PREVENTION OF SUICIDE BY YOUTH HEALTH CARE

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Abstract

Study objective - To examine the effect of freely accessible consultation hours in secondary schools by youth health care departments, on population rates for suicide and parasuicide

Design – Ecologic case-referent study design, with data from the Netherlands Bureau of Statistics, the National Hospital Discharge Register, the High-School Students Study, the youth health care departments in the Netherlands and relevant census.

Setting and Participants - Cases were 137 suicide victims aged 15 - 19 y and 182 12 – 18 y old subjects admitted to hospital because of parasuicide and additionally coded as having had surgery as a consequence of the attempted suicide or having a pertinent psychiatric disorder. The relevant census in the regions of the participating youth health care departments served as referents.

The High-School Students Study included 4997 students aged 12 - 18 y of which 303 reported having attempted suicide at least once.

Results - In the ecologic case-referent studies the adjusted Odds Ratio for completed suicide in regions with open consultation hours was 0.98 (95% CI 0.69-1.38) and the adjusted Odds Ratio for parasuicide was 1.30 (95% CI 0.97-1.75). In the High-School Students Study the Odds Ratio was 0.96 (95% CI 0.72 - 1.26). The overall homogeneous Odds Ratio for (para)suicide in regions with open consultation hours for all three studies was 1.00 (95% CI 0.97-1.04); the heterogeneous Odds Ratio was 1.08 (95% CI 0.95-1.09).

Conclusion - This study does not support the hypothesis that regions where youth health care departments have instituted freely accessible consultation hours in secondary schools, show lower rates of suicide or parasuicide compared to regions where no consultation hours were implemented

Keywords

suicide, parasuicide, prevention, consultation hours, youth health care

INTRODUCTION

In the last four decades the suicide rate among adolescents has increased much more dramatically than it has in the general population. This rate increase is such that in most Western countries suicide is the second leading cause of death in this age group, only surpassed by death caused by accidents. [1-7] In the past years this has led to an increased interest in the causes of adolescent suicide and possible preventive measures. The psychological characteristics of adolescents that successfully commit suicide are by definition hard to determine. In general, information is inferred from 'psychological autopsies' of completed suicides. [2,8] In this way a multitude of different underlying causes was found, taking in almost every aspect of human physical, psychological or social functioning. [1,6,8-20] Therefore, primary prevention can only be nonspecific, that is, preventive of poor adjustment to his or her family, occupational, and/or social environment. [6] In addition, special attention should be given to youngsters who exhibit one of the five so-called warning signs described by the American Association of Suicidology [*]. [2]

Because of the rate increase, both in The Netherlands and other countries there has been a surge of school-based programs to prevent adolescent suicide, in some cases in response to startling clusters of suicides or suicide attempts. [21-23] However, these programs proved to have little effect in for instance changing attitudes of students who had made a previous suicide attempt, clearly the highest risk group. [2,4,7,14,24,25]

YOUTH HEALTH CARE AND PREVENTION OF (PARA)SUICIDE IN THE NETHERLANDS

Youth health care (YHC) departments in the Netherlands are part of the Regional Health Services, often working for more than one municipality. They offer programs to all primary and secondary schools in the region and the take-up by the schools is almost 100%. The services are most often rendered on the school premises and may include health promotion programmes, screening for specific physical abnormalities, well-care visits and (freely accessible) consultation hours. For the most part these activities are carried out by youth health care physicians, less often by nurses, and medical assistants.

Between youth health care departments, there is a large variety in the total number, content and intensity of programmes, screenings, and well-care visits as well as the availability of consultation hours on schools. This variety is largely due to different views and priorities in the various health care regions with regard to the content of preventive services for children and adolescents.

