

The Epidemiology of Phosphine Self-Poisoning in Sari, Iran, 2008-2010

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Abstract: Self-poisoning Suicide has constituted a critical public health problem for many decades. The number of completed suicide is traditionally high in Iran. Phosphine that is named "tablet of rice" in agriculture in Iran, is administrated for rice as pesticide substance in north of Iran where the rice is base of agriculture. Phosphine is fatal and it haven't antidote. The objective of the present study was to describe the epidemiology of phosphine suicide in 2008 to 2010 at Imam Referral hospital in Sari city -The center of Mazandaran province. In this cross-sectional study, All suicidal attempts that referred to this hospital were screened since 2008 to 2010. All suicides in the obtained from Factors recorded included age, gender, occupational and marital status and methods of suicide. Results revealed that Phosphine suicide Attempts was 44 (%4.3), 22(%3), 31(%5.8) cases in 2008, 2009, 2010 also total suicide Attempts was 1026, 729, 536 in 3 years. The most common age of suicide was (15-24) in 3 years. The married to single ratio was 0.8, 1.4 and 1.4 in 2008, 2009, 2010 and the average was 1.2. For seasonally, the highest suicide attempts was at summer and was %41, 36%, 39% in 3 years. Meanwhile 35%, 29%, 30% of cases in 3 years were employed and others were unemployed. Suicide attempt rate in Sari is higher among females than males and higher among singles and by poisoning is more. It can be due to social and familial problems.

Key words: Phosphine poisoning • Suicide • Iran • Hospital

INTRODUCTION

Suicide is among ten causes of mortality and morbidity in the world. The incidence of suicide in the countries known as the suicide ring is 10-25 in hundred thousand annually [1].

Long-term mortality after self-poisoning, by both natural and unnatural causes [2], is much higher than for the general population, irrespective of intention [3]. For those who have not made suicide attempts, there is less literature, although the risk of death both in general and by suicide is increased for substance use disorders [4]. One would expect suicide attempt patients to differ from those who have not attempted suicide in more than the evaluated intention, even among self-poisoning cases. However, recent research indicates that the populations

overlap, with repetitions of self-poisoning during the same year differing in their evaluated intentions [5]. It is unclear whether the morbidity of the substance users treated in emergency departments has been underestimated [6].

Females' preferred method is drug overdose, which is not usually lethal, whereas males tend to prefer more lethal methods [7, 8]. There is a lack of international research on suicide by drug overdose as a preventable suicide method.

MATERIALS AND METHODS

The present study was a retrospective survey carried out at the Imam Hospital in Sari city northern Iran. All suicidal attempts that referred to this hospital were

screened since 2008 to 2010. All suicides in the obtained from Factors recorded included age, gender, occupational and marital status and methods of suicide. Data analysis was performed by using SPSS 13 software.

RESULTS

Average age of cases in male and female was 25, 27.5 in 2008, 32.3, 29.2 in 2009 and 29.2, 34.4 in 2010.

The male to female ratio of phosphine self-poisoning in the aggregate data was 0.83, 0.48 and 0.9 in 2008, 2009, 2010 and the Average was 0.74. The highest rates of phosphine suicide were found in male and female aged 15-24 in 2008 and males aged 15-24 in 2008, 2009, 2010. In this study, the highest phosphine suicide rate was in the 15-24 age group in 3 years (55%, 46% and 37% of cases in 2008, 2009, 2010) (Table 3).

The married to single ratio was 0.8, 1.4, 1.4 in 2008, 2009, 2010 and the average was 1.2 (Table 2).

The overall age distribution of suicide rates wasn't uniform. The range of age in males was 15-57, 22-44, 16-62 and in females was 16-58, 18-60, 16-77 in 2008, 2009, 2010 (Table 3).

Phosphine suicide Attempts was 44 (%4.3), 22(%3), 31(%5.8) cases in 2008, 2009, 2010 also total suicide Attempts was 1026, 729, 536 in 3 years (Table 4). Mean while the method of all of suicides were self-poisoning. %64, 68%, 74% of the phosphine suicide attempts were from Sari city population and others were from other cities in mazandaran province that referred to imam hospital. For seasonally, the highest suicide attempts was at summer and was %41, 36%, 39% in 3 years (Table 5)

Meanwhile 35%, 29%, 30% of cases in 3 years were employed and others were unemployed.

