

## A MEDICOLEGAL STUDY OF SUICIDE IN ALEXANDRIA

*BY*

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### ABSTRACT

*Suicide among Egyptians is a subject of great concern which requires thorough study to formulate a prevention strategy. The aim of this work was to study the magnitude of the problem of suicide in Alexandria. The study entailed two parts: retrospective part and prospective one. The data of retrospective study was retrieved from the medico-legal reports of cases of suicidal death referred to the Directorate of Forensic Medicine in Alexandria for autopsy during a period of four years starting from 1st of January 2008 till the end of December 2011. The prospective study included all cases of suicidal death referred to the Directorate of Forensic Medicine in Alexandria for autopsy during a period of six months, starting from 1st of January 2012 till the end of June 2012. The results revealed that the total number of cases was 205, 11.5% of autopsied cases during the period of the study were suicidal with the highest percentage of cases was recorded in 2010 (15.1%). The rate of suicidal deaths ranged from 0.88 to 1.09/100,000 population. The majority was males (75.6%), high prevalence (49.3%) was found in age group 21-30 years in both sexes. The prevalence was higher in urban (94.1%), educated (88.8%), unemployed (57.1%) and unmarried (49.3%). Hanging was the most common method of suicide in males (45.16%), while falling from height was the commonest method used by females (36%). The majority of suicidal deaths occurred in spring (36.1%), and indoors (65.9%). Psychological problems were reported in 38% and history of previous suicidal attempts was present in 20% of cases. Conclusion: Suicide rate in Alexandria is much lower than in other areas but still considered a problem and should be given high priority with regard to prevention. Methods used to commit suicide are widely available and are difficult to restrict. Therefore, suicide prevention strategy based on risk factors could be more effective rather than limiting the access to methods.*

***Keywords:*** *Suicide, Medicolegal study, Alexandria.*

### INTRODUCTION

Suicide (Latin *suicidium*, from *suicae-*

*dere*, “to kill oneself”) (Kumar et al., 2013). It may be positive or negative. Suicide is a positive act when one takes one's

own life. Suicide is a negative act when one does not do what is necessary to escape death such as leaving a burning building (Franzese, 2009).

Suicide is one of the top ten causes of death for individuals of all ages in most developed countries (Ernst et al., 2007). Global suicide rates have shown a steady increase over the last 50 years and are projected to increase to 1.53 million by the year 2020 (WHO, 2001). It is believed that the most dramatic increase in suicide mortality will be observed in the Third World countries because the socioeconomic and behavioral factors of suicide risk are present in a higher degree than in developed countries (Diekestra, 1991). The most important problem in Egypt is that there is no data bank for suicide cases. This causes the suicide problem to be underestimated, although this problem seems to be universal (Abdel Moneim et al., 2011). The last data found regarding suicide rates in Egypt, according to the WHO (2011) was in 1987.

There is paucity of research on suicide from developing countries. Very little is known about suicides in many Middle Eastern, African and South American countries. Without good accurate information, prevention programs cannot be developed (Khan, 2005). So, the aim of the present work is to study the magnitude of the problem of suicide in Alexandria,

Egypt.

### ***SUBJECTS AND METHODS***

The study entailed two parts: a retrospective part and a prospective one. The data of retrospective study was retrieved from the medico-legal reports of cases of suicidal death referred to the Directorate of Forensic Medicine in Alexandria for autopsy during a period of four years starting from 1st of January 2008 till the end of December 2011. The prospective study included all cases of suicidal death referred to the Directorate of Forensic Medicine in Alexandria for autopsy over six months starting from 1st of January 2012 till the end of June 2012. The total number of suicidal cases during the whole period of study was 205 (177 in retrospective & 28 in prospective study). Doubtful cases regarding manner of death were excluded from the series. All deceased individuals included in the current study were Egyptians. Demographic data and personal history were recorded for all cases (age, sex, marital status, residence, education, employment, place, season and method of suicide, history of psychological troubles, drug or alcohol abuse, menses in females, previous suicidal attempts and presence of suicidal note). In addition, results of forensic examination were also recorded for each case, including presence of associated injuries, signs of severe illness or sexual or physical abuse and toxicological laborato-

ry results. The study protocol was approved by the ethical committee of Alexandria, Faculty of Medicine.

**Statistical analysis:**

Statistical analysis was done using the SPSS software package version 20 to obtain mean and standard deviation. Chi square test was used to study significant association between two qualitative variables. P value < 0.05 was considered statistically significant (Kirkpatrick and Feeney, 2013).

**RESULTS**

Rate of suicidal cases were demonstrated in table (1). 11.5% of autopsied cases during the study period were suicidal, with the highest percentage recorded in year 2010 (15.1%) followed by year 2009 (12.4%) and the least was 9.5% in 2008. Table (2) illustrated a fluctuating trend of suicide in Alexandria governorate along the studied years. The rate of suicide ranged from 0.88 to 1.09/100,000 population, with an average rate of 1.02/100,000 population.

**Table (1) :** Distribution of autopsied and suicidal cases during the years of the study.

Year	Total number of autopsied cases	Number of suicidal cases	percentage
2008	396	38	9.5%
2009	387	48	12.4%
2010	303	46	15.1%
2011	424	45	10.6%
Whole year of 2012	454	49	10.7%
Total	1964	226	11.5%

**Table (2) :** Suicidal rates in Alexandria during the studied years (2008-2012) in relation to number of Alexandria population.

