

# Suicidal ideation and suicide attempts among adult Danes

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This study describes the prevalence of suicidal ideation and attempted suicide in a representative survey among adults in Denmark and gives the proportion of people reporting a suicide attempt that results in contact with the health care system. The data for the 1994 Danish national health interview survey were collected by personal interview and a self-administered questionnaire. A subsample of 1362 individuals participated in the part of the survey that addressed suicidal behaviour (64% of the random sample). The results show that 6.9% reported having had suicidal thoughts within the past year. Averaging across all age groups the overall prevalence of people reporting ever having made a suicide attempt was 3.4% and the one-year prevalence was 0.5%. Suicidal ideation was more prevalent among young people than among older people, whereas ever-attempted suicide showed no age gradient. Both suicidal ideation and ever-attempted suicide were more prevalent among economically inactive people (e.g. unemployed) and among unmarried or divorced people. We estimate that 50–60% of suicide attempts reported in a representative, national survey become known to the healthcare system.

*Key words:* attempted suicide, suicide ideation, health interview survey, epidemiology.

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## INTRODUCTION

The prevalence of suicidal behaviour (including suicidal ideation and attempted suicide) can be studied in two ways. One method is by utilizing registration studies where all suicide attempts that are treated in the health care system are registered, including inpatient and outpatient hospital care and primary and secondary care physicians. A second method is by utilizing surveys, including interviews or questionnaires, among a population sample, preferably a representative one. This method enables researchers to assess the prevalence of the suicidal behaviour not registered by the health care system.

Typically, only a portion of suicide attempts become known to the health care system. For example, in a representative sample of all first-year students at a major public university in Nevada, Meehan et al. (1) showed that only 10% of people reporting a suicide attempt said it resulted in hospital admission, 25% of the attempts resulted in contact with a physician, and 44% of the attempts caused injury or illness. In a Norwegian national survey among 14–22 years old, who had taken an overdose of pills or had tried to harm themselves, 6% reported having received help or treatment, either in the

hospital or from a medical doctor, and 16% had received help from a psychologist or a psychiatrist. Half of the participants had not received or sought any kind of help (2). In a Swedish study of adolescent psychiatric inpatients two-thirds of the inpatients had received some help after a suicide attempt (3). In both Scandinavian studies, the prevalence of depressive symptoms or diagnosis was correlated with help-seeking after the suicide attempt.

We found only few studies on help-seeking among people who had already attempted suicide. Studies of help-seeking behaviour before a suicide attempt show a consistent pattern of increased contact with general practitioners, psychologists, or outpatient clinics before the suicide attempt (4–6).

The prevalence of suicidal ideation and attempted suicide among adults in Denmark has not previously been determined using a nationwide representative survey. In reviewing suicidal ideation and attempted suicide, Moscicki points out that "... population-based data on the occurrence of attempted suicides in any age-group are infrequently reported and no national-level data have been published" (7).

According to Goldney et al., suicidal ideations "vary from fleeting thoughts that life is not worth

living, to very concrete, well-thought-out plans for killing oneself, to an intense delusional preoccupation with self-destruction" (8). We define attempted suicide as "a potentially self-injurious action with a non-fatal outcome for which there is evidence, either explicit or implicit, that the individual intended to kill himself/herself. The action may or may not result in injuries" (7).

The aims of this study were:

1. to determine the prevalence of suicidal ideation and attempted suicide in a representative sample of adults in Denmark;
2. to describe the prevalence of suicidal ideation and attempted suicide according to several sociodemographic factors, including sex, age, education, economic activity, and civil status; and
3. to determine the proportion of self-reported suicide attempts not identified by the health care system.

As the main purpose of the study was descriptive in nature we did not specify hypotheses related to the study objectives in advance.

## MATERIAL AND METHODS

This study is based on a subsample of 1397 respondents from a nationwide, representative population survey conducted in 1994 by the Danish Institute for Clinical Epidemiology (DICE). Only this subsample contained questions on the prevalence of suicidal ideation and attempted suicide.

The nationwide survey was based on a random sample of 6000 adults in Denmark aged 16 years or older. The data were gathered through personal interviews, after which the interviewees were asked to complete a self-administered questionnaire. The data were collected in three rounds, with approximately 2000 people in each round. A national representative sample for each of the three rounds was drawn immediately before the beginning of the data collection in each round and the selected participants received an introductory letter that explained that participation was voluntary and confidential.

