

*Original Article****Study of Mortality Rate and Poisoning Status by using Pesticides, Drugs, and Chemicals in Meshkinshahr, Ardabil Province***

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***Abstract***

**Background and Purpose:** Poisoning with pesticides, drugs, and chemicals is one of the most important health problems in the world, causing a varying mortality rate in different regions. Easy access to a variety of drugs and poisons has caused some people to be hurt by using such things. The aim of this study was to evaluate the poisoning and mortality rate by using poisons, drugs, and chemicals in Meshkinshahr, a city in Ardabil Province.

**Materials and Methods:** This descriptive and analytical cross-sectional study was conducted in Meshkinshahr Hospital from 2017 until the end of 2018. All information of people who were poisoned with pesticides, drugs, and chemicals was extracted from hospital case, and then was analyzed by SPSS 23.

**Results:** Totally, 453 cases were referred to hospital with 173 (38.20 %) male and 280 (61.80 %) female. 73% of the cases were poisoned by using medications and drugs, 18% by using other chemicals and 9% by poisons and pesticides. The mortality rate was 4%, with 70% due to exposure to pesticides and toxics, and 60% pertaining to deliberate suicide.

**Conclusion:** According to the results of this study, most of the poisoning cases occurred as a result of using drugs; however, more than 70% of mortality was due to pesticides which indicated the toxicity of the pesticides.

**Keywords:** Poisoning; Deaths; Pesticides; Drugs; Chemicals; Ardabil

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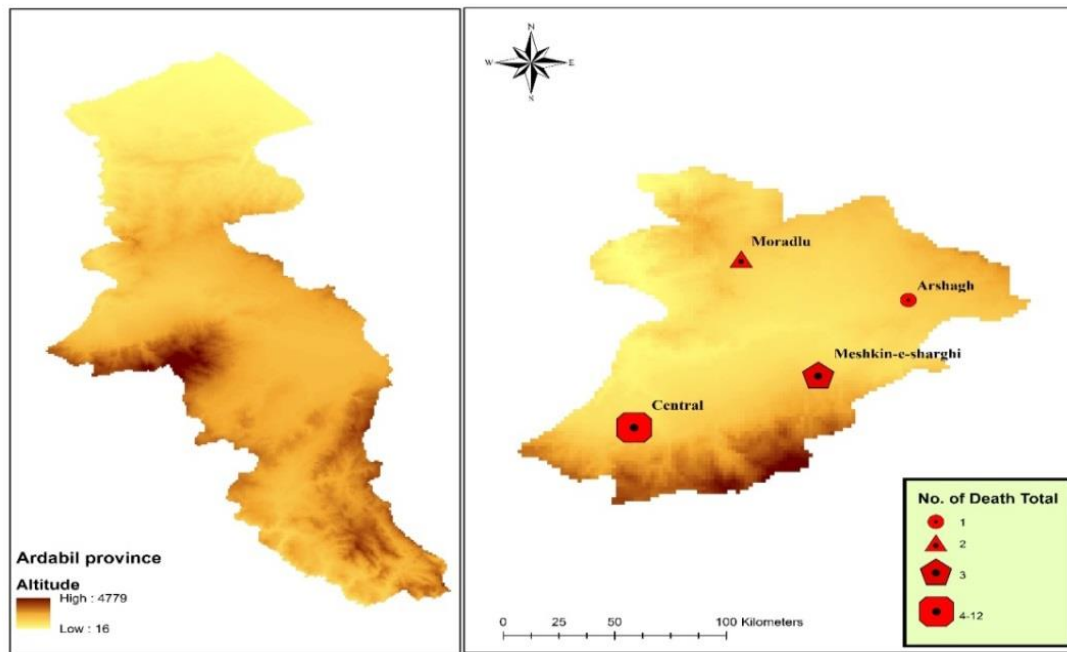
## **1. Introduction**

