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The Zurich Study:

XV. Suicide Attempts in a Cohort from Age 20 to 30

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Summary. The life-time prevalence of suicide attempts in a Swiss population, interviewed four times between the ages of 20 and 30 years, was 3.8% (females 5.4%, males 2.1%). One fifth of the 30-year-olds reported persistent suicidal ideation. In comparison with controls, attempters reported a more disturbed childhood, and subjects with multiple attempts reported more sexual abuse. Over 10 years attempters persistently showed more negative affectivity, more feelings of helplessness and lower selfesteem. At age 30 they were higher on the scales neuroticism, masculinity and aggressivity in a personality test. Over ten years, a higher than expected comorbidity appeared of suicide attempts with depressive and anxiety disorders, with substance abuse, and with sociopathic features.

Key words: Suicide attempts – Suicidal ideation – Young adults – Life-time prevalence – Sexual abuse – Comorbidity

1 Introduction

Suicide is one of the leading causes of death among young people (Blumenthal 1990), and a history of previous suicide attempts is one of the most powerful predictors of suicide. Ten to twenty percent of adult suicide attempters eventually die by suicide. The same rate of later suicides was found among adolescent male attempters, whereas the rate is about one tenth among adolescent female attempters (Blumenthal 1990, Häfner 1989).

A vast literature on suicide attempts is based on outpatients or inpatients who were treated after the incident. Data obtained from subjects using available services may not be representative; in The Netherlands only one in every four attempts (24.3%) led to contact with professional health services (Diekstra 1989) and only 12% of attempters in a US high school were treated (Smith and Crawford 1986). In order to gain a more comprehensive view of suicide attempts community studies are required.

In Table 1 data from community studies are listed. Subjects were usually asked during an interview whether they ever had attempted suicide. This method resulted in remarkably consistent prevalence rates of 3–4%. There was a consistent female predominance among attempters, which corresponds to the well known preponderance of women among treated attempters (Häfner 1989).

Another set of data is provided by *questionnaire studies* (Table 2). The rates obtained on small non-represen-

Table 1. Lifetime suicide attempt rates in community studies based on interviews

		N	%	Woman at higher risk
Schwab et al. (1972)	Florida	1645	2.7	*
Paykel et al. (1974)	New Haven	720	1.1	+
Ramsey and Bagley (1985)	Calgary	679	4.2	*
Schepank (1987)	Mannheim	600	5.3	+
Velez and Cohen (1988)	NY State	724	3.5	+
Dyck et al. (1988)	Edmonton, Canada	3258	3.6	+
Moscicki et al. (1988)	ECA, USA, 5 sites	18571	2.9	+
Levy and Deykin (1989)	Boston	424	3.5	*
Breslau et al. (1991)	Detroit	1007	5.2	*
Wacker (1991)	Basle	470	4.7	+ Pers. comm.

* Not investigated

Table 2. Lifetime suicide attempt rates based on questionnaires

			Sample size	Attempts (%)	Female surplus
Widmer (1977)	Kanton Zurich	Inductees	596	1.9	–
Smith and Crawford (1986)	Midwest	Highschool	313	8.4	+
Friedman et al. (1987)	New York	Highschool	380	9	n.d.
Shaffer et al. (1990)	N.Y. State	9–10th grade	973	6	n.d.
Kienhorst et al. (1990)	Middle Netherlands	Secondary schools (age 14–20)	9393	2.2	+

n.d.= No data given

tative high school samples in the United States are higher than those obtained at interviews (Smith and Crawford 1986; Friedman et al. 1987; Shaffer et al. 1990). Two larger representative samples (Kienhorst et al. 1990, Widmer 1977 unpublished) on the other hand, reveal data which correspond to the latter.

At present there has been only one *longitudinal study* on community attempted suicide over twelve months (Petronis et al. 1990) in the context of the ECA-Study. We present a longitudinal epidemiolgical study carried out on young adults in the Canton of Zurich, Switzerland. The data on prevalence rates and on the occurrence of psychiatric disorders among suicide attempters over ten years will be compared with other investigations.