The subsample for this study corresponds to all respondents from the third data collection round that completed the self-administered questionnaire.

The personal interview covered the following core elements: chronic illness, two-week prevalence of symptoms, complaints and injuries (acute illness), long- and short-term disability, self-rated health, use of health services, illness behaviour, health promotion behaviour (dietary habits, physical exercise, smoking behaviour, alcohol consumption), health risk behaviour, and demographic and socioeconomic charac-

teristics. The self-administered questionnaire covered topics such as questions on health-related quality of life (SF-36), questions on prioritization in the health care sector, prevention of allergy in families with children and, in the third round, the questions on suicidal behaviour (9).

The overall participation rate for the personal interviews was 78%. Of these participants, 87% completed and returned the questionnaire. Thus, 68% of the entire sample (all three rounds) completed both parts of the survey (10). In the third round, 76% completed the personal interview and 87% answered the self-administered questionnaire. Thus, a total of 66% of the sample from the third round completed both the face-to-face interview and the self-administered questionnaire. According to our experience from the previous health interview surveys it is quite common that the response rate decreases from the first to the third data collection round.

The overall participation rates were similar among men and women. By age, the participation rates were similar from 16 to 59 years, but decreased rapidly thereafter to 35% among people 80 years of age or older. Fewer widows, widowers, divorced, and never-married people participated than did currently married people (11). The participation rates for the individual data-collection rounds were not analysed separately. Taking into account that all three rounds were random samples, that the data-collection method was identical in all three rounds, and that round three obviously is a subset of the entire sample, we do not believe that the pattern of participation differed substantially between the three rounds. This view is further confirmed by the fact that the participation pattern related to sex, age, and marital status has not changed since 1987 where we conducted the first national health interview survey.

The correction required for the skewed participation rates in the total survey was calculated to be between 0.2% and 2.4%, which is less than the uncertainty associated with random sampling. The results were therefore not weighted.

A total of 1397 people completed the self-administered questionnaire in the third round of data collection; 35 people (2.5%) did not answer any of the questions on suicidal behaviour. The analysis is thus based on the responses of 1362 people. The maximum proportion of non-response for the individual questions among the 1362 respondents who answered at least one question was 0.6%.

We determined the prevalence of suicidal behaviour using questions originally developed by Meehan et al. (1). The questions examine the severity of a suicide attempt. This makes it possible to compare the prevalence rates of self-reported attempted suicide

and of suicide attempts registered through contact with the health care system.

Jan Beskow and Peter Allebeck of the University of Göteborg, Sweden, translated these questions into Swedish and translated them back into English. The present survey used selected questions from Meehan et al. The questions were translated into Danish based on the English questions and subsequently compared with and adapted based on the Swedish version. Tables I and II show the English versions of the questions used.

We used multivariate analysis (PROC CATMOD, SAS) (12) to analyse the differences in the prevalence of suicidal behaviour according to sex and age. We examined the relationship between the other socio-demographic factors and suicidal behaviour using a sex- and age-corrected prevalence ratio, which expresses the difference between the expected and the observed prevalence.

## RESULTS

Ninety-four (6.9%) of the respondents reported that they had thoughts of taking their life within the previous year even if they would not really do it (Table I). Forty-seven respondents (3.4%) reported ever having attempted suicide, including 7 (0.5%) within the previous year.

Three questions inquired about the use of health-care services in connection with suicide attempts (Table II). Among the 47 respondents who reported ever having attempted suicide, 5 reported that the attempt had not resulted in injury or illness, 22 reported contacting a physician, emergency room or other health facility, and 21 reported admission to a hospital. Twenty-nine of the 47 respondents (62%) had contacted a physician and/or were admitted to a hospital to stay overnight or longer.

### *Sex and age*

The prevalence of suicidal ideation and ever having attempted suicide was identical among men and women (Table III). The proportion who reported suicidal

ideation within the past year declined substantially with increasing age: from 13.0% among respondents 16–24 years old to less than 3% among respondents 67 years and older. The prevalence of ever having attempted suicide did not vary with age.