Poisoning with pesticide, drugs or chemicals, deliberately or accidentally, is one of the most important and urgent problems in the health system of developed or developing countries (1-6). In the United States, poisoning has been reported to be more than two million cases per year (7, 8). The mortality rate from these poisonings has been reported in some parts of the world to be 20%, and according to the World Health Organization reports, more than 200,000 deaths from poisoning occur annually in the world (9). In Asian countries including Iran, the use of poisons or chemicals and drugs is one of the most common ways in which humans hurt themselves, leading to death in more than 60% of the cases (10). Iran is one of the developing countries with more than 80 million people (11) with 15-20% of those who come to the country's emergency to be poisoned with chemicals and pesticides (11-13). In 2003, Iran was ranked 58<sup>th</sup> in the world with 3967 suicides per year using poisons, drugs, and chemicals (14, 15). Suicide using pesticide, drugs and chemicals is one of the health problems of the country. The most important causes of poisoning and suicide attempt using pesticides, drugs, and chemicals in Iran are the availability of drugs, chemicals, and

pesticides, and the lack of knowledge about the nature of chemicals and their complications can be prevented in many of poisoning and suicides by raising awareness in households about the nature of these substances (16-18). In Ardabil Province, mortality rate among poisoned people with pesticide, drugs, and chemicals was 3-4%, of which more than 66% were suicide attempts, and only 5% were accidentally poisoned and died (19, 20). Due to the high mortality rate, studies should be conducted in all cities in order to extract actual level in the Province. Therefore, this study evaluated the level of poisoning and its mortality rate among patients referring to Meshkinshahr Valiasr Hospital in Ardabil Province.

## **2. Materials and Methods**

Meshkinshahr has 47. 6648490 Longitude and 38.3948290 latitude that is located in the central regions of Ardabil Province and 25 km away from Sabalan Mountains. The region has a mountainous climate and has a population of about 160,000 people and consists of four districts, central part, Arshagh, Moradlou, and Meshkin, with an only 96-bed hospital to which all patients refer (21) (Figure 1).



**Fig1.** The study area and mortality rate by poisoning in different parts of Meshkinshahr in Ardabil Province

The data of people who were referred to this hospital and were poisoned with pesticides, drugs, and other chemicals during the years 2017 to 2018 were extracted and analyzed by SPSS23 and statistical methods of T-test and Chi-square. This project was sponsored by the Student Research Committee of Ardabil University of Medical Sciences under the number 436878. It was also approved and conducted with the code of ethics: IR.ARUMS.REC.1395.41.

### 3. Result

In this study, 453 people were poisoned with various chemicals, drugs, and pesticides in the past two years of 2017 and

2018, of which 173 (38.20%) were male and 280 (61.8%) female. The numbers of poisoned people were 204 (45%) and 249 (56%) in the years 2017 and 2018, respectively. 72.8% of the poisoned cases were poisoned with a variety of drugs in these two years, and 25.8% were poisoned with various pesticides, and the rest were poisoned with other chemicals, and they were all treated in the hospital of Meshkinshahr. More than 40% of poisoning was reported in housewives. 61.67% of poisoning were married, 39.95% were single, and 2.44% were divorced. 32.38% of the subjects had finished their high school and had diplomas (Table1).