Year	Alexandria Population <sup>(1)</sup>	Number of cases	Suicide rate per 100,000
2008	4,302,000	38	0.88
2009	4,366,000	48	1.09
2010	4,417,000	46	1.04
2011	4,461,000	45	1.008
Whole year of 2012	4,509,000	49	1.09

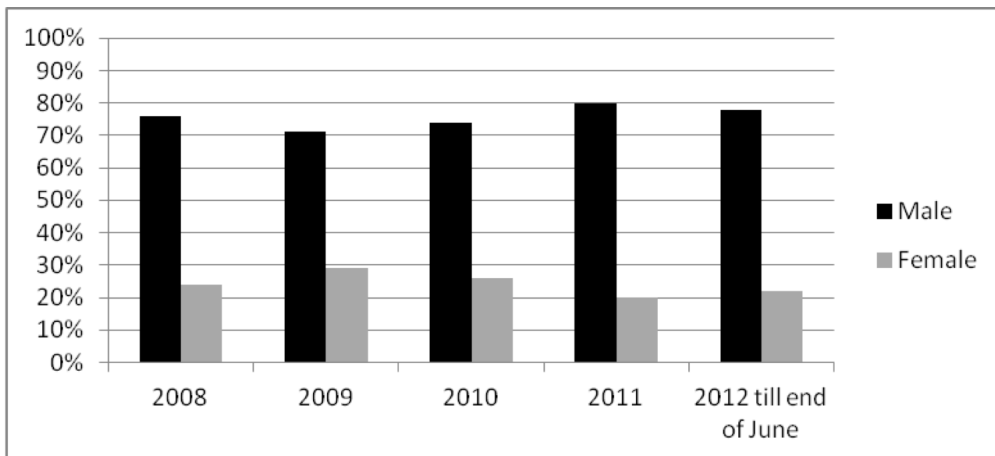
(1)Alexandria population according to (www. capmas.gov.eg).

Table (3) illustrated age and sex distribution of suicidal cases. 75.6 % were males (n=155) and 24.4% were females (n=50), with male to female sex ratio of 3.1: 1. Males outnumbered females in all studied

years as shown in figure (1). The mean age of cases was 30.73±10.43 years. There was no statistically significant difference between males and females regarding age (P> 0.05).

**Table (3) :** Age comparison between male and female suicidal cases in Alexandria governorate (n= 205).

	n	%	Range (years)	Mean± SD	t	P-value
Male	155	75.6%	15-62	30.43± 9.823	0.545	0.461
Female	50	24.4%	17-73	31.68±12.200		
Total	205	100%	15-73	30.73± 10.435		



**Figure (1) :** Distribution of suicidal cases according to gender over the studied years.

Figures (2 & 3) showed that the highest frequency of suicide in all studied years was among those in the 3rd decade of life which accounted for 49.3%, followed by

those in age group from 31-40 years. There was no statistically significant difference between males and females regarding age groups.

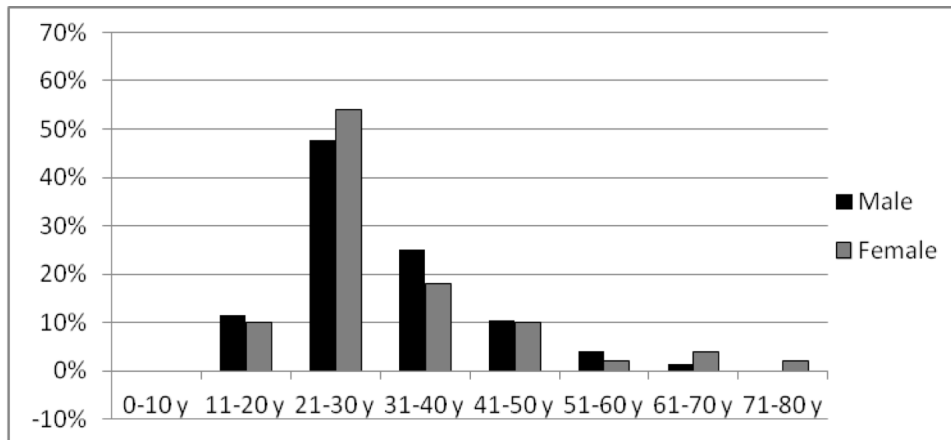


Figure (2) : Distribution of suicidal cases according to age groups and gender.

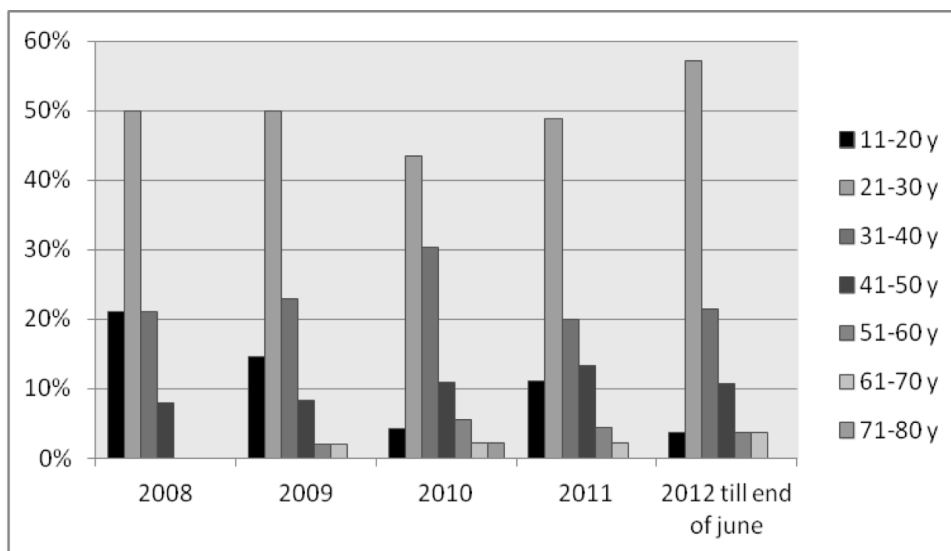


Figure (3) : Distribution of suicidal cases according to age groups per year.

