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DEMOGRAPHIC FACTORS IN DROWNING DECEASED REFERRED TO TEHRAN AUTOPSY HALL FROM 2012 TO 2016

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ABSTRACT

Drowning is the process of experiencing respiratory impairment from submersion/immersion in liquid; Drowning outcomes are classified as death, morbidity and no morbidity. In this retrospective cross-sectional study during a five years period from 2012 to 2016, autopsy reports of all drowning deaths who referred to the Tehran province forensic medicine dissection hall in Iran, and their demographic factors were studied. Overall there were 91 (85/8%) men and 15 (14/2%) women who drowned during five years in Tehran. Most victims were 19-34 and 15-18 years of age. There were 77 (72/6%) single and 29 (27/4%) married. The most frequently connected activity was swimming and falling. 44(41/5%) cases of drowning had occurred in the spring, 45 (42/5%) in the summer, 13 (12/3%) in the autumn and 4 (3/8%) cases had occurred in the winter respectively. The majority of drowned victims were workless or self-employment. Most victims were student. There was an obvious seasonal variation in mortality by drowning during the study period. June, July, August,

September, April and May, respectively, were the most common months when deaths due to drowning happened. Ethanol was not detected in the blood of any victims. Most victims were healthy without any preexisting illness, so they were not use any kinds of drugs. Cases of drowning were increased from 19 (17/9%) in 2012 to 28 (26/4%) in 2016.There was no substance abuser. Most victims were drowned in swimming pool but the most activity when drowning happened were swimming and falling equal. Although the drowning related mortality in Tehran province is comparable to developed countries, effective prevention of drowning with better programming and policies might reduce its rate.

Keywords: Drowning, Demographic Factors, Autopsy, Tehran.

INTRODUCTION

Drowning is the process of experiencing respiratory impairment from submersion/immersion in liquid; Drowning outcomes are classified as death, morbidity and no morbidity. In 2012, an estimated 372 000 people died from drowning, making drowning a major public health problem worldwide. Injuries account for over 9% of total global mortality. Drowning is the 3rd leading cause of unintentional injury death, accounting for 7% of all injury-related deaths. Children, males and individuals with increased access to water are most at risk of drowning [1]. Variation in the bodies of water in which children of different ages drown has been described in several regional and national studies [2]. Drowning varies by age group, but for children and adolescents aged 1-24 years it ranks within the first five causes of death for the Western Pacific Region (which includes Australia)[3]. Official statistics are, however, known to underestimate the true burden of drowning and recent studies in high-income countries(US, Australia, New Zealand) have shown the importance of considering all drowning (e.g. boating, transport) in obtaining a complete profile of drowning mortality [4]. Among children, drowning accounts for a higher mortality rate than any other type of child injury, and the drowning rate in Asia is 20 times higher than in developed countries [5]. Drowning is preventable, yet in most countries drowning ranks among the top three causes of injury death. Additionally, countries categorized by income such as high income countries (HIC) or low and middle income countries (LMIC) have broadly varying death rates [6]. Despite the global decrease of age-standardized unintentional drowning mortality rate from 7.5(deaths per 100 000 population) in 1990 to 5.1 in2010, there was still a total of 439 100 unintentional drowning deaths

globally in 2010, according to the Global Burden of Disease Study 2010 (GBD 2010). [7]. Unintentional injuries, including drowning, continue to be one of the leading causes of childhood mortality among children. Different studies in the USA proposed several preventive strategies, such as poolfencing, installation of pool-alarm and telephone, and cardiopulmonary resuscitation in the case of near-drowning, along with parent's awareness. Previous reports indicated that, although the death rate from unintentional drowning for persons aged 0–19 years decreased in the United States, drowning had become the major cause of death from unintentional injury among children aged 1–4 years [8]. In China, drowning is the leading cause of death from injury for children aged, 8- 14years, and accounted for 40% of all deaths from injury [9].About 1,200 drowning deaths occur each year in Iran. Despite the big number of deaths, relatively few epidemiologic studies have examined drowning in Iran [10].

