Original article

Trends in suicide, parasuicide and accidental poisoning in Addis Ababa, Ethiopia.

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Abstract: Because of lack of compiled data on Suicide, Parasuicide and Accidental Poisoning (AP) in the general population and in over 15 year olds in Addis Ababa, Ethiopia, it was essential to prepare and analyze these basic data. The average crude suicide rate for over 15 year olds was found to be 12.7 and 2.45 for males and females, respectively. The difference between male and female rates is significant (P<0.002). The commonest method of committing suicide was by hanging and strangulation (70.2%). Suicide rates showed marked declines, especially in males, during exacerbation of the civil wars. The average standardized parasuicide rate was found to be 74.85 and 25.93 for males and females respectively. The difference between male and female rates is significant (P<0.002). In over 15 year olds, 83.91% of parasuicides were in the age group of 15-44 and males in this age group had the highest parasuicide rate (122.03). Trends of parasuicide rates had indicated high peaks during stressful years. The average standardized AP rate was found to be 14.17 and 8.19 for males and females respectively. The differences between male and female rates is significant (P<0.002). In over 15 year olds, 76% of AP cases were in the age group of 15-44, but males in the age group of 45-64 had the highest AP rate (19.37). Possible reasons for changes in the trends of these three phenomena are discussed. [*Ethiop. J. Health Dev.* 1999;13(3):247-261]

Introduction

Suicide is defined as an intentional, self-inflicted death while 'attempted suicide' is defined as a non-fatal suicidal act. The terms 'suicidal behavior', which generally embraces both Suicide and 'Attempted Suicide', and "suicidal ideation" are extreme expressions of underlying psychopathology, not diagnoses by themselves (1, 2, 3).

In a genuine suicidal act, a person having decided to end up his life, or acting on a sudden impulse to do so, kills himself, having chosen the most effective method available and having made sure that nobody interferes. The definition and categorization of 'Attempted Suicide' is far from simple as the outcome of a suicidal act may depend on outside intervention, irrespective of the seriousness of the suicidal behavior. The attempters usually recognize that the means are non-lethal and they have different characteristics than patients who display lethal suicidal behavior. In other words, those who attempt and those who commit suicide constitute two different groups of populations, which may overlap (1). Studies show that between 14% and 51% of adolescent attempters repeat their attempts depending partially on length of follow-up period (4). Therefore, one can not discount the importance of 'Attempted Suicide'. Sex and age composition and the peak age for Suicides and 'Attempted Suicides' are different. More men than women kill themselves, but more women than men attempt Suicide. It has usually been found that the peak age for Suicides lies between 55 and 65 years and for 'Attempted Suicide' between 24 and 44 years (2,3). The methods and the settings are very important in the determination of the risk-to-rescue fantasy ratio. Attempters have a lower ratio than those who complete Suicide (4).

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Many people deny suicidal intentions after an act of self-damage, because they feel ashamed and guilty. They may not want to tell the truth, or their intentions may have been confused at times (1).

As Kreitman has pointed out, intention can not be used as a criterion since the person's motive may be too uncertain or too complex to ascertain readily. Therefore, more and more authors on the subject prefer the term 'Parasuicide' to 'Attempted Suicide' since it makes no reference to intention (4). The term 'Parasuicide' covers behaviors that can vary from suicidal gestures and manipulative attempts to serious but unsuccessful attempts to kill oneself (2,4). Hereafter, in this paper, the term 'Parasuicide' will be used as much as possible instead of 'Attempted Suicide'.

Suicide is certainly under-reported to some extent everywhere. If the agent responsible for certifying deaths in a country is reluctant to report death as Suicide, due to lack of clear evidence that the injury was self-inflicted and that the individual intendeds to kill himself, the most likely categories for reporting the case are 'Undetermined Cause of Death' or 'Accidental Death'(1,4). Experience in Addis Ababa indicates that Suicides and Parasuicides by poisoning are also incorrectly recorded as 'Death due to Accidental Poisoning' and 'Accidental Poisoning', respectively.

According to the 8th edition of the International Classification of Diseaes (5), doubtful cases of Suicide may be placed in a category of death - 'Injury undetermined whether accidentally or purposely inflicted (E980-E989)' which also include doubtful Homicides (6). Barraclough (7) believes that in the UK the majority of cases allocated in this category are probably equivocal Suicides, since Homicides are rare and usually obvious, and doubtful accidents will be more readily placed in the accident category. Thus, he believes that the sum of the Suicide rate and the 'Undetermined Death' rate may be a closer approximation to the true incidence of Suicide than Suicide rate alone. When we come to Parasuicide, which is still a legal offense in many countries, it often goes unreported unless hospital treatment has been sought. Therefore, the figures of Parasuicide are less reliable.

In 1986, in the USA, Suicide was the 8th leading cause of death, affecting 30,904 people. The true incidence is believed to be far greater. Parasuicide is conservatively estimated to be 10 to 20 times more frequent than successful Suicide (4,8).

Statistics of Suicide and Parasuicide show periodic changes in rates for total population and for different sex and age groups. Changes were also observed in the rate of different methods of Suicide and Parasuicide-sometimes one method is substituted for another method (5,9). Social class, religious, and ethnic groups most affected by Suicide and Parasuicide and seasonal variations of these acts have been studied well in developed countries. Crisis interventionists, social workers, and psychiatrists are familiar with methods of predictions of these acts and this has helped them to establish community - based 'Suicide Prevention Centers'.

In Addis Ababa, eventhough hospital statistics on Suicide, Parasuicide, and 'Accidental Poisoning' are available, they have not been systematically analyzed. Clinical researches also have not been carried out. The reason was that researches on these topics have been rather discouraging because of political consequences as Suicide and Parasuicide were taken as offense against the government. This early notion about Suicide and Parasuicide in Ethiopia is probably changing now and seen as signs of acute emotional disturbance (a cry for help) or a consequence of mental illness.

This paper reports the results of the analyses of the compiled data on Suicide, Parasuicide, and 'Accidental Poisoning' in different hospitals of Addis Ababa and related information from the Ministry of Health. The main objective was to find out the magnitudes (rates) of Suicide, Parasuicide, and 'Accidental Poisoning' in Addis Ababa in different age and sex groups together with seasonal and periodic (yearly) variations. If the magnitudes of these problems are found to be convincing, a proposal will be forwarded to the concerned authorities in Addis Ababa to organize 'Suicide Prevention Services', governmental or non-governmental, like 'Samaritans'. These services could include public education and training within the context of mental health services together with social and psychological support system for the vulnerable groups.

It is known that adults differ from children in the incidence of Suicide, Parasuicide, and 'Accidental Poisoning', in the methods used, reasons given, etiologic and psychodynamic factors associated with the incidences of these three phenomena. This paper deals with cases of over 15 years olds, but to have some general view of all ages, sex-specific crude or standardized rates of each category will also be presented and analyzed.

Methods

Data on suicide, parasuicide and accidental poisoning: Two reliable sources of data were identified in Addis Ababa.