Table (4) demonstrated the sociodemographic data regarding marital status, residence, education, employment and place

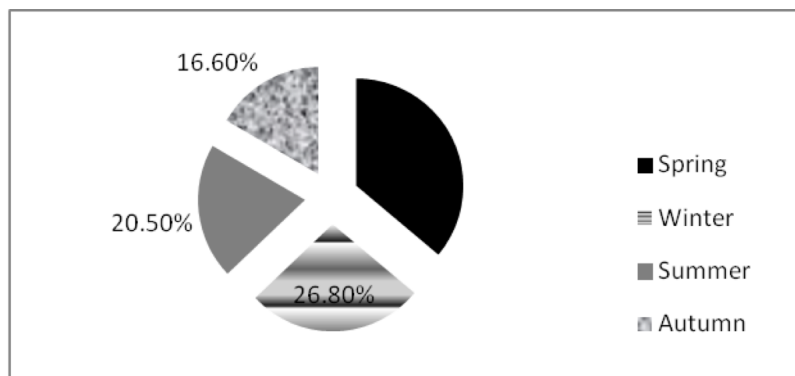
of suicide. Regarding menstrual history, 20% of females (n=10) had menses while committing suicide.

**Table (4) :** Distribution of suicidal cases in Alexandria governorate (n= 205) regarding the socio-demographic data.

Socio-demographic data		Frequency	Percentage
Marital status	Unmarried	101	49.3%
	Married	67	32.7%
	Divorced	27	13.2%
	Widow	7	3.4%
	Unknown	3	1.5%
Residence	Urban	193	94.1%
	Rural	12	5.9%
Education	University graduates	152	74.2%
	Read and write	30	14.6%
	Illiterate	23	11.2%
Employment	Unemployed	117	57.1%
	Employed	77	37.6%
	Unknown	11	5.3%
Place of suicide	Indoors	135	65.9%
	Outdoors	70	34.1%

Figure (4) showed that the highest percentage of cases (36.1%) occurred during spring, then percentage decreased

through winter and summer (26.8% and 20.5% respectively), to reach 16.6% % in autumn .



**Figure (4) :** Distribution of suicidal cases according to seasons of the year.

The methods of suicide were shown in figure (5). The highest percentage of cases (35.1%) committed suicide by hanging, followed by falling from height and burning (19.5% & 19% respectively). Suicide by self poisoning accounted for 12.2% of cases (n=25); 15 of them were males and 10 were females. They used 12 different types of poisons, nine cases used organophosphate rodenticide, four cases used carbamate insecticide, two cases used chlorinated insecticides, two cases used butane gas and eight cases used the following poisons (iodine, chlorox, tramadol, heroin, imipramine, amitriptyline, metoclopramide, strychnine).

Methods of suicide in relation to age and gender were presented in table (5) and figure (6). Table (5) showed that hanging was the commonest method used for committing suicide in all age groups except the age group from 70-80 years, which included one case committed suicide by burning. Furthermore, hanging, falling from height and burn were the only methods used by victims in age groups above 50 years. There was no statistical significant association between age group of the studied cases and the method of suicide, where P=0.61.

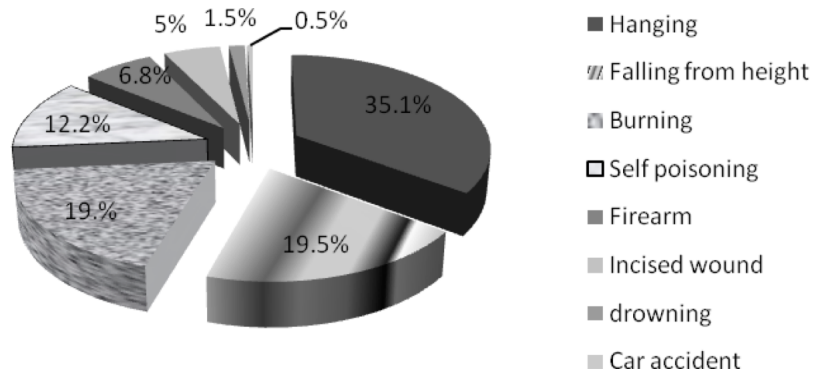


Figure (5) : Distribution of suicidal cases according to methods of suicide.