MATERIAL AND METHODS

In this retrospective cross-sectional study during a five years period from 2012 to 2016, autopsy reports of all drowning deaths who referred to the Tehran province forensic medicine dissection hall in Iran, were studied. We compared rate of drowning each year and causes of drowning between male and female during five years. By examining the files from Tehran province forensic medicine dissection hall and compared between male with female rates of drowning during 2012-2016, demographic required information such as gender, age, marital status, past medical history, past drug history, place of drowning such as "water channel, river, lake, swimming pool, sea or unknown", season of year, and education level data were coded and analyzed by SPSS. The exclusion criteria in our study were insufficient data about demographic factors.

RESULTS

Gender

Overall there were 91 (85/8%) men and 15 (14/2%) women [Table 1].

AGE

Children: There were 16 (15/1%) between 0 to 4 years old.11 (10/4%) between 5 to 14 years old. There were 19 (17/9%) between 15 to 18 years old.

Young adults: There were 46(43/4%) between 19 to 34 years old.

Middle aged: There were 13 (12/3%) between 35to 64 years old.

Olds: There were 1 (0/9%) above 65 years old [Table 2].

Marital Status

There were 77 (72/6%) single and 29 (27/4%) married [Table 3].

The places of drowning

The sites of drowning were 28(26%) lake, 37(35%) swimming pool, 16(15%) river, 5(5%) sea, and 20 (19%) water channel [Table 4].

The seasonal variation

44(41/5%) cases of drowning had occurred in the spring, 45 (42/5%) in the summer, 13 (12/3%) in the autumn and 4 (3/8%) cases had occurred in the winter respectively [Table 5].

Occupation

There were 52(49/1%) workless, 5(4/7%) employee, 49(46/2%) self-employment and no retired [Table 6].

Level of Education

There were 23(21/7%) illiterate, 36(34%) school, 35(33%) high school and 6(5/7%) diploma, 6(5/7%) Bachelor and 0 Master's degree or higher [Table 7].

Past Medical History

There were 2(1/9%) Epileptic, 2(1/9%) asthmatic, 3(2/8%) with other diseases and 99(93/4%) with no history of disease [Table 8].

Past Drug History

There were no Alcohol Drinker, 6(5/7%) Narcotic Abuser (include Heroin, Crack …) and

1(0/9%) Sedative-hypnotic Abuser (include Benzodiazepines, Antihistamines…), Non Stimulants Abuser (include Amphetamine, Methamphetamine, and Cannabis…), 1(0/9%) Anti-epileptic drugs, no oral Anti-diabetic drugs or insulin and 98(92/5%) hadn`t used drugs [Table 9].

Activity

There were no wading or motor boating or motor vehicle accidents. Swimming and accidental falls into water were activities implicated with drowning, equally [Table 10].

Year

Cases of drowning were occurred 56(87%) in 2012, 56(87%) in 2013, 56(87%) in 2014, 56(87%) in 2015 and 56(87%) in 2016 [Table 11].

Table 1: Gender

Gender	Frequency	Percent
male	91	85.8%
female	15	14.2%

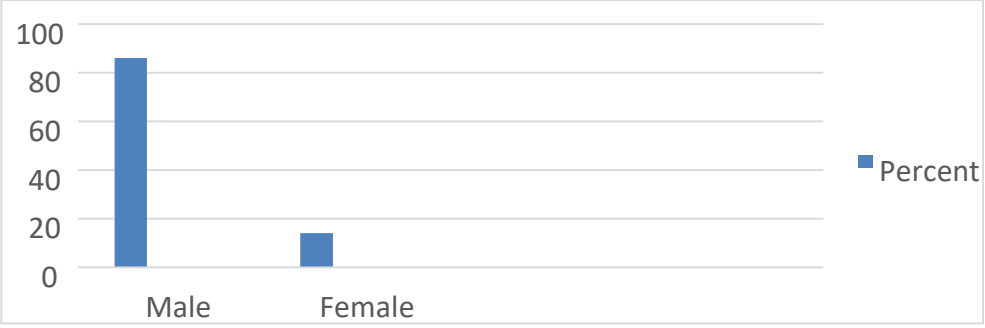

Figure 1: Gender

Table 2: Age

Years Old	Frequency	Percent
0-4	16	15.1 %
5-14	11	10.4 %
15-18	19	17.9 %
19-34	46	43.4 %
35-64	13	12.3 %
65 above	1	.9%

