Effects of Training Program on Recognition and Management of Depression and Suicide Risk Evaluation for Slovenian Primary-care Physicians: Follow-up Study

Aim To implement and evaluate an educational program for primary care physicians on recognition and treatment of depression and suicide prevention.

Method The study was conducted in 3 Slovenian neighboring regions (Celje, Ravne na Koroškem, and Podravska) with similar suicide rates and other health indicators. All primary care physicians from Celje (N = 155) and Ravne na Koroškem (N = 35) were invited to participate in the educational program on depression treatment and suicide risk recognition. From January to March 2003, approximately half of them (82 out of 190; educational group) attended the program, whereas the other half (108 out of 190; control group 1) and physicians from the Podravska region (N = 164; control group 2) did not attend the program. The prescription rates of antidepressants and anxiolytics before and after the intervention were compared between the studied regions. Also, suicide rates three-years before and after the intervention were compared.

Results From 2002 to 2003, there was a 2.33-fold increase in the rate of antidepressant prescriptions in the educational group (P<0.05) and only 1.28-fold (P<0.05) and 1.34-fold (P<0.05) increase in control groups 1 and 2, respectively. However, the 12% decrease in suicide rate in the intervention regions was not significantly greater than the 4% decrease in the non-intervention region (P>0.05).

Conclusion Our training program was beneficial for primary care physicians’ ability to recognize and manage depression. However, there was no significant decrease in local suicide rates.
Slovenia is an example of a high suicide rate country, with between 25 and 30 suicides per 100,000 population (years 2000-2006). The suicide rate is highest in the northeastern part of the country and gradually decreases toward the southeast. Such uneven distribution pattern is similar to the situation in Europe (1).

Suicidal behavior often manifests in people with mental illness, mostly depression (2). If depression is not recognized in primary care setting (3,4), it can deteriorate and subsequently lead to a development of suicidal behavior. Most persons who engaged in suicidal behavior had had contact with a primary care physician within a month prior to death (5-7), which suggests that education of primary care physicians on depression could contribute to suicide prevention. The first study on education of general practitioners on depression, conducted in 1983 in the Swedish island of Gotland, increased the prescription of antidepressants and decreased the prescription of anxiolytics (8-9). Furthermore, it decreased the number of women’s suicides by two thirds, whereas the number of men’s suicides remained more or less the same (10-12). Since then, many replications of the study have been done, with different outcomes. Similar programs have increased the prescription of antidepressants and substantially decreased suicide rates, eg, in some regions of Sweden (11,12), Hungary (13), and Japan (14). Furthermore, education programs for primary care physicians have improved the detection and treatment of depression in the UK (15), Australia (16), US (17), and the Northern Ireland (18). Studies in some other countries, such as Brazil (19), UK (20), and the USA (21), have failed to confirm a beneficial effect of such programs. Other forms of community-based intervention programs have also been effective in reducing the suicide rate and outcomes. Similar programs have increased the prescription of antidepressants at the baseline period (March-December 2002). The group of physicians attending the educational program in the two regions showed a significant reduction in suicide rate by about 20%, both with respect to a 1-year-baseline and the control region (22).

Primary care physicians were chosen as the target group for our program because in the Slovenian health care system they have a gatekeeping role of referring patients to specialists. The aim of our study was to develop, follow-up, and measure the effects of primary-care physicians’ training on recognition and management of depressive disorder and evaluation of suicide risk. The effects were divided into short-term ones, like improvement in the ways of prescribing antidepressants and anxiolytics, and long-term ones, like a potential decrease in the local suicide rates.

**METHODS**

The study was conducted in 3 Slovenian neighboring regions, Podravska, Savinjska, and Koroška, with the highest suicide rates in Slovenia and similar health indicators (Table 1). These regions were also chosen due to shortage of outpatient psychiatric services, which is why the treatment of patients with mental disorders there relies more on primary care physicians.

**TABLE 1. Basic statistical data for three Slovenian regions included in the study (www.stat.si)**

<table>
<thead>
<tr>
<th>Region</th>
<th>Average annual suicide rate (2000-2002)*</th>
<th>Population (2001)</th>
<th>GDP (level index)†</th>
<th>Area (km²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Podravska</td>
<td>31.7</td>
<td>319,235</td>
<td>84.5</td>
<td>2,170</td>
</tr>
<tr>
<td>Savinjska</td>
<td>34.7</td>
<td>257,375</td>
<td>89.2</td>
<td>2,383</td>
</tr>
<tr>
<td>Koroška</td>
<td>39.2</td>
<td>73,745</td>
<td>77.5</td>
<td>1,041</td>
</tr>
</tbody>
</table>

*Average annual suicide rate in Slovenia in the same period was 28.5.
†Average gross domestic product (GDP) level index for Slovenia is 100.