Table 1: suicide attempts by gender and marital status during 2008-2010

| Year | Sex | | | | | | | | |
|---------|--------------------|--------------|-------------|------------|--------------|-------------|------------|--------------|-------------|
| | 2008 | | | 2009 | | | 2010 | | |
| Marital | Male (Frequency %) | Female F (%) | Total F (%) | Male F (%) | Female F (%) | Total F (%) | Male F (%) | Female F (%) | Total F (%) |
| Single | 14(8) | 10(42) | 24(50) | 2(29) | 7(47) | 9(41) | 7(44) | 6(40) | 13(42) |
| Married | 6(20) | 14(58) | 20(7.1) | 5(78) | 8(53) | 13(59) | 9(56) | 9(60) | 18(58) |
| Total | 20(100) | 24(100) | 44(100) | 7(100) | 15(100) | 22(100) | 16(100) | 15(100) | 31(100) |

Table 2: marital status and gender ratio during 2008-2010

| Year | 2008 | 2009 | 2010 | Mean |
|----------------|------|------|------|------|
| Married/single | 0.8 | 1.4 | 1.4 | 1.2 |
| Male/female | 0.83 | 0.48 | 0.9 | 0.9 |

Table 3: Average, range of age and frequency in 15-24 years of suicide attempts during 2008-2010

| Year | Sex | | | |
|-----------------------------|--------|--------|--------|--|
| | 2008 | 2009 | 2010 | |
| Average of age | | | | |
| Male | 25 | 32.3 | 34.4 | |
| Female | 27.5 | 29.2 | 29.2 | |
| Total | 26.25 | 30.75 | 31.8 | |
| Range of age | | | | |
| Male | 15-57 | 22-44 | 16-62 | |
| Female | 16-58 | 18-60 | 16-77 | |
| Suicide in (15-24) age (F%) | | | | |
| Male | 13(27) | 8(37) | 9(22) | |
| Female | 13(27) | 2(9) | 6(15) | |
| Total | 26(55) | 10(46) | 15(37) | |

Table 4: Total of phosphine suicides during 2008-2010

| Year | 2008 Fre(%) | 2009 Fre(%) | 2010 Fre(%) |
|-----------------------------|-------------|-------------|-------------|
| Total of phosphine suicides | 44(4.3) | 22(3) | 31(5.8) |
| Total suicides in a year | 1026(100) | 729(100) | 536(100) |

Table 5: Suicide attempts by season

| The season | 2008 Fre(%) | 2009 Fre(%) | 2010 Fre(%) |
|------------|-------------|-------------|-------------|
| Spring | 5(11) | 7(32) | 7(22) |
| Summer | 18(41) | 8(36) | 12(39) |
| Autumn | 13(30) | 4(18) | 8(26) |
| Winter | 8(18) | 3(14) | 4(13) |
| Total | 44(100) | 22(100) | 31(100) |

DISCUSSION

Phosphine that is named tablet of rice in agriculture in Iran, is administrated for rice as pesticide substance in north of Iran where the rice is base of agriculture. phosphine in form tablet is available in supermarkets and drug stores although The committee of suicidal prevention in health center of mazandaran province became forbidden for sale. Phosphine is fatal and it haven't antidote so all of phosphine suiciders were death in this study.

In our research, the highest suicide attempts by phosphine were at summer.