**Table (5) :** Relation between age groups and methods of suicide.

Age		Methods of Suicide								Total	
		Hanging	Falling from height	Firearm	Drowning	Incised wound	Burn	Self-poisoning	Car accident		
Age groups in years	11 - 20	n	10	3	2	0	1	0	7	0	23
		%	43.5%	13.0%	8.7%	0.0%	4.3%	0.0%	30.4%	0.0%	100%
	21 - 30	n	29	22	8	2	5	22	13	0	101
		%	28.7%	21.8%	7.9%	2.0%	5.0%	21.8%	12.9%	0.0%	100%
	31 - 40	n	18	12	3	0	2	8	4	1	48
		%	37.5%	25.0%	6.3%	0.0%	4.2%	16.7%	8.3%	2.1%	100%
	41 - 50	n	9	2	1	1	3	4	1	0	21
		%	42.9%	9.5%	4.8%	4.8%	14.3%	19.0%	4.8%	0.0%	100%
	51 - 60	n	4	1	0	0	0	2	0	0	7
		%	57.1%	14.3%	0.0%	0.0%	0.0%	28.6%	0.0%	0.0%	100%
	61 - 70	n	2	0	0	0	0	2	0	0	4
		%	50.0%	0.0%	0.0%	0.0%	0.0%	50.0%	0.0%	0.0%	100%
	71 - 80	n	0	0	0	0	0	1	0	0	1
		%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	100%
	Total	n	72	40	14	3	11	39	25	1	205
		%	35.1%	19.5%	6.8%	1.5%	5.4%	19.0%	12.2%	0.5%	100%
X <sup>2</sup>		38.787									
P		0.613									

There was a highly statistical significant relation between gender and the methods of suicide, where  $X^2= 42.01$ ,  $P=0.0001$ . Males constituted 97.2% of cases of hanging, 85.7% of firearm cases and 90.9% of suicide by incised wounds. Moreover, fe-

males did not use neither drowning nor car accident as a method of suicide. The commonest method used by males was hanging (n=70), while the highest percentage of females committed suicide by falling from height (36%) as seen in figure (6).



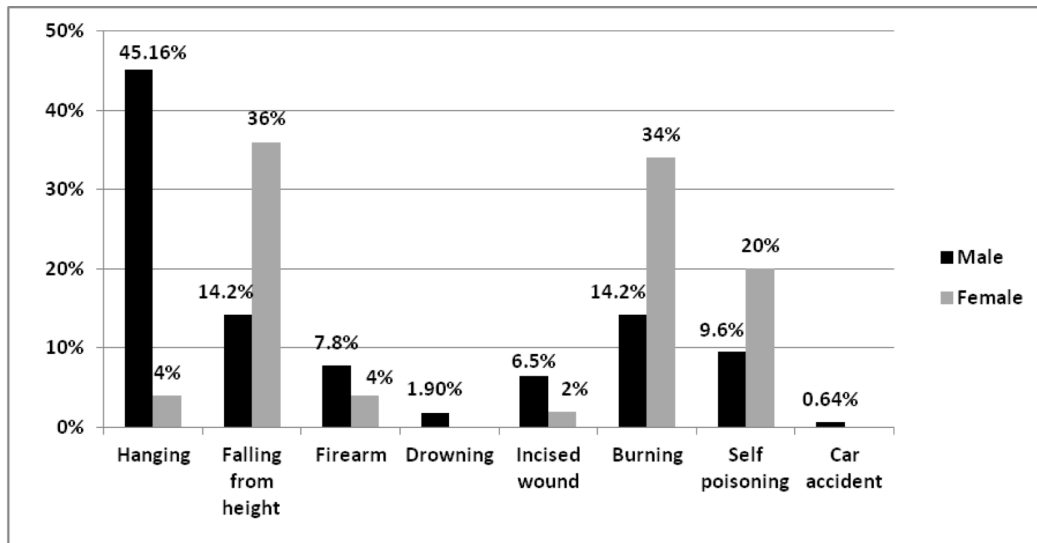


Figure (6) : Relation between gender and methods of suicide among the studied cases (n=205).

The current study revealed that psychic troubles were present in 38% of cases of suicide (n=78), while they were absent in 127 cases (62%). Table (6) showed that 12.7% of the cases had history of alcohol abuse and 10.2% of cases had history of drug abuse.

Table (7) showed the results of studied samples taken from suicide victims, 78.5% of them had negative results, while 21.5% had positive results. The highest percentage were positive for toxins (11.7%), followed by alcohol (4.4%), then drugs (2.9%) and flammable material (2.4%).

Table (6) : Distribution of the studied suicidal cases in Alexandria governorate (n=205) regarding the history of drug and alcohol abuse.

History	Drug abuse		Alcohol abuse	
	n	%	n	%
Positive history	21	10.2%	26	12.7%
Negative history	172	83.9%	168	82%
Unknown history	12	5.9%	11	5.4%
Total	205	100%	205	100%

**Table (7) :** Distribution of the studied suicidal cases in Alexandria governorate (n=205) regarding the toxicological laboratory results.

	Frequency	%
Alcohol	9	4.4%
Drugs	6	2.9%
Toxins	24	11.7%
Flammable material	5	2.4%
Negative samples	161	78.5%
Total	205	100%

The present study showed that 20% of suicide victims had previous suicide attempts (n=41). Suicidal note was present in 3.4% of suicide cases of the current study. Table (8) showed that there was no statistical significant association between presence of suicidal note and method of suicide ( $X^2=9.6$ ,  $P= 0.21$ ).

**Data related to forensic examination (Tables 9 & 10):**

As illustrated in table (9), the associated injuries are present in 10.7% of the studied cases. They included recent injuries seen during examination of the cases, they were either due to failed suicidal attempt preceded the committed suicide, or self-inflicted injuries including superficial wounds and burns.