With respect to suicide prevention, the differences in access of open consultation hours is of particular interest; because of the diversity of underlying causes and relatively low incidence of (para)suicide, experts[*] agree that, given the working methods of the youth health care, only the institution of open consultation hours can hope to

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[*]   These signs are: (1) a suicide threat or other statement indicating a desire or intention to die, (2) a previous suicide attempt, (3) depression, (4) marked changes in behaviour, including eating and sleeping patterns, acting out, hyperactivity, (major) substance abuse, or high risk taking behaviour, and (5) making final arrangements or saying goodbye to possessions and/or individuals)

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have any effect in reducing (para)suicide rates. Other activities of youth health care departments, like screenings for specific physical abnormalities and well-care visits, are either not easily accessible or strictly related to developmental stage or age of the pupil.

Consultation hours are accessible to pupils, parents and teachers, in most cases without prior appointment. In most cases, open consultation hours were implemented, because in the early eighties regular well-care visits for the older adolescents (age 16/17 y) were discontinued, mostly on budgetary grounds. They are intended to give easy access to the Health Care professionals – in most cases physicians, sometimes nurses - for questions on, and in aid of prevention of, physical and mental health problems. Because in freely accessible consultation hours, advice is often actively sought, the impact of individual counselling during these contacts is supposed to be greater than in the more non-specific setting of well-care visits. As regards prevention of suicide and suicidal behaviour, the possibility of easy referral of youths by teachers or student advisors without the risk of stigmatisation is especially important.

Special training is not obligatory for workers that conduct these consultation hours, as additional schooling on top of the basic medical and public health training mainly depends on personal interests. What sets youth health care practice apart from primary and secondary health care, is the fact, that youth health care workers, be it physicians or nurses, are not permitted to treat children under their care. If therapy of any sort is deemed necessary, the child is referred to a general practitioner or other relevant therapist. However, in some cases a restricted number of short counselling sessions may precede (or even replace) referral to, for instance, institutes for mental welfare.

We studied the potential contribution of open consultation hours in youth health care to the prevention of (para)suicide in adolescents, using three different data sources. More specifically, three research hypotheses are investigated:

Suicide mortality rates should be lower in youth health care regions that have instituted consultation hours, compared to regions that have not. As reporting practices are comparable throughout the Netherlands, these mortality data are considered most reliable.

The rate of hospital admissions for parasuicide should be lower in youth health care regions, that have instituted consultation hours, compared to regions that have not. As referral and admission practices differ greatly throughout the country, only the more severe cases can be considered reliable enough to include in interregional comparisons.

The proportion of adolescents that, in a health questionnaire, report one or more suicide attempts, should be lower in youth health care regions, that have instituted consultation hours, compared to regions that have not.

POPULATION AND METHODS

Allocation of the youth health care departments in the Netherlands to those with or without open consultation hours in schools for secondary education in the period of 1987-1992 was based on their annual reports, and additional sources where necessary. Only one youth health care department refused to participate.

In 1995 the Dutch Institute for Research on Government Spending published a study in which it was determined, which variables could reliably be used to predict regional differences in prevalence of psychosocial problems among 0-18 y old youths.[26] The seven variables chosen (gender, age, degree of

urbanisation, proportion of ethnic minorities, percentage of single-parent families, type of secondary education and percentage of people on social security) are good predictors for suicide and parasuicide as well, and were consequently used to balance the regions with respect to differences in the prevalence of psychosocial problems. This was done by weighting the data with overall-weights for each region, composed of the weights for each variable for each region. The relevant information was obtained from the National Institute of Public Health and Environmental Protection and the Netherlands Central Bureau of Statistics.

The three different data sources used were the Netherlands Bureau of Statistics, the National Hospital Discharge Register (SIG Services) and the High-School Students Study from the Netherlands Institute for Budget Information. Each of these required a different study design.

MORTALITY RATES FOR SUICIDE

For the mortality data an ecologic case-referent study was designed with the total population of 15-19 y olds in the Netherlands in the consecutive years 1988-1993 as the source population. Cases in the population were identified from the mortality statistics of the Netherlands Bureau of Statistics for the period 1988-1993.

