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Suicide Among Children and Adolescents in a Province of Turkey

ABSTRACT: Despite well-documented increases in completed suicides among children, accurate knowledge of the characteristics of these suicides is very limited. The aim of this study was to investigate general characteristics of suicide among children and adolescents in the province of Istanbul and to evaluate obtained results in the light of the literature. Data were collected from autopsy records of the Morgue Department of Institute of Forensic Medicine, Istanbul. General characteristics of completed suicides among children and adolescents between 2001 and 2005 were retrospectively reviewed. The study included 176 suicides aged 9–19 years. The overwhelming majority of the suicides (92%) were aged 15–19 years. More than half of the suicides (60%) were male. The most frequent means of suicide was hanging (55%) followed by firearms (20%) and jump or descent from height (15%).

KEYWORDS: forensic medicine, children, adolescents, suicide, risk factors, autopsy

Suicide is described as death in which one makes an intentional, direct, and conscious effort to end his/her life. It may be triggered by biological, psychological, philosophical, sociological, and geographical factors (1).

Suicide has been chosen as an option by people in many different situations since ancient times. Several studies from other countries have indicated that child suicides are rare. However, according to more recent research, the number of suicides in the pediatric age group has been increasing for the last two decades (2–9). In some developed countries, suicide is one of the leading causes of death in children and adolescents (7,9).

Suicide is an important cause of death in children and adolescents; therefore, it is important to know common scenarios, risk factors, methods, characteristics of suicides as well as pitfalls likely to be involved in childhood and adolescent suicides (7). This could provide health professionals with knowledge to change erroneous public opinions about suicidal behavior and to determine the content and structure of intervention programs directed at these events. Consequently, there is an urgent need for systematic information designating the characteristics of children who commit suicide (4, 10). Although suicide attempts are higher in women, completed suicides are much higher in men than in women (11–14). In addition, suicide methods vary with respect to age, gender, and cultural differences (11–14). Death is a complicated entity for children under the age of 10 to comprehend. For this reason, suicides are rare among the 0–10 years age group (1,15). The strongest risk factors for childhood and adolescent suicides are mental disorders (such as mood disorders), substance abuse, and antisocial behavior. Furthermore, the presence of a psychopathological history is an important factor (16,17). Suicide has been regarded as an important childhood and adolescent problem since it was reported to be the second or third most common cause of death in this age group (18–20). The aim of this study was to investigate demographic, psychological, and situational factors associated with suicides and how the death occurred in completed suicides among adolescents living in Istanbul—a large urban area in Turkey.

Istanbul is the most crowded city in Turkey (population about 12 million) and has been experiencing significant migration from rural areas. The problems that accompany migration and socio-economic deprivation increase the incidence of violence and suicide rates (21).

Material and Methods

We retrospectively reviewed all forensic cases referred to the Morgue Department of the Institute of Forensic Medicine, Istanbul, between 2001 and 2005 and enrolled child and adolescent suicides in the study. Data were collected from autopsy reports, records of public prosecutors, crime scene investigation records, and hospital reports.

In Istanbul, death investigations are performed by one public prosecutor and one doctor specializing in forensic medicine. Almost all children dying suddenly or dying from trauma except for traffic accidents undergo autopsy. Witnesses, relatives, and friends are interviewed and obtained information is recorded and sent to the center where autopsy is performed by the public prosecutor and the doctor.

According to the retrospective review of the data, history was taken by public prosecutors and doctors in all cases and blood, urine, gastric, and internal organ specimens were collected at all autopsies to detect alcohol, psychotropic substances, and narcotics. In addition, histopathological examination of the internal organs was performed in all cases. Sexual assault evidence collection including DNA analyses was performed in all cases to determine sexual assaults. Microbiological examinations were made when necessary. Medical records of all the cases receiving treatment in hospital were available.

