

The alliance against depression: 2-year evaluation of a community-based intervention to reduce suicidality

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ABSTRACT

Background. The global burden and large diagnostic and therapeutic deficits associated with depressive disorders call for intervention programs. The aim of the Nuremberg Alliance against Depression (NAD) is to establish and to assess the effectiveness of a four-level intervention program for improving the care of patients with depression.

Method. A 2-year intervention program was performed in Nuremberg (480 000 inhabitants) at four levels: training of family doctors and support through different methods; a public relations campaign informing about depression; cooperation with community facilitators (teachers, priests, local media, etc.); and support for self-help activities as well as for high-risk groups. The effects of the 2-year intervention on the number of suicidal acts (completed suicides plus suicide attempts, main outcome criterion) were evaluated with respect to a 1-year baseline and a control region (Wuerzburg, 270 000 inhabitants).

Results. Compared to the control region, a reduction in frequency of suicidal acts was observed in Nuremberg during the 2-year intervention (2001 v. 2000: -19.4% ; $p \leq 0.082$; 2002 v. 2000: -24% , $p \leq 0.004$). Considering suicide attempts only (secondary outcome criterion), the same effect was found (2001 v. 2000: -18.3% , $p \leq 0.023$; 2002 v. 2000: -26.5% , $p < 0.001$). The reduction was most noticeable for high-risk methods (e.g. hanging, jumping, shooting). Concerning completed suicides, there were no significant differences compared to the control region.

Conclusions. The NAD appeared to be effective in reducing suicidality. It provides a concept as well as many methods that are currently being implemented in several other intervention regions in Germany and in other countries.

INTRODUCTION

Major depression is a highly prevalent disorder (point prevalence around 5%), characterized by a recurrent, episodic and often chronic course. It impairs the quality of life more than most other diseases and is life-threatening due to suicidality and other direct and indirect contributions to mortality (Avery & Winokur, 1976; Hagnell *et al.* 1987; Paykel, 1991; Kessler *et al.* 1994;

Wittchen *et al.* 1994; Goldberg, 1995; Hays *et al.* 1995; Lepine *et al.* 1997). Psychological autopsy studies have shown that more than 90% of suicides are committed in the context of a psychiatric disorder, with affective disorders accounting for 30–88% of all cases (Lönngqvist & Koskenvuo, 1988). It is therefore not surprising that the World Health Organization (WHO) study *The Global Burden of Disease* identified depression as heading the list of disorders responsible for disability in the developed countries (Murray & Lopez, 1997*a, b*).

Treatments with well-documented efficacy are available but are adequately provided to only a

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minority of depressed persons (Sartorius *et al.* 1993; Coppen, 1994; Spitzer *et al.* 1995). This defines a large range for improvement and calls for action programs to enhance the access to and the quality of care provided to depressed persons in the community. Until recently, there has been a lack of guidance for the design of programs that are effective in improving the care of depressed persons in a natural setting. One inspiring example was the 'Defeat Depression Campaign' (Paykel *et al.* 1997), which was started in the UK in the 1990s to increase understanding of depression and to reduce stigma. The campaign aimed at informing the public about the disorder and at updating general practitioners in the recognition, detection and management of depression. The goal was to decrease suicidality by 15% by the year 2000. The overall suicide rate fell by 11.7% in 5 years, but because of the study design (no control) there are some doubts whether the campaign itself or non-specific factors contributed to the decrease. In 2000 the Australian government initiated a multi-faceted and multi-level program addressing depressive disorders named 'beyondblue'. The program aimed to raise community awareness about depression and reducing stigma. According to the first evaluation of this program, an increase in public awareness and general recognition of the program could be observed after 3 years of intervention (Jorm *et al.* 2005). A further interesting approach was the Gotland study (Rutz *et al.* 1989, 1990; Hickie, 2004). Following intensive medical education for general practitioners on depression, an increase in antidepressant prescriptions and a reduction in suicides were observed on the island of Gotland. Nevertheless, caution should be exercised when generalizing the results because of the lack of a control group, the small sample size and the specific community structure of Gotland. Other studies with a controlled design were not able to confirm the effectiveness of activities focusing on primary care physicians only (Callahan *et al.* 1994; Rahman *et al.* 1998; Thompson *et al.* 2000; Bennewith *et al.* 2002; King *et al.* 2002). A recent systematic review of studies on educational and organizational interventions to improve the management of depression in primary care concluded that only complex and multi-faceted approaches appear to be clinically effective (Gilbody *et al.* 2003).