It was found a remarkably consistent pattern of seasonality with peak incidence around June in the northern hemisphere and December in the southern hemisphere. Moreover, there was a positive association between the seasonal amplitude of suicide (measured by relative risk) and total sunshine in the corresponding country. These findings indicate that sunshine may have a triggering effect on suicide [9]. In other study in Iran, for seasonality the suicide rate in spring was in the highest level but winter was in the lowest level [20]. Based on the statistics presented in Japan, suicide rate increase in April and reduces in autumn while it is higher in spring in Fey-salabad of Pakistan. Our findings show a relative increase in summer [10,11]. Self-poisoning patients had several psychosocial risk factors for suicidal behavior. The male to female ratio of phosphine self-poisoning in the aggregate data was 0.83, 0.48 and 0.9 in 2008, 2009, 2010 and the Average was 0.74. The highest rates of phosphine suicide were found in male and female aged 15-24 in 2008 and males aged 15-24 in 2008, 2009, 2010. In this study, the highest phosphine suicide rate was in the 15-24 age group in 3 years (.55%, 46%, 37% of cases in 2008, 2009, 2010). In other study, the male to female ratio for suicide was estimated 7.1: 1 and the most cases of suicide were observed in the age of 21-30 yr. 79.5% of cases were employed and 20.5% of them were unemployed. Regarding marital status, 49.3% were married [12]. The married to single ratio was 0.8, 1.4, 1.4 in 2008, 2009, 2010 and the average was 1.2. In contrast with many studies reporting suicide more among single person, we found the suicide rate is higher among the married, the reason of which is unknown but it appears to be the unemployment, substance related disorders and economic problems [13,14]. The gender was difference corresponds with other studies, with more females among phosphine suicides [15] and more females among suicide attempt patients, although being male is a risk factor for completing suicide [16]. The age difference is also supported by other studies [17]. In this study Almost One third of the patients were employed. Compared with the general population of Oslo [18] lack of social integration has been identified in previous studies of suicide attempters and is thought to be an important risk factor for suicidal behavior [19]. The high rate of unemployment and economic problems are the most important predicaments of young people, which lead to disappointment and repression one hand and marriage inability, crime increase, addiction and corruption, on the other hand, in the society that provides a risk factor for people to commit suicide.

The low level of education lack of association with the labor market and high proportion of being single found here among self-poisoning patients was that found in studies on suicide attempters [20]. Of course, in our study, the married-to-single ratio was 0.8, 1.4, 1.4 in 3 years and overall the marriages were more.

In a recent cross-national study on suicide attempters, the same picture was seen. With the exception of employment status, which didn't appear as a risk factor for suicidal behavior [21]. In fully-adjusted models, people aged >64yrs were 13.8 (95%CI 3.6-53.0) times more likely to die than those aged <25yrs [22]. Lack of social integration has been found to be a risk factor for increased mortality even among samples of healthy in this study the females had suicide women than men.

CONCLUSION

In many cases, suicide in psychic patients can be prevented with a complete resume and psychic Assessment of the patients. It is not possible to prevent all suicides or totally and absolutely protect a given patient from suicide. But it is possible to reduce the likelihood of suicide for populations or subpopulations and to reduce the risk of it for a given person. Key strategies to reduce self-harm from intentional phosphine overdose include a public-health approach: informing patients and their families about the dangers of medicines; controlling their availability; and making it easier to dispose of unused tablets. Governments and agencies should be obliged to regulate access to lethal substances, promote training programmes and define international standards. Future development should be based on other countries' best practices, especially those incorporating effective monitoring and evaluation strategies.

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REFERENCES

1. Ahmadi, M. and M. Hajiahmadi, 2000. An epidemiological report on successful suicide in mazandaran province in 1990-91. *Journal of Mazandaran University of Medical Sciences* fall; 10(28): 8-12.