2 Methodology

Originally the cohort of our study consisted of 292 males born in 1959 and 299 females born in 1960. They were selected from a representative sample of 2201 males and 2346 females of the Canton Zurich (Switzerland), residence of about one sixth of the Swiss population. In 1978 the subsample for the prospective study was selected according to scores on the 90-item Hopkins Symptom Checklist (SCL-90-R) (Derogatis 1977). Two thirds of the sample subjects were selected among those scoring above the 85th percentile; the remaining subjects were low scorers. Interviews were given in 1979, 1981, 1986 and 1988. The drop-out rate after the third interview was 23%, after the fourth interview 28.3%. The longitudinal design spans ages 20 years to 30.

The diagnostic instrument employed was the SPIKE, a structured interview which was especially developed for epidemiological studies (Angst et al. 1984). The interview was given by trained psychiatric residents and clinical psychologists at the subjects' homes. We collected information on childhood and adolescence characteristics (including behavioural symptoms and school performance), on treatment history, psychiatric and somatic syndromes and on use and abuse of various substances. For each syndrome symptoms, duration and frequency, subjective degree of suffering, treatment, social consequences, previous history, and family history were established. Symptoms and syndromes were assessed for the twelve months before the interview.

At each interview the eventual presence of suicidal ideation and suicide attempts was stated. In 1988, data on life time suicide attempts and on suicidial ideation occurring during the last twelve months were collected according to the interview questions listed in the appendix. Suicidal ideation was graded into four levels of severity. Only levels three or four were considered: severe persistent thoughts of committing suicide or a carefully thought-out scheme on how to commit suicide. If present, the suicide schemes then were assessed in detail by open questions. In a section on the lifetime history, the lifetime prevalence of suicide attempts and of age at an eventual first treatment for suicidal behaviour were assessed in retrospect.

A suicide attempt was reported by 57 subjects, of whom two dropped out after the first interview and 11 others at some later time before age 30 years. The drop-out rate was not different from that of the whole sample.

The statistical analysis is based on non-parametric methods (chi^2, Wilcoxon Tests). Weighted prevalence rates were obtained by referring the cases to the original population sample and correcting for the overrepresentation of subjects with high SCL-90 scores in the longitudinal sample.

3 Prevalence of Lifetime Suicide Attempts, Suicidal Ideation, Single and Multiple Attempts, Early and Late Attempts

At age 30 years a lifetime suicide attempt was or had formerly been reported by 57 subjects, i.e. by 17 males and

Table 3. Rates of subjects with persistent suicidal thoughts in 1988 and life-time suicide attempts

	Subjects with suicidal thoughts (N = 176)		Suicide attempters (N = 57)	
	N	%	N	%
Unweighted rates				
Males (N = 292)	84	28.8	17	5.8
Females (N = 299)	92	30.8	40	13.4
Total (N = 591)	176	29.8	57	9.6
Weighted rates				
Males		20.2		2.1[a]
Females		24.2		5.4[a]
Total		22.2		3.8[a]

[a] Lifetime prevalence

Table 4. Rates of single vs multiple suicide attempts and early vs late attempts until age 30 years

	Attempts ($N = 57$)				Attempts ($N = 44$)[a]			
	One		Multiple		Early <20		Late ≥20	
	N	%	*N*	%	*N*	%	*N*	%
Unweighted rates								
Males	13	4.5	4	1.4	7	2.4	4	1.4
Females	23	7.7	17	5.6	25	8.4	8	2.5
Total	36	6.1	21	3.6	32	5.4	12	2.0
Weighted rates (lifetime prevalence)								
Males		1.0		1.1		0.5		1.1
Females		2.5		2.9		2.7		1.4
Total		1.8		2.0		1.6		1.3