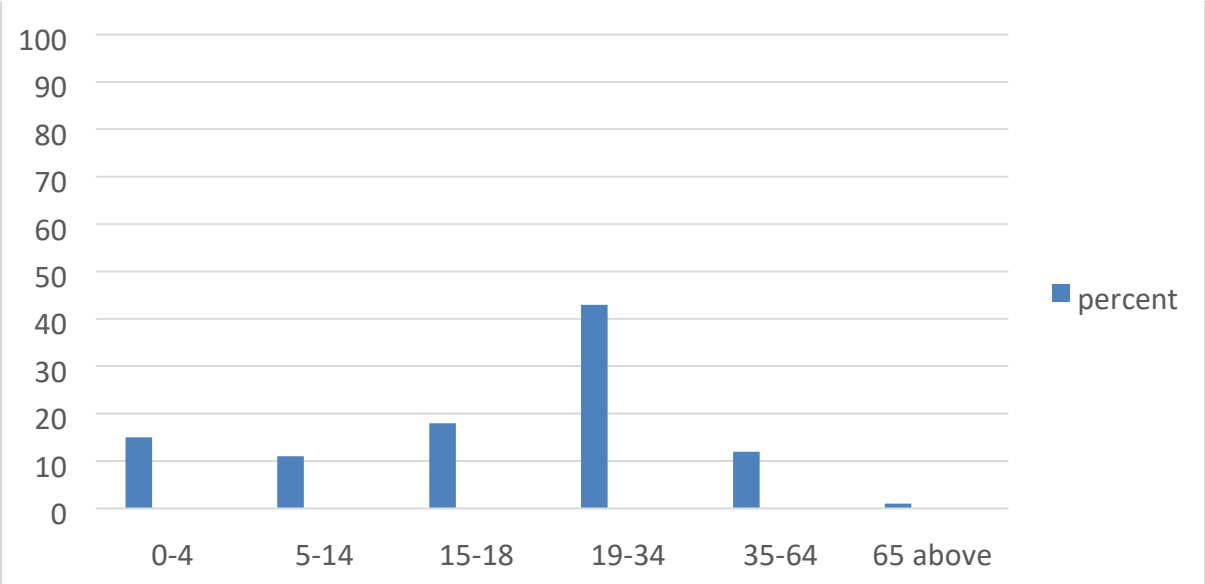

Figure 2: Age

Table 3: Marital status

Marital Status	Frequency	Percent
single	77	72.6
married	29	27.4

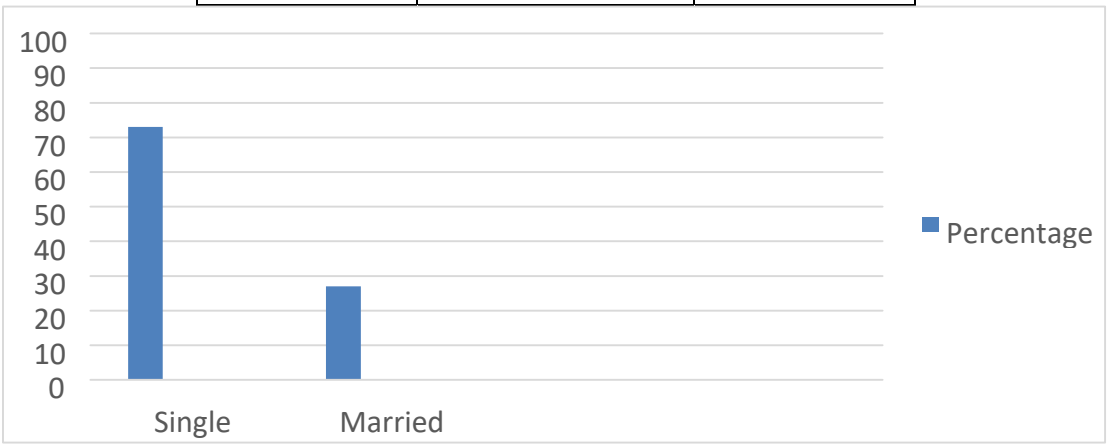

Figure 3: Marital status

Table 4: Place

Place	Frequency	Percent
lake	28	26.4%
Swimming pool	37	34.9%
river	16	15.1%
sea	5	4.7%
Water channel	20	18.9%