### *Education*

Table IV presents the prevalence rates in percentage and the sex- and age-corrected prevalence ratios for the relationship between educational level and the prevalence of reported suicidal behaviour. The prevalence ratio indicates a higher or lower prevalence of suicidal behaviour in relation to a standard group (people with ten years of education in this case) and expresses the differences between the expected and the observed prevalence. If the ratio is higher than 1, the prevalence is higher than expected in relation to the standard group. If the ratio is less than 1, the prevalence is lower than expected in relation to the standard group. The prevalence ratio is also corrected for any underlying sex and age differences in relation to school education.

The prevalence of reported suicidal ideation was highest among school pupils and lowest among people with seven years of education or less. When the prevalence ratios were corrected for the underlying differences in educational level by sex and age, however, only among school pupils was the prevalence significantly higher than in the standard group with ten years of education. The prevalence of ever having attempted suicide did not vary according to educational level.

### *Employment status*

The prevalence of both suicidal ideation and ever having attempted suicide was higher among the respondents 16–66 years old who were economically inactive (unemployed, disability pensioner, housewife, pupil or student) than among those who were economically active (employed or self-employed). The sex- and age-corrected prevalence ratio for reported suicidal ideation was 2.2 times higher

Table I. *Prevalence of suicidal behaviour among a representative sample of adults in Denmark. The questions listed are from the original English version by Meehan et al. (1). Number of respondents = 1362*

Question	Affirmative response	
	<i>n</i>	%
During the past 12 months have you had thoughts of taking your life, even if you would not really do it?	94	6.9
Have you ever made an attempt to take your own life?	47	3.4
During the past 12 months have you made an attempt to take your own life?	7	0.5

Table II. *Self-reported effects of attempted suicide among a representative sample of adults in Denmark. The questions listed are from the original English version by Meehan et al. (1). Number of respondents ever having attempted suicide = 47*

Question	Affirmative response	
	<i>n</i>	%
Have you suffered an injury or illness as a result of trying to take your own life?	5	0.4
Did you go to a doctor, emergency room, or other health facility for the resulting injury or illness	22	1.6
Were you admitted to a hospital to stay overnight or longer as a result of trying to take your own life?	21	1.5

among economically inactive respondents than among economically active ones, and the prevalence ratio for ever having attempted suicide was 3.5 times higher among economically inactive respondents than among economically active ones (Table V).

The prevalence of reported suicidal ideation did not differ among the various economically active groups (self-employed, salaried employees, and workers). Among the economically inactive respondents, the prevalence was especially high among pupils and students (sex- and age-corrected prevalence ratio 3.8), compared with the mean prevalence among economically active respondents. The prevalence ratio for ever having attempted suicide was 2.7 for unskilled workers and 3.4 for unemployed respondents, compared with the mean for economically active respondents.

#### *Cohabiting status*

Compared with married respondents, 3.2 times as many unmarried respondents and 2.5 times as many separated or divorced respondents reported that they had thought about suicide in the previous year (Table VI). The prevalence ratio for ever having attempted suicide was significantly higher among separated or divorced, unmarried, and cohabiting respondents than in the standard group of married respondents.

## DISCUSSION

This study assessed the prevalence of self-reported suicidal ideation and attempted suicide in a representative sample of adults in Denmark. The data were gathered using a self-administered questionnaire. Both suicidal ideation and attempted suicide are broadly defined concepts that can include all variants of death wishes, behavioural determination, and self-destructiveness. Asking the respondents simple and direct questions about their thoughts about suicide and their attempts to take their lives maintains the broad definition. A few additional questions then make it possible to assess the behaviour in relation to its effects, such as contact with the health care system.

Nearly all respondents answered the questions on suicidal ideation and attempted suicide. This shows that the respondents probably did not feel uncomfortable about answering these questions and did not have specific difficulty in doing so. Only 2.5% of the original sample (35 of 1397) did not answer any of the questions on suicidal ideation and attempted suicide. To illustrate the consequence of this small non-response we recalculated the prevalence of ever having attempted suicide as 5.9% assuming that all the non-respondents had ever attempted suicide and 4.0% assuming that just one-quarter had done it. Thus, even assuming a rather high level of suicide attempts in the non-responding part of the sample our obtained

Table III. *Prevalence (%) of suicidal behaviour among a representative sample of adult men and women in Denmark by age group*