Regarding signs of sexual or physical

abuse, tables (9 &10) demonstrated that signs of sexual abuse were present in 1.5% of suicide victims (n=3), all of them were females. Moreover, signs of physical abuse were present in 5.4% of suicide victims (n=11), the majority (90.9%) of them were females (n=10). There were statistical significant differences between males and females regarding presence of sexual or physical abuse where  $P= 0.014$  and  $0.000$  respectively.

Table (9) illustrated that signs of severe illness were present in 3.9% of suicide victims ( n=8 ). They were suffering from severe physical illness (like advanced malignancy, miliary TB, severe rheumatoid arthritis, epilepsy, liver cirrhosis, peptic ulcer, interstitial lung fibrosis, and chronic renal failure).

**Table (8) :** Relation between suicidal note and method of suicide.

			Method of Suicide								Total
			Hanging	Falling from height	Firearm	Drowning	Incised wound	Burn	Self poisoning	Car accident	
Suicidal note	Yes	n	3	0	1	0	0	0	3	0	7
		%	42.9%	0.0%	14.3%	0.0%	0.0%	0.0%	42.9%	0.0%	100.0%
	No	n	69	40	13	3	11	39	22	1	198
		%	34.8%	20.2%	6.6%	1.5%	5.6%	19.7%	11.1%	0.5%	100.0%
Total		n	72	40	14	3	11	39	25	1	205
		%	35.1%	19.5%	6.8%	1.5%	5.4%	19.0%	12.2%	.5%	100.0%
X <sup>2</sup>			9.624								
P			0.211								

**Table (9) :** Distribution of the suicidal cases in Alexandria governorate (n= 205) regarding data related to forensic examination.

Data related to forensic examination		Frequency	Percentage
Associated injuries	Yes	22	10.7%
	No	183	89.3%
Signs of sexual abuse	Yes	3	1.5%
	No	202	98.5%
Signs of physical abuse	Yes	11	5.4%
	No	194	94.6%
Signs of severe illness	Yes	8	3.9%
	No	197	96.1%

**Table (10) :** Relation between signs of sexual or physical abuse and gender.

			Gender		Total	Chi square Test
			male	female		
Signs of sexual abuse	Yes	n	0	3	3	X <sup>2</sup> = 9.43 P = 0.014*
		%	0.0%	100%	100%	
	No	n	155	47	202	
		%	76.7%	23.3%	100%	
Signs of physical abuse	Yes	n	1	10	11	X <sup>2</sup> = 27.88 P = 0.000*
		%	9.1%	90.9%	100%	
	No	n	154	40	194	
		%	79.4%	20.6%	100%	

## DISCUSSION

The current study revealed that the highest percentage of cases was recorded in year 2010 (15.1%). This may refer to the stress lied upon the Egyptian community during this year just before the Egyptian revolution. In fact, in 2011 after the Egyptian revolution there was complete security breakdown lasted for about one month before the gradual recovery of police, and during this period there may be unrecorded cases of suicide or homicide which have been buried without informing the police and without performing forensic autopsy.

The average rate of suicide in the present study was 1.02/100,000 population. This rate exceeded that reported by the WHO for Egypt in 1987, which was 0.1 for males and 0.0 for females per 100,000 persons. This may be explained by increasing depression, social problems and drug abuse among Egyptians. In addition, this rate of suicide in Alexandria is higher than that recorded in other studies in Egypt e.g. Assuit, 0.55–0.81 for the period 2005–2009 (Abdel Moneim et al., 2012), Sohag, 0.16–0.35 for the period 2005–2009 (Aboul-Hagag et al., 2013) Cairo, 0.47–0.74 /100.000 for the period 2003–2007 (Taha et al., 2011), but lower than the rate reported in Port Said, 1.66–2.41/100.000 for the period 1998–2004 (Gad El-Hak et al., 2009). This variation could be explained by the

difference in number of population, cultural and socioeconomic levels as well as the possibility of underestimation of the number of suicides due to lack of adequate surveillance and misclassification of suicide as an accidental deaths.

The Arab police and government records reported that the annual completed suicide rates of the countries of the Eastern Mediterranean Region (EMR) ranged from 1.1/100.000 to 6.2/100.000 (Hanna et al., 2011). This rate is lower than that of countries like USA, UK, Canada, and China which ranged from 11.5/100,000 in USA to 23/100,000 in Canada and China. This could be explained by the good relations between family members throughout the country, the religious nature of the Egyptian people either muslim or christian whose religions consider suicide an offense towards Allah (Aboul-Hagag et al., 2013).

Okasha (2009) stated that suicidal behavior is affected by the cultural attitudes towards suicide which is openly condemned in Islamic countries, a fact related to its explicit prohibition in the Qur'an. El-Fawal (1999) showed a relatively low average suicide rate (1.1/100,000 population per annum) in his study in another Islamic country; Saudi Arabia. This idea is supported by the work of Setenay et al. (2007) who reported that religion plays a great role, especially with respect to a belief in

an afterlife, which averts feelings of hopelessness, a feeling that has been described as an important predisposing factor for suicide.

Males outnumbered females in all studied years. The predominance of male suicide victims is consistent with the results of Behera et al. (2005); Shields et al. (2005) and Gad El-Hak et al. (2009) who recorded that males were 2.7, 4.5, 2.07 times respectively more prone to commit suicide than females. It is hypothesized that males have been socialized to act decisively in their professional and personal lives without sharing feelings of depression or suicidal ideation with others. On the other hand, females discuss emotional concerns with friends and family which may ease the inherent disagreeable tensions (Shields et al. 2005). In addition, there is higher incidence of other risk factors among males, e.g. availability of firearms, more financial problems, difficulty in having a good job opportunity and more incidence of drugs of abuse.