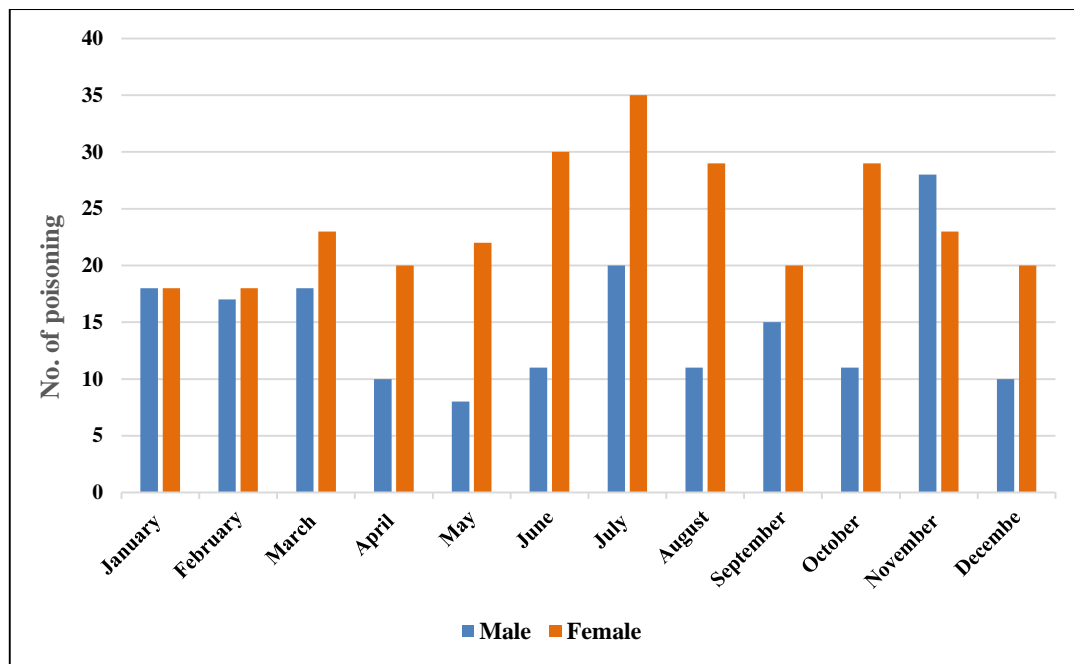


Fig 2. Number of poisonings by month and sex in Meshkinshahr county of Ardabil Province

Statistical analysis results showed that the mean age of poisoning was 26.4 years with a standard deviation of 10.2 years and 91% of those under 40 years of age. The mean (SD) age for males and females was (7.8) 27.5 and (9.8) 25.75 years, which was not statistically significant. There was a significant difference between age and type of poisoning, and those who were poisoned by medication had a mean age higher than the rest ( $P < 0.001$ ). The highest poisoning

occurred in July with 53 cases, and the lowest was in December with 29 poisonings (Figure 2). Most of the poisonings were done with drugs, and the rate was higher for women than men with a statistically significant difference ( $P < 0.001$ ). Also, the type of poisoning for the variables of residence, marital status and educational level was found to be not significant ( $P > 0.005$ ) (Table 1).

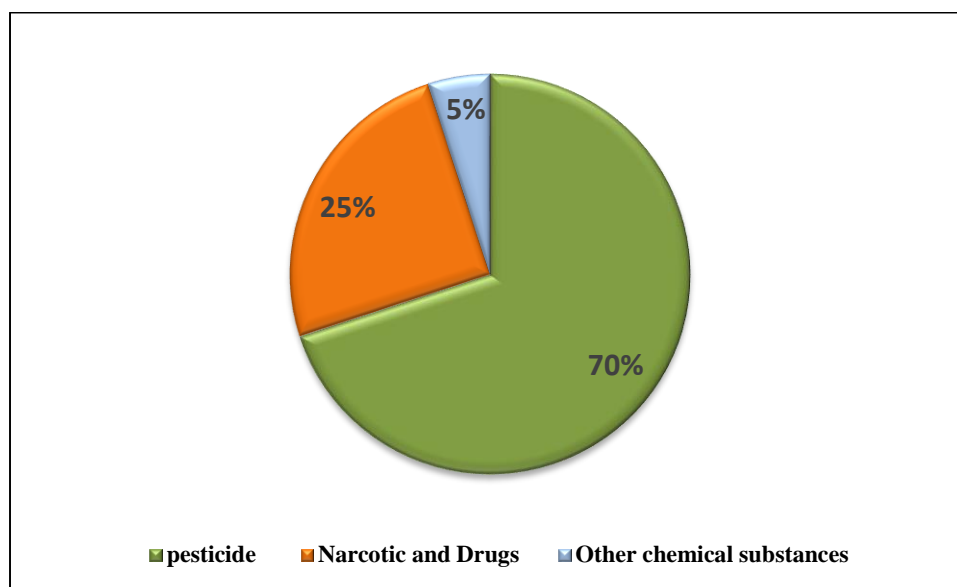


Fig 3. The mortality rate of poisoning cases in Meshkinshahr of Ardabil Province

During two years, from 453 patients who were referred to Meshkinshahr Hospital because of poisoning, 18 (4%) died with 66.67% male and 33.33% female. 11.16% lived in rural areas and 89.88% were in urban areas. Investigating the causes of death showed that 70% of death was due to the use of pesticides, 25% due to drugs, and