Behaviour	Men					Women					Total
	16-24 years	25-44 years	45-66 years	≥67 years	Total	16-24 years	25-44 years	45-66 years	≥67 years	Total	
Suicidal thought within the past 12 months	13.0	9.0	3.8	2.8	7.2	12.7	6.8	5.4	1.2	6.7	6.9
Ever having attempted suicide	5.4	2.2	3.3	-	2.8	5.1	4.3	2.9	4.9	4.0	3.4
Number of respondents	92	267	211	71	641	118	280	242	81	721	1362

Table IV. Prevalence and standardized prevalence ratio of suicidal behaviour among a representative sample of adults in Denmark according to level of education<sup>a</sup>

Level of education	Number of respondents	Suicidal thoughts within the last 12 months			Ever having attempted suicide		
		%	Prevalence ratio standardized for sex and age	95% confidence limits	%	Prevalence ratio standardized for sex and age	95% confidence limits
Attending school	53	22.6	2.52*	1.02-6.22	5.7	0.74	0.18-2.94
≤7 years	305	2.3	0.50	0.12-2.10	2.3	0.47	0.18-1.24
8-9 years	247	7.3	1.26	0.70-2.27	6.1	2.09	1.00-4.36
10 years	440	6.1	1.00	0.60-1.67	3.2	1.00	0.49-2.05
Upper secondary education	307	9.8	1.49	0.89-2.49	2.6	0.80	0.31-2.09

<sup>a</sup> Ten respondents had a level of education that could not be determined based on the possible categories here.

\* Statistically significant difference compared with the standard group of 10 years of education.

figure (3.4%) remained approximately the same. The maximum proportion of non-response for the individual questions among the 1362 respondents that answered at least one question was 0.6% and similar to the proportion of non-response for the other questions in the self-administered questionnaire. So we believe that the found prevalence of ever having attempted suicide (3.4%) is not influenced by non-response.

There are a few noteworthy aspects of comparing survey data on suicidal behaviour. First, traditional methodological problems, such as differences in sampling frames, methods of data collection, and wording of questions, can make it difficult to compare survey results on the prevalence of suicidal ideation and ever having attempted suicide. Second, the recall period of the question (e.g., have you had suicidal thoughts within the past 14 days, 6 months, 12 months, or ever) is obviously important for the reported prevalence. The general rule is that uncertainty in the accuracy of response increases with the length of time the respondent is asked to recall the incident. For example, a longitudinal study among an original sample of 3130 people living in 12 randomly selected metropolitan secondary schools in Adelaide, Australia (8), demonstrated that 40% of the respondents who reported having had suicidal ideation at the

first survey denied ever having suicidal ideation at the follow-up survey four years later. Of course it is not possible to determine whether this is a result of recall bias or repression.

#### Suicidal ideation

A total of 6.9% of the adults in Denmark 16 years or older reported that they had thought of taking their life within the past 12 months even if they would not really go through with it. The prevalence was highest among participants 16-24 years of age and declined with increasing age. School pupils reported more suicidal ideation than did people who had completed school, as did economically inactive versus active 16-66-year-olds, students versus economically active people, and unmarried and separated or divorced people versus married people.

There are few (if any) national surveys that have studied a nation's prevalence of suicidal ideation using representative samples. Paykel et al. (13) conducted a general population survey among 720 subjects in Connecticut, USA, and found that 8.9% of the respondents had had some type of suicidal ideation within the past year. Salander-Renberg et al. (14) surveyed a sample of residents of Västerbotten County in Sweden 18-65 years old; 12.5% reported that they had thought about ending their life within

Table V. Prevalence and standardized prevalence ratio of suicidal behaviour among a representative sample of adults in Denmark according to status as economically active

Status	Number of respondents	Suicidal thoughts within the last 12 months			Ever having attempted suicide		
		%	Prevalence ratio standardized for sex and age	95% confidence limits	%	Prevalence ratio standardized for sex and age	95% confidence limits
Economically active	836	5.7	1.00	0.68-1.47	2.2	1.00	0.52-1.90
Economically inactive	374	11.5	2.17*	1.37-3.45	6.7	3.48*	1.79-6.75

\* Statistically significant difference between economically active and economically inactive respondents.