1. All general hospitals, except Dejazmach Balcha, the Army, and the Police Hospitals, include in their monthly reports to the Ministry of Health, the number of cases of Parasuicide (E code No. 148) and 'Accidental Poisoning' (E code No. 140) seen at the OPD or admitted to the inpatient departments. If death occurs in the hospital it is certified by the attending physician as 'completed Suicide' or as 'Death after Accidental Poisoning' or as 'Death Undetermined whether Accidental or Intentional' in doubtful cases. Postmortem examination is not mandatory in such circumstances and certificates are issued to the Police Department if requested. But in doubtful cases, the dead body is usually sent to Minilik II Hospital for confirmation.

2. Minilik II hospital has a postmortem examination service carried out by a qualified Pathologist or Forensic Physician. All cases of violent death from Addis Ababa Region and a considerably large number from other regions are taken there by the Police Department to establish causes of deaths. All circumstantial evidences leading to the death are supplied by the Police Department to help the Forensic Physician to decide on the cause of the death. Certificates are issued to the Police Department, but detailed informations are kept in the record book of the Forensic Department of the Hospital. In the record books, some cases do not contain the age of the victim as it was probably difficult to know. Some other important demographic variables also were not available on the record books. The dates of the examination were written either in the E.C. or G.C. and it was difficult for the data collector to convert all the dates to either of the calendars. So the author had to restrict himself to calculating only the crude sex-specific Suicide plus 'Undetermined Death' rates and Suicide rates. It was confirmed that in practice a verdict of Suicide is recorded by the Forensic Physician only if there was a clear evidence that the injury was self-inflicted and that the individual intended to kill himself. Methods of committing Suicide also were specified in the record books except in cases of 'Undetermined Death'. For the purpose of this paper, only Suicide cases and 'Undetermined Deaths' from Addis Ababa were included. The rest were excluded.

The permission to get access to all hospital monthly reports was obtained from the Medical Directors of the respective hospitals. The general hospitals that handle cases of Parasuicide and 'Accidental Poisoning' and submit their monthly reports include St. Paul's, Ras Desta, Yekatit 12th (adult and pediatrics), Minilik II, Empress Zewditu, Tikur Anbessa, and Ethio-Swedish pediatrics hospitals. The data were collected, by a psychiatric nurse, a trained data collector and by the author himself.

Demographic data: The mid-year population (in medium variant) for Addis Ababa, by sex and five year age groups, from 1982 to 1996 was obtained from the 1984 (10) and the 1994 (11) Population and Housing Censuses and from the sample surveys of 1984 (10). These population data are used in calculating yearly rates (per 100,000) of Suicide, Parasuicide and 'Accidental Poisoning' for both sexes in the general population and in different age groups (i.e. 0-4, 5-14, 15-44, 45-64, and 65 and above) according to the standard monthly report form of the Ministry of Health.

Fiscal year proclamation of 1959(12): Ethiopia follows the Julian Calendar, locally known as Ethiopian Calendar (E.C.), which consists of 12 months, of 30 days each and a 13th month of five days or six days on leap-years. The 13th month is customarily added to the 12th month (i.e. Nehasie) to make it 35 days or 36 days on the leap-year.

All morbidity and mortality statistical reports in Ethiopia traditionally follow the Fiscal Year Proclamation of 1959 which is fixed at a period of one year (in E.C.) from 'Hamle' 1st (i.e. July 8) to 'Senie' 30 th (i.e. July 7 of the following year). So, the end of the Ethiopian fiscal year coincides roughly with the mid-year of the Gregorian Calendar, the time when the size of the population is estimated. These facts are well known when morbidity and mortality rates are calculated and results obtained are taken to represent that specific Ethiopian fiscal year which covers the duration specified above in the Gregorian Calendar. To make it simple, all tables and graphs in this paper will have the corresponding years and dates in the Gregorian Calendar also.

Presentation and analyses of data: Both descriptive and analytical methods are used in the presentation and analyses of data.

On Suicide and 'Undetermined Death' data collected from the Forensic Department of Minilik II Hospital and other hospitals in Addis Ababa, yearly sex-specific crude suicide death rates and crude suicide plus 'Undetermined Death' rates (per 100,000) of 15 years ,from 1974 to 1988 E.C.(i.e., from 1981/'82 to 1995/'96 G.C.), were calculated. Reliable and uniform data collection was started in all civilian government hospitals of Addis Abeba in 1974 E.C. (i.e. 1981/'82 G.C.). These two sets of rates were tabulated and statistically tested whether they maintain their rank order over the 15 years. Differences between male and female rates were tested for singnificance. Two-tailed test was applied here and in all other tests for significance in this paper. Methods of committing suicide were also analyzed and changes in these methods over 15 years were commented upon.

On Parasuicide data, standardized rates (per 100,000) for both sexes for the specified 15 years were calculated and tabulated. The differences between male and female Parasuicide rates were tested for significance. Age- and sex-specific Parasuicide rates were calculated for over 15 year olds and also for under 15 year olds. The trends of these age- and sex-specific rates were compared with those of the standardized rates mentioned above. The average number of Parasuicide cases reported in each Ethiopian month for the specified 15 years among those aged 15 and above were calculated. In both age groups, the difference between daily means of the peak month and the trough was tested for significance and possible reasons for these differences were discussed.

Similar calculations and analyses were conducted on 'Accidental Poisoning' and Parasuicide data.

Results

Table 1 Shows the number and crude sex-specific rates (per 100,000) of Suicide plus 'Undetermined Death' and Suicide Deaths for Addis Abeba in those aged 15 and above from 1974 to 1988 E.C. (i.e. from 1981/'82 to 1995/'96 G.C.). The male crude Suicide Death rates have always been higher throughout the specified 15 years than those of the females. The Wilcoxon's rank sum test on paired data has shown that these differences are highly significant ($P<0.002$). In males, the average crude Suicide Death rate of 15 years was 12.71 and in females, it was 2.45 (per 100,000). Thus male-to-female ratio of the average rates is 5.19:1. For both sexes combined, the average crude Suicide rate was 7.76 (per 100,000).

Figure 1 demonstrates trends of the above mentioned rates for both sexes. Between 1981/'82 and 1985/ `86 G.C., no clearly apparent divergence was seen on the graph. Between 1986/'87 and 1990/'91 G.C., as more 'Undetermined Deaths' were reported in both sexes, slight divergences on the graph become apparent. After 1991/'92 G.C., the number of 'Undetermined Deaths', both in males and females, has continued to increase during successive years that the divergence of

Table 1: **Numbers and crude sex-specific rates (per 100,000) of suicide plus undetermined deaths and (suicide deaths) for over 15 year olds for Addis Ababa from 1974 to 1988 E.C. (i.e. 1981/82-1995/96 G.C.), Addis Ababa, 1998.**