[a] Data collected in 1988, when 13 subjects had dropped out

Table 5. Behavioural childhood characteristics assessed at age 28 years

	Controls ($N = 407$) %	Suicide attempts ($N = 50$) %	*P*	Odds ratio
Less popular than school-mates	14.0	26.0	0.03	2.2/1.1– 4.3
Fear of gymnastics	17.7	32.0	0.02	2.2/1.1– 4.2
Disciplinary difficulties at school	30.5	50.0	0.005	2.3/1.3– 4.1
Frequent truancy	6.6	18.0	0.005	3.1/1.4– 6.8
Running away from home	2.0	14.0	0.000	8.1/3.3–20.2
Problems with police	4.4	6.0	ns	1.4/0.4– 4.8
Repeated thefts	4.9	8.8	ns	1.9/0.7– 5.1
Frequent fightings with peers	7.4	8.0	ns	1.1/0.4– 3.2
Any of the above	29.6	50.9	0.001	2.5/1.4– 4.2

40 females. ($P < 0.01$). The lifetime weighted prevalence rate of suicide attempters until age 30 was 3.8%; the rate was 2.1% for males and 5.4% for females and the female to male sex ratio was 2.35 ($P < 0.01$).

In contrast to the differential prevalence of suicide attempts by sex, serious suicidal thoughts at age 29–30 were found almost at the same rate in males and females. The weighted prevalence rate for males in 20.2%, for females 24.2% (n.s.).

There were 36 subject who reported a single attempt and 21 with multiple attempts. The subjects were subdivided into those who had attempted suicide before age 20 (N = 32) and after (N = 12) (Table 4). Weighted lifetime prevalence rates for a single suicide attempt were 1.8%, for multiple attempts 2.0%. Early suicide attempts were found in 1.6%, late attempts in 1.3% of the population.

4 Onset of Symptoms and Lifetime Treatment Prevalence

Data on first onset of attempts or suicidal ideation were collected in retrospect and may not be entirely reliable. The median age of onset for serious suicidial ideation was 16 years; 80% of the subjects thus affected reported suicidal ideation also at age 20.

At age 30 a *lifetime treatment history for suicide attempts* and for severe suicidal thoughts was taken. Fourty-four of 57 attempters, i.e. 77%, had had treatment in connection with an attempt at some point in their life. In 70% the treatment was initiated before age 20 (N = 26).

5 Demographic Characteristics

Subjects with any attempt, or with a single or with multiple attempts did not differ from controls in social class of origin or in education. Suicide attempters had, however, less often completed an occupational training and at age 30 were more often unskilled workers (25.7%) than controls (5.9%; $P < 0.001$). This was particularly true for subjects reporting multiple attempts (35.7%; $P < 0.001$).

6 Behavioural and Environmental Childhood Characteristics

Table 5 gives some behavioural childhood characteristics, which differentiated suicide attempters from controls. The former reported being less popular and having more disciplinary difficulties at school, they reported

Table 6. Environmental childhood characteristics assessed at age 28 and 30 years

	Controls ($N = 380$) %	Suicide attempts ($N = 44$) %	P	Odds ratio
Broken home	7.3	17.5	0.03	2.2/1.1– 4.2
Parents				
– chronic somatic disorder	24.0	27.3	ns	1.2/0.6– 2.4
– chronic psychiatric disorder	26.8	45.5	0.01	2.3/1.2– 4.2
Conflicts in the family	62.1	88.6	0.001	4.9/2.0–11.4
Marital conflicts, divorce	18.2	31.8	ns	2.0/1.0– 3.9
Financial problems	16.6	25.0	ns	1.7/0.8– 3.5
Low prestige of the family	11.1	15.9	ns	1.5/0.6– 3.4
Suicide attempt in family	5.1	13.2	0.02	2.2/1.2– 4.2
Traumatic sexual abuse	3.2	7.0	ns	2.3/0.8– 6.9
(Subjects with multiple attempts, $N = 20$)	3.2	19.1	0.01	7.7/2.8–21.3

more truancy, and especially much more running away from home. Nineteen percent of subjects with multiple attempts reported running away ($P \leq 0.000$). Suicide attempters in childhood also showed slightly more signs of fear than controls; but the difference was more evident with regard to behavioural symptoms.

There was no difference between attempters and non attempters in psychiatric or psychological treatment and none in the more severe behavioural deviations (thefts, police contacts).