On the contrary, Kaplan and Sadock (1998) and Ajdacic-Gross et al. (2008) stated that females were four times more likely to attempt suicide than males, utilize methods of lower lethality as drug overdose or superficial incisions of wrists and select a venue with a high likelihood of discovery and rescue. Hawton (2000) found that in china there were very high

rates of suicide in females than in males, especially in rural areas. This is explained by the fact that females seek help for psychological problems more than males. Furthermore, Aboul-Hagag et al. (2013) recorded a higher rate of suicide among females and explained it by the increasing stress on females because of the traditions like gender disparity, early age of marriage, lack of autonomy to choose her male partner, pressure to have a male offspring and subordinate role of females in society with economic dependence on husband which may generate feeling of hopelessness and frustration together with decreased chance of marriage in women (spinsterhood), mainly in Upper Egypt.

The mean age of studied suicidal cases was  $30.73 \pm 10.43$  years. This age distribution for males and females is the age of youth and work and, in females, the age of reproduction. This indicates the existence of a problem: a decrease in the chance of working (unemployment) and marriage (spinsterhood). An additional factor that may aggravate the state of depression in youth, especially among men, is the increase in drug abuse among youth, which is difficult to explain: does the depression lead them to use these drugs or does the drug abuse increase depression?. Gad El-Hak et al. (2009), Taha et al. (2011) and Abdel Moneim et al. (2012) supported these results in demonstrating that the highest rate of suicide in Port Said and

Assuit; another cities in Egypt, was in the age group of 20–30 years. It was noticed in the current study that the suicide rate decreased as age increased among males and females, which can be explained by the increase in the level of responsibility of males and females towards their families. None of cases occurred at age below 15 years and this coincides with McClure (1994) who stated that suicide is very uncommon in childhood and early adolescence and there were no recorded suicides in children under 10 years in the United Kingdom between 1960 and 1990.

In the retrospective study, a problem in collecting data was faced as the archive does not include all required information because although the memorandum of the public prosecution sent to the directorate of forensic medicine usually include the personal data, history of the case and the testimony of the relatives, but still in some cases not all the required data were available like the marital status, education, occupation, and history of physical and sexual abuse because most coroners and members of the public prosecution used to ask in cases of suicide only about the history of psychological disease, alcohol and drug abuse, previous suicidal attempts and if the victim has enemies (to exclude any criminal suspicion). So, collection of unavailable data was done through other ways as the registration file of the mortuary, permission of burial, death certificates

and police reports, this was most successful in year 2011 (last year of retrospective study) and the mission was harder in previous years leading to a small percentage of missing data not exceeding 6 % such as marital status (1.5%), history of drug abuse (5.9%), history of alcohol abuse (5.4%) and occupational history (5.3%).

The present study showed that the highest percentage of suicide was among single victims. Kposowa (2008) studied suicide in England and Wales between (1982-2005) and showed that the rate of suicide was the lowest among married people and the rate of suicide among single and divorced people is three times higher than married people. Marriage was found to be a preventive factor in attempted suicide (Shirazi et al., 2012). It is possible that suicidal cases are underreported or misclassified when they occur in families with strong religious ties; it is also possible that single females and males have fewer ties and thus their suicides are over-represented in these data.

The majority of cases in the present study were from urban areas as it is well known that Alexandria is mainly an urban community with a few numbers of villages in the distant east and west parts of the governorate. Literate and university graduates outnumbered illiterate cases and this coincides with Behera et al. (2005) and Pompili et al. (2013) whose study revealed

that individuals with higher educational achievement may be more prone to suicide risk when facing failures, public shame and high premorbid functioning than illiterate and less educated people. Moreover, unemployed victims outnumbered employed ones. This is consistent with Blakely et al. (2003) who stated that there was an approximately two to three folds excess risk of suicide among the unemployed compared to the employed persons and explained that by increased vulnerability and impact of stressful life such as mental illness and financial difficulties.

The majority of suicide cases in the present work occur indoor. This coincides with Stack and Wasserman (2009) who stated that the majority of suicide cases commit suicide indoor and most of them inside their bedrooms with an indoor to outdoor ratio of 3.2:1. Lalwani et al. (2004) found that the majority of victims committed suicide at their residence to provide an easy access to all facilities required for commitment of suicide without giving time to reconsider the decision.

The highest percentage of cases occurred during the spring months. This coincides with Bridges et al. (2005) and Taha et al. (2011). The seasonal spring peak of suicide was reported in many previous studies, and it is a highly replicated epidemiological feature of suicide. A peak in spring has also been reported for exacer-

bation of mood disorder, as manifested in hospital admissions, mood disorder severity, electroconvulsive therapy use, and worsening of depression scores (Goodwin and Jamison, 2007; Postolache et al., 2010). This could be explained by bioclimatic theory: seasonal variation in bright light, photoperiod, and other meteorological variables, such as environmental temperature, may induce adverse changes in neurotransmitter systems. Thereby, a rapid increase in sunshine in spring might increase suicidal tendencies in vulnerable subjects. The neurotransmitters implicated by the monoamine-deficiency theory of mood regulation/dysregulation, such as dopamine, norepinephrine, and serotonin, are also neurotransmitters of thermoregulation. Seasonal changes in neurotransmitter systems have been previously reported. For instance, Maes et al. (1995) reported that plasma L-tryptophan, the precursor of serotonin, a neurotransmitter broadly implicated in depression and suicide; has a trough in spring. Alternative biological factors have been proposed as triggers of suicide in spring, such as the marked tree pollen peaks in spring (Postolache et al., 2005) which could result in seasonally increased cytokine production in upper airways resulting in increased exacerbation of mood disturbance in spring (Guzman et al., 2007).

