasing (81%). About one-third (32.35%) of medicinal herbs sellers reported that tramadol was offered in combination with spices or herbal medicines.

In the studied provinces, 1969 people referred to the pharmacies, of them 12.2% purchased tramadol in addition to other drugs. This means that among those who purchased tramadol, 12.2%

had tramadol in addition to other drugs, which 82% of the purchased tramadol was not prescribed. 54% of the subjects stated that they purchased tramadol for others.

## Discussion

It is estimated that there are 118290 people in 31 provinces of Iran and 212440 people in the total cities of Iran with misuse of tramadol. According to the NSU estimation and WOTE methods, it was estimated that about seven people per 1000 population aged 15-49 years in Iran had misuse of tramadol (95% UL: 4-20).

From the pharmacy technicians and medicinal herbs sellers' perspective, young people were the most important group of tramadol users in Iran and the most important reason for using tramadol in addition to addiction was sexual relationships. One out of eight of the subjects had tramadol in addition to other drugs, which 82% of the purchased tramadol was not prescribed. More than half of the subjects stated that they purchased tramadol for others.

In this study, it was estimated that 7 people per 1000 population had misuse of tramadol. Other studies reported differing results from the current study due to differences in the study population. Bashirian et al. reported the lifetime prevalence of 12.5% and a past-year prevalence of 11.0% for tramadol use in Iran.<sup>23</sup>

**Table 3.** The most important group with misuse of tramadol in the past 12 months from the perspective of pharmacy technicians and medicinal herbs sellers

Province	Pharmacy technicians					Medicinal herbs sellers				
	Number	Youth [n (%)]	Addicts [n (%)]	Youth and addicts [n (%)]	Others (FSW, nervous patients, ...) [n (%)]	Number	Youth [n (%)]	Addicts [n (%)]	Youth and addicts [n (%)]	Others (FSW, nervous patients, ...) [n (%)]
East Azerbaijan	42	26 (61.9)	11 (26.2)	5 (11.9)	-	30	13 (48.1)	7 (25.9)	6 (22.2)	1 (3.7)
Isfahan	60	21 (35.0)	28 (46.7)	10 (16.7)	1 (1.7)	30	3 (10.0)	11 (26.7)	16 (53.3)	-
Tehran	37	11 (32.4)	20 (58.8)	-	3 (8.8)	27	11 (47.8)	6 (26.1)	5 (21.7)	1 (4.3)
Khorasan Razavi	60	53 (88.3)	2 (3.3)	-	5 (8.3)	30	29 (96.7)	-	1 (3.3)	-
Khuzestan	55	22 (40.0)	25 (45.5)	4 (7.3)	4 (7.3)	38	20 (55.6)	10 (27.8)	5 (13.9)	1 (2.8)
Fars	55	30 (45.5)	21 (38.2)	4 (7.3)	-	30	15 (57.7)	9 (34.6)	2 (7.7)	-
Kerman	49	30 (62.5)	13 (37.1)	2 (4.2)	3 (6.3)	29	12 (42.9)	10 (35.7)	6 (21.4)	-
Kermanshah	56	32 (58.1)	16 (28.6)	8 (14.3)	-	30	15 (50.0)	8 (26.7)	7 (23.3)	-
Mazandaran	57	40 (70.2)	14 (24.6)	3 (5.3)	-	30	24 (88.9)	1 (3.7)	1 (3.7)	1 (3.7)
Hormozgan	33	15 (45.5)	15 (45.0)	3 (9.1)	-	32	24 (75.0)	-	5 (15.6)	3 (9.4)
Whole Iran	504	280 (55.5)	165 (32.7)	39 (7.7)	32 (3.3)	306	166 (54.2)	62 (20.3)	54 (17.6)	7 (2.3)

FSW: Female sex workers

**Table 4.** The most important reason for misuse of tramadol in the studied provinces from the perspective of pharmacy technicians in the past 12 months