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Medicolegal autopsies are performed by forensic medicine specialists in the State Institute of Forensic Medicine, an affiliate of the Ministry of Justice. About 3400 autopsies are performed in the Morgue Department of the State Institute of Forensic Medicine per year. Health centers in Istanbul or the neighboring cities and towns also refer autopsies to the Morgue Department. If the cause of death is not clear at autopsy, histopathological and toxicological examinations are made and if the cause is still suspicious, the case is referred to the First and Fifth Specialized Boards of the Department, which evaluates the case in the light of data from the court records and autopsy reports.

Autopsies (*n*: 16,583) performed between 2001 and 2005 were reviewed. A total of 1986 pediatric deaths (11.97%) were autopsied. Of all childhood and adolescent deaths, 176 were suicidal deaths. Data about age, gender, cause of death, method of suicide, results of toxicological analyses, and location of incident were investigated in all 176 cases. When available, additional information regarding the social and psychological background, family and school problems, presence of suicide note, and any previous attempts were investigated. Chi-square test was used to determine differences in suicide methods between genders and age groups. $p < 0.05$ was considered significant.

Results

There were 176 suicides aged 9–19 years with a mean age of 17.4 years. The overwhelming majority of the suicides were older adolescents (15–19 years). Of all the suicides, 50 (28%) were 19 years old, 45 (26%) 18 years old, 39 (22%) 17 years old, 19 (11%) 16 years old and eight (5%) 15 years old. Fifteen (8.5%) suicides were under 15. More than half of the suicides (60%) were male; the ratio of males to females was 1.3:1 (Fig. 1). Only 4% were married; 96% were single. The most frequent means of suicide was hanging. In fact, 96 suicides (55%) hanged themselves. The other methods of suicide were firearms in 35 suicides (20%), jump or descent from height in 27 suicides (15%), poisoning in 16 suicides (9%), self-inflicted burning in one suicide (0.5), and drinking corrosive substance in one suicide (0.5) (Table 1). The method of suicide was not different between genders ($p > 0.05$). In all age groups, hanging was the most frequent method ($p = 0.04$). Shooting was the second most frequent method in our series. In fact, 23 males and 12 females shot themselves. The most frequently used firearms were shotgun (21 suicides), followed by pistol (14 suicides). Differences in the method of death between age groups are shown in Fig. 2. The great majority of suicides occurred at the decedent's home ($n = 162$; 92%). Fourteen suicides (8%) in this study occurred outdoor (Table 2).

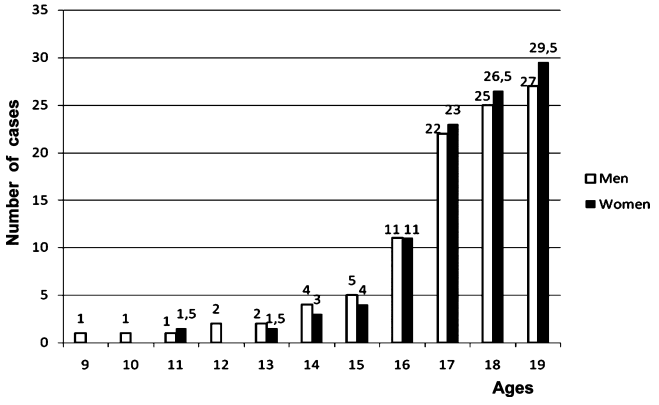

FIG. 1—*Distribution of suicide victims by age and gender.*

TABLE 1—*Gender differences of methods of suicide total.*

	Male		Female		Total	
Methods	%	*n*	*n*	%	*n*	%
Firearm (X2:0.52, p: 0.47)	23	22	12	17	35	20
Jump or descent from height (X2: 0.14, 0.70)	17	16	10	14	27	15
Hanging (X2: 0.49, p: 0.48)	55	52	41	58	96	55
Poisoning (X2: 0.08, p: 0.77)	9	9	7	10	16	9
Self-inflicted burning	1	1	–		1	0.5
Drinking corrosive substance	–	–	1	1	1	0.5
Total	105	100	71	100	176	100

Social and psychological background and predictive factors are displayed in Table 3. Possible reasons identified were mainly a psychiatric disorder followed by troubles within the family. The parents of 12 (7%) suicides were divorced. Only 6% of the decedents were known to have made a prior suicide attempt. Only 18 suicides (10%) left a note elucidating the background. There were no seasonal variations in the rates of suicides.