Considering these results and the complexity of the factors contributing to the underdiagnosis and undertreatment of depression, an action program aiming at multiple levels appears to be the most promising (Rutz *et al.* 1989, 1990). The Nuremberg Alliance against Depression (NAD) is a community-based 2-year action program against depression and suicidality in Nuremberg (480 000 inhabitants), targeting primary care physicians, the media and general public, community facilitators of access to care for depression and depressed persons and suicide attempters as well as their relatives. The primary outcomes for the present report were changes in the frequency of suicidal acts (suicide attempts + completed suicides) with respect to a 1-year baseline and the control region Wuerzburg (270 000 inhabitants). Further evaluation of results (prescriptions of antidepressants and other psychoactive drugs, the number of referrals from primary care physicians to specialists, changes in public opinion and changes in the media coverage of suicidality) will be presented elsewhere.

METHOD

Participants

Nuremberg was chosen as the intervention region because of its adequate size, its infrastructure, with a large central hospital facilitating the assessment of suicide attempts, and the existence of active and cooperative practice networks. Wuerzburg was chosen as a control-comparison region also because of its infrastructure for assessing suicide attempts and because of its participation in the WHO/EURO Multicentre Study on Suicidal Behaviour (Schmidtke *et al.* 1996). The distance between Nuremberg and Wuerzburg is 100 km. The two cities differ somewhat in socio-demographic characteristics. Nuremberg is an industrial city whereas Wuerzburg is a smaller university town surrounded by a rural area. In 2000 Nuremberg had 488 400 inhabitants, and Wuerzburg 286 885. During intervention, the size of the population in the two regions was essentially stable (Nuremberg: +1.6%, Wuerzburg: +1.1%). The rate of unemployment in Nuremberg in 2000 was 8.0%, increasing to 8.9% in 2001 and 10.0% in 2002 (Wuerzburg: 5.8% in 2000, 5.7% in 2001, and 6.2% in 2002).

In Nuremberg, 18.1% of the population were immigrants (Wuerzburg: 7.8%). The proportion of persons younger than 40 years was higher in Wuerzburg than in Nuremberg (41.3% v. 37.3%). Such differences between the cities were considered to be tolerable because the focus of the study lies in changes in suicidality after intervention and not in differences in base rates. Approval was provided by the local ethics committee. To preserve confidentiality, an algorithm for pseudonymization was used for data concerning suicide attempts.

Intervention activities at four different levels

Level of primary-care physicians

Close cooperation with primary-care physicians (general practitioners, family physicians, specialists in internal medicine) is of importance because most depressed persons are treated in a primary-care setting. Therefore, primary-care physicians were trained using a highly interactive educational package. Elements of the training sessions were diagnosis (based on ICD-10 diagnostic criteria) and especially therapy, with a strong focus on pharmacotherapy based on the guidelines of the 'Drug Commission of the German Physicians'. A further focus comprising role playing was on how to deal with suicidality. Handouts included, for example, a one-page laminated recommendation on how to proceed from screening and diagnosis to pharmacotherapy. A further handout was the WHO-5 Well-being Questionnaire. This screening instrument was recommended because, in a study on 448 patients in primary-care practices, it was found to be the best with regard to sensitivity and practicability (Henkel *et al.* 2003). Twelve training sessions were performed in Nuremberg during the 2-year intervention, each with a maximum of 15 participants and duration of 4 hours. Seventy-seven primary-care physicians were trained in these sessions (20% of the primary-care providers in Nuremberg); 34 of them attended two training sessions. In addition, two videos (about 20 minutes each) were produced for and offered to all primary-care physicians. One video contained information for primary-care physicians on how to diagnose and treat depression. The other video contained information for patients and their relatives and

aimed to support the primary-care physicians in the time-consuming task of transmitting relevant information and disease concepts to patients with depression. As a continuing practice support, primary-care physicians could consult a specialist hotline offering individual advice for the treatment of depressed patients.

