Research Paper
Epidemiology of Suicide in the Relief Missions in the Pre-Hospital Emergency System of Mazandaran University of Medical Sciences During 2019-2021

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ABSTRACT

Background: Mazandaran Province is one of the provinces with a high suicide rate. Therefore, this study aimed to determine the epidemiology of relief missions following suicide in the pre-hospital emergency system of Mazandaran University of Medical Sciences.

Materials and Methods: This descriptive study was conducted from September 2019 to 2021 in the pre-hospital emergency department of Mazandaran University of Medical Sciences. Statistical information related to the missions carried out after suicide was extracted using the data contained in the emergency national mission form recorded in Asayar software. According to the questionnaire, demographic information including age, gender, accident location, time, method of suicide, as well as mission outcome were extracted. To examine the results, frequency percentage, Mean±SD were used, and to examine the qualitative variables, the Chi-square test, and Fisher's exact test were used. The collected data were analyzed using SPSS software, version 26 (SPSS Inc., Chicago, IL, USA). A significance level of 0.05 was considered.

Results: In this study, 712(53.7%) were men and 615(46.3%) were women. The mean age of patients was 32.12±2.03 years. Fisher›s exact test revealed a statistically significant relationship between age groups and suicide methods (P=0.02). The Chi-square test was used to investigate the relationship between the suicide method and gender. According to the results of this test, a statistically significant relationship was observed between gender and suicide methods (P=0.00). The most common methods of suicide among clients were drug poisoning (32.1%), other cases (30.06%), and self-harm (20.6%), respectively. The highest frequency of suicide attempts occurred between evening and night among 497 people (37.5%) in terms of accident time.

Conclusion: Young and productive age groups are among the most vulnerable groups among suicides. Men died about five times more than women after committing suicide in a pre-hospital emergency room. According to the results, more planning is required regarding mental health self-care education in families and schools, implementation of psychological counseling, diagnosis, and prompt treatment in vulnerable groups.

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1. Introduction

Suicide is known as one of the biggest medical and social problems in the world [1, 2]. In addition to personal and family injuries, this phenomenon causes social challenges as well [3, 4].

According to the definition of the World Health Organization (WHO), suicide is an act in which a person intentionally and without the intervention of others performs an abnormal behavior, such as self-harm or consuming a substance in an amount greater than the amount prescribed for treatment, and his goal is to achieve the expected changes [5]. This organization announced in June 2021 that more than 700,000 people die by suicide every year. For every suicide, more people commit suicide [6].

According to the long-term history of suicide to improve the public health of society, epidemiological investigations of suicide and its action are considered essential components of the mental health of society [7]. The issue of suicide becomes more prominent when, according to reports, suicide attempts are more common among teenagers and young people than among other age groups [8]. This phenomenon is reported as the fourth cause of death among teenagers aged 15-19 years in 2021.

The causes of suicide are different in people, and factors, such as despair or having inappropriate mental and psychological conditions, drug addiction and abuse, financial problems, family challenges, cultural issues, etc. can be considered to be involved in its creation. Various factors, such as age, sex, race, psychological factors, socioeconomic conditions, family conditions, and the level of access to counseling and mental health services, etc. can play a vital role in the formation of suicide attempts and their repetition in people [9]. A previous suicide attempt is the crucial risk factor for suicide in the general population. Eating pesticides, hanging, and firearms are among the most common methods of suicide in the world [6].

In the world, a suicide attempt occurs every three seconds [1]. The frequency of suicide varies depending on the geographical situation in different countries and regions so that 77% of the world's suicides occur in low- and middle-income countries [6]. The rate of suicide has increased in Iran in recent years and has reached 9.4 per hundred thousand people. In terms of the global ranking of suicide, Iran ranks 58th, among which the three provinces of Ilam, Kermanshah, and Hamadan have the highest suicide rate [5]. Considering the increase in suicide-related behaviors in recent years in the country, investigating and recognizing patterns related to it can help to prevent and control this health problem [2].

Geographical and temporal changes in the rate of suicide mortality are closely related to different social statuses in the provinces and over time [10]. Also in a study conducted in Taiwan, a significant relationship was observed between air temperature, humidity, sunlight, atmospheric pressure, season, and year with suicide [11]. Climatic factors (changes in temperature, humidity, and season) and geographic and atmospheric factors can be effective in the rate of suicide [12]. Studies have shown that demographic factors, such as age, sex, cultural, social, and economic factors [13-16] and marital status, physical health, alcohol addiction, drugs [17, 18], mental illnesses and depression, financial and legal problems and loss of relatives [19], even climate, geographical conditions, family history of suicide, and religion [20], each of them is somehow effective in the occurrence of suicide. The gender difference in suicide methods and the variety of suicide patterns are different in the geographical regions of the world [21].