The current study revealed that the highest percentage of cases committed sui-

cide by hanging. Nikolic et al. (2003) stated that hanging is the commonest method of suicide in developing countries. This is consistent with Hanna et al. (2011) study in Lybia and Al-Madni et al. (2010) in Saudi Arabia, Damman. They recorded that firearms, self-burning and falling from height were the next most common methods of suicide after hanging. The most common toxin used for suicide in the present study was organophosphates. This coincides with studies of Abdel Moneim et al. (2012) and Gad El-Hak et al. (2009) in Egypt and may be attributed to the availability and cheap price of organophosphates.

The commonest method used by males was hanging (n=70) which reflects a higher degree of autoaggressive behavior, followed by falling from height and burning (n=22 for each), while the highest percentage of females committed suicide by falling from height (36%), followed by burning (34%) then self poisoning (20%). This could be explained by the differences in personality characteristics between men and women, as men mostly choose more violent methods of suicide.

These results coincide with Ajdacic-Gross et al. (2008) who reported the methods of suicide in different countries according to the WHO mortality database finding in 2006. It was found that hanging was the most frequent cause of suicide

among males. Moreover, Brock and Griffiths (2003) showed that even in England and Wales, hanging is the commonest method of suicide especially among males, accounting for 2000 deaths each year. This may be explained by that hanging is a very simple and highly effective suicidal method. Also, the materials required are easily available, and a wide range of ligatures can be used.

Taha et al. (2011) studied suicidal death in Cairo. They stated that the most commonly used method of suicide among females was burning which represented 43% of cases, followed by falling from height which represented 28%, which is not too far from the results of the present study.

In the present work, the total number of cases of suicide by firearm was 14 cases (6.8%), 12 males and two females. This coincides with Romero and Wintmute (2002) who mentioned that even in USA the rate of suicide by firearm among males is much higher than females with a male to female ratio of 6.5:1. On the contrary, Shields et al. (2005) recorded that suicide by firearm was the preferred method either in males or females, accounting for 67.5% of cases and this may be attributed to high rates of household firearm ownership in USA.

Out of 12 males committed suicide by



firearm, 8 were soldiers in armed forces and police forces and committed suicide while on duty or just after the duty inside the military camp and used the official firearm. Martin et al. (2005) stated that firearm suicide accounted for 53% of the total number of cases of suicide among Irish military personnel and this can be explained by the easy access to the lethal weapon which suggests that significant factors in workplace suicide include opportunity to use lethal means in occupational settings.

Psychic troubles were present in 38% of cases of suicide in the current study. Shields et al. (2005) stated that risk factors for a completed suicide include male sex, and psychiatric disorders. This coincides with Kutcher and Chehil (2012). They found that mental disorders are often present at the time of suicide with estimates ranging from 27% to more than 90%, half of all people who die by suicide may have major depressive disorder or one of the other mood disorders such as bipolar disorder which increases the risk of suicide 20-fold.

The present findings showed that 12.7% of cases had history of alcohol abuse and 10.2% of them had history of drug abuse, also toxicological analysis of samples taken during autopsy show positive results for alcohol in 4.4% of cases (all of them were males) and positive results for drugs

in 2.9% of cases (83.3% of them were males). This coincides with Borges et al. (2006) who reported that alcohol and drug abusers have higher rates of suicide than other people; and they found that 2.4% of those who are consuming alcohol and drugs have previous suicidal attempts, while only 0.78% of non alcohol or drug abusers have previous suicidal attempts, and they stated that policies designed to reduce the consumption of alcohol and illegal drugs may succeed in reducing suicidal behaviors. The major risk factors for suicide among alcoholics are: current drinking, major depression, suicidal thoughts, loss of support from family and friends, living alone, and unemployment (Martin et al., 2012). Positive postmortem toxicological screen for addicting drugs was detected in 14.6% of victims in the study of Taha et al. (2011) in Cairo.

The present results showed that 20% of suicide victims had previous suicide attempts. Chang et al. (2011) stated that approximately 20% of suicides have had previous attempts and of those who have attempted suicide 1% commit suicide within a year and more than 5% commit suicide after 10 years, so they consider that a history of previous suicide attempts is the greatest predictor of eventual completion of suicide.

Suicidal notes were present in 3.4% of suicide cases in the current work and

there was no statistical significant association between presence of suicidal note and methods of suicide. This coincides with Eisenwort et al. (2006) whose study revealed that suicide victims who leave suicide notes do not differ statistically from non-note-leavers in sex, age, family status, psychiatric care, motive, or method.

In the current study, 20% of females had menses while committing suicide. This is consistent with the results of Behera et al. (2005), where 30% of female victims were in the period of menstruation at the time of committing suicide. In females, the proportion of suicide attempters due to psychological disorders associated with menses (premenstrual syndrome, menstrual psychosis) is significantly higher than the expected probability in the general population (Hatotani et al., 1986).