Level of the media and the professional and lay community

A media relations and city-wide publicity campaign was launched to increase awareness among health professionals and lay public concerning depression, with the intention of destigmatizing depression and motivating affected persons to seek help. Well-known Bavarian politicians were enlisted as patrons for the campaign and to support public relation activities. Forty-three lectures and events for the general public were organized within the 2 years of the campaign. A total of 25 000 brochures and 150 000 information leaflets were distributed. Posters advertised all over the city the campaign's key messages ('depression can be treated', 'depression has many faces', 'depression can affect everybody'). A cinema trailer was produced and has been running in local movie theatres since the beginning of the intervention period. The topic 'suicidality' was of central importance in our cooperation with health professionals but it was not actively addressed in our public relations campaign. A website was established (www.buendnis-depression.de) that offered information about depression, important mental health-care institutions in Nuremberg and current events of the campaign.

Close cooperation with the local media (newspapers, television and radio) was established to implement a 10-point recommendation guide about the media coverage of suicides in order to prevent imitation suicides (Werther effect) (Phillips, 1974). If newspaper reports were rated as being in sharp contrast to these recommendations, the local editorial offices were contacted and asked to take into consideration the recommendation about media coverage on suicides. There was no overlap between the local editorial offices in Nuremberg and Wuerzburg. Therefore, the media activities were not expected to have a major effect on the control region.

Level of community facilitators

During the 2 years of intervention, 84 training sessions were offered to different groups of community facilitators, persons whose role in the community might make them influential in depressed and suicidal persons' decisions to access care. These educational workshops separately targeted priests (11 sessions), teachers (nine sessions), geriatric care-givers (23 sessions), counselling centers and primary health-care professionals (18 sessions), help-lines (six sessions), psychotherapists (eight sessions), pharmacists (three sessions), policemen (five sessions) and prison officers (one session). Key messages of these sessions were how to recognize patients with moderate to severe depression and how to separate these patients from those with depressive mood as a normal reaction to unfavorable life events. Basic knowledge on what to recommend to depressed persons concerning treatment was a further element. In total, over 2000 community facilitators participated in these training sessions.

Level of depressed persons, suicide attempters and their relatives

In spring 2001 a meeting for the initiation of eight self-help groups (8–15 participants) was organized. Five of these groups still existed 2 years later. Additionally, special support was provided for patients after attempted suicides. Very similar to the 'Green card Study' (Morgan *et al.* 1993), an emergency card was offered that guaranteed direct access to a specialist in the case of a further suicidal crisis. The decision to hand out an emergency card to a patient after a suicide attempt was made by the consultant doctor. During the intervention, 84 high-risk patients were provided with this card and 43 phone calls were registered from September 2001 to December 2002.

Objectives

As depression is a major proximal antecedent for suicidality, improved care of depressed patients should result in a reduction in suicidality. Completed suicides and suicide attempts are hard outcomes that can also be measured with limited resources. However, both are infrequent events with strong fluctuations, making it difficult to obtain sufficient statistical power to

demonstrate an effect (Althaus & Hegerl, 2003). Especially for completed suicides, the base rate is too low to detect even highly relevant reductions for a region such as Nuremberg. To decrease the risk of missing a clinically relevant effect and to increase the power of the study, the composite variable 'suicidal acts' (suicide attempts + completed suicides) was taken as the main outcome criterion, even though it combines two quite different aspects of suicidality.