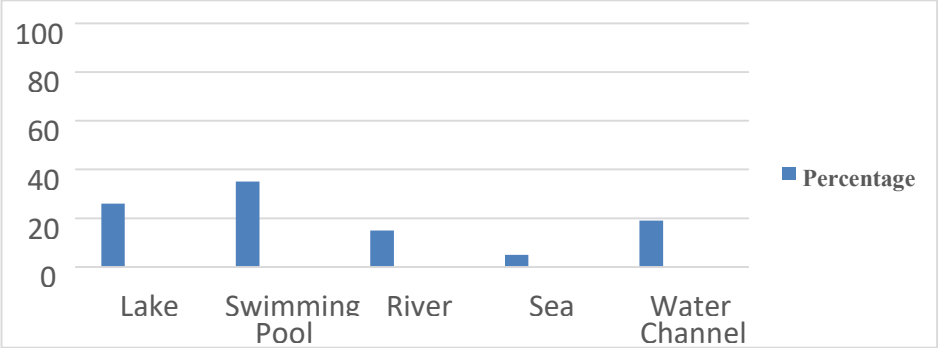

Figure 4: Place of drowning

Table 5: Season

Season	Frequency	Percent
spring	44	41.5%
summer	45	42.5%
autumn	13	12.3%
winter	4	3.8%

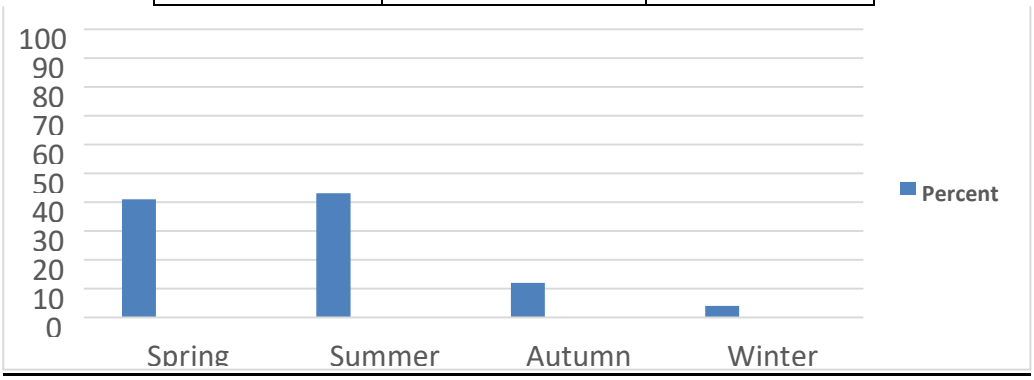

Figure 5: Season of year

Table 6: Occupation

Occupation	Frequency	Percent
workless	52	49.1%
employee	5	4.7%
Self-employment	49	46.2%

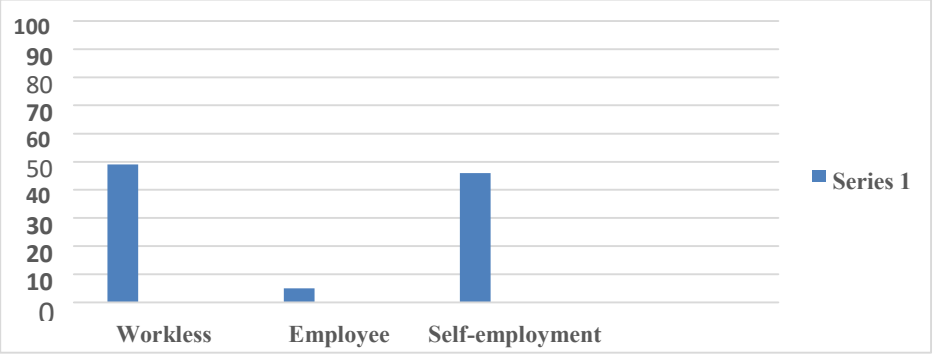

Figure 6: Occupation

Table 7: Education Level

Education Level	Frequency	Percent
illiterate	23	21.7%
school	36	34.0%
High school	35	33.0%
diploma	6	5.7%
bachelor	6	5.7%