The results of toxicological analyses performed at autopsy showed ethyl alcohol in 16 suicides. No toxic substance except for ethyl alcohol was detected in all 16 deaths and they were all males aged 16–18 years.

Discussion

Suicide in the young is a major health problem in many societies and forensic investigators must show more interest in this problem (10,22). Western societies have had a more negative view of suicide, but it has been well known that in eastern societies, people who feel they have brought shame upon themselves or their families often resort to suicide to restore their family honor (6).

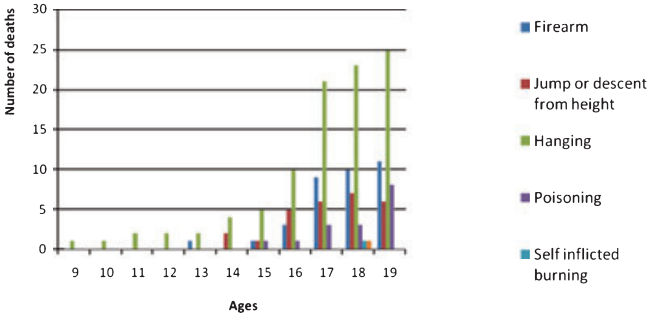

FIG. 2—*Differences in methods of death between age groups.*

TABLE 2—*Location where victims were found.*

	n	%
Indoor	162	92
Inside dwelling	135	83
Balcony	8	5
Rooftop	8	5
Window	11	7
Outdoor	14	8
Garden	4	29
Field	7	50
Street	3	21

TABLE 3—*Detected social and psychological background and predictive factors of the victims.*

	n	%
Psychiatric disorder	52	29
Family conflict	27	15
Parents divorced	12	7
Quarrel with spouse	8	5
Quarrel with father	6	3
Difficulties at school	16	9

The results of the present study showed that suicides were extremely infrequent in people aged 14 years and younger; suicides tended to be more prevalent among older teenagers. At that stage of life, teenagers feel increased pressure from friends and parents. They also feel distressed about their grades, sex, future plans, and jobs. Children younger than 15 years of age less frequently suffer from psychiatric disorders, family conflicts, or romantic disappointment. Moreover, children do not develop insight in the definitiveness of death before the age of 12 or 14 years (23). The high prevalence of suicides in adolescents is in good agreement with the data reported in prior forensic studies (6,24–28).

Results from the studies performed since the early 1960s have remained relatively consistent: Males are three to four times more likely to commit suicide than females (4,7,10,29,30). In the present study, there was a slight increase in the number of suicides among males. However, the percentage of female suicides was 71% in a study by Gören and colleagues (27) and 62% in a study by Arslan and colleagues (28).

Recently, in Turkey, there seems to be a trend of people under 20 years of age to object to their parent's traditional (conservative) rules and demand more autonomy. Their desire for social and economic freedom often conflicts with strong family oppression (31). All four married adolescents in this series were female. They were found to get married at adolescence unwillingly under parental oppression. This is not unusual in our country and can be attributed to traditional and socio-economic factors and extended family structure.

We found that the vast majority of the suicides hanged themselves, consistent with the literature (32). Other frequent suicide methods in this series were so-called "violent methods," firearm, jump or descent from height, poisoning, self-inflicted burning, and drinking corrosive substance, in respective order.