Province (n)	Sedative [n (%)]	Addiction [n (%)]	Sexual relationships [n (%)]	Addiction and sexual relationships [n (%)]	Addiction and sedative [n (%)]	I do not know [n (%)]
East Azerbaijan (42)	-	33 (78.60)	3 (7.10)	4 (9.50)	-	2 (4.80)
Isfahan (60)	18 (30.00)	30 (50.00)	12 (20.00)	-	-	-
Tehran (37)	7 (18.90)	14 (37.80)	8 (21.60)	8 (21.60)	-	-
Khorasan Razavi (60)	7 (11.70)	15 (25.00)	20 (33.30)	15 (25.00)	3 (5.00)	-
Khuzestan (55)	8 (15.70)	25 (49.00)	18 (35.30)	-	-	-
Fars (55)	8 (15.40)	11 (21.20)	29 (55.80)	4 (7.70)	-	-
Kerman (49)	3 (6.10)	30 (61.20)	13 (26.50)	-	-	3 (6.10)
Kermanshah (56)	4 (7.10)	30 (53.60)	22 (39.30)	-	-	-
Mazandaran (57)	20 (36.40)	7 (12.70)	27 (49.10)	1 (1.80)	-	-
Hormozgan (33)	10 (30.30)	14 (42.40)	9 (27.30)	-	-	-
Whole Iran (504)	85 (16.80)	209 (41.40)	161 (31.90)	32 (6.34)	3 (0.59)	5 (0.99)

Ansari-Moghaddam et al. in a review reported a prevalence of 23.6% for tramadol use in Iran.<sup>24</sup> A study in China showed a prevalence of 0.4% for tramadol use.<sup>25</sup> Although tramadol should be sold with a prescription; however, several factors including selling without physician's prescription, less reaction to tramadol use from the society compared to other drugs,<sup>9</sup> and the current wrong belief about tramadol's effectiveness<sup>10</sup> has led to an increase in the misuse of tramadol. Tramadol not only is addictive, but also can cause respiratory depression and death when is used with alcohol.<sup>13</sup> Tramadol-related deaths have increased in recent years in Iran. Using tramadol with some substances such as benzodiazepines (BZDs) has increased the risk for tramadol poisoning.<sup>26</sup> Accordingly, due to the effects of tramadol on society and the fact that using drugs is affected by the awareness and beliefs, training people can change their attitudes and reduce tramadol consumption.<sup>23</sup>

In this study, young people were the most important tramadol users. Zabihi et al. reported adolescents as the most important users of tramadol.<sup>27</sup> Bassiony et al. showed the increased prevalence of tramadol use in adolescents.<sup>11</sup> Friends have been shown to play a determinant role in tramadol use, and those with tramadol using friends are more likely to use tramadol.<sup>28</sup> It has been demonstrated that among students who use drugs, tramadol is the first drug to use.<sup>29</sup> There is an association between tramadol consumption and cigarette smoking and by using tramadol, the likelihood of smoking is also increased leading to regular smoking among young people.<sup>30</sup> Tramadol not only can be used with cigarette smoking, but also is used with alcohol, cannabis, and ecstasy in the youth.<sup>15</sup> Possibly unemployment in young people and the current wrong belief about tramadol's effectiveness in sexual relationship have increased the consumption of this opioid-like painkiller among young people.<sup>8,10</sup> Therefore, the educational and supportive role of parents, schools, and universities can play an important role in raising awareness and reducing tramadol abuse.

Based on the results, the most important reasons for tramadol use were addiction and sexual relationship. The effectiveness of tramadol on the treatment of premature ejaculation<sup>31</sup> and also the wrong belief about tramadol's

effectiveness in the increased sexual functioning<sup>10</sup> may result in the increased consumption of this opioid-like painkiller during sexual relationship.<sup>13</sup> An increase in tramadol use has been reported and there have been several cases of unprotected sexual relationships and also multiple sexual partners among tramadol users.<sup>25</sup> Due to the resulted problems for tramadol users and the restriction on tramadol use for those with therapeutic purpose,<sup>13</sup> its use should be considered and people also should be educated about its addiction and side effects.

In our study, about one-eighth of those who referred to the pharmacies had tramadol among their prescribed drugs, and about 82% of the tramadol in pharmacies was purchased without a prescription. Zabihi et al. showed that about 70% of people purchased tramadol without a prescription and reported that the most of shoppers purchased tramadol for themselves.<sup>27</sup> Abood and Wazaify announced that about 10% of the shoppers asked tramadol, and asking for tramadol was among the most common requests.<sup>32</sup> Although according to the Ministry of Health and Medical Education guidelines, selling tramadol without prescriptions is prohibited, it is sold without physician's prescription.<sup>27</sup> However, it is recommended that access to the over-the-counter (OTC) drugs be reduced, since drugs are reported as the main cause of poisoning in Iran.<sup>26</sup> Non-OTC drugs are provided without prescriptions by some pharmacies due to their low and moderate attitudes toward professional ethics.<sup>33</sup> The number of pharmacies has risen in different regions of Iran for the increased access and well-being of patients;<sup>27</sup> however, their performance should be more supervised.