Outcomes

The effects of the 2-year intervention were analyzed with respect to both the baseline year (2000) and the control region (Wuerzburg). The primary outcome criterion was a reduction in the number of suicidal acts (suicide attempts + completed suicides).

Information about completed suicides in Nuremberg and Wuerzburg was provided by the Bavarian State Office for Statistics and Data Processing. Suicide attempts in Nuremberg and Wuerzburg were assessed in cooperation with the local hospitals, a representative sample of 28 psychiatric practices, crisis intervention centers and the local authorities. In each single suicide attempt an interview was performed using the monitoring form of the WHO/EURO Multicentre Study on Suicidal Behaviour. Standardized information about suicide attempts was collected in the study center. To assure a high reliability in the collection of suicide attempts, the number of participating institutions was kept constant. Data assessment in the two regions was continuously homogenized and interviews were regularly supervised.

The WHO definition of parasuicide was used to define suicide attempts (Bille-Brahe *et al.* 1997).

Statistical methods

To evaluate changes in the frequency of suicidal acts in Nuremberg and Wuerzburg, raw data were processed. The registration of suicidal acts is aimed not at the calculation of the exact epidemiological rates of suicides and suicide attempts but mainly at the stable collection of comparable data in the two regions over the whole 3 years (baseline and intervention) in order to detect possible changes in the frequency

of suicidal acts during intervention. Calculation of rates of suicide attempts would not have been accurate as not all possible settings were ascertained.

Given unvaried data in the control region, power analyses revealed that even a 30% reduction in completed suicides in Nuremberg would not reach significance ($\alpha=0.05$, one-tailed). Therefore, according to protocol (see: www.kompetenznetz-depression.de/zwischenbericht_1_1_2000.pdf), completed suicides and suicidal attempts were combined and taken as the primary outcome criterion to enhance the power and reduce the risk of statistically negative results despite clinically relevant effects. As there were no relevant changes in the base populations over the 3 years, χ^2 analysis was performed and a 1 df component for trend was extracted.

For completed suicides official numbers for the 12 years before intervention are available from the Bavarian State Office for Statistics and Data Processing. This enabled calculation additionally of a regression analysis and the corresponding 95% confidence interval for the expected number of suicides. Such data are not available for suicide attempts.

RESULTS

Suicidal acts (main outcome criterion)

The number of suicidal acts (completed suicides + suicide attempts) in Nuremberg decreased from 620 at baseline to 500 (−19.4%) during the first intervention year and to 471 (−24.0%) in the second intervention year. In the control region Wuerzburg, the number of suicidal acts changed from 183 at baseline to 182 (−0.5%) in the first and 196 (+7.1%) in the second intervention year. Confirmatory tests concerning this primary outcome criterion revealed a significant reduction in suicidal acts in Nuremberg compared to the control region (2000 v. 2001: $\chi^2=3.021$, $df=1$, $p\leq 0.082$ two-tailed; 2000 v. 2002: $\chi^2=8.28$, $df=1$, $p\leq 0.004$ two-tailed). A comparable reduction was found for males and females (Fig. 1). Table 1 shows the 2×3 table for Nuremberg and Wuerzburg. The total χ^2 was 8.42 (2 df), $p=0.0148$. The χ^2 for linear trend was 8.34 (1 df), $p=0.0039$.

Table 1. Number of suicidal acts in Nuremberg and Wuerzburg during baseline (2000) and intervention (2001–2002)

	Nuremberg	Wuerzburg	Total
2000	620	183	803
2001	500	182	682
2002	471	196	667
Total	1591	561	2152

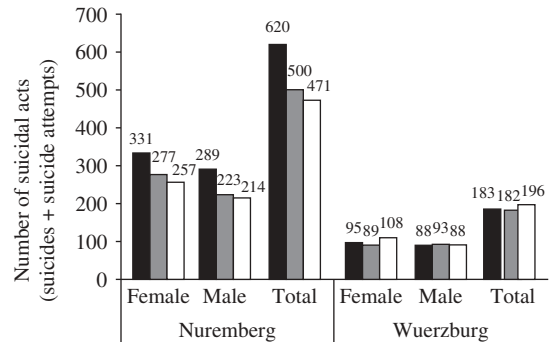


Fig. 1. Frequency of suicidal acts (suicides + suicide attempts) in Nuremberg and Wuerzburg during baseline (2000) and intervention (2001–2002). ■, 2000; ▒, 2001; □, 2002.