Attempters differed from non attempters in reporting more often psychiatric disorders of parents and family conflicts. They lived less often with both natural parents up to age 16 years (broken home). Against expectation the former two risk factors were found more often in subjects with single attempts. Subjects with multiple attempts gave a history of severe sexual trauma before age 15 years in 19% vs. 3.2% in controls ($P < 0.001$) whereas subjects with single attempts in no case mentioned such events. More specifically and against expectation neither suicide attempts nor suicide had occurred more often among first degree relatives of subjects than controls. There was also no difference for reported symptom of anxiety and depression. Alcohol abuse of first degree relatives on the other hand, was reported by 41.5% of attempters and 17.1% of controls ($P \leq 0.000$), and a treatment of first degree relatives for this disorder in 17% of subjects and 3.5% of controls ($P \leq 0.000$).

7 Symptom Checklist 90-R

From 1978 to 1988 the symptom checklist 90-R (Derogatis 1977) was given six times. At each occasion suicide attempters scored higher on all scales. Compared with controls the ten year stability of the high scores of the SCL-90 suicide attempters is impressive. Longitudinally over the years the scores both of attempters and controls decreased. This is partially due to a regression to the mean created by the oversampling of high scorers at the beginning of the study; but this regression was less effective in the case of attempters.

8 Self-esteem and Mastery

Pearlin and Schooler's scales of self-esteem and mastery (1978) were given at the 1979, 1981, and 1986 interviews. Attempters consistently over seven years showed less self-esteem and more feelings of helplessness.

9 Personality Features at Age 30 Years

At age 30 personality features were assessed by a multidimensional personality test, the Freiburg Personality Inventory (FPI) (Fahrenberg and Selg 1970). The suicide attempters did not differ from controls in extraversion, sociability, frankness, and resilience. Suicide attempters, however, deviated remarkably from controls on the depression score. They were high on nervousness, excitability, spontaneous and reactive aggression (strive for dominance), on Fahrenberg et al's supplementary scales 'neuroticism' and on Angst and Clayton's (1986) first order factors "neuroticisim" and "aggression". They were low on "masculinity" (high tendency to produce psychosomatic symptoms).

In a further analysis we compared *early vs. late suicide attempters* (defined by the first suicide attempt before age 20 years or later). The two groups did not differ on the SCL-90 scales or the FPI scales. A similar negative finding was obtained when we compared *single suicide attempters* with *multiple suicide attempters*.

10 Comorbidity

Subjects with at least one suicide attempt over 10 years were assessed for the presence of DSM-III diagnoses over the same period.

Suicide attempters over ten years were at a significantly higher risk of being given a psychiatric diagnosis than controls. This is particularly true for all diagnostic classes of depressive and anxiety disorders. Suicide attempts were associated with smoking and with the regu-

Table 7. SCL-90 scores of subjects with suicide attempts lifetime

	Interview					
	1978	1979	1980	1981	1986	1988
Suicide	($N = 56$)	($N = 46$)	($N = 50$)	($N = 42$)	($N = 47$)	($N = 43$)
Controls	($N = 533$)	($N = 494$)	($N = 453$)	($N = 404$)	($N = 382$)	($N = 362$)
Hostility						
Suicide	1.29	1.25	1.21	1.03	0.75	0.74
Controls	0.79	0.65	0.63	0.56	0.52	0.48
Anxiety						
Suicide	1.52	1.22	1.14	1.10	0.81	0.88
Controls	0.82	0.66	0.61	0.55	0.49	0.44
Phobic anxiety						
Suicide	0.83	0.70	0.67	0.65	0.50	0.49
Controls	0.41	0.35	0.34	0.29	0.26	0.24
Depression						
Suicide	1.73	1.52	1.46	1.32	1.13	1.19
Controls	1.02	0.85	0.82	0.72	0.66	0.67
Interpersonal sensitivity						
Suicide	1.57	1.38	1.38	1.29	1.08	1.14
Controls	0.93	0.85	0.74	0.73	0.61	0.62
Obsessive-compulsive						
Suicide	1.51	1.30	1.22	1.02	0.89	0.97
Controls	0.87	0.77	0.72	0.62	0.58	0.57
Paranoid ideation						
Suicide	1.42	1.32	1.24	1.07	0.91	0.90
Controls	0.94	0.37	0.73	0.73	0.62	0.61
Psychoticism						
Suicide	1.04	0.91	0.94	0.69	0.54	0.49
Controls	0.66	0.53	0.47	0.39	0.33	0.32
Somatization						
Suicide	1.07	0.94	0.83	0.69	0.60	0.72
Controls	0.57	0.53	0.48	0.42	0.41	0.39