Based on postal code of place of residence, cases were allocated to the youth health care departments that were divided into two determinant categories. One category included 13 youth health care departments that had consultation hours in schools for secondary education all through the study period, the other category contained 25 departments that did not have consultation hours at any year in that period. A remaining group of 23 departments (with app. 37% of the total population of 15-19 y olds and 40% of the suicide victims) was excluded for one of the following reasons: (a) the institution of consultation hours in any year later than 1987 (11 departments) ; (b) consultation hours only held at certain types of schools for secondary education, not on the school premises, or otherwise not freely and generally accessible (3 departments); or (c) activities unknown (9 departments). For these reasons a total of 90 of the 227 cases were not classifiable.

The distribution of the remaining 137 suicide victims over the two determinant categories is compared to that of the relevant census of 15-19 y old youths. The size of the referent population in the period 1988-1993, i.e. the total number of 15-19 y olds was 485,597 for youth health care departments with consultation hours and 876,196 for those without.

Odds Ratios were calculated both before and after weighting for possible differences between the two categories in degree of urbanisation, proportion of ethnic minorities, percentage of single-parent families, number and type of facilities for secondary education and percentage of people on social security.

HOSPITAL DISCHARGE DATA

For these data again an ecologic case-referent study was designed with the total population of 12-18 y olds in the Netherlands in the consecutive years 1990-1993 as the source population. The Institute for Informatics in Health and Welfare (SIG Services) provided data concerning the number of hospital admissions for attempted suicide during the years 1990 through 1993 by youth health care region. Information concerning hospital admissions before 1990 were considered to be less reliable and were therefore excluded.

To minimise the effect of the widespread differences in referral practice of physicians and admission policy of hospitals throughout the country, only cases were included that additionally underwent surgical intervention

(that is the operating procedures, for which hospitalisation was necessary) because of the severity of the resulting injuries and/or were diagnosed with a relevant psychiatric disorder. These disorders were chosen based on their known association with a higher incidence of (para)suicide.[*]

Cases therefore included all 12-18 y old patients who had on discharge a main diagnosis 'attempted suicide' and additionally were coded as having had surgery as a consequence of the attempted suicide or having a relevant psychiatric disorder. Also included was information regarding age, year of admittance, gender and postal code of place of residence. The two groups were analysed independently, because cases in the first group are even more likely to be treated uniformly throughout the country. Consequently, data on the group with severe injuries are more reliable than those on the group with a psychiatric disorder.

Based on the year of admittance, cases were manually allocated to one of the two categories of youth health care departments according to the existence of open consultation hours at least one year before the suicide attempt took place. A total of 19 youth health care departments had open consultation hours in schools for secondary education in the period of 1989-1992 at least one year prior to the registered suicide attempt and 25 departments did not. The remaining group of 17 departments had either instituted consultation hours in the same year as the suicide attempt or their activities were unknown (n=8 and n=9 respectively with approximately 23% of the total population in the relevant age group and 12% of the admissions).

The distribution of the remaining 182 cases over the two determinant categories (youth health care regions with and without consultation hours) was compared to that of the population of 12-18 y olds. In the period 1990-1993, the total size of the referent population of 12-18 y olds was 671,192 for youth health care departments that held consultation hours and 835,033 for those that did not. Table 1 gives an overview of the distribution of parasuicide cases according to diagnosis group among the categories of youth health care departments. Odds Ratios were calculated both before and after weighting for possible differences between the determinant categories for the six relevant variables mentioned previously. Separate analyses were carried out for parasuicide patients that during their stay in hospital had had surgery because of their suicide attempt (n=31) and those that were coded as having psychiatric disorders (n=151).

HIGH-SCHOOL STUDENTS STUDY

In 1992 the Netherlands Institute for Budget Information conducted the High-School Students Study in which more than 11,000 students were asked to complete a questionnaire. [27] This questionnaire included among others questions about age, gender, ethnic origin, type of education, family situation, parental background (education, jobs), and suicide attempts.[*] The questionnaires were completed in the classroom and had a response of more than 95%. A random selection of 50% was made available for this analysis.