5% due to other chemical substances. 60% of the death cases were intentional through committing suicide, and 40% were unintentional and accidental. 50% of the dead were between the ages 21 and 40, and 66.66% of them were in the central part of the city, while the rest were in other parts. (Figure 3)

**Table1. Demographic information and its relation with the amount of poisoning present.**

	Drugs N (%)	Chemical N (%)	Pesticide N (%)	P-value
Male	117(68)	3(1.7)	52(32.2)	0.009
Female	215(77.6)	11(4)	51(18.4)	
Urban	210(75.5)	7(2.5)	61(21.9)	0.494
Rural	122(71.3)	7(4.1)	42(2.6)	
Single	138(76.7)	4(2.2)	38(21.1)	0.458
Married	193(72)	10(3.7)	65(24.3)	
Illiterate	85(72.2)	6(5)	30(24.8)	0.635
Under diploma	139(76.4)	4(2.2)	39(21.4)	
Diploma and Academic	97(72.9)	4(3)	32(24.1)	

#### 4. Discussion

Pesticide poisoning is a major contributor to population patterns of morbidity and mortality in developing nations. The use of pesticides for self-poisoning may distort conventional epidemiological features of suicide and contribute to their excess premature mortality (22). In this study, the mortality rate was estimated to be 4% due to the use of pesticides, narcotics, and drugs 60% of which were due to the intentional consumption of various poisons. According to the results of this study, from total number of people, 9% were poisoned with pesticides, while the rest of them were poisoned with drugs and other chemicals, but 70% of the cases were among those who were poisoned with pesticides, and 30% were related to the use of other kinds of drugs and other chemicals. In 2012 in Ardabil Province, the mortality rate due to poisoning with pesticides and chemicals

was 3.71% (19), whereas in 2014, it increased to 4.25% (20), which is consistent with the present study. In other regions of Iran, including Gorgan, in 2015, the mortality rate was 80.6% (23), and in 2000, this rate was 57.2% in Mazandaran (22). Considering the fact that in this region, most careers of people are agriculture and farming, and the use of pesticides in these careers is high, ease of access to poisons is a major cause of poisoning and suicide (23, 24). The high rate of poisoning and mortality due to pesticides in the world and in Iran shows that consumption of these chemicals is high, and there is a potential risk to international health and people's health. In this study, women experienced more percentage of poisoning (61.80%), while most death cases were due to these poisonings in men (66.67%). The study of Oguzturk in Turkey in 2010 was then in line with our study (25). However, in other

studies, the cases of poisoning in men has been reported to be more than women, which can be attributed to the studies of Tolami et al. (1989), and Bohnert 2006 (26, 27), whose results were not in line with the findings of our study. In the current study, more poisonings were carried out using a variety of narcotics and drugs, accounting for more than 73% of poisoning. The results of similar studies, including Seraji et al. in Khomein (28) and Afzeli et al. in Hamadan (29) showed that narcotic and drug abuse is at the first rate in poisoning. In Iran, ease of access to drugs, arbitrary use of drugs, belief in the health of some drugs including opium, and the presence of many drug stores at homes cause that the amount of consumption of these substances, and poisoning with a variety of them to be increased (30-32). In this study, most of the poisonings and deaths occurred in the age range of 21-40 years old, among active workforces in the community, which was consistent with the results of the studies of Shadnia et al. (9) in Tehran and Srivastava et al. in India(33).

### 5. Conclusion

According to the results of this study, poisoning and mortality rate of poisoning due to chemicals were found to be high, as also indicated by national reports, but it was also remarkably documented that most poisoning cases were with narcotics and all other kinds of drugs. However, the majority of deaths was reported to be due to pesticides, that indicated the harmfulness of them, as well as the availability of these substances for poisoning and suicide, which should be need to be educated in about the dangers of pesticides in the region.

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### Conflict of interests

The authors declare that they have no conflicts of interest.