Table VI. Prevalence and standardized prevalence ratio of suicidal thoughts and behaviour among a representative sample of adults in Denmark according to civil status. Source: Kjoller et al. (4)

Civil status	Number of respondents	Suicidal thoughts within the last 12 months			Ever having attempted suicide		
		%	Prevalence ratio standardized for sex and age	95% confidence limits	%	Prevalence ratio standardized for sex and age	95% confidence limits
Married	713	3.8	1.00	0.59–1.68	1.8	1.00	0.45–2.21
Cohabiting	238	6.7	1.60	0.68–3.79	4.2	2.85*	1.00–8.12
Single (separated or divorced)	75	9.3	2.54*	1.14–5.63	10.7	6.17*	2.62–14.5
Single (widow or widower)	63	1.6	0.91	0.13–6.67	1.6	0.22	0.03–1.86
Single (unmarried)	272	15.8	3.24*	1.70–6.17	5.5	4.66*	1.72–12.6

\* Statistically significant difference compared with the standard group of married respondents.

the past year. One reason for the higher prevalence of suicidal ideation in Sweden and the USA might be that both studies included milder forms of suicidal ideation than we did, for example beliefs that "life is not worth living" and death wishes.

Several surveys have focused on young people. Bjerke et al. (15) surveyed the students of the University of Trondheim in Norway; 15% of the sample reported suicidal ideation within the previous year, which is close to the 13% prevalence among 16–24-year-olds found in this survey. In contrast, Meehan et al. (1) found a 26% prevalence of suicidal ideation among students in Nevada. However, these two surveys are not representative for the relevant age groups, in that only university students participated.

The present survey found no difference in the prevalence of suicidal ideation among men and women. This is consistent with Bjerke et al. (15), Meehan et al. (1) and with the results of a postal questionnaire survey on health among 1200 residents of Reykjavik, Iceland, which asked about the prevalence of suicidal ideation within the previous week (16). In contrast, Paykel et al. (13) and Diekstra & Gulbinat (in a review article) (17) found higher prevalence rates among women than among men. It is difficult to know exactly why sex differences in suicidal ideation show an inconsistent pattern.

The literature also shows inconsistent results on age distribution. Our survey and that of Salander-Renberg et al. (14) found that suicidal ideation declines with increasing age, whereas Paykel et al. (13) and Vilhjalmsson et al. (16) did not find an age gradient.

The higher prevalence of suicidal ideation among unmarried and separated or divorced respondents in the present survey is consistent with the pattern of prevalence of attempted suicide. In accordance with our results, several studies (13, 14, 16) have shown that social isolation but not socioeconomic status is correlated with the prevalence of suicidal ideation.

#### Attempted suicide

Among our respondents, 3.4% reported ever attempting suicide, and 0.5% reported attempting suicide within the past year. The prevalence was identical among men and women and did not vary systematically with age. The prevalence did not vary with educational level, but was considerably higher among economically inactive versus active respondents, among unskilled workers versus all other employed people, among unemployed people compared with all employed people, and among separated or divorced, never married and cohabiting people compared with married people.

In Västerbotten County in Sweden, Salander-Renberg et al. (14) found an overall lifetime prevalence of ever having attempted suicide of 2.5% and a one-year prevalence of 0.6% among a sample of 18–65-year-olds. Based on a review of surveys, Moscicki (18) estimates that the overall lifetime prevalence of attempted suicide in selected countries varies between 1.1% and 4.3% and the one-year prevalence between 0.3% and 0.8%. Our results are consistent with these figures.

Similar to suicidal ideation, many studies have examined self-reported suicide attempts among young people. Jessen et al. (19) found a lifetime prevalence of 4.9% among a sample of students in Denmark 15–24-years-old. Bjerke et al. (15) found a prevalence of attempted suicide or self-destructive behaviour of 3.4% at the University of Trondheim in Norway. Both results are close to the present survey's prevalence of 5.3% for 16–24-year-olds. Diekstra and Gulbinat (17) examined ten questionnaire surveys of young people and found prevalence rates of attempted suicide ranging from 2.4% to 20%. Among university students in Nevada (1) 2% had attempted suicide within the past year and 10% reported ever attempting suicide in their lifetime.