As the High-School Students Study data were unevenly distributed among the cities and counties of the Netherlands, the data were standardised for age and gender, based on the population in the respective youth health care departments. The relevant demographic data were obtained from the Netherlands Bureau of Statistics.

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[*] The following ICD-10 (International Classification of Diseases, 10th edition) codes were included: 291-3, 295-301, 303-5, 307-9, 311-3, and 315-6.

[*] Question: 'Did you ever seriously attempt to put an end to your life?' (possible answers: 'never', 'once', 'more than once')

Also, data were available from a survey of local preventive activities in 1992 of the Regional Institutes for Ambulant Mental Welfare, aimed at reducing suicidal deaths and suicide attempts by enhancing professional ability of teachers in the recognition of the warning signs mentioned earlier.[28] Therefore, information could be included about preventive activities other than and unrelated to those of youth health care departments. Based on the school postal code, it was determined which of the students that had answered the relevant questions could have used open consultation hours and whether the school as a whole could have benefited from the Mental Welfare activities.

The data were analysed as an ecologic case-referent study with 4,997 students aged 12-18 y as subjects of which 1,983 could have visited open consultation hours and 3,014 could not. Table 2 gives an overview of the distribution of the number of students among the youth health care departments in the two determinant categories, before and after standardisation for age and gender.

In a dichotomous variable the answers 'once and 'more than once' were combined into one category. With this variable as dependant, in a logistic regression procedure with forward stepwise selection the influence of having access to open consultation hours on the prevalence of parasuicide was determined. Apart from the variable 'consultation hours', the following variables were included in the regression equation: age, gender, ethnicity, grade, type of education, family situation, parental work situation, degree of urbanisation of place of residence of the subject and Mental Welfare activities. Variables were added to the model at an alpha less than 0.05.

OVERALL ODDS RATIO

Based on the weighted Odds Ratios for suicide, hospital admission for parasuicide and reported parasuicide, both a homogeneous and heterogeneous overall Odds Ratio was calculated using the method described for computing overall Odds Ratios for meta-analyses. [29]

RESULTS

Table 3 shows the Odds Ratios with 95% confidence interval for the risk of completed suicide in youth health care departments with and without freely accessible consultation hours both before and after the weighting procedure. An Odds Ratio of more than 1.00 signifies an adverse effect.

No effect of open consultation hours could be measured (adjusted Odds Ratio = 0.98, 95% CI=0.69-1.38). In a further analysis, the sensitivity of the study was estimated by adding all 90 non-classifiable cases with their referent population to the category with consultation hours. The resulting Odds Ratio was 1.36 (95% CI=1.04-1.77). When added to the category without consultation hours, the Odds Ratio shows 0.77 (95% CI=0.56-1.05).

Table 4 shows the crude and adjusted Odds Ratios with 95% confidence interval for the risk of hospital admission due to parasuicide in the two categories of youth health care departments. Overall, no effect could be measured (adjusted Odds Ratio = 1.30, 95% CI=0.97-1.75), but in the case of parasuicide with concomitant surgery the risk in regions with open consultation hours was significantly higher (adjusted Odds Ratio = 2.59, 95% CI=1.30-5.16).

Regarding the High-School Students Study, in the final logistic regression model the following variables were found to have a statistically significant influence: gender, age, grade, type of education, family situation,

parental work situation, degree of urbanisation of the place of residence of the subject and preventive activities of the Mental Welfare organisations. No effect could be demonstrated for open consultation hours (adjusted Odds Ratio = 0.96, 95% CI=0.72-1.26), whereas the preventive activities of the Mental Welfare organisations did have a positive influence (adjusted Odds Ratio = 0.60, 95% CI=0.44-0.81). Exclusion of the variable 'Mental Health activity' did not significantly change the Odds Ratio for open consultation hours, so a confounding influence of this variable is less likely.