Year in E.C.* (year in G.C.)	Male		Female		Male & Female	
	No.	Rate	No	Rate	NO.	Rate
1974 (1981/82)	74(74)*2	11.48(11.48)	14(14)	2.02(2.02)	88(88)	6.57(6.57)
1975 (1982/83)	64(64)	9.6(9.6)	10(10)	1.39(1.39)	74(74)	5.35(5.35)
1976 (1983/84)	99(98)	14.36(14.22)	12(12)	1.62(1.62)	111(110)	7.76(7.69)
1977 (1984/85)	85(85)	11.81(11.81)	17(17)	2.20(2.20)	102(102)	6.84(6.84)
1978 (1985/86)	56(56)	7.46(7.46)	8(8)	1.00(1.00)	64(64)	4.12(4.12)
1979 (1986/87)	125(124)	15.99(15.86)	37(37)	4.41(4.41)	162(161)	10.01(9.95)
1980 (1987/88)	148(146)	18.17(17.93)	31(28)	3.56(3.21)	179(174)	10.61(10.44)
1981 (1988/89)	105(100)	12.35(11.76)	29(27)	3.20(2.98)	134(127)	7.62(7.51)
1982 (1989/90)	170(160)	19.07(17.95)	41(39)	4.34(4.13)	211(199)	11.50(11.39)
1983 (1990/91)	106(103)	11.36(11.06)	28(28)	2.84(2.84)	134(131)	6.98(6.98)
1984 (1991/92)	54(54)	5.55(5.55)	11(11)	1.07(1.07)	65(65)	3.24(3.34)
1985 (1992/93)	161(160)	15.85(15.74)	41(35)	3.80(3.25)	202(195)	9.65(9.36)
1986 (1993/94)	129(119)	12.60(11.63)	34(23)	3.12(2.11)	163(142)	7.71(7.19)
1987 (1994/95)	153(127)	14.55(12.08)	30(24)	2.68(2.14)	183(151)	8.43(8.15)
1988 (1995/96)	225(180)	20.59(16.47)	44(28)	3.78(2.41)	269(208)	11.93(11.65)
Total	1754(1650)	11.48(11.48)	387(341)			2141(1991)
Average	12.71	9.6(9.6)	2.45			7.76

*E.C. = Ethiopian or Julian Calendar, G.C. = Gregorian Calendar.
Numbers in parentheses refer to suicide death & suicide death rates. M:F (crude suicide rate)=5.119:1
Kendall's rank correlation coefficient (T) between suicide plus undetermined death rates and (suicide rates) is 0.886, P<0.001 for males and 0.905, P<0.001 for females
Defference between M and F crude suicide rates is significant, P<0.002 (Wilcoxon's rank sum test on paired data)

the two sets of rates on the graph became wider and clearly apparent. But as a whole, the general trends in both sexes are obviously similar. Further more, Kendall's rank correlation coefficient (T) between Suicide Death rates and Suicide plus 'Undetermined Death' rates of 15 years was found to be 0.886, P<0.001 for males and 0.905, P<0.001 for females, both showing strong positive correlation which are very highly significant. This shows that the trends in both sexes are maintained.

Table 2 shows the number and percentage of methods of Suicide in Addis Ababa during the specified 15 year period. 'Hanging and strangulation' were the most common methods as 1502 (70.2%) victims of both sexes have used this method. The second common method was drowning which was used by 328 (15.3%). The third method of committing Suicide was by drinking poisonous liquids which was responsible for 161 (7.5%) deaths of both sexes. One hundred and fifty cases(7.%) were diagnosed as 'Undetermined Deaths' and their methods were not also specified in the record books. It was earlier mentioned why 'Undetermined Deaths' are included into Suicide statistics.

Now, considering changes observed in the methods of Suicide at a five-year-intervals, it is clear as shown on Table 2, that 'hanging and strangulation', in both sexes, have manifested a gradual percentage reduction every five years. The drowning method of Suicide among females has not shown remarkable changes except for a small degree of successive reductions, but, among males, there was a remarkable increase, almost double, during the second five - year period just to come back almost to the previous level during the third five - year period. The percentage of drinking poison among females did not show remarkable changes during the three five-year periods, but, among males, there was a remarkable decrease from 10.58% to 2.75% during the second five- year period and then, during the third five-year period, the percentage was back almost to the previous level. The methods of committing Suicide in the 'Undetermined Death' were unspecified.

Table 2: **Number and percentage distribution of methods of suicides in Addis Ababa in both sexes at 5 years intervales from 1974 to 1988 E.C. (i.e 1981/82 - 1995/96 G.C.), Addis Ababa, 1998.**

Methods	1974-1978E.C (1981/82-1985/98 G.C.) Male No.	%	Female No.	%	1979-1983 E.C. (1986/87-1990/91 G.C.) Male No.	%	Female No.	%	1984-1988 E.C (1991/92-1995/96 G.C.) Male No.	%	Female No.	%	Total Male & Female No.	%	No.	%
1. Hanging/ Strangulation	290	76.72	49	88.33	467	71.41	127	75.51	457	65.79	94	58.75	1502	70.15		
2. Drowingin	47	2.43	8	3.11	148	22.63	20	12.05	89	12.33	16	10.00	328	15.32		
3. Drinking Poison	40	0.85	4	6.56	18	2.75	12	7.23	76	10.53	11	6.88	161	7.52		
4.Unspecified undetermined	1	0.26	0	10.00	21	3.21	7	4.22	82	11.36	39	24.38	150	7.01		
Total	78	100	61	100	65	100	166	100	722	100	160	100	2114	100		

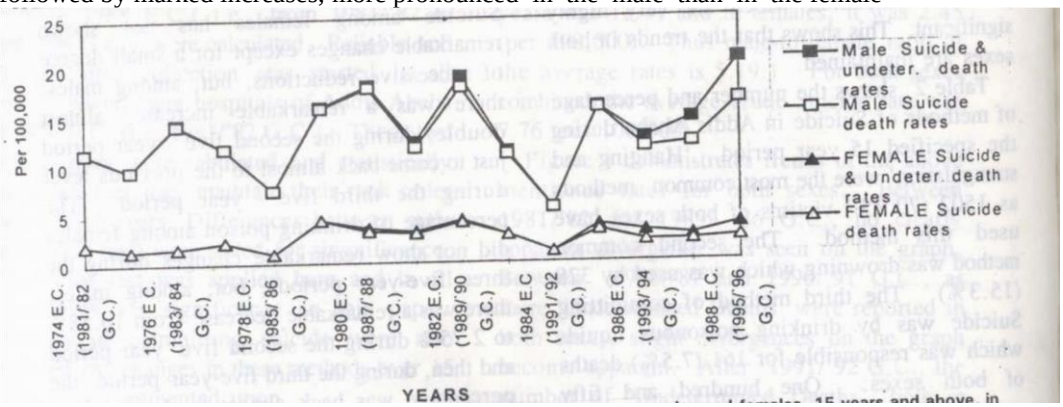
*Percentages are corrected to 100%

In both sexes, such deaths have shown remarkable increases. In males, the percentage which was 0.26 in the first five-year period has reached 11.36 in the third five- year period. In females, the percentage has increased from 0.00 in the first five-year period to 24.38 in the third 5- year period.

Table 3 shows the number of Parasuicide cases and the standardized male and female Parasuicide rates and crude Parasuicide rate (per 100,000) of combined sex in the general population for Addis Ababa for the specified 15 years. Throughout, the male rates were higher than the females and the Wilcoxon's rank sum test on paired data has indicated that the differences between male and female standardized Parasuicide rates is very highly significant (P<0.002) in favor of the males. The average

standardized Parasuicide rate was found to be 74.85 and 25.93 (per 100,000) for males and females, respectively. Thus, the male-to-female ratio of the standardized Parasuicide rate is 2.89:1.The average crude Parasuicide rate is 49.80 (per 100,000) for the specified 15 years duration. The ratio of the average crude Parasuicide rate to crude Suicide rate is 6.42:1.