Suicide attempts (secondary outcome criterion)

The number of suicide attempts in Nuremberg fell from 520 at baseline to 425 (−18.3%) during the first intervention year and to 382 (−26.5%) in the second intervention year. In the control region Wuerzburg, the number of suicide attempts changed from 125 at baseline to 140 (+12.0%) during the first and 156 (+24.8%) during the second intervention year. This reduction in suicide attempts in Nuremberg is significant compared to the control region (2000 v. 2001: $\chi^2=5.13$, $df=1$, $p\leq 0.023$ two-tailed; 2000 v. 2002: $\chi^2=14.98$, $df=1$, $p<0.001$ two-tailed). Comparable results were found when analyses were limited to persons having made at least one suicide attempt. In Nuremberg the number fell from 475 at baseline to 375 in 2001 (−21.1%) and to 358 in 2002 (−24.6%). Compared to the control region, this reduction is significant (2000 v. 2001: $\chi^2=6.99$, $df=1$, $p\leq 0.008$ two-tailed; 2000 v. 2002: $\chi^2=12.98$, $df=1$, $p<0.001$ two-tailed).

Fig. 2 shows the differences in the number of suicide attempts between the intervention and

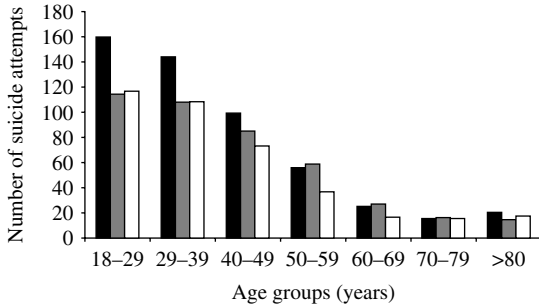


FIG. 2. Number of suicide attempts in Nuremberg during baseline (2000) and intervention (2001–2002) for different age groups. ■, 2000; ▒, 2001; □, 2002.

the baseline year for different age groups. Differences were more pronounced for young (18–40 years) than for older age groups (>70 years).

Has the campaign influenced the recognition of suicide attempts?

Changes in the methods of suicide attempts were analyzed to answer this question. If the awareness effects of the campaign had influenced the recognition rate of suicide attempts, this influence should be visible mainly for ‘low-risk’ suicide methods, because suicide attempts performed with these methods can easily be overlooked or are not classified as suicide attempts. ‘Medication overdose’ and ‘cuts/stabs’ were termed low-risk methods. They account for 81.8% of all suicide attempts during baseline and intervention but for only 13.9% of completed suicides. High-risk methods such as ‘hanging’, ‘jumping’, ‘shooting’, ‘being run over’ and ‘drowning’ account for only 10.1% of suicide attempts but for 78.0% of completed suicides (Table 2).

Changes in suicide attempts in Nuremberg differed significantly with regard to high- and low-risk methods. During intervention, the average frequency of suicide attempts with high-risk methods decreased by 47%, whereas the mean decrease in suicide attempts with low-risk methods was only 15% ($\chi^2=7.86$, $p\leq 0.005$; Fig. 3).