The number of adolescents committing suicide by firearms has continuously increased over the past four decades (33). It has been shown that rapid, easy access to firearms may facilitate suicides since there is little opportunity to reconsider the impulsive decision (7). Most of the recent studies showed that children and adolescents most frequently used firearms to commit suicide (4,7,34). Other methods of suicide cannot be underestimated. In fact, in the present study, the majority of deaths were because of both hanging and firearms. In our region firearms are easily accessible at home. Families should be recommended not to keep firearms. If parents do keep them, they should be in a secured location/locked so that children and adolescents cannot access them.

It has been shown that males are more likely to employ more violent methods of suicide like firearms or hanging; conversely drug overdose has been shown to be favored mostly by females (4, 29). In this study, we did not find a considerable difference between males and females in suicide methods.

In this study, children and adolescents most frequently committed suicide in places familiar to themselves. In fact, the majority committed suicide at the decedent's home, compatible with the literature (4,5,7,10,26). Adolescents commit suicide in a familiar setting because they can easily access the necessary equipment such as a rope in hanging (3–7,35,36). In this study, of all children under 16 years of age, 17 hanged themselves, two used firearms, three jumped, and one drank poison. Among adolescents younger than 16 years old, hanging was the more predominant method used when compared with those older than 16 years ($p = 0.04$).

The majority of the data reported in the literature do not indicate a clear tendency concerning the time of suicide (4,5,26), but in few studies a preference of the warm months of summer has been pointed out (4,5). There was no seasonal difference in the rates of the suicides in this study.

As for the social and psychological background, major psychiatric disorders have been reported to be depression and substance abuse (2,4,5,7–10,35). In this series, according to data from the interviews made by doctors and public prosecutors with the family members of the suicide cases, there were 39 (22%) cases of depression. With regard to the role of families in suicides, a high proportion of parental psychopathology, alcohol/substance abuse, a high frequency of suicides of family members, and "broken home situations" have been reported (3,8,9,37). Arguments, school problems, and breakup of romantic relationships were found to be more common precipitating factors. In fact, in this study, 12 suicides (7%) had divorced parents, six suicides (3%) had quarrels with their father, eight suicides (5%) had quarrels with their spouse, 16 suicides (8%) had school problems, 27 suicides (15%) had miscellaneous family problems. Data obtained in this study suggest that even minor conflicts can trigger suicide. Familial conflicts are highly prevalent in adolescent suicides. It may be that family members may not have the ability to help adolescents or may not be aware of their problems. Most important factors regarding the decedent's family have been reported to be lack of emotional support from their families and conflict in their homes (2,38–40).

Another common belief is that most suicides leave a kind of a final note (7). Half of the suicides left a note in Shaffer's (41) and Hoberman's (4) studies, while in some other reports (7,10,42,43) the rate of suicides leaving a note ranged between 19% and 37%. In this study, 10% of the suicides were found to leave a final note.

There are no institutions specializing in prevention of suicides among children and adolescents in Turkey. For this reason, children and adolescents at risk of suicides may not be followed regularly and treated appropriately.

Adolescent suicide prevention programs must emphasize early identification and appropriate treatment of an underlying psychopathology. Adolescents are at a particular risk and programs are needed to train parents, teachers, and physicians to recognize their depressive disorders. A strong social support system is an essential component in reducing suicide risk. Access to firearms should also be restricted.

Limitations of Study

One limitation of the study is that in Turkey, doctors who perform autopsies do not report the manner of death, which is in fact determined in the courts, and, therefore, we cannot evaluate their determination of the manner of death. Second, according to the last census, one-sixth of the Turkish population lives in Istanbul. Statistical data from the Police Headquarters showed that rates of murder, assault, and battery were higher in Istanbul than other cities (21). In addition, Istanbul is very cosmopolitan because a lot of people migrate to the city every year. Therefore, we think that data

about suicides in Istanbul are interesting compared with its counterparts in the world although it does not exactly represent the Turkish population. Third, there have been no large forensic studies and statistical data on child deaths in Turkey. For this reason, we could not compare the obtained data with data about suicidal child deaths in general from Turkey.