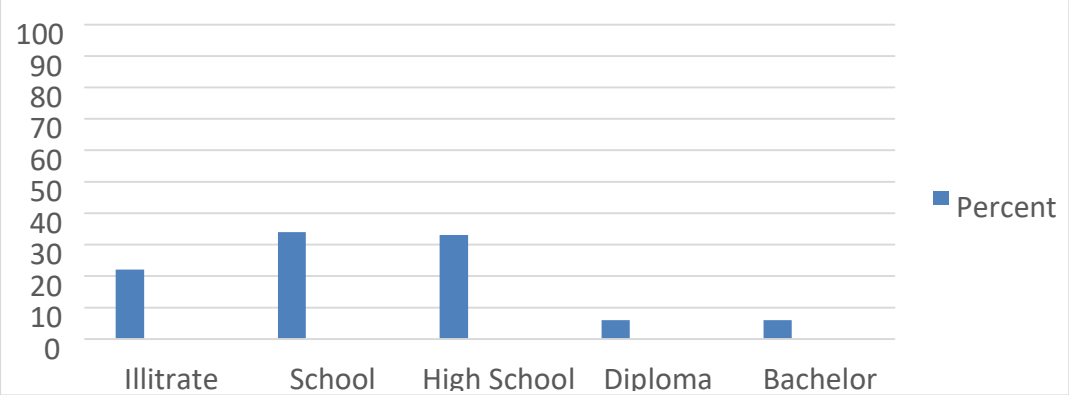

Figure 7: Level of Education

Table 8: PMH

PMH	Frequency	Percent
epilepsy	2	1.9%
asthma	2	1.9%
others	3	2.8%
none	99	93.4%

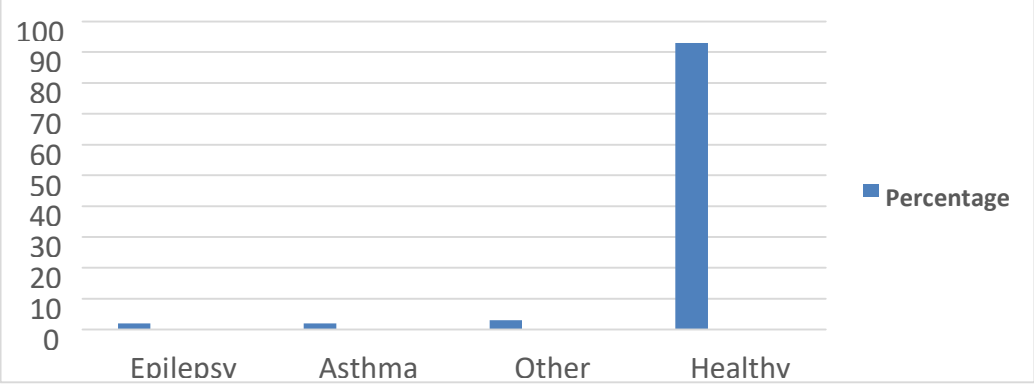

Figure 8: Past Medical History

Table 9: PDH

Drug	Frequency	Percent
heroin	6	5.7%
Sedative-hypnotic	1	.9%
antiepileptic	1	.9%
none	98	92.5%