Completed suicides

When analyzing changes in completed suicides, Nuremberg shows a decrease from 100 at baseline to 75 (–25%) during the first and 89

(–11%) during the second intervention year. In the control region the number of completed suicides changed from 58 at baseline to 42 (–28%) in the first and 40 (–31%) in the second intervention year. In the first as well as in the second intervention year there are no significant differences between the two regions compared to baseline (2001 v. 2001 $\chi^2=0.02$, $p=0.89$; 2002 v. 2000: $\chi^2=1.02$, $p=0.31$). The number of 75 registered suicides in the first intervention year was the lowest in the past 12 years, but not outside of the 95% confidence interval (95% CI 72.2–96.7). In Fig. 4 the suicide rates in the years before the intervention year are presented for Nuremberg and Wuerzburg. There are high annual fluctuations in both regions and no intervention effect becomes visible.

DISCUSSION

The NAD comprises a 2-year, four-level, multi-faceted, community-based intervention with evaluation with respect to both a baseline year and a control region. Looking at suicidal acts (completed suicides + suicide attempts) as the predefined main outcome criterion, a statistically significant and clinically highly relevant reduction in suicidal acts was found in Nuremberg compared to the control region Wuerzburg. Suicidal acts in Nuremberg fell from 620 at baseline (2000) to 471 at the end of the 2-year intervention, corresponding to a reduction of 24%. This finding mainly reflects a reduction in suicide attempts (–26%).

It is likely that these effects are still an underestimation of the real effect. The enhanced awareness during the intervention year could have lowered the threshold for classifying ambiguous accidents and self-injurious acts as suicide attempts. Such a bias can be expected, especially for the methods ‘medication overdose’ and ‘cuts/stabs’, which are easily overlooked or not classified as suicide attempts. These low-risk methods account for 69% of all suicidal acts but for only 14% of completed suicides. This reasoning is supported by the finding that the intervention had significantly different effects on low- versus high-risk methods. High-risk methods decreased during intervention by 47%, low-risk methods by only 15%.

Table 2. Suicidal acts and their lethality in Nuremberg and Wuerzburg during baseline (2000) and intervention (2001–2002)

	Nuremberg						Wuerzburg						Ratio of suicidal acts (%)	Ratio of suicide attempts (%)	Ratio of suicides (%)	Lethality (%)
	Suicide attempts			Suicides			Suicide attempts			Suicides						
	2000	2001	2002	2000	2001	2002	2000	2001	2002	2000	2001	2002				
Medication overdose	324	294	257	9	9	9	83	104	97	7	5	2	55.0	65.4	9.7	3.3
Cuts and stabs	80	71	67	4	7	3	20	23	24	2	1	0	14.0	16.3	4.2	5.6
Hanging	26	9	9	36	25	38	3	2	5	29	15	22	10.2	3.1	40.8	75.3
Drowning	4	0	2	4	2	4	2	0	5	4	5	1	1.6	0.7	5.2	61.8
Shooting	2	1	3	13	3	8	0	3	2	1	6	1	2.0	0.6	7.9	74.4
Jumping from high	34	14	18	23	14	16	3	2	9	6	6	6	7.0	4.6	17.6	47.0
Being run over	6	5	6	7	6	3	2	0	0	4	3	3	2.1	1.1	6.4	57.8
Others	44	31	20	4	9	7	12	6	14	5	1	5	8.1	8.1	8.2	18.9
Total	520	425	382	100	75	89	125	140	156	58	42	40	100.0	100.0	100.0	18.8
Low-risk	400	361	319	12	15	12	102	127	120	9	6	2	69.0	81.8	13.9	3.8
High-risk	72	29	38	83	50	70	10	7	21	44	35	33	22.9	10.1	78.0	64.0
Others	48	35	25	5	10	7	13	6	15	5	1	5	8.1	8.1	8.2	18.9

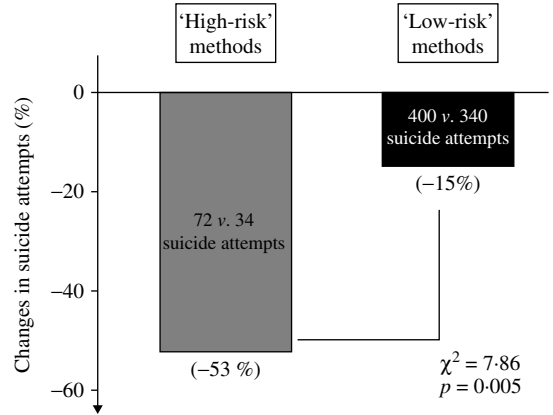


FIG. 3. High-risk and low-risk methods in suicide attempts in Nuremberg during baseline (2000) and intervention (mean of 2001 and 2002).