Figure 2 demonstrates the trends in standardized male and female Parasuicide rates in Addis Abeba in the general population during the specified 15 years. In 1981/'82 G.C., the standardize male Parasuicide rate was 99.61 and that of females was 64.83 (per 100,000). Then, there was a marked decline in the rates after two years that the male rate reached to 22.06 and that of females to 9.57. Thereafter, the rates showed only minor fluctuations until 1990/'91 G.C.. This was then followed by marked increases, more pronounced in the male than in the female



Fugure 1: **Suicide plus undetermined death rates and suicide death rates among males and females, 15 years and above, in Addis Ababa, from 1974 to 1988 E.C. (i.e. 1981/82-1995/96 G.C.), Addis Ababa, 1998.**

Table 3: **Number of Parasuicide cases and standardized male and female parasuicide rates and crude parasuicide rates (per 100,000) of the general population of Addis Ababa from 1974 to 1988 E.C.*1(i.e. 1981/82-1995/96 G.C.*1), Addis Ababa, 1998.**

Year	Male		Female		Male & Female		
	No.	(S. Rate)	No	(S. Rate)	No	(C. Rate)
1974 E.C. (1981/82 G.C.)	642	99.61	450	64.83	1092	81.57
1975 E.C. (1982.83 G.C.)	764	114.65	109	15.16	873	63.07
1976 E.C. (1983/84 G.C.)	152	22.06	71	9.57	223	15.58
1977 E.C. (1984/85 G.C.)	86	11.94	24	3.11	110	7.38
1978 E.C. (1985/86 G.C.)	111	14.8	47	5.85	158	10.22
1979 E.C. (1986/87 G.C.)	159	20.34	93	11.11	252	15.57
1980 E.C. (1987/88 G.C.)	88	10.81	45	5.16	133	7.89
1981 E.C. (1988/89 G.C.)	129	15.17	64	7.06	193	10.98
1982 E.C. (1989/90 G.C.)	91	10.21	88	9.32	179	9.75
1983 E.C. (1990/91 G.C.)	148	15.9	55	5.58	203	10.58
1984 E.C. (1991/92 G.C.)	396	40.71	133	12.9	529	26.4
1985 E.C. (1992/93 G.C.)	516	50.77	100	9.28	616	29.42
1986 E.C. (1993/94 G.C.)	2015	196.89	618	56.73	2633	124.62
1987 E.C. (1994/95 G.C.)	2655	252.47	1057	88.68	3712	117.98
1988 E.C. (1995/96 G.C.)	2692	246.47	983	84.55	3675	162.99
Total	10644		3937		14581	

Average		74.85		25.93		49.8

E.C=Ethiopian or Julian Calendar G.C.= Gregorian Calendar
S. Rate = Standardized Rate C.Rate = Crude Rates
M:F of standardized Parasuicide rate = 2.89:1
Difference between male and female standardized Parasucide rates is significant, P<0.002 (Wilcoxon's rank sum test on paired data).

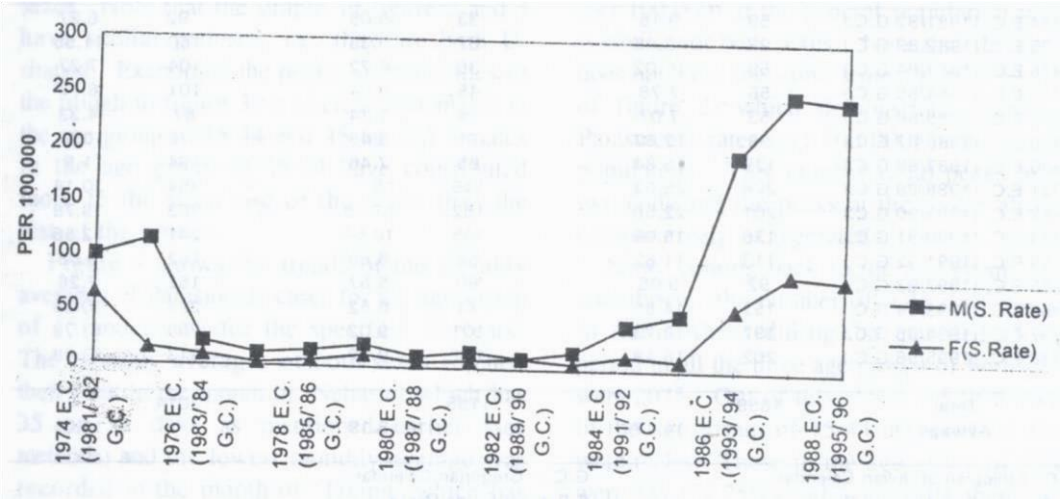


Figure 2: **Standardized male and female parasuicide rates (per 100,000) of the general population of Addis Ababa from 1974 to 1988 E.C. (i.e. 1981/82-1995/96 G.C.), Addis Ababa, 1998.**

population, that it reached 252.47 (per 100,000) in males and 88.69 (per 100,000) in females in 1994/'95 G.G.. Then, in 1995/'96 G.C., there was a negligible decline in the rates both in males and females.

In the age group of 15 years and above, the total number of Parasuicide cases seen during the specified 15 years in both sexes of this age group amounted to 14102. Out of these, 11833 (83.91%) were in the age group of 15-44 and

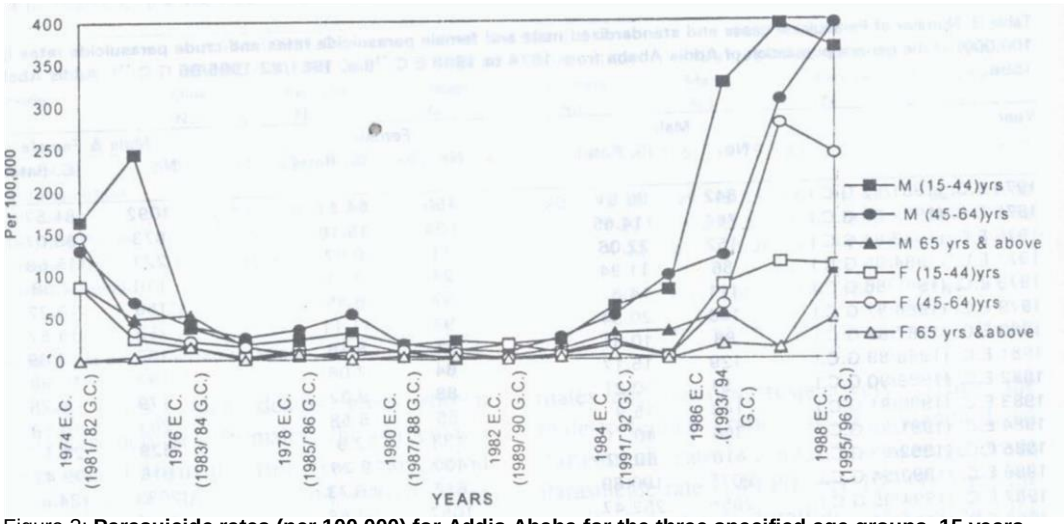


Figure 3: **Parasuicide rates (per 100,000) for Addis Ababa for the three specified age groups, 15 years and above, of both sexes from 1974 to 1988 E.C. (i.e. 1981/82-1995/96 G.C.), Addis Ababa, 1998.**