**Education program**

From January to March 2003, 68 out of 155 primary care physicians from Savinjska and 14 out of 35 primary care physicians from Koroška region completed a 4-hour educational program. The program consisted of two lectures providing theoretical information about depression and suicide (etiology, prevalence, etc) and practical guidelines about treatment of depression. The lectures were followed by a longer workshop including a role play between a physician and a depressive/suicidal patient. The aim of the workshop was to train the physician how to ask the patients about their symptoms in order to ensure a more accurate diagnosis, ensure patients’ compliance, recognize and ask about suicidal thoughts, make an anti-suicide pact, design the follow-up treatment, etc. The overall attendance rate to the educational program in the two regions was 43%. The group of physicians attending the educational program (the educational group, n = 82) was compared with two groups: the group of physicians from the same regions not attending the program (control group 1, n = 108) and the group of physicians from Podravska region not attending the program (n = 164) (control group 2). The inclusion criteria were working in primary care as a primary care specialist and prescribing at least 5 prescriptions of antidepressants at the baseline period (March-December 2002).
Data analysis and statistics

The statistical analyses were based on the number of outpatient clinic prescriptions of psychotropic medications (antidepressants and anxiolytics as sorted according to the Anatomical Therapeutic Chemical Classification system – N06A, N05B) from primary care physicians in Slovenia. The baseline measurement of prescription rates was carried out before the training, from March to December 2002, and another measurement was carried out after the training, from March to December 2003 to examine the effect of the education program. For each primary care physician we calculated (i) the ratio of antidepressants prescribed before and after the training (the number of prescribed drugs after the training was divided by the number of prescribed drugs before the training) and (ii) the ratio of anxiolytics prescribed before and after the training. The ratio >1.0 indicated that more drugs of a certain type were prescribed after the training, while the ratio <1.0 indicated that more drugs were prescribed before the training. The ratio of the two values (comparison between the years 2002 and 2003) was chosen instead of the difference between the years because there was a large variability among the physicians in the baseline amount of prescribed drugs. Analysis of variance was used to compare the ratios in the three groups.

Distributions of the variables were positively skewed and Kolmogorov-Smirnov test showed significant declines from the normal distribution. This is why we used the bias-corrected and accelerated bootstrap approach (23) in SPSS/PASW 18.0 (SPSS Inc., Chicago, IL, USA) with 1000 generated samples for assessing the 95% confidence intervals of different statistics (bias-corrected and accelerated 95% CI).

A χ² test with continuity correction was used to compare the number of suicides in the studied regions between two periods: 2000-2002 period (the period before the intervention) and 2004-2006 period (the period after the intervention). Hence, the 3 years before the intervention (2000-2002) represented a baseline period, and the 3 years after the intervention (2004-2006) represented a period with a possible effect of education program, indicated with a decrease in the number of suicides in the intervention regions, but not in the control region. All the hypotheses were tested at the α error rate of 0.05.

RESULTS

Prior to our study, primary care physicians from different groups did not prescribe significantly different number of antidepressants (for descriptive statistics see Table 2) ($F(2, 351) = 0.91$, $P = 0.403$, mean square error = 12 083.96, partial $\eta^2 = 0.01$, power = 0.207) or anxiolytics ($F(2, 351) = 0.08$, $P = 0.920$, mean square error = 633 547.05, partial $\eta^2 = 0.00$, power = 0.063).

After the training, there was a significant increase in the number of antidepressant prescriptions in all three groups (Table 3; average ratios and their confidence intervals in all the groups were above 1.0). Whereas the average in-
crease in the rate of prescribed antidepressants was 28% in the control group 1 and 34% in the control group 2, it was as much as 133% in educational group. The analysis of variance showed a significant effect of the group on the ratio of antidepressant prescriptions ($F[2, 351] = 8.51$, $P \leq 0.001$, mean square error = 32.41, adjusted $R^2 = 0.05$, power = 0.97). Post-hoc tests did not show a significant difference between the control group 1 and control group 2 (mean difference = -0.06, bias = 0.00, standard error [SE] = 0.18, bias-corrected and accelerated 95% CI = -0.29, 0.43). The difference between educational group and control group 1 was significant (mean difference = 1.05, bias-corrected and accelerated 95% CI = 0.47, 1.80, bias = 0.01, SE = 0.36) and so was the difference between educational group and control group 2 (mean difference = 0.99, bias-corrected and accelerated 95% CI = 0.40, 1.69, bias = 0.01, SE = 0.36). To sum up, even though the antidepressants prescription rate increased in all the studied groups, the increase was significantly higher in the educational group than in the two control groups.