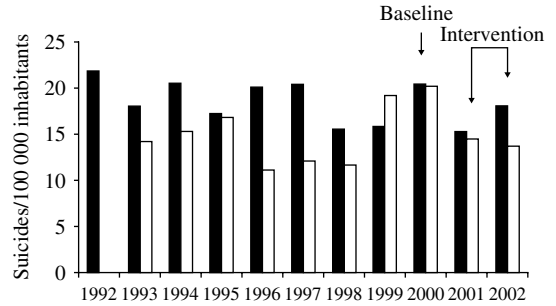


FIG. 4. Suicide rates in Nuremberg (■) and Wuerzburg (□) from 1992 to 2002.

Concerning completed suicides alone, the number fell from 100 to 75 in Nuremberg (the lowest value ever measured) in the first intervention year but increased again to 89 in the second intervention year. Such changes are within the annual fluctuations. In addition, in the smaller control region there are even more pronounced annual fluctuations and the suicide rate fell without a specific suicide preventive intervention program. A relevant intervention effect on completed suicides can therefore be neither confirmed nor excluded. Because of the low base rate, the included population is much too small, resulting in insufficient statistical power.

The fact that Nuremberg showed a statistically significant reduction in ‘suicidal acts’ (completed suicides and suicides attempts, main outcome criterion) and suicide attempts

(secondary outcome criterion) cannot be taken as definitive evidence that the intervention program has been effective. In a broad and community-based intervention there will always be many factors that cannot be controlled. In this context it should be mentioned that the regions studied differ with regard to their size and sociodemographic characteristics. Nuremberg is a more industrial city; the smaller control region Wuerzburg comprises a population from rural areas as well as university students and staff. However, the fact that not only baseline differences in the rates of suicidal acts but also changes in their frequency over time were the outcome criteria limits the probability that these sociodemographic differences between the observed regions have biased our results.

Even taking into account the limitations of the study, the four-level action program in Nuremberg presumably improved the care of depressed patients and prevented suicidality. This raises the question of which of the different activities were the most effective. To answer this question, at least in part, other aspects of the NAD will be analyzed in the future, including changes in referral patterns of primary-care physicians, changes in attitudes to and knowledge about depression in the general population of Nuremberg, changes in drug prescriptions in Nuremberg, and changes in media coverage of suicide.

Independent of the results of such sub-analyses, it became clear during the project that not only additive but also strong synergistic effects resulted from being simultaneously active at four levels. For example, as a consequence of the public relations activities, primary-care physicians are questioned by their patients about depression. Therefore, primary-care physicians are motivated to participate in the training sessions, and in addition it becomes easier for primary-care physicians to confront their patients with a psychiatric diagnosis because they can refer to the ongoing project in Nuremberg.

At present, the NAD is expanding to many other regions in Germany. In addition, based on the results of NAD, similar activities are now starting or have already been started in 16 European countries within the project 'European Alliance against Depression'

founded by the European Commission (www.EAAD.net).

ACKNOWLEDGMENTS

This project was supported by the German Ministry for Education and Research within the professional emphasis 'German Research Network on Depression and Suicidality'. Collaborating investigators in our research include Prof. W. Felber, who gave conceptual advice for the study design, Drs A. Ziervogel, H. Lehfeld and C. Loehr, who were involved in the data assessment, and J. Stefanek and J. Kunz, who provided technical assistance in data analyses. A. Ziervogel is guarantor.

DECLARATION OF INTEREST

None.

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