Table 4: **Number of Accidental Poisoning (AP) cases and standardized male and female AP rates and crude AP rates (per 100,000) of the general population of Addis Ababa from 1974 to 1988 E.C. (i.e. 1981/82-1995/96 G.C.), 1998.**

Year	Male		Female		Male & Female	
	No.	(S. Rate)	No	(S. Rate)	No	(C. Rate)
1974 E.C. (1981/82 G.C.)	59	9.15	33	5.05	92	6.87
1975 E.C. (1982.83 G.C.)	93	13.95	67	9.33	160	11.56
1976 E.C. (1983/84 G.C.)	69	10.02	35	4.72	104	7.27
1977 E.C. (1984/85 G.C.)	56	7.78	45	5.84	101	6.77
1978 E.C. (1985/86 G.C.)	53	7.07	14	1.74	67	4.33
1979 E.C. (1986/87 G.C.)	99	12.67	71	8.49	170	10.5
1980 E.C. (1987/88 G.C.)	129	15.84	65	7.46	194	11.5
1981 E.C. (1988/89 G.C.)	208	25.63	146	15	354	20.14
1982 E.C. (1989/90 G.C.)	201	22.56	162	17.15	363	19.78
1983 E.C. (1990/91 G.C.)	136	15.08	105	10.64	241	12.56
1984 E.C. (1991/92 G.C.)	113	11.62	69	6.69	182	9.08
1985 E.C. (1992/93 G.C.)	92	9.05	60	5.57	152	7.26
1986 E.C. (1993/94 G.C.)	152	14.85	71	6.52	223	10.56
1987 E.C. (1994/95 G.C.)	197	18.73	101	9.02	298	13.73
1988 E.C. (1995/96 G.C.)	202	18.49	111	9.56	313	13.88
Total	1859		1155		3014	
Average		14.17		8.19		11.05

E.C=Ethiopian or Julian Calendar G.C.= Gregorian Calendar
S. Rate = Standardized Rate C.Rate = Crude Rates
M:F = 1.73 (standardized AP rate)
Difference between male and female standardized AP rate is significant, P<0.00 (Wilcoxon's rank sum test on paired data).

75% of them (8863) were males. Those in the age group of 45-65 were 2123 (15.05% of the total) and 66% of them (1392) were male. In the age group of 65 and above, there were 146 (1.04%) cases of Parasuicide out of which 75% (110) were males. During the specified 15 years, the average annual Parasuicide rate (per 100,000) for the age group of 15-44 was 122.03 for males and 36.04 for females. For the age group of 45-64, it was 92.63 for males and 57.1 for females, and for the age group of 65 and above, it was 31.86 for males and 7.93 for female. Note that in each age group, the male group has higher average Parasuicide

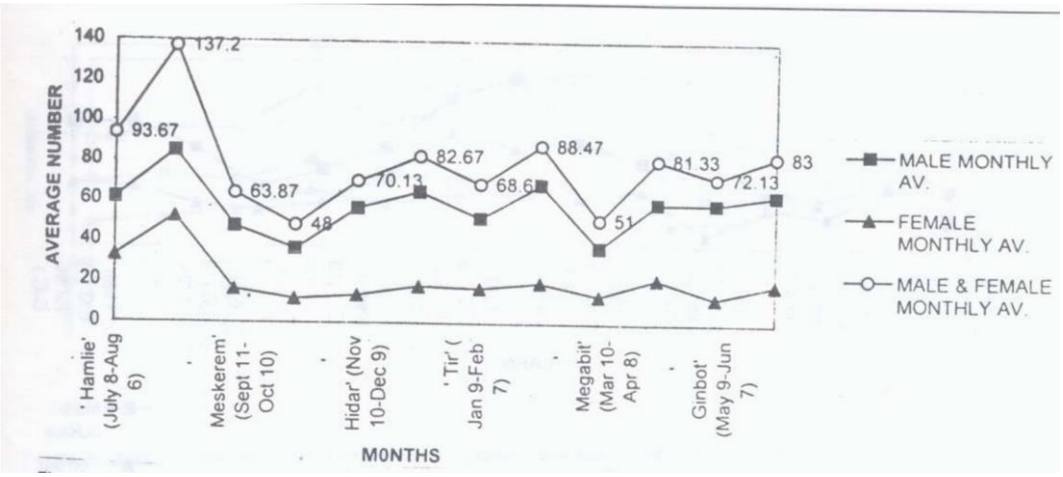


Figure 4: **Monthly average of parasuicide cases for the Addis Ababa population, aged 15 and above, from 1974 to 1988 E.C. (i.e. 1981/82-1995/96), Addis Ababa, 1998.**

rate than its female counterpart and that males in the age group of 15-44 have the highest average Parasuicide rate (122.03 per 100,000).

Figure 3 demonstrates the trends of Parasuicide rates (per 100,000) for the three specified age groups, 15 and above, of both sexes. Note that the graphs in figure 2 and 3 have similar patterns, i.e. they are both U-shaped. Examining the peaks on both sides of the trough in figure 3, it is clear that males in the age group of 15-44 and 45-64 and females in the age group of 45-64 have contributed more to the steep rise of the peaks than the rest of the groups.

Figure 4 shows the trends of the monthly averages of Parasuicide cases for the age group of 15 and above for the specified 15 years. The monthly averages of both sexes reached their peak in the month of 'Nehasie' which has 35 or 36 days as mentioned earlier (see methods) and the lowest monthly average was recorded in the month of 'Tikimt' which has 30 days. When the daily average of 'Nehasie' (mean = 3.89, S.D=6.64) is compared with that of 'Tikimt' (mean = 1.6, S.D, - 2.48), the difference is not statistically significant (t=1.2514, P>0.1).

Table 4 shows the numbers and the standardized male and female 'Accidental Poisoning' (AP) rates and crude AP rates (per 100,000) of both sexes in the general population for Addis Ababa for the specified 15 year period. Throughout, the male rates were higher than those of the females and the Wilcoxon's rank sum test on paired data has indicated that the difference is very highly significant ($p<0.002$).

Figure 5 demonstrates the trends of AP rates (per 100,000) in the general population which is similar for both sexes. Note that this graph does not have the same scale (Y-axis) as that of figure 2, which demonstrates trends of Parasuicide rates (per 100,000) in the general population. This graph has no peaks at the two ends and the peaks at the center also are comparatively exaggerated.

Now, coming back to the age group of 15 and above, the number of AP cases reported in Addis Ababa during the specified 15 year period in all the three age groups of both sexes were 2075. Out of this, 1576 (75.95%) were in the age group of 15-44 and 60% of them were males. Those in the age group of 45-64 were 441 (21.25%) and again 60% them were males. In the age group of 65 and above, there were only 58 (2.8%) cases of AP and 66% of them were males.