There was also an increase in the number of prescribed anxiolytics in the educational group – the average increase in the rate of prescribed anxiolytics was 51% and the ratio of prescriptions after and before the training was significantly greater than 1.0 (Table 3). In the control group 2, the increase in the number of prescribed anxiolytics did not reach significance. In the control group 1, the number of prescribed anxiolytics decreased by 14%, and this decrease was significant. The analysis of variance, however, did not show the ratios in the three groups to be significantly different ($F[2, 350] = 1.34$, $P = 0.264$, mean square error = 7.60, adjusted $R^2 = 0.00$, power = 0.29) (Table 4).

The 12% decrease in the number of suicides between the two observation periods in the intervention regions was not significantly larger than the 4% decrease in the control region ($\chi^2 = 0.56$, $P = 0.453$, power = 0.58; see Table 4 for frequencies). When the samples were divided according to sex, although there was a tendency toward a greater decrease in number of suicides in the intervention regions than in the control region, the regional differences remained non-significant: for men ($\chi^2 = 0.05$, $P = 0.828$, power = 0.44) and for women ($\chi^2 = 0.98$, $P = 0.323$, power = 0.63).

**DISCUSSION**

Our training program on depression and suicide for primary care physicians increased the number of prescribed antidepressants, but also unexpectedly increased the number of prescribed anxiolytics in the intervention group. However, the increase in the number of prescribed anxiolytics was not as large as the number of prescribed antidepressants.

The increase in the number of prescribed antidepressants in the intervention group in comparison with the control group is very encouraging. It indicates that primary care physicians are no longer only "symptom focused" and, besides previously preferred anxiolytics, they prescribe more antidepressants or a combined antidepressant/anxiolytics therapy.

Even though our study was systematically conducted and planned (every primary care physician from the intervention regions was invited to take part in the educational program), we were not able to prevent the participants...
from attending other similar educational programs (organized by pharmaceutical companies, medical chamber, etc.). Therefore, our results may not be exclusively attributable to our program but may also reflect the impact of educational programs provided by other sources. This could explain the finding that the antidepressants prescription increase was noticed in all three groups of primary care physicians rather than in the educational group only. Physicians from both intervention regions also underwent another educational program on depression and suicide (within a project called European Alliance Against Depression) shortly after our training program. This can explain the increase in antidepressant prescriptions in the physicians from the intervention region who did not attend our educational program. Besides, the physicians might have obtained information about the content of our program from their colleagues.

Although the study was conducted several years ago and many things might have changed since, we believe that it is still relevant today, as primary care physicians are important gatekeepers in regard to depressive disorder and suicidal behavior.

Some of the studies that have reported increased prescription of antidepressants also have reported a decline in suicide rates (11-14). Although we did record a larger increase in antidepressant prescriptions in the educational group than in the control group 2, we did not record a significantly different decrease in the suicide number either in the intervention or the control regions. From the clinical point of view, the absolute number of suicides was much lower in the intervention regions, but the decrease was not large enough to detect the actual effect. This can perhaps be explained by the fact that primary care physicians who did not attend our educational program (ie, physicians included in the control group 1) did not increase the number of antidepressant prescriptions as much as those in the educational group, so the overall effect of the increase in antidepressants prescription rate was not high enough in the intervention regions, or at least it was not a lot higher in the intervention regions than in the control region.

Even though we did not find a significant decrease in the number of suicides in the intervention regions and this result may seem discouraging at first sight, such a short intervention in a small group of physicians could have hardly produced a strong effect. Besides that, in the field of suicide prevention even a slight move toward the desired effect can be encouraging.

To be able to draw more valid conclusions on the impact of the educational program on the number of suicides, it is necessary to conduct similar programs in a specific region for a longer period of time. Since educational programs for primary care physicians are only a part of suicide prevention, it seems reasonable to ensure booster sessions on the same topic (9), where primary care physicians could update their knowledge and skills on how to recognize and treat a suicidal patient. Focusing on primary care physicians for suicide prevention is necessary but other primary health care workers must also be included. We must also be aware of the time and provision restraints within general practices. Some studies found systematic collaboration between general practitioners and nurses, such as nurse telehealth care (24) or telephone care management with structured cognitive-behavioral psychotherapy (25) feasible as they fit well within the busy primary care setting (26).

Despite the mentioned shortcomings, the results are encouraging as our study confirms the previously reported positive effects of educational programs on antidepressant prescription (15-18). This leads us to believe that such programs are necessary in order to ensure an adequate depression treatment.

Acknowledgment

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References

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