The overall homogeneous Odds Ratio was 1.00 (95% CI = 0.97-1.04); the heterogeneous Odds Ratio was 1.08 (95% CI = 0.95-1.09). The test for homogeneity resulted in a chi-square of 3.06 (DF=2, p > 0.10).

DISCUSSION

This study does not support the hypothesis that regions where youth health care departments have instituted freely accessible consultation hours in secondary schools, show lower rates of suicide or parasuicide compared to regions where no consultation hours were held.

Each of the three data sets used and their analyses present their own difficulties and methodological issues.

In the case of the analysis of the mortality and hospital admission rates, when comparing the distribution of cases between the two determinant categories the danger mainly lies in misclassification of subjects. Indeed, the information concerning the working methods of the youth health care departments could be insufficient or even incorrect. Given the comprehensive method of data gathering however, this is less likely. Internal migration can be a second reason for misclassification of cases and can have led to some dilution of the effect. A third reason for misclassification can be a difference between place of residence and place of the secondary school and therefore the youth health care region.

It should be stressed that in all of these instances misclassification of cases is nondifferential. Differential misclassification is very unlikely in this type of study. The same applies to selection bias, because there was no selection of a referent population and the theoretical study base is almost identical to the reference population. In most cases, open consultation hours were instituted in response to budgetary cutbacks, because of which well-care visits in grade 4 of the secondary schools had to be discontinued. Therefore, selection by indication - for instance when instead, consultation hours were instituted in response to a higher prevalence of (para)suicide or mental health problems in general - is not likely.

For the mortality figures the starting year is 1988, because the institution of consultation hours will not be effective immediately after implementation. It will take at least a year for them to become an accepted extension of youth health care practice. Therefore, any influence on outcome variables can only be expected after that. As information concerning working methods of youth health care departments was available from 1987 onward, 1988 was the earliest year usable.

Because no youth health care departments discontinued consultation hours once they were instituted, it was considered safe to include 1993. This is supported by the fact that the Odds Ratios over the years 1988-1992 are exactly the same as those over the period 1988-1993.

The youth health care services that could not be assigned to one of the two categories were evenly distributed across the country and on average did not differ from the services in the two categories in respect to the six relevant variables mentioned before (p = 0.66). This is substantiated by a further analysis, in which all 90 cases

with their referent population were added to one or the other determinant category. This analysis showed, that even in the highly unlikely event, that all non-classifiable cases could be allocated to the category without consultation hours, no positive influence of open consultation hours could be demonstrated.

It is clear that the 15-19 y age band will not be totally covered by youth health care activities. The age group most likely to benefit is 18 y old or less. Even so, as mentioned previously, in this type of study selection bias can safely be ruled out. Furthermore, the mortality figures are corrected for possible differences regarding the various relevant variables. Therefore, cases older then 18 years of age will have been equally distributed between the two determinant categories. It is unlikely that misclassification will have masked an otherwise significant difference.

For the hospital discharge data the starting year was 1990, because information on the preceding years was considered to be less reliable; in the years prior to 1990 not all hospitals supplied (complete) data. The rationale for including 1993 is mentioned above, and again the Odds Ratios over the years 1990-1992 were comparable to those over the period 1990-1993.

The two diagnosis groups on discharge, that is, parasuicide with severe trauma requiring surgery, and parasuicide with a relevant psychiatric disorder, were analysed separately because cases belonging to the first category are most likely to be treated uniformly across the country. Therefore, Odds Ratios computed for this category are more reliable. As such the resulting Odds Ratio indicating that in regions with consultation hours the rates for hospitalisation because of severe trauma following parasuicide is significantly higher - even for these small numbers - is not particularly encouraging. Clearly, further studies are necessary to determine the significance of this finding.

Due to the widespread differences in referral practice of physicians and admission policies of individual hospitals, the discharge data on cases other than belonging to the two diagnosis groups are considered to be unreliable. This of course is unfortunate, because those cases will constitute a substantial and from the viewpoint of prevention a potentially very important group.