### Reference

1. Ahmadi A, Pakravan N, Ghazizadeh Z. Pattern of acute food, drug, and chemical poisoning in Sari City, Northern Iran. *Human & experimental toxicology*. 2010;29(9):731-8.
2. Ala A, Vahdati SS, Moosavi L, Sadeghi H. Studying the Relationship Between Age, Gender and Other Demographic Factors with the Type of Agent Used for Self-Poisoning at a Poisoning Referral Center in North West Iran/Kuzey Bati Iran'da Bir Zehirlenme Referans Merkezinde Kendini Zehirlenmek için Kullanılan Ajan Tipi ile Yas, Cinsiyet ve Diğer Demografik Faktörlerin İlişkinin Arastırılması. *Journal of Academic Emergency Medicine*. 2011;10(3):100.
3. Karbakhsh M, Zandi NS. Pattern of poisoning in the elderly: an experience from Tehran. *Clinical toxicology*. 2008;46(3):211-7.
4. Kassiri H, Feiz-Haddad MH, Ghasemi F, Rezaei M, Ghanavati F. An epidemiologic and demographic survey of poisoning in Southwest of Iran. *Middle-East Journal of Scientific Research*. 2012;12(7):990-6.
5. Masoumi G, Ganjei Z, Teymouri E, Sabzghabae AM, Yaraghi A, Akabri M, Eizadi-Mood N. Evaluating the Prevalence of Intentional and Unintentional Poisoning in Vulnerable Patients Admitted to a Referral Hospital. *Journal of Isfahan Medical School*. 2013;31(252):1452-1460.
6. Sawalha AF, Sweileh WM, Tufaha MT, Al-Jabi DY. Analysis of the pattern of acute poisoning in patients admitted to a governmental hospital in Palestine. *Basic & clinical pharmacology & toxicology*. 2010;107(5):914-8.
7. Lamireau T, Llanas B, Kennedy A, Fayon M, Penouil F, Favarell-Garrigues JC, Demarquez JL. Epidemiology of poisoning in children: a 7-year survey in a paediatric emergency care unit. *European journal of emergency medicine*. 2002;9(1):9-14.