2. Owens, D., C. Wood, D.C. Greenwood, T. Hughes and M. Dennis, 2005. Mortality and suicide after non-fatal self-poisoning: 16-year outcome study. *Br J. Psychiatry*. 187: 470-475.
3. Bjornaas, M.A., D. Jacobsen, T. Haldorsen and O. Ekeberg, 2009. Mortality and causes of death after hospital-treated self-poisoning in Oslo: A 20-year follow-up. *Clin Toxicol.*, 47: 116-123.
4. Harris, E.C. and B. Barraclough, 1998. Excess mortality of mental disorder. *Br J. Psychiatry*, 173: 11-53.
5. Heyerdahl, F., M.A. Bjornaas, R. Dahl, K.E. Hovda, A.K. Nore, O. Ekeberg and D. Jacobsen, 2009. Repetition of acute poisoning in Oslo: 1-year prospective study. *Br J. Psychiatry*. 194: 73-79.
6. Rockett, I.R., S.L. Putnam, H. Jia and G.S. Smith, 2003. Assessing substance abuse treatment need: a statewide hospital emergency department study. *Ann Emerg Med.*, 41: 802-813.
7. Gunnell, D., D. Ho and V. Murray, 2004. Medical management of deliberate drug overdose: a neglected area for suicide prevention. *Emerg Med. J.*, 21(1): 35-38.
8. Michel, K., P. Ballinari, U. Bille-Brahe, T. Bjerke, P. Crepet, D. De Leo, C. Haring, K. Hawton, A. Kerkhof, J. Lonnqvist, I. Querejeta, E. Salander-Renberg, A. Schmidtke, B. Temesvary and D. Wasserman, 2000. Methods used for parasuicide: results of the WHO/EURO Multicentre Study on Parasuicide. *Soc Psychiatry Psychiatr Epidemiol.*, 35(4): 156-163.
9. Petridou, Eleni^{1, 2}; Papadopoulos, Fotios C.¹; Frangakis, Constantine E.³; Skalkidou, Alkistis¹ and; Trichopoulos, Dimitrios^{1,2}. A Role of Sunshine in the Triggering of Suicide. *Epidemiology*: January 2002 13(1): 106-109. Brief Report
10. Baumert, J., N. Erazo, E. Ruf, K.H. Ladwig, 2008. Time trends in suicide mortality vary 2. in choice of methods: An analysis fatal suicide cases in Germany, 2 008, 3. *Epidemiol. Jun 2008*; 12:144-50. *Soc Psychiatry Psychiatr*.
11. Nakaji, S., S. Parodi, V. Fontana, T. Umeda, K. Suzuki, J. Sakamoto, S. Fukuda, S. Wada and K. Sugawara, 2004. Seasonal changes in mortality rates from main causes of death in Japan (1970-1999). *Eur. J. Epidemiol.*, 19(10): 905-7
12. Ghaleiha, A., M. Khazaei, S. Afzali, N. Matinnia and B. Karimi, 2009. An Annual Survey of Successful Suicide Incidence in Hamadan, western Iran, 2009, *J Res Health Sci.*, 9(1): 13-16.
13. Marcikic, M., M. Ugljarevic, T. Dijanic, B. Dumenci and I. Pozgain, 2003. Epidemiological features of suicides in Osijek County, Croatia, from 1986 to 2000. *Coll Antropol.*, 27 Suppl(1): 101-10.
14. Lotrakul, M., 2005. Suicide in the north of Thailand. *J Med Assoc Thai.*, 88(7): 944-8.
15. Gossop, M., D. Stewart, S. Treacy and J.A. Marsden, 2002. Prospective study of mortality among drug misusers during a 4-year period after seeking treatment. *Addiction*, 97: 39-47.
16. Canetto, S.S., 1998. Sakinofsky I. The gender paradox in suicide. *Suicide Life Threat Behav.*, 28: 1-23.
17. Townsend, E., K. Hawton, L. Harriss, E. Bale and A. Bond, 2001. Substances used in deliberate self-poisoning 1985-1997: Trends and associations with age, gender, repetition and suicide intent. *Soc Psychiatry Psychiatr Epidemiol.*, 36: 228-234.
18. Statistics Norway: StatBank Norway. <http://statbank.ssb.no/statistikkbanken/?PLanguage=>
19. Duberstein, P.R., Y. Conwell, K.R. Conner, S. Eberly, J.S. Evinger and E.D. Caine, 2004. Poor social integration and suicide: Fact or artifact? A case-control study. *Psychol. Med.*, 34: 1331-1337.
20. Bille-Brahe, U., W. Hansen, L. Kolmos and A.G. Wang, 1985. Attempted suicide in Denmark. I. Some basic social characteristics. *Acta Psychiatr Scand.*, 71: 217-226.
21. Nock, M.K., G. Borges, E.J. Bromet, J. Alonso, M. Angermeyer, A. Beautrais, R. Bruffaerts, W.T. Chiu, G.G. De, S. Gluzman, G.R. De, O. Gureje, J.M. Haro, Y. Huang, E. Karam, R.C. Kessler, J.P. Lepine, D. Levinson, M.E. Medina-Mora, Y. Ono, J. Posada-Villa and D. Williams, 2008. Cross-national prevalence and risk factors for suicidal ideation, plans and attempts. *Br J Psychiatry*, 192: 98-105.
22. Eddleston, M., M. Dissanayake, M.H. Rezvi Sheriff, D.A. Warrell and David Gunnell, 2006. Physical Vulnerability and Fatal Self-harm in the Elderly. *Br J Psychiatry*. September. 189: 278-279.