All differences significant at the $P \leq 0.000$ level

Table 8. Self-esteem and mastery in subjects with suicide attempts (lifetime), age 20/21 to 28/29 years

	1979 %	1981 %	1986 %
Self-esteem			
Cases	12.78	13.09	14.18
Controls	14.36	14.39	15.35
P	0.003	0.05	0.01
Mastery			
Cases	12.05	12.98	14.06
Controls	13.80	14.43	15.13
P	0.0003	0.005	0.05

N cases = 43–56, *N* controls = 407–532

lar use of cannabis and/or prescription drugs but not, however, at this relatively young age, with alcohol abuse.

The strongest association of comorbidity was that with sociopathic features which we operationalized by instability at the work place and severe problems with police and/or having been under arrest.

Table 9. Measures of the Freiburg Personality Inventory (FPI) at age 30 years of subjects with suicide attempts

FPI scales	1 Controls ($N = 373$) *x*	2 Suicide attempts lifetime ($N = 43$) *x*	*P*
1 Nervousness	16.37	21.60	0.0001
2 Spontaneous aggression	16.04	18.88	0.01
3 Depressiveness	13.60	19.97	0.0001
4 Excitability	20.32	25.25	0.0002
5 Sociability	18.68	20.31	ns
6 Stability	15.43	14.57	ns
7 Reactive aggression	15.86	18.92	0.01
8 Inhibition	19.17	22.11	0.04
9 Frankness	17.21	19.11	ns
E Extraversion I	17.87	17.86	ns
N Neuroticism	15.71	22.39	0.0000
M Masculinity	17.57	12.48	0.0001
S1 Aggression	17.32	20.80	0.004
S2 Extraversion II	18.57	16.51	ns
S3 Autonomous lability	16.07	21.60	0.0001

Table 10. Comorbidity of suicide attempts (1979–88)

	Controls (534) %	Suicide attempts (57) %	Odds ratio	95% confidence limits
Depressive disorders				
Major depressive disorder (147)	21.9	52.6	4.0	2.3– 6.9
Dysthymia (25)	4.4	14.0	3.6	1.4– 9.1
Recurrent brief depression (156)	23.2	56.1	4.2	2.4– 7.4
Any diagnosis of a depressive disorder (253)	38.9	78.9	5.9	3.0–11.4
Anxiety disorders				
Panic disorder (96)	13.7	40.3	4.3	2.4– 7.7
General anxiety disorder (25)	4.3	14.0	3.6	1.4– 9.1
Panic + general anxiety disorder (115)	16.9	43.9	3.9	2.2– 6.8
Agorphobia (13)	2.4	6.0	2.6	0.7– 9.7
Social phobia (28)	5.3	12.0	2.4	0.9– 6.3
Substance abuse and sociopathic features				
Smoking >10 cigarettes/day (236)	36.7	70.2	4.1	2.2– 7.4
Cannabis (weekly) (78)	11.1	33.3	4.0	2.2– 7.4
Medication (weekly) (45)	6.0	22.8	4.6	2.3– 9.5
Sociopathic features (57)	3.6	19.3	6.5	2.9–14.4

11 Discussion

Lifetime suicide attempt prevalence in ocmmunity studies varies between 3% and 4% and our finding of 3.8% at age 30 falls within this range. As in all other studies females are predominant. There is evidence of a somewhat deviant develoment of suicide attempters. Whereas at age 30 they did not differ from controls in social class and education, fewer of them had completed an occupational training. Their having lived more often in a broken home confirms Kienhorst et al's (1990) findings in Dutch adolescents and Moscicki et al.'s (1988) findings in ECA samples. In childhood and adolescence suicide attempters show more behavioural and slightly more anxiety problems than controls. Precursors of later sociopathy, such as repeated thefts or police contacts, were, however, not prominent. Suicide attempters, in particular subjects with one attempt, report more familial conflict and more parental psychological disorder than controls. Severe sexual abuse, on the other hand, was found more frequently among subjects with multiple attempts. An association of behavioural disorder with children's and adolescents' suicide attempts was reported by Velez and Cohen (1988) and of high school students' attempts with sexual abuse by Smith and Crawford (1986).