Suicide prevention is not an easy process and this program is considered one of the vital priorities of the World Health Organization. Identifying the causes, methods of action, demographic, and epidemiological characteristics of suicides are vital in controlling and reducing this social challenge [22]. In other words, to have an effective program and intervention to reduce the cost and burden caused by this health problem in society, it is necessary to have accurate and appropriate information and identify the risk factors related to it [9].

Therefore, in this regard and considering that Mazandaran Province is one of the provinces with a high suicide rate, the present study was conducted to determine the epidemiology of relief missions following the suicide in the pre-hospital emergency system of Mazandaran University of Medical Sciences.

2. Materials and Methods

This study is descriptive and was conducted from September 2019 to September 2021 in the pre-hospital emergency area of Mazandaran University of Medical Sciences. Statistical information related to the missions carried out following suicide during the years under review using data contained in the national emergency mission form registered in Asayar software was extracted. Among the available information and by the demographic information questionnaire, age, sex, as well as from the emergency mission forms, items, such as the

Table 1. Frequency of suicide according to age groups and gender

Age Groups (y)	No.	Woman	Man
10-19	185	99	86
20-29	407	170	237
30-39	416	195	221
40-49	201	98	103
50-59	79	35	44
60-69	23	14	9
70-79	13	4	9
<80	3	0	3
Sum	1327	615(46.3%)	712(53.7%)

location of the accident, time of the accident, method of suicide, and the result of the mission were extracted.

To examine the results, frequency percentage, Mean± SD were used, and to examine the qualitative variables between the groups, the Chi-square test and Fisher's exact test were used. The collected data were analyzed using SPSS software, version 26 (SPSS Inc., Chicago, IL, USA). A significance level of 0.05 was considered.

The Chi-square test was used to investigate the relationship between suicide method, time of suicide, and gender. Fisher's exact test was also used to investigate the relationship between age groups and suicide methods.

The inclusion criteria included all the patients assisted with a diagnosis of suicide in the pre-hospital emergency department of Mazandaran and the exclusion criteria included patients assisted outside the time frame of the study.

3. Results

According to the information obtained during the 2 years from September 2019 to the end of August 2021, 1327 patients diagnosed with suicide were admitted to the pre-hospital emergency system of Mazandaran. The highest frequency of suicide attempts during these two years occurred in 2020 among 524 people (39.5%) and in September among 87 people (6.6%).

In the present study, 712 people (53.7%) were men and 615 people (46.3%) were women. The mean age of the patients was 32.2±12.03 years, and the most common age of suicide attempt was 20-29 and 39-30 years, re-

spectively. The lowest age of the admitted person was 11 years and the highest age was 87 years (Table 1).

According to the results of Fisher's exact test, a statistically significant relationship was observed between age groups and suicide methods (P=0.02).

The Chi-square test was used to investigate the relationship between the suicide method and gender. According to the results of this test, a statistically significant relationship was observed between gender and suicide methods (P=0.00) (Table 2).

The most common method of suicide among patients was drug poisoning (32.1%), other cases (30.06%), and self-harm (20.6%).

In the survey of people in terms of the time of the accident, the highest frequency of suicide attempts was between evening and night among 497 people (37.5%) and the lowest was among 195 people (16.8%) between 6 AM and 12 AM (Figure 1).

The Chi-square test was used for the relationship between the year of suicide and suicide attempt methods. According to the results, a significant relationship was observed (P=0.03).

The most common cause of death was hanging in 32 cases and the age group of 50 to 59 years. A total of 83% of deaths in the pre-hospital emergency area were male. In total, 5.3% of the missions resulted in death. A total of 988 suicide cases (74.5%) were sent to health centers (Table 3).

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Table 2. Comparison of frequency of causes of suicide and gender

Causes of Suicide	No.	Woman	Man
Self-immolation	11	1	10
Self-harm	273	74	199
Hanging	66	5	61
Free fall	17	7	10
Firearms	3	0	3
Rice pill poisoning	40	23	17
Drug poisoning	426	267	159
Alcohol and drug poisoning	18	2	16
Detergent poisoning	3	1	2
Poisoning with agricultural pesticides	2	1	1
Gas poisoning	4	3	1
Insecticide poisoning	3	2	1
Rodenticide poisoning	6	3	3
Other poisonings	56	28	28
Other reasons	399	198	201
Sum	1327	615	712

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Table 3. Results of suicide missions by gender