8. Litovitz TL, Klein-Schwartz W, Rodgers GC, Cobaugh DJ, Youniss J, Omslaer JC, May ME, Woolf AD, Benson BE. 2001 Annual report of the American Association of Poison Control Centers toxic exposure surveillance system. *The American journal of emergency medicine*. 2002;20(5):391-452.
9. Shadnia S, Esmaily H, Sasanian G, Pajoumand A, Hassanian-Moghaddam H, Abdollahi M. Pattern of acute poisoning in Tehran-Iran in 2003. *Human & experimental toxicology*. 2007;26(9):753-6.
10. Konradsen F, van der Hoek W, Cole DC, Hutchinson G, Daisley H, Singh S, Eddleston M. Reducing acute poisoning in developing countries—options for restricting the availability of pesticides. *Toxicology*. 2003;192(2-3):249-61.
11. Alinejad S, Zamani N, Abdollahi M, Mehrpour O. A narrative review of acute adult poisoning in Iran. *Iranian journal of medical sciences*. 2017;42(4):327.
12. Mehrpour O, Zamani N, Brent J, Abdollahi M. A tale of two systems: poisoning management in Iran and the United States. *DARU Journal of Pharmaceutical Sciences* 2013;21(1):42-48.
13. Bagheri P, Sepand M. A meta analytical study of intentional and accidental non-food poisoning incidences in Iran (1991-2013). *Koomesh*. 2015;16(3):443-53.
14. Kheyraadi Gh.R. Intentional and accidental poisonings and their relation with some individual characteristics of patients. *Scientific Journal Of Kurdistan University Of Medical Sciences* 2001;6(1):26-9.
15. Islambulchilar M, Islambulchilar Z, Kargar-Maher MH. Acute adult poisoning cases admitted to a university hospital in Tabriz, Iran. *Human & experimental toxicology*. 2009;28(4):185-90.
16. Najjari F, Ramazannejad P, Ahmadi A, Amini Z. Epidemiological Study of Poisoning in Patients Referring Educational and Clinical Center of Ayatollah Kashani Hospital, Shahrekord (West of Iran) throughout 2008-2014. *International Journal of Medical Toxicology and Forensic Medicine* 2016;6(3):121-7.
17. Hawton K, Fagg J, Simkin S, Bale E, Bond A. Trends in deliberate self-harm in Oxford, 1985–1995: Implications for clinical services and the prevention of suicide. *The British Journal of Psychiatry*. 1997;171(6):556-60.
18. Randev S, Grover N, Sharma R, Sharma H. Acute poisoning in children: seven year experience at a tertiary care hospital of north India. 2011;15(1):65-8.
19. Farzaneh E, Amani F, Sadeghiyeh S, Sayad Rezaeei E, Mirzarahimi M, Mostafazadeh B, Ghorbanzadeh A. Acute Poisoning in Adults Admitted in Ardabil Imam Khomeini Hospital. *Journal of Ardabil University of Medical Sciences*. 2012;12(5):95-102.
20. Sadeghih Ahari S, Farzaneh E, Amani F, Azari S. Epidemiology of Poisoning due to Agricultural Pesticides in Patients Referred to Ardabil City Hospitals. *Journal of Health and Hygiene*. 2014;5(3):240-7.
21. Shokrzadeh M, Hoseinpoor R, Hajimohammadi A, Delaram A, Shayeste Y. Epidemiological survey of suicide attempt by drug poisoning in Gorgan, Iran, 2008 to 2015. *Journal of Mazandaran University of Medical Sciences*. 2016;26(143):201-10.
22. Moghadamnia AA. Common poisoning episodes the routes of solution with a view of poisoning in mazandaran province past, present and the future. *Journal of Babol University of Medical Sciences*. 2008;9(6):61-77.
23. Moradi-Asl E, Hanafi-Bojd AA, Rassi Y, Vatandoost H, Mohebbali M, Yaghoobi-Ershadi MR, Habibzadeh S, Hazrati S, Rafizadeh S. Situational analysis of visceral leishmaniasis in the most important endemic area of the disease in Iran. *Journal of arthropod-borne diseases*. 2017;11(4):482-492.
24. Moradiasl E, Rassi Y, Hanafi-Bojd AA, Vatandoost H, Saghafipour A, Adham D, et al. The Relationship between Climatic Factors and the Prevalence of Visceral Leishmaniasis in North West of Iran. *International Journal of Pediatrics*. 2018;6(2):7169-78.
25. Oguzturk H, Turtay MG, Pamukcu E, Ciftci O. Demographic features of acute drug poisoning admitted to Inonu University Hospital in Malatya, Turkey. *Scientific research and essays*. 2010;5(18):2761-7.
26. Fazel Tolami L, Maleki Ziabari S. Study of Variety of Toxicity in the Poisoned Cases

- Rescued by Emergency Medical Sciences Center in Guilan. *Journal of Guilan University of Medical Sciences*. 2012;21(84):77-82.
27. Bohnert AS, Fudalej S, Ilgen M. Increasing poisoning mortality rates in the United States, 1999–2006. *Public health reports*. 2010;125(4):542-7.
  28. Seraji A, Momeni H, Salehi A. The investigation of factors affecting dependence on narcotics and reappearance of drug usage in narcotics anonymous population in Khomein. *Arak Medical University Journal*. 2010;13(3):68e75.
  29. Afzali S, Mani Kashani K, Abbasi Kolsoum F. Pattern of mortality due to poisoning by drugs and chemical agents in Hamadan, Iran, 2005-2007. *Qom university of medical sciences Journal*. 2008;2(2):27-32.
  30. Karbakhsh M, Zandi N. Acute opiate overdose in Tehran: the forgotten role of opium. *Addictive behaviors*. 2007;32(9):1835-42.
  31. Milev V, Mikhov D. Attempted suicide by poisoning in the Sofia region. *The British Journal of Psychiatry*. 1992;160(4):560-2.
  32. Soudi R, Sadeghieh Ahari S, Morad Asl E, Soudi ZJJoH. Study of Drug Storage in Meshkin Shahr Households in 2014. *Journal of Health*. 2017;8(4):408-15.
  33. Srivastava A, Peshin SS, Kaleekal T, Gupta SK. An epidemiological study of poisoning cases reported to the national poisons information centre, All India Institute of Medical Sciences, New Delhi. *Human & experimental toxicology*. 2005;24(6):279-85.