References

1. The first suicide science web site in Turkish. What is the suicide? Available at: http://www.intihar.de/Frame.htm (accessed 5 February 2007).
2. Brent DA. Risk factors for adolescent suicide and suicidal behavior: mental and substance abuse disorders, family environmental factors, and life stress. Suicide Life Threat Behav 1995;25:52–63.
3. Groholt B, Ekeberg O, Wichstrom L, Haldorsen T. Suicide among children and younger and older adolescents in Norway: a comparative study. J Am Acad Child Adolesc Psychiatry 1998;37:473–81.
4. Hoberman HM, Garfinkel BD. Completed suicide in children and adolescents. J Am Acad Child Adolesc Psychiatry 1988;27:689–95.
5. Hoberman HM, Garfinkel BD. Completed suicide in youth. Can J Psychiatry 1988;33:494–504.
6. Guyer B, Martin JA, MacDorman MF, Anderson RN, Strobino DM. Annual summary of vital statistics—1996. Paediatrics 1997;100:905–1018.
7. Lee CJ, Collins KA, Burgess SE. Suicide under the age of eighteen: a 10-year retrospective study. Am J Forensic Med Pathol 1999;20:27–30.
8. Shafii M, Carrigan S, Whittinghill JR, Derrick A. Psychological autopsy of completed suicide in children and adolescents. Am J Psychiatry 1985;142:1061–4.
9. Holinger PC. The causes, impact and preventability of childhood injuries in the United States. Am J Dis Child 1990;144:670–6.
10. Weinberger LE, Sreenivasan S, Sathyavagiswaran L, Markowitz E. Child and adolescent suicide in a large, urban area: psychological, demographic, and situational factors. J Forensic Sci 2001;46:902–7.
11. Dülger HE, Yemiscigil A, Karali H, Ege B, Hancı IH. Retrospective analysis of suicidal deaths. J Forensic Med 1991;7:115–8. (In Turkish)
12. Kuğu N, Beyaztas FY, Akyuz G, Ersan E, Doğan O. Evaluation suicide attempt cases admitted to Sivas University Hospital in the mean of sociodemographic, clinical features, Beck depression scale and SCL-90-R results. Clin Forensic Med 2002;2:15–26. (In Turkish).
13. World Health Organization. Suicide prevention, http://www.who.int/mental_health/prevention/suicide/suicideprevent/en (accessed 5 February 2007).
14. Pritchard C, Amanullah S. An analysis of suicide and undetermined deaths in 17 predominantly Islamic countries contrasted with the UK. Psychol Med 2007;37(3):421–30.
15. Toero K, Nagy A, Sawaguchi T, Sawaguchi A, Sotony P. Characteristics of suicide among children and adolescents in Budapest. Pediatr Int 2001;43:368–71.
16. Renshaw DC. Suicide in children. Am Fam Physician 1981;24:123–7.
17. Beautrais LA. Risk factors for suicide and attempted suicide among young people. Aust N Z J Psychiatry 2000;34:420–36.
18. Yaycı N, Colak B, Ağrıtmıs H, Imre KY. Adolescent suicide cases that are submitted to the Institute of Forensic Medicine. Türkiye Klinikleri J Forensic Med 2004;1:18–24. (In Turkish)
19. Agrıtmis H, Yaycı N, Colak B, Aksoy E. Suicidal deaths in childhood and adolescence. Forensic Sci Int 2004;142:25–31.
20. Shaw D, Fernandes J, Rao C. Suicide in children and adolescents: a 10-year retrospective review. Am J Forensic Med Pathol 2005;26:309–15.
21. Public security statistics, http://www.egm.gov.tr/asayis/istatistik.asp (accessed 23 October 2006).