In the age group of 15-44, the average AP rate (per 100,000) for 15 years was found to be 15.34 for males and 8.74 for females and in the age group of 45-64, it was found to be 19.37 for males and 13.21 for females. In the age group of 65 and above, the average AP

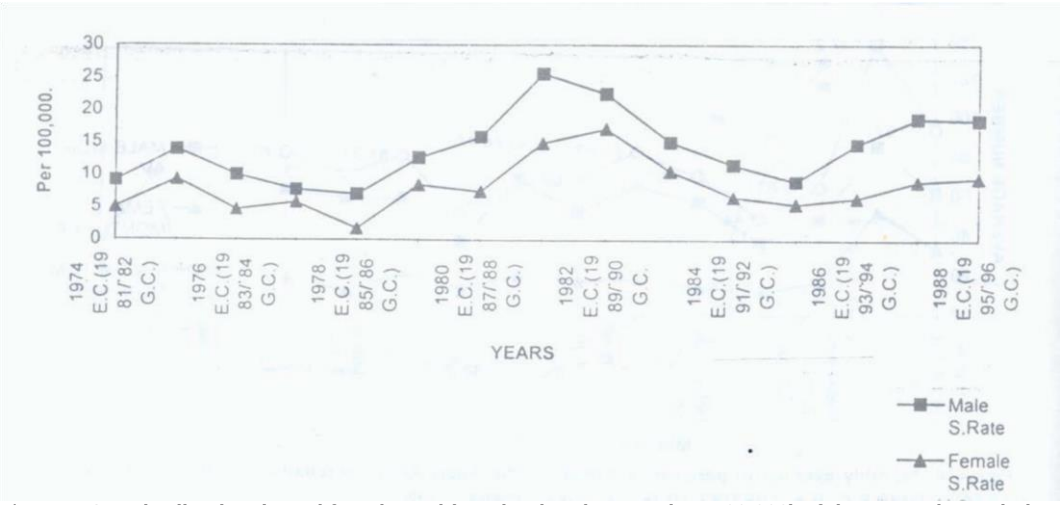


Figure 5: **Standardised male and female accidental poisoning rate (per 100,000) of the general population for Addis Ababa from 1974 to 1988 E.C. (i.e. 1981/82-1995/96 G.C.), 1998.**

rate was found to be 10.26 and 4.20 for males and females, respectively. Note that in this age group, there were no reports of AP for nine years in males and for 11 years in females.

Figure 6 demonstrates the trends of AP rates (per 100,000) for the three specified age bands 15 years and above, of both sexes. Note again that the general trends in this graph, except for those aged 65 and above, is similar to that of figure 5 which demonstrates the trends of standardized AP rates in the general population both for males and females.

In figure 6 it is evident that all age groups of both sexes, except females aged 65 and above, have their peak rates between 1985/'86 and 1991/'92 G.C.. The pronounced increase in rates in 1995/'96 G.C. for the age group of 65 and above of both sexes needs explanation.

Figure 7 demonstrates the trends of the monthly average of AP cases for the specified 15 years for the age groups of 15 and above. Note that this graph is not drawn with the same scale as that of figure 4 which demonstrates the monthly average of parasuicide cases. Note also that it does not have a predominant peak as in figure 4. However, when both sexes are combined, the highest daily average of AP (meam=0.491, S.D=0.318) was recorded for the month of 'Yekatit' and the lowest (mean=0.298, S.D=0.293) for the month of 'Ginbot'. The difference between these two means is not statistically significant (t=0.6993, P>0.1).

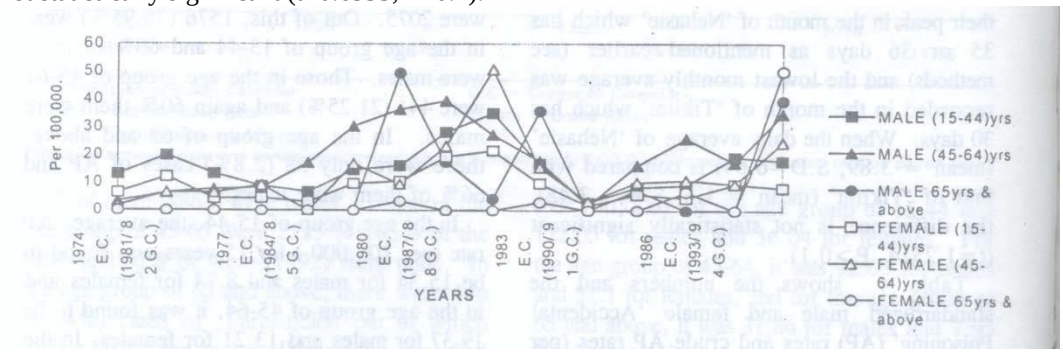


Figure 6: **Accidental poisoning rates (per 100,000) for Addis Ababa for the specified age groups, 15 years and above, of both sexes from 1974 to 1988 E.C. (i.e. 1981/82-1995/96 G.C.), 1998.**

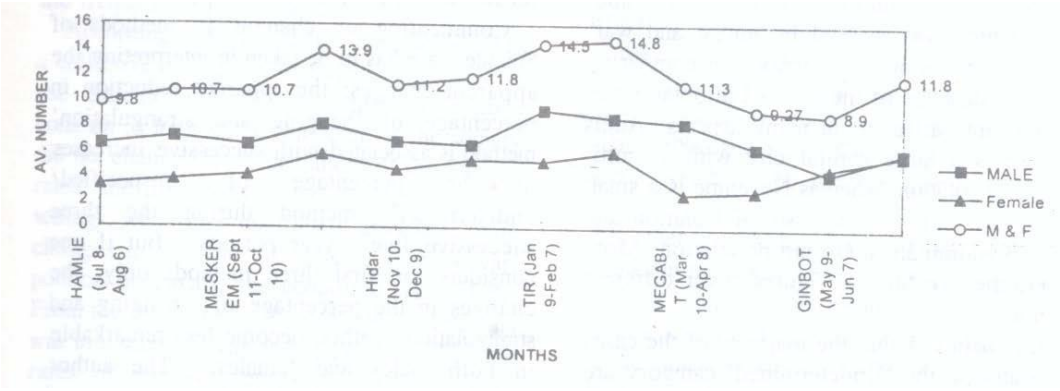


Figure 7: **Morthly average of accidental poisoning cases for Addis Ababa population, aged 15 and above, from 1974 to 1988 E.C. (i.e. 1981/82-1995/96), 1998.**

Discussion

Thorough investigation into the causes of violent or unexpected deaths (including autopsy), constant case definition of Suicide, and consistent ascertaining techniques render reliability to any Suicide data (13). Such procedures are being followed at Minilik II Hospital. It is inevitable, in our circumstances, that certain informations about the victims, especially the demographic variables, remain incomplete. This will certainly limit the type and the number of epidemiological and sociodemographic analyses that could be performed from the data obtained from the records of Minilik II Hospital.