The methodological problems described above are for the most part not applicable to the analysis of data from the High-School Students study. As the data were standardised for age and gender, based on the population of the respective youth health care departments and in the basic logistic regression model the various relevant variables were included, it is hard to ascribe possible differences between the two determinant categories to anything other than the existence of open consultation hours. As the uneven distribution of subjects among cities and counties was due to differences in ease of access to schools and geographic preferences and not to variations in prevalence of (para)suicide, this will not have led to differential misclassification.

Apart from that, the effect, if any, of nondifferential misclassification seems to be small, seeing that a much more equivocal and general variable - the regional school-oriented preventive activities of Mental Welfare organisations - does prove to have a significant positive effect on the prevention of parasuicide. Therefore, this variable can more or less be considered as a control for the sensitivity of the study. Also, it suggests a possibly more effective approach regarding the prevention of (para)suicide than the institution of consultation hours. Furthermore, nondifferential misclassification because of a difference between place of residence and place of the secondary school is not possible as in this case the postal code of the school is used for allocation.

By combining the results in one overall Odds Ratio the importance of possible methodological shortcomings of the three separate studies is further reduced.

CONCLUSION

From the individual Odds Ratios and the overall Odds Ratio it is concluded that maintaining open consultation hours by youth health care departments does not contribute to the prevention of suicide or parasuicide. Further studies are necessary to determine the implications of the unexpected adverse Odds Ratio for parasuicide with surgery in regions with open consultation hours. Also, new and/or different approaches should be considered concerning the prevention of (para)suicide. In this respect, the positive effect of the Mental Welfare activities can be considered an interesting and valuable starting point.

ACKNOWLEDGMENTS

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Table 1.　　　Distribution of cases of parasuicide among the Youth health care departments.

	consultation hours	no consultation hours	other	TOTAL
parasuicide + surgery	16	15	4	35
parasuicide + psych.disorder	65	86	21	172
Total number of parasuicides	81	101	25	207

Table 2.　Total number of students with and without reported suicide attempts per determinant category (High-School Students Study).

	consultation hours		no consultation hours		TOTAL	
	unstand.	standardised*	unstand.	standardised*	unstand.	standardised*
1 (or more) suicide attempt(s)	84	119	219	153	303	272
no suicide attempts	1,899	2,410	2,795	2,270	4,694	4,680
TOTAL	1,983	2,529	3,014	2,423	4,997	4,952

*　standardised for age and gender, based on the population in the respective youth health care departments

Table 3. Odds Ratios (95% CI) for suicide in Youth health care Departments with freely accessible
consultation hours.

	cases	weighted* cases	referents	OR (95% CI)	adjusted OR (95% CI)
consultation	52	49	485,597		
				1.10 (0.78-1.55)	0.98 (0.69-1.38)
no consultation	85	90	876,196		

* weighted for differences in degree of urbanisation, proportion of ethnic minorities, percentage of single-parent
families, number and type of facilities for secondary education and percentage of people on social security

Table 4. Odds Ratios (95% CI) for parasuicide in Youth health care departments with freely accessible
consultation hours.

	cases	standardised* cases	referents	OR (95% CI)	adjusted OR (95% CI)
hospital admission for parasuicide and surgery					
consultation	16	25	671,192		
				1.33 (0.66-2.68)	2.59 (1.30-5.16)
no consultation	15	12	835,033		
hospital admission for parasuicide and psychiatric disorder					
consultation	65	64	671,192		
				0.94 (0.68-1.29)	1.09 (0.78-1.53)
no consultation	86	73	835,033		
all hospital admissions for parasuicide					
consultation	82	89	671,192		
				0.99 (0.73-1.43)	1.30 (0.97-1.75)
no consultation	101	85	835,033		

* standardised for age and gender, based on the population in the respective youth health care departments