In the present survey, the proportion of respondents

who had ever attempted suicide was identical among men and women and did not vary systematically with age. The identical rates among men and women are especially striking. A population-based interview survey of approximately 20,000 adults in the United States revealed a prevalence of reported attempted suicide of 1.5% among men and 4.2% among women (20). The WHO/EURO multicentre study on suicide attempts bases its data on registered contacts with health care facilities. In 14 of the 15 centres (Helsinki excepted) the female: male ratio was greater than 1, ranging from 0.72:1 to 2.10:1, with a median of 1.5:1 (21). In Fyn County, the centre participating in Denmark, the female: male ratio was 1.17:1 (22). It appears that the trend in Denmark is toward similar rates for men and women (23), which is consistent with the lack of sex differences in this survey. The sex difference in the prevalence of registered attempted suicide could also result from women being more willing to contact the health care system after a suicide attempt.

Contrasting our results of no age gradient among suicide attempters the WHO/EURO multicentre study demonstrated the highest prevalence of attempted suicide in the age group of 15–34 years and lowest among those 55 years or older. This might be an effect of different methods. When working with self-reported data one might expect that the lifetime prevalence would increase with increasing age, but both our study and other studies imply substantial recall bias, caused by declining recall and by denial of previous suicide attempts (24). When working with registered contacts to the health care facilities recall bias is not an issue.

The higher prevalence of attempted suicide among never married and separated or divorced people has been found in both studies of self-reported suicidal behaviour (14, 20) and in studies based on registration in the health care system (25, 26).

The higher prevalence of ever having attempted suicide among economically inactive versus active people is consistent with population-based interview surveys (18) and in studies based on registration in the health care system (26). A case-control study in New Zealand compared 302 people with serious suicide attempts with 1028 randomly selected residents in the same area and found a much higher rate of unemployment among the suicide attempters than among the controls (odds ratio=4.2) (27). Further analysis showed, however, that the differences between the groups disappeared when the results were corrected for psychosocial factors, such as poor childhood conditions and poor mental health, which are risk factors for both attempted suicide and unemployment (25).

#### *Self-reported attempted suicide and contact with the healthcare system*

This survey provides two ways of estimating the number of suicide attempts unknown to the health care system, i.e. the self-reported suicide attempts in which the person did not contact the health care system.

First, the one-year prevalence for self-reported attempted suicide (from this survey) can be directly compared with the one-year prevalence for attempted suicide registered by the health care system (from other data). As part of the WHO/EURO multicentre study, Fyn County in Denmark registered all patients who contacted a somatic or psychiatric hospital or any physician after a suicide attempt from January 1 to December 31, 1989. The annual rate of attempted suicide among people 15 years and older was 251 per 100,000 (22, 25). The population of Fyn County is usually considered representative of the Danish population. In the present survey, the self-reported prevalence of attempted suicide within the past year in Denmark as a whole was 500 per 100,000 people (Table I). The prevalence of self-reported attempted suicide is thus about twice as high (in our study) as the rate registered by the healthcare system (in the Danish WHO/EURO study). The results must be interpreted cautiously, because the number of people reporting suicide attempts in the survey was very low.

Secondly, the respondents' own information can be used. Twenty-nine of the 47 people reporting that they ever had attempted suicide (62%) also said that they had subsequently contacted the healthcare system (physician, emergency room, or hospital admission). Thus the registered rate for Fyn County of 251 per 100,000 equals a rate of self-reported suicide attempts of 400 per 100,000, not very different from the rate of 500 per 100,000 obtained in our study.

#### CONCLUSION

The results indicate that only 50–60% of the suicide attempts reported in this national representative population survey were known to the health care system. We could not find any study that confirms or rejects this figure. The present results of no sex- and age-differences in the prevalence of attempted suicide are inconsistent with the results found in studies based on registration of suicide attempts by the health care system. In contrast, both our survey and register studies demonstrate a higher prevalence among economically inactive versus economically active persons and a higher prevalence among never married, separated or divorced persons versus married or cohabiting individuals.

The sample size in this survey is not large enough to further investigate the effect of sex, age or other sociodemographic factors on the proportion of suicide attempters who subsequently contact the health care system. The results emphasize the importance of studying trends in suicidal behaviour by using representative surveys based on self-reported data.

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