In addition to the possible bias of each method, the limitations of our study can be as follows: this study was performed on people aged 15-49 years, so there may be some tramadol users younger than 15 years and over 49 years who were not studied in our study. Our findings can be more generalized to large cities, and there may be fewer tramadol users in small towns and rural areas. Using both methods and their information to estimate the considered population in this study may provide a better estimate of tramadol users. Moreover, it may be due to some methodological issues such as transparency of the users to others, prestige bias, and etc. that the results of this study

has underreported the size of population that misuse tramadol in the country.

### Conclusion

Since tramadol is easily obtained and due to the wrong current beliefs about its effectiveness, it seems that tramadol use is increasing among young people in their sexual relationships, which owing to its misuse and also preparing without prescription can lead to addictive effects of this opioid-like substance as well as other unwanted problems due to its effect on the body organs and the death of young people. Supervision of

pharmacies and how tramadol is prepared seems to be effective in reducing the distribution and consumption of this substance.

### Conflict of Interests

The Authors have no conflict of interest.

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## برآورد اندازه جمعیت سوء مصرف کنندگان ترامادول در جمعیت شهری ایران: ترکیب روش‌ها و نتایج

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### مقاله پژوهشی

### چکیده

**مقدمه:** تخمین جمعیت مصرف‌کنندگان مواد برای برنامه‌ریزی، پایش و ارزیابی، پیشگیری و درمان آنان ضروری است. هدف از انجام پژوهش حاضر، تخمین جمعیت مصرف‌کنندگان غیر قانونی ترامادول در جمعیت شهری ایران بود.

**روش‌ها:** در این مطالعه، از دو روش بسط شبکه‌ای و خرد افراد صاحب‌نظر برای محاسبه جمعیت مصرف‌کنندگان غیر قانونی ترامادول در ۱۰ استان ایران در سال ۱۳۹۵ استفاده شد. روش خرد افراد صاحب‌نظر در میان مسؤولان داروخانه‌ها و فروشندگان عطاری‌ها به کار برده شد. آن‌ها بهترین تخمین از مصرف‌کنندگان غیر قانونی ترامادول در شهرهایشان را ارائه نمودند. روش بسط شبکه‌ای در جمعیت عمومی به منظور برآورد مصرف‌کنندگان تفنی و مستمر غیر قانونی ترامادول طی ۱۲ ماه گذشته مورد استفاده قرار گرفت. میانه دو روش برای محاسبه نسبت جمعیت بزرگسال (۴۹-۱۵ سال) به کار برده شد.

**یافته‌ها:** اندازه جمعیت مصرف‌کنندگان غیر قانونی ترامادول ۸۳۳۰۰ (فاصله اطمینان ۹۵ درصد = ۲۶۵/۲۲۰-۴۷/۹۶۰) برابر با ۶/۶ در هر ۱۰۰۰ نفر (فاصله اطمینان ۹۵ درصد = ۳/۸۸-۲۰/۳۰) بود. تعداد مصرف‌کنندگان غیر قانونی ترامادول برای ۳۱ مرکز استان کشور، ۱۱۸/۲۹۰ (فاصله اطمینان ۹۵ درصد = ۱۳۰/۸۴۰-۶۶/۱۰۰) و برای مناطق شهری، ۲۱۲/۴۴۰ (فاصله اطمینان ۹۵ درصد = ۶۵۳/۴۱۰-۱۲۲/۳۱۰) برآورد گردید. روش بسط شبکه‌ای تعداد مصرف‌کنندگان مستمر ترامادول را ۵۲ هزار نفر (فاصله اطمینان ۹۵ درصد = ۱۷۶/۵۷۰-۱۹/۹۴۰) برای شهرهای مورد بررسی، ۷۳۸۴۰ نفر (فاصله اطمینان ۹۵ درصد = ۲۵۰/۷۴۰-۲۸/۳۲۰) برای مراکز استان‌ها و ۱۳۲۶۱۰ نفر (فاصله اطمینان ۹۵ درصد = ۴۵۰/۳۱۰-۵۰/۸۶۰) برای تمامی نواحی شهری ایران برآورد نمود.

**نتیجه‌گیری:** تحقیق حاضر شیوع بالای مصرف غیر قانونی ترامادول را در جمعیت شهری نشان می‌دهد. به نظر می‌رسد نیاز به برنامه کنترل ملی و کاهش تقاضا جهت کنترل مصرف غیر قانونی ترامادول ضروری می‌باشد.

**واژگان کلیدی:** ترامادول، سوء مصرف، جمعیت، بسط شبکه‌ای، خرد جمعی، ایران

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