A persistent deviation of the SCL-90-R measures over ten years indicates the presence of emotional lability as a trait and is an equialent of neuroticism (Williams 1981)). The same propensity to negative affect among attempters was found by Kienhorst et al. (1980). At each interview the Zurich attempters were lower on self-esteem and mastery than controls. High neuroticism and additionally high depression, aggressivity and excitability appeared on the attempters' personality test at age 30. The findings confirm those of Angst and Clayton (1986), who in a longitudinal study over 16 years found among a male inductee cohort higher loadings on the first order factors nervousness and aggressivity among later suicides and later attempters.

In our study a strong association of attempts with other psychiatric diagnoses appears, which confirms Moscicki et al's (1988) findings of a lifetime psychiatric diagnosis as the strongest risk factors for attempts. The association with depression and drug use is in line with epidemiological data on attempts (Kienhorst et al. 1990, Petronis et al. 1990), as well as with data on treated attempters (Blumental 1990) and on completed suicide (Häfner 1989, Böhme et al. 1976, Blumenthal et al. 1990). Our recently operationalized diagnosis of recurrent brief depression (Angst et al. 1990) helped us to assess depressive disorder in almost 80% of our sample of attempters, while Böhme et al. (1976) and Ovenstone (1973) found among treated attempters about 50% without diagnosable psychiatric disorder. The difference makes sense as suicide attempts appear in a context of lability and impulsivity. Also panic disorders, substance abuse and sociopathic features are quite strongly associated with attempts and the former two diagnoses and sociopathy prevail also among treated attempters and among suicides (Blumenthal et al. 1990, Böhme et al. 1989, Häfner 1989, Weissman et al. 1989). In accordance with our findings substance abuse and major depressive disorder were risk factors in an epidemiological incidence study on percursors of attempts (Petronis et al. 1990).

Differences between early and late attempters (i.e. first attempt before or after age 20) were not found, and differences between subjects with multiple and single attempts were slight though in the expected direction: the

former more frequently reported severe childhood sexual abuse and had less occupational training. The lack of findings may be due to the small numbers invovled.

In conclusion, our data show that the difference between studies of treated attempters and those found among the general population is not large. (This is understandable as in contrast to other epidemiological studies we found that 77% of our attempters were treated.) For both groups the same risk factors appear, in particular female sex. As Blumenthal (1990) pointed out, risk factors for suicide attempts and completed suicide in adolescents and young adults are strikingly similar with the exception of gender: among suicides males predominate. This finding leads to the hypothesis that all suicidal behaviour lies on one dimension beginning with occasional thoughts of death and ending with completed suicide. A study on risk factors for a persistent ideational preoccupation with suicide would be worthwile, especially as our data show the chronicity of such preoccupations at a young age.

The limitations of this study are the following: its subjects belong to one cohort born in the late fifties and were about thirty years old at the last interview. The findings thus may not be applicable to older or younger groups. Further, as we did not study incidence but the correlations of prevalence data, in a strict sense we did not isolate precursors but risk factors of suicide attempts. Our results confirm, however, the short time incidence analysis given by Petronis et al. (1990) based on ECA data. Over ten years, our study population had a tendency to lose subjects without diagnoses. This fact lowers the differences between attempters and controls, but the attempters' vulnerability still appears very clearly.

Appendix

"During the past twelve months did you feelt that you wouldn't mind being dead or did you want to harm yourself?" If the subject answered in the positive the following items were presented:

- I wouldn't mind being dead
- I had transient thoughts of harming myself
- I had serious persisting thoughts of harming myself
- I had clear and precise ideas of how to do it
- I made a suicide attempt

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