22. Murphy GE, Wetzel RD. Suicide risk by birth cohort in the United States, 1949 to 1974. Arch Gen Psychiatry 1980;37:519–23.
23. Solomon MI, Hellon CP. Suicide and age in Alberta, Canada, 1951 to 1977: a cohort analysis. Arch Gen Psychiatry 1980;37:511–3.
24. Nissen G. Suizidversuche und Suizid. In: Eggers G, Lempp R, Nissen G, Strunk P, editors. Kinder-und Jugendpsychiatrie. Berlin: Springer, 1993;301–9.
25. Bennett AT, Collins KA. Suicide: a ten-year retrospective study. J Forensic Sci 2000;45:1256–8.
26. Lecomte D, Fornes P. Suicide among youth and young adults, 15 through 24 years of age. A report of 392 cases from Paris, 1989–1996. J Forensic Sci 1998;43:964–8.
27. Goren S, Gurkan F, Tirasci Y, Ozen S. Suicide in children and adolescents at a province in Turkey. Am J Forensic Med Pathol 2003;24:214–7.
28. Arslan M, Akçan R, Hilal A, Batuk H, Cekin N. Suicide among children and adolescents: data from Cukurova, Turkey. Child Psychiatry Hum Dev 2007;38(4):271–7. Epub 2007 Jun 13.
29. Boor M. Methods of suicide and implications for suicide prevention. J Clin Psychol 1981;37:70–5.
30. Schmidt P, Müller R, Dettmeyer R, Madea B. Suicide in children, adolescents and young adults. Forensic Sci Int 2002;127:161–7.
31. Koc M. An essay concerning literature of scientific research about the psychology of adolescence. Sosyal Bilimler Enstitüsü Dergisi 2004;17:231–56. (In Turkish).
32. Uzun I, Buyuk Y, Gürpinar K. Suicidal hanging: fatalities in Istanbul: retrospective analysis of 761 autopsy cases. J Forensic Leg Med 2007;14(7):406–9. Epub 2007 March 26.
33. Boyd JH. The increasing rate of suicide by firearms. N Engl J Med 1983;308:872–4.
34. Anonymous. Fatal and nonfatal suicide attempts among adolescent—Oregon, 1988–1993. Mor Mortal Wkly Rep 1995;5:321–3.
35. Shaffer D, Gould MS, Fisher P, Trautman P, Moreau D, Kleinman M, et al. Psychiatric diagnosis in child and adolescent suicide. Arch Gen Psychiatry 1996;53:339–48.
36. Brent DA, Baugher M, Bridge J, Chen T, Chiappetta L. Age- and sex-related risk factors for adolescent suicide. J Am Acad Child Adolesc Psychiatry 1999;38:1497–505.
37. Brent DA, Perper JA, Moritz G, Allman C, Friend A, Roth C, et al. Psychiatric risk factors for adolescent suicide: a case-control study. J Am Acad Child Adolesc Psychiatry 1993;32:521–9.
38. Marttunen MJ, Aro HM, Lonnqvist JK. Precipitant stressors in adolescent suicide. J Am Acad Child Adolesc Psychiatry 1993;32:1178–83.
39. Adams DM, Overholser JC, Lehnert KL. Perceived family functioning and adolescent suicidal behaviour. J Am Acad Child Adolesc Psychiatry 1994;33:498–507.
40. Renaud J, Brent DA, Birmaher B, Birmaher B, Chiappetta L, Bridge J. Suicide in adolescents with disruptive disorders. J Am Acad Child Adolesc Psychiatry 1999;38:846–51.
41. Shaffer D. Suicide in childhood and early adolescence. J Child Psychol Psychiatry 1975;15:275–91.
42. Poteet DJ. Adolescent suicide: a review of 87 cases of completed suicide in Shelby County, Tennessee. Am J Forensic Med Pathol 1987;8:12–7.
43. Thompson TR. Childhood and adolescent suicide in Manitoba. Can J Psychiatry 1987;32:264–9.

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