In Addis Ababa, as mentioned earlier, all doubtful Suicides are classified as 'Undetermined' whether accidentally or purposefully inflicted in accordance with the revised 8th edition of the International Classification of Diseath. Logically, such procedures tend to underestimate further the Suicide rates (9,14,15).

Hospital-based Parasuicide rates also under-estimate the true rates because many Parasuicide cases do not come to the hospital unless they are critically ill. Among those who come to the hospital, some probably present themselves as cases of 'Accidental Poisoning' because of the stigma and possible legal problems. This, on the other hand, led to an exaggerated rates of 'Accidental Poisoning' (1,4,16).

With this background in mind, the important aspects of this study are discussed below. The finding that male Suicide rates were significantly higher ($P<0.002$) than female Suicide rates is consistent with the reported rates throughout the world. China is the only exception where women have a higher incidence of Suicide than men from youth through middle age. For example, the male-to-female ratio was 0.8:1 in China in 1989 (8). For Addis Abeba, the male-to-female ratio of the average crude Suicide rate was found to be 5.19:1 which means that men had had higher risk (over five times) of Suicide than women. For most countries the male-to-female ratio is well above 3(4).

The crude Suicide rate (both sexes combined) for Addis Ababa ranged from 3.24 to 11.65 (per 100,000), the average being 7.76. Rate between 5 and 15 in considered as a midium rate and below 5 as a low rate (4). Literature on Suicides is very rare in Ethiopia. Jacobson (17), in a retrospective analysis of medical records from Nekemtie General hospital, found Suicide rates ranging from three to 11 (per 100,000) with an average of 4.5 for a duration ranging from 1966-1972, which could be described as a peaceful period. It has to be remembered that the above- mentioned rates for Addis Ababa cover 15 years duration from the early 80's to the mid-90's which was marked by unrest and war. The author has no any intention of comparing the Suicide rates of these two Ethiopian cities which are different in many aspects. Addis Ababa is a large capital city with a multi-ethnic

population, whereas Nekemtie is a small provincial city with less social isolation and with predominantly Oromo population. More over, the two Suicide figures cover different periods.

It is believed that the majority of the cases allocated in the 'Undetermined' category are probably equivocal Suicides; and the sum of the Suicide rates and the 'Undetermined Death' rates may be a closer approximation to the true incidence of Suicide than Suicide rate alone (7). But when we come to interpreting the trends of Suicide rates of Addis Ababa any one of the two sets of rates could be correctly used. The reason is that Kendall's rank correlations between the Suicide Death rates and Suicide plus 'Undetermined Death' rates of both sexes are strongly positive and very highly significant showing that even when doubtful Suicides are included the order or the pattern is maintained.

This study has shown that the most common method of committing Sucide in both sexes is 'hanging and strangulation' (70.2%) followed by drowning (15.3%) and poisoning (7.5%). In (7.%) of cases, the method is not specified. The fact that 'hanging and strangulation' is the most common means of committing Suicide in Ethiopia was also confirmed by other studies (17,18). The reported Suicide by poisoning does not give any clue about the nature of the poison (i.e. drugs, pesticides etc.) and therefore this information does not help to point to the preventive action.

It is known that cultural values and social policies determine the preference for methods of Suicide (8). Suicide by firearms and explosives, cutting and piercing instruments, jumping from high places and by domestic gas, though not unheard of in Addis Ababa, were not reported in this study. The author believes that such causes are probably treated as accidents and this has to be confirmed by further investigations.

Commenting on changes in methods of Suicide, care has to be taken in interpreting the apparent changes: the apparent reduction in percentage of 'hanging and strangulation' method is associated with successive increases in the percentage of 'unspecified/ undetermined' method during the three successive five - year periods. But if one considers the first three methods only, the changes in the percentage of 'hanging and strangulation' method become less remarkable in both males and females. The author believes that the increase in the percentage of 'unspecified/ undetermined' method could be due to a fall in the quality of police reports since 1991, which help, to some extent, the Forensic Physician to come to a correct decision about methods of committing Suicide. In 1991, following the overthrow of the 'Derge' regime, the entire police force of Addis Ababa was replaced by less experienced police force. This explanation is of course simply speculative which needs further investigation. A sudden increase in the percentage of 'drowning' method and a reduction in the percentage of 'poison drinking' method in males during the second five-year period (i.e. 1986/'87-1990/`91 G.C.) could partly suggest the theoretical possibilty of a substitution of one method, which is less available, by another more available method during that period. This sort of possible substitution is not apparent in females who generally prefer less violent methods of Suicide.

Reasons for committing Suicide are not mentioned in the record books of Minilik II Hospital, so that there is no clue about the most frequent reason for committing Suicide in Addis Ababa. In general, risk factors are classified into societal or psychological. Other factors include physical illness, alcoholism, financial problems, interpersonal disputes, social and political protests, and general sense of meaningless in life. These factors are not mutually exclusive. Easy access to the killing agent and publicity about suicidal acts are reported to be strongly and directly related to the frequency of suicidal acts (4,8).

According to E. Durkheim, each society has a collective inclination to Suicide expressed in the Suicide rate which tended to remain constant as long as the character of the society did not change (1). Fluctuations of the Suicide rates, the directions of which depend on the settings, were often manifestly associated with changes in the state of society, such as war, political upheavals, and economic crisis (1,8). From the mid-70's to the early 90's, Ethiopia was in a state of war and, in general, Suicide rates of this era represent war-time rates. Further more, there were specific turning points in this era which were marked by mass mobilization of the army and aggravation of catastrophic wars. Such aggravations appear to have coincided with further declines in the Suicide

rates in Addis Ababa. In Addis Ababa, there was a dramatic decline of Suicide rates in both sexes in 1985/'86 (i.e. 1978 E.C.) following the great drought and war especially in the North of the country and in 1991/'92 (i.e. 1984 E.C.) following the overthrow of the 'Derge' regime. There was also another minor decline in 1988/'89 (i.e. 1981 E.C.) coinciding with the total evacuation of military from the entire Tigray province and an aborted coup d' e`tat in Addis Ababa. In general, the pattern of trends in male and female Suicide rates are similar except that in male the rates 0fluctuated within a wide range while in female rates fluctuated within a narrow range.

The decline of the Suicide rates in war time had never been explained satisfactorily, but at least three possible conditions were mentioned. These are (1): 1/- less social isolation, which means that the more strongly the individual was integrated with social groups, the smaller was the likelyhood of Suicide, 2/- directions of aggressive feelings form the threatened self against the external enemy, and 3/- decline of the value of individual life. In Addis Ababa there could be another explanation also: it appears that mass mobilization of the youth to the war front and to the resettlement areas of drought victims might have helped to reduce the vulnerable groups in the city, thus leading further to reduced Suicide rates.

Now, focusing on Parasuicide in Addis Ababa, the average crude rate (per 100,000) which is 49.80 is much higher than that of Ibadan (1986) and Benin City (1978 to 1981), Nigeria, which is 2.60 and 7.00 (per 100,000), respectively (19,20).