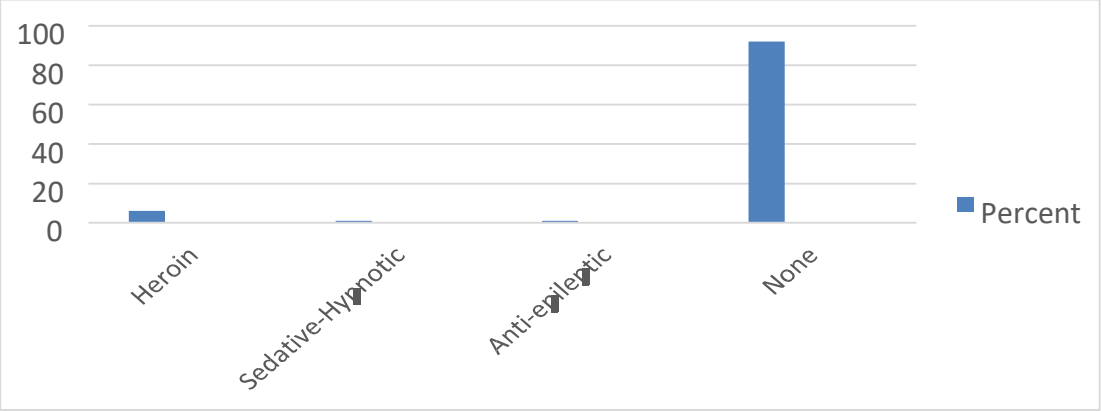

Figure 9: Past Drug History

Table 10: Activity

Activity	Frequency	Percent
swimming	53	50.0%
falling	53	50.0%

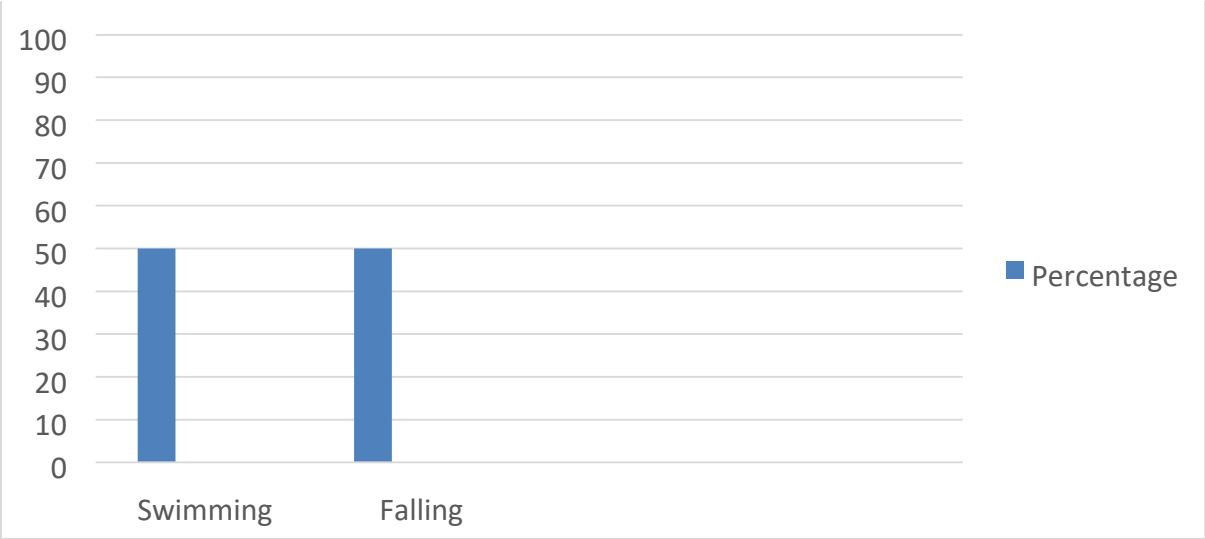

Figure 10: Activity

Table 11: Drowning each year

Year	Frequency	Percent
2012	19	17.9 %
2013	4	3.8 %
2014	29	27.4 %
2015	26	24.5 %
2016	28	26.4 %