The present findings showed that signs of sexual abuse were present in 1.5% of suicide victims. Moreover, signs of physical abuse were present in 5.4%. Brickman and Briere (1998) stated that sexual abuse victims often experience guilt and self-blame along with low self-esteem especially if during the abuse, the victim incorporates responsibility for the act, or sees himself/herself as "deserving it" possibly as a response to the stigmatization and internalized negative evaluation, all that make over 50% of sexually abused crisis clients

had attempted suicide one or more times in their lives and were significantly more likely to commit suicide after that.

The present study revealed that signs of severe illness were present in 3.9% of suicide victims. History from relatives refer to that some of them committed suicide because of severe chronic pain and feeling of dependence on others, because they cannot afford the high cost of treatment and this coincides with Taha et al. (2011) who stated that chronic medical illness has been identified as a motivating factor in approximately 25% of all suicides and the percentages rise with age. Pain may be a primary reason as approximately 20–30% of suicides result from depression and high rates of depression occurs in many chronically painful conditions. This is also, consistent with the results of Behera et al. (2005), who reported that 16.4% of suicidal cases suffered from chronic painful illness at the time of committing suicides.

### **CONCLUSION**

Diagnosis of suicide may be difficult in some cases, where the victim's family may alter the scene or fabricate a story for the event in an effort to avoid the social stigma, guilt or loss of insurance benefits. A multifaceted investigation is warranted in suspicious suicide to explore and support the self-inflicted and intentional nature of

death. It is not possible to bring back those lives which were often lost in such tragic manner, but identifying the underlying factors for committing suicide can certainly prevent its escalating trend all over the world.

### **RECOMMENDATIONS**

It is recommended to perform more detailed studies across all governorates of Egypt for evaluation and further assessment of social and life circumstances of these groups. Moreover, similar studies should be done concurrently for both suicide deaths and attempted suicide as well. Collection of results of all studies done in Egypt is necessary to form a data bank for suicidal cases over the country as a whole. Suicide affects mainly youth who are capable of work, which causes a big loss to the community. Therefore, all efforts should be directed to solve youth' problems so as to decrease the rate of suicide in society. Testing the psychological tendency for committing suicide should be performed especially on patients with advanced illnesses. Any person with history of psychological problems, financial troubles or previous suicidal attempts should be put under observation and it is mandatory to keep the poisonous substances, firearms and other tools used in suicide out of the reach of them to prevent possible future cases of suicide.

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## دراسة طبية شرعية عن الانتحار بالإسكندرية

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ومصلحة الطب الشرعى بالإسكندرية\*

الانتحار فى المصرين موضوع ذو أهمية عظيمة ويحتاج إلى دراسة شاملة لتشكيل خطة لمنع حدوثه وكان الهدف من هذا العمل دراسة حجم مشكلة الانتحار بالإسكندرية. الدراسة اشتملت على جزأين وهما دراسة مرجعية وأخذت بياناتها من التقارير الطبية الشرعية لحالات الانتحار المحولة إلى مصلحة الطب الشرعى بالإسكندرية للتشريح أثناء فترة أربع سنوات (من أول يناير ٢٠٠٨ وحتى نهاية ديسمبر ٢٠١١) والجزء الثانى دراسة مستقبلية وتضمنت كل حالات الانتحار المحولة إلى مصلحة الطب الشرعى بالإسكندرية للتشريح أثناء فترة ستة أشهر (من أول يناير ٢٠١٢ وحتى يونيو ٢٠١٢).

كان العدد الكلى لحالات الانتحار ٢٠٥ حالة ومثلت ١١,٥ ٪ من حالات التشريح وأعلى نسبة ١٥,١ ٪ قد سجلت في سنة ٢٠١٠. وكان معدل الانتحار يتراوح بين ٠,٨٨ و ١,٠٩ لكل ١٠٠٠٠٠ نسمة بمتوسط ١,٠٢ لكل ١٠٠٠٠٠ نسمة. كان غالبية الحالات من الرجال (٧٥,٦) وأعلى نسبة كانت فى الفئة العمرية من ٢١ - ٣٠ سنة فى كلا الجنسين ومثلت (٤٩,٣ ٪) من مجموع الحالات. أكثر الحالات كانت فى المناطق الحضرية (٩٤,١ ٪) و بين المتعلمين (٨٨,٨ ٪) وذوى البطالة (٥٧,١ ٪) والغير متزوجين (٤٩,٣ ٪). كان الانتحار بالشنق أكثر الطرق شيوعا بين الرجال (٤٥,١٦ ٪) بينما السقوط من أعلى كان أكثر الطرق شيوعا بين النساء. أغلب الوفيات من الانتحار حدثت فى الربيع (٣٦,١ ٪) وبداخل الأماكن المغلقة (٦٥,٩ ٪) ورصدت المشاكل النفسية فى ٣٨ ٪ من الحالات وكان ٢٠ ٪ من الحالات لهم محاولات سابقة للإنتحار.

نستنتج من هذه الدراسة أن معدل الانتحار فى الإسكندرية أقل بكثير من أماكن أخرى. لكن مازالت تعتبر مشكلة لا بد من إعطاءها الأولوية تجاه منعها وأن طرق الانتحار فى متناول الأيدي فى كل مكان ومن الصعب حظرها، لذا خطط منع الانتحار المبنية على عوامل الخطر من الممكن أن تكون أكثر فاعلية من حجب الوصول لتلك الطرق.