No other hospital-based rate of Parasuicide is available for Addis Ababa, but there are two community studies worth mentioning here, one in Addis Ababa and the other in 'Butajira'. In a community survey in 1989/'90 academic calendar among Addis Ababa high school students aged 11-18, Kebede and Ketsela (21) found a life-time prevalence of Parasuicide of 14.3%. In a crosssectional survey in 1997 in a rural and semi-urban community of 'Butajira', South Ethiopia, Alem (18) reported a life-time Parasuicide of 3.2% which is most frequent between the age of 15 and 24.

Male-to-female ratio of Parasuicide for Addis Ababa which was earlier mentioned as 2.89:1 is also higher than that of Ibadan and Benin city which is 1.4:1 and 1.2:1, respectively (19,20). This shows clear preponderance of males in these three African cities which is in contrast to the findings in developed countries (4). As far as Addis Ababa is concerned, it was earlier mentioned that male standardized Parasuicide rates are significantly higher ($P<0.002$) than those of female rates.

The ratio of the average crude Parasuicide rate to Suicide rate was mentioned earlier as 6.42:1. This is within the range reported in urban community of the U.K. and the U.S.A in 1960's (1), but recent studies have indicated ratios as high as 20:1 (22). One possible explanation to this change could be that in these countries under-reporting of Parasuicide is decreasing as the associated stigma also is becoming less severe (22).

Age-and sex-specific average Parasuicide rates have indicated that males in all the three age groups have much higher rates than their female counter-parts. The finding that most (83.91%) of those who committed Parasuicide are in the age group of 15-44 is consistent to some extent with other studies in Ethiopia (18,23). It was mentioned earlier that the peak age for Parasuicide in the West has usually been found to lie between 24 and 44 years (1).

While examining the general pattern of trends of Parasuicide shown on figure 2, it is important also to identify which age and sex groups were responsible for the observed upward trends on both sides of the trough. As shown in figure 3 it is clear that males in the age band 15-44 and 45-64 and females in the age band 45-64 are mainly responsible for the observed upward trends. The author has no adequate explanations for the unusually high rates observed in the three age groups prior to 1976 E.C. (1983/'84) and after 1983 E.C. (1990/'91), but much of the risk-factors could be speculated as acute stresses or sudden critical changes of different forms related to political, social and economic changes. The Parasuicide acts could also have appealing effect or function against such changes.

Between 1976 E.C. (1983/'84) and 1983 E.C. (1990/'91), the duration was marked by an aggravation of war in the northern provinces, national military services, formation of a repressive

communist regime, attempt of a coup d'e`tat, extension of the war to central provinces and the final takeover of Addis Ababa by the Ethiopian Peoples Democratic Revolutionary Forces. It appears that the population had adapted well to a gradual accumulation of miseries and thus have manifested less parasuicidal acts.

Examining the seasonal variations of the incidence of Parasuicide in Addis Ababa, the peak daily average which was recorded in "Nehasie" (Aug. 7-Sept. 10), has to be explained.

The author is not aware of any study in Addis Ababa or in Ethiopia in general that establishes correlations among the incidences of Parasuicide, Suicide and other conditions. He believes that any sociological, seasonal, and weather factors peculiar to the two months, 'Hamlie' and 'Nehasie', should be carefully investigated for possible associations. Such factors could include:- 1. Heavy rain and cold

2. Possible lack of employment
3. School vacation and increased courting behavior of the youth and all of its related complications.
4. Failure in class and national examinations.
5. The effect of the Ethiopian new year at the end of 'Nehasie'.

Earlier, it was stated that Parasuicide is under-reported because some are possibly reported as 'Accidental Poisoning' (AP). But a close examination of the data on AP indicates that they do not resemble that of Parasuicide: the general trend, age-and sex-specific trend, the peak age, M:F, and the seasonal patterns of the two phenomena (i.e. Parasuicide & AP) are quite different. Therefore, it is unlikely that the data on AP provide some corroboration to believe that appreciable number of Parasuicide have been reported as AP.

As shown on figure 5, the yearly AP rates for both sexes did not fluctuate to form peaks and troughs as in Parasuicide. Thus, it appears that the factors that have possibly affected the Parasuicide rates prior to 1976 E.C. (1983/'84) and after 1983 E.C (1990/'91) have not affected the AP rates. Examining figure 6, which shows AP rates for the three specific age groups of both sexes, indicates that between 1977 E.C. (1984/'85) and 1984 E.C. (1991/'92) some age groups have shown small isolated peaks which are difficult to explain. Though 75.95% of cases of AP are in the age group of 15-44, this group does not have the highest average rates. Among both males (19.37) and females (13.21) the average AP rate is the highest in the age group of 45-64. In adults AP is usually jobrelated, such as exposure to pesticide spray or to factory chemicals. Probably more males than females are employed in such jobs in Addis Ababa. In a four - year study at Tikur Anbessa Hospital in Addis Ababa, it was found that organophosphate poisoning accounts for 50% of all poisonings (24). In another study of 50 organophosphate poisoning cases in the same hospital, only three cases were due to accident while 47 had suicidal intentions (24). The trends of the monthly averages of AP for the specified 15 years do not show peaks similar to that of Parasuicide.

In conclusion, this study has shown that male crude Suicide rates, standardized Parasuicide rates, and AP rates are significantly higher than those of females. Age distribution of Suicides and monthly distribution was found to be unreliable from the hospital records. These records have to be improved in the future. Remarkable fall in Suicide Death rates was observed during the exacerbation of the civil wars and, in fact, all the Suicide rates reported during the specified 15 years are war time rates. The most common means of Suicide was found to be 'hanging or strangulation', but the immediate reasons for Suicides are not known as they were not recorded.

The study has also shown that males in the age group of 15-44 have the highest Parasuicide rate and that 83.91% of all Parasuicide cases over the age of 15 are in this age group. During stressful years, trends of Parasuicide rates have shown dramatic rises, specially in males of the age group of 15-44 and 45-64 and females of the age group of 45-64. The highest mean daily number of Parasuicide (3.89) was recorded for 'Nehasie' (Aug. 7-Sept. 10), but this is not significantly higher than those of other months. The ratio of the average crude Parasuicide rate to crude Suicide rate is 6.42:1.

Finally, this study has shown that males in the age group of 45-64 have the highest AP rate, but 75.95% of all AP cases over the age of 15 were in the age group of 15-45. Trends of AP rates have not shown dramatic rises during stressful years. The mean daily number of AP was the highest (0.49) for 'Yekatit' (Feb. 8-Mar. 9), but this is not significantly higher than those of other months and does not form a prominent peak on the graph as in Parasuicide.

Because of gross under-reporting of Suicidal behaviors worldwide, the author believes that the figures reported in this paper may represent only a fraction of the prevailing problem. Prevention of Suicide is an important public health responsibility and success depends largely on early identification and adequate treatment of the high-risk population. It was earlier mentioned that suicidal act is committed frequently as a "cry for help" rather than with a clear desire to die. It appears that, regardless of local conditions, where this cry for help is answered, and the help is continued with the aim of solving the outstanding problems leading to the act, much suffering may be prevented (5). General instructions on how to prevent household and industrial poisoning should be available to the public and patterns of drug prescription and drug packaging should follow safety procedures. The need for Suicide prevention services, governmental or non-governmental, and a continuous research program for Addis Abeba is quite obvious.

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