Result of Mission	No.	Woman	Man
Outpatient treatment and referral to a medical center	52	23	29
Transfer by personal vehicle	4	2	2
Dispatch	988	473	515
Delivery to another ambulance	2	1	1
Absence of the patient	2	1	1
Non-cooperation and refusal to perform treatment	209	103	106
Death	70	12	58
Sum	1327	615	712

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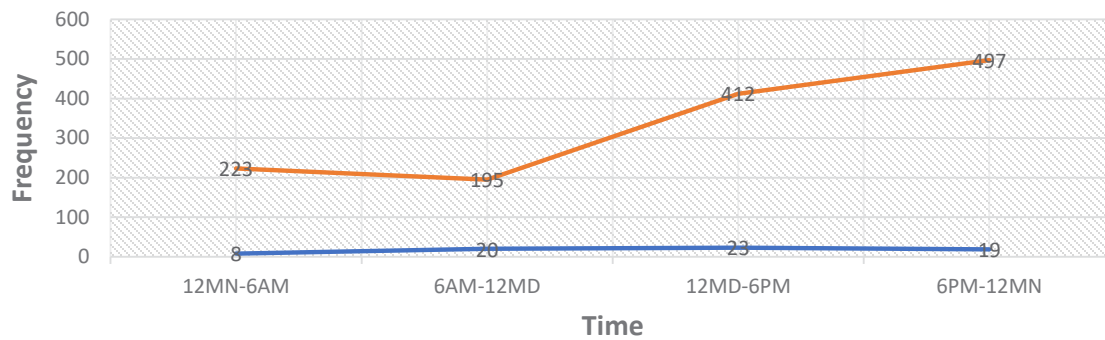
Figure1. Correlation between total number of suicide cases and death

4. Discussion

According to the findings of this research, the highest number of suicide cases occurred in the age group of 30-39 years, with 416 people, and the lowest number of suicide cases was reported in the elderly age group, with 39 cases. With increasing age, the percentage of suicide cases increased. The results of the present study were consistent with the findings of Mohammadi et al.'s study [1], but it was not consistent with the results of the study conducted by Shekarzadeh [9] and Rezaian [8] in 2014, which could be due to the different geographical location and also the difference in the investigated area (pre-hospital and hospital area).

In this study, men accounted for a greater share of suicide cases than women, men with 53.7% compared to women at 46.3%, which is consistent with the results of Zarenejad et al.'s study in Fars Province [20]. In the study conducted by Shokrzadeh et al. titled suicide attempt by drug poisoning, as well as in the study conducted by Mohammadi et al., women constituted a higher proportion of cases [1, 9].

Drug poisoning included the most cases of suicides. In women, the number of drug poisoning cases was more than in men. Intentional drug poisoning is one of the most common methods of committing suicide in many parts of the world [23]. In many investigations inside the country, including in Golestan [24], Semnan [25], Kermanshah [26], Ahvaz [27], Gilan [28], northwest Iran [29] and also some countries, including India [30], Turkey [31], and Romania [32] this trend has been observed. These results emphasize that the drug is considered one of the critical means of suicide in Iran and many parts of the world due to its easy access and ease of use.

Between 6 PM and 12 PM, the most cases of suicide were recorded, which is consistent with the study of Shekarzadeh and colleagues [9]. The highest frequency of deaths was reported between 12 AM and 6 PM.

Hanging, other cases of suicide, and self-harm had the largest contribution to the death of pre-hospital emergency system clients seeking suicide.

One of the limitations of this study is the lack of access to the demographic information of the patients due to the emergency of the patients and the need to quickly transfer and send them to the treatment center. Also, the medical records of the patient, the cause of the suicide attempt, the person's history of suicide, the result of being sent to the health-treatment center, etc. are not available in the pre-hospital emergency area.

5. Conclusion

Suicide prevention is not an easy process, and this program is considered one of the crucial priorities of the WHO. Young and productive age groups are among the most vulnerable groups in suicide cases. Men died about 5 times more than women due to suicide in the pre-hospital emergency department. In the summer season, suicide is more common than in other seasons. Therefore, more planning is required, including mental health self-care training in families, schools, etc. implementation of psychological counseling, rapid diagnosis, and treatment in vulnerable groups. Due to the emergency conditions of patients and the lack of access to medical records and demographic information of patients, more detailed investigations are needed to determine the epidemiology of suicide in the pre-hospital emergency system.

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Ethical Considerations

Compliance with ethical guidelines

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Authors' contributions

All authors equally contributed to preparing this article.

Conflict of interest

The authors declared no conflict of interest.

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