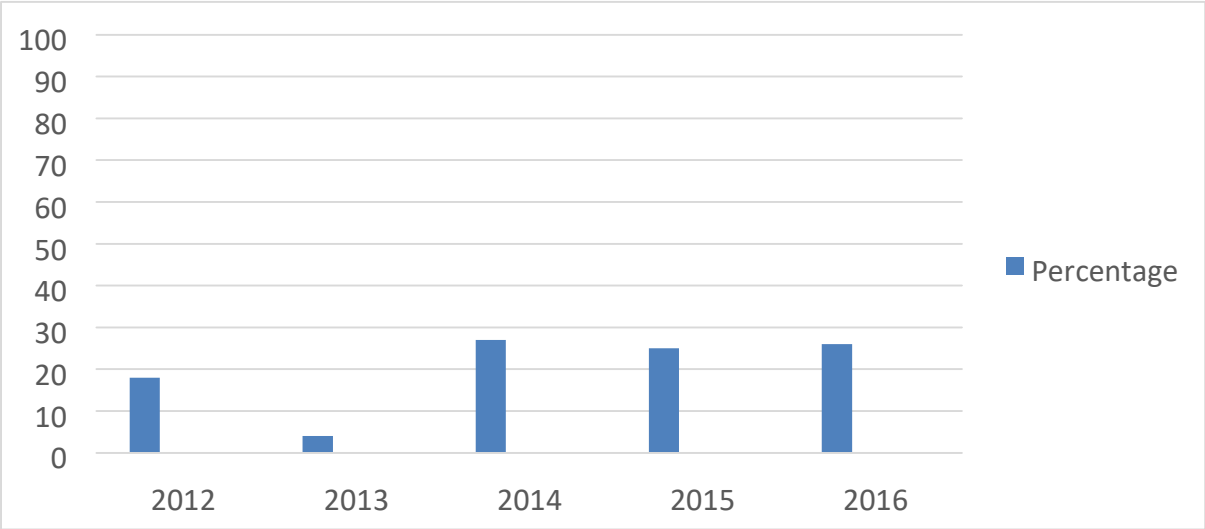

Figure 11: Year

DISCUSSION

The goal of this retrospective cross-sectional study performed during a five years period from 2012 to 2016, was to collect autopsy reports of all drowning deaths who referred to the Tehran province

forensic medicine dissection hall in Tehran. The other goal was to compare rate of drowning each year and causes of drowning between male and female during five years. In our study most of victims were males, this result is consistent with the results in many countries [2,11,12,13,14,15,16,17,19]. Our findings also showed that most victims were 19-34 and 15-18 years of age which is in contrast with the results of other studies conducted in Isfahan [10], Sweden [12] and Toronto [15].In our study most victims were single. Our findings showed most victims were male and in this sense is compatible with studies conducted in many studies [2, 11, 12, 13, 15, 16, 17, and 19]. Our findings showed that the most common place of drowning is swimming pool and in this sense is in contrast with studies performed in Washington [2], Canada [11], Sweden [12], Alaska [13], Ontario [15], USA [16] and UK [19]. The present study showed that June, July, August, September, April and May, respectively, were the most common months when deaths due to drowning happened which is compatible with studies conducted in Isfahan[10],Canada[11],Sweden[12] and china[17] but is in contrast with study performed in Australia[3].Our findings also showed that the most frequently connected activity is swimming and falling down in to the water equally which is in contrast with studies performed in Isfahan, Canada, Sweden and Alaska [10, 11, 12, and 13].In the present study most victims were healthy without any preexisting illness, so they were not use any kinds of drugs or opioids which is in contrast with studies performed in many countries [10, 11, 15].Most of past studies showed that Alcohol consumption is an important risk factor for drowning [2,10,11,12,13,14,15,18] but our findings did not confirm their results. Our study showed that the majority of drowned victims were workless or self-employment. Our findings showed that most victims were student which is the same as results in china [17]. Also our findings showed that Cases of drowning were increased from 19 (17/9%) in 2012 to 28 (26/4%) in 2016 and this results in contrast with studies performed in Alaska [13] and Toronto [16].Copious amounts of children and young adults' victims of drowning in Tehran province during five year study is terrible. Parents should supervise their children. Drowning due to swimming or accidental falls into water show preventable by adequate supervision or fencing.

Further investigation around behavior and culture must be done in order to decrease drowning death rates.

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