Evaluating the Impact of an Educational Program on Practice Patterns of Canadian Family Physicians Interested in Depression Treatment

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Background: Depression is frequently unrecognized and undertreated. Therefore, there is a need to increase the knowledge and skills of primary care physicians regarding the diagnosis and treatment of depression. The aim of this study was to provide, and evaluate the impact of, a brief educational program with a number of practice tools and resources in order to improve family physicians' knowledge, diagnosis, and treatment of depression.

Methods: Two educational programs (general and enhanced) were delivered to family physicians interested in depression treatment. The enhanced program focused on more practical clinical issues such as use of diagnostic and symptom assessment tools, recommended dosing of citalopram, how to initiate and discontinue treatment, and relapse prevention. Physicians' knowledge of depression was assessed pretraining and posttraining. Chart audits were conducted for 6 months. Primary endpoints were recognition of depression and pharmacologic management (initial dose, maximum dose, length of treatment, adverse events, and concomitant psychotropic drugs). Secondary endpoints were patient satisfaction with treatment, compliance, withdrawal from the study, treatment outcome, use of adjunctive psychotherapy, and number of office visits.

Results: There was a global increase in physicians' knowledge of depression in the short term. Physicians in the enhanced group were more likely to use a symptom-based diagnostic checklist, record the diagnosis of depression, and prescribe the recommended initial dose of citalopram, and they referred less frequently for adjunctive psychotherapy. No difference between educational intervention groups was found in patient satisfaction, compliance, and treatment outcome.

Conclusions: A well-designed brief, simple, and low-cost educational program can increase family physicians' knowledge of depression, improve their diagnostic skills, and optimize their treatment of depression.

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Major depressive disorder (MDD) may become a chronic, recurrent mood disorder, associated with significant morbidity, mortality, and excessive utilization of medical services.[1,2] Epidemiologic findings indicate that some 10% to 15% of primary care patients suffer from MDD,[2–6] with most depressed patients presenting to primary care practitioners with somatic symptoms of depression or help-seeking behaviors related to physical concerns.[1,2] In spite of its high prevalence, depression is not recognized in up to 70% of cases.[1,7] Nearly half of the undetected patients with depression in primary care develop suicidal ideation, and more than 50% continue to meet criteria for major depression 1 year after the index evaluation.[8] Even when depressed patients are recognized and pharmacologically treated, fewer than 50% receive adequate doses or duration of antidepressant treatment.[2,9] Thus, primary care practitioners are ideally positioned to decrease the morbidity, mortality, and cost of depressive disorders by accurate diagnosis and effective treatment of the disorder.

It has been demonstrated that obstacles to the recognition and successful treatment of depression include inadequate knowledge of the diagnostic criteria for depression and principles of rational antidepressant pharmacotherapy.[7,10,11] Both of these obstacles can be addressed by education of primary care practitioners, which could potentially then play an important role in decreasing depression-related morbidity and mortality.[12] Effective educational interventions may thus improve the care of treated patients and concurrently reduce the health burden of depression.[12–14]

Various clinical practice guidelines and educational programs have been developed with the purpose of improving diagnosis and treatment of depression in primary care. These programs have demonstrated variable results. Many investigators have noted a significant impact of education/training programs on primary care physicians' knowledge,[15–21] recognition,[9,22–30] and treatment[9,19,24–28,31–33] of depression. However, analysis of patient outcomes has demonstrated contradictory results. While some investigators show significant clinical improvement following educational programs,[32–46] others demonstrate that physician education alone is not effective in changing patient outcome.[47–54]

Although there is widespread interest among primary care physicians for continuing medical education (CME) programs in depression,[55–58] many programs are too time-intensive, costly, and detailed to disseminate widely. As a result, most primary care practitioners are unlikely to participate in them. Because financial, professional, and personal costs are associated with CME attendance,[59] brief educational sessions are often the preferred learning methods for busy family physicians.[18,47,59,60] Therefore, the aim of this study was to evaluate the impact of a low-cost and brief educational program on family physicians' diagnosis and treatment of depression. This program provided a number of practical practice tools and resources, as it was hypothesized that this added component could enhance the effectiveness of the intervention. This intervention could enhance not only family physicians' knowledge about depression but also improve their diagnostic practice and optimize psychopharmacologic treatment. This educational intervention coincided with the introduction of a new antidepressant medication (citalopram) to the Canadian market. Unlike previous studies, the present study had the advantage of providing education to an audience largely unfamiliar with the use of this medication, thus allowing the effect of education programs on prescribing behavior to be more clearly examined.

METHOD

A brief educational program (mixed lecture/seminar format) was delivered to family physicians interested in depression treatment. The effect of the program on physicians' knowledge, recognition, and treatment of depression; patient satisfaction with treatment; compliance; withdrawal from the study; and treatment outcome was evaluated.

Subjects

Sixty-eight nonacademic family physicians spending the majority of the time in a community based practice were identified by psychiatrists in 8 sites across Canada. They were volunteers, interested in depression treatment. Family physicians in Vancouver, Toronto, Winnipeg, and Halifax (35 participants) were assigned to receive an enhanced educational program, while those in Quebec City, Ottawa, Thunder Bay, and Calgary (33 participants) received a general educational program. Following written informed consent, these physicians participated in either the general or the enhanced education program (see below for description). Upon completion of the program, each physician was asked to enroll 8 to 10 depressed patients in the study by offering the opportunity for study participation to each sequential patient to whom he or she would usually have prescribed an antidepressant medication. Patients recruited to the study provided written informed consent regarding their participation. Patients of either sex, 18 years and older, and (if a woman of childbearing years) using a recognized contraceptive method were included.

Exclusion criteria for patients were as follows: (1) previous treatment with citalopram or known allergy to citalopram or other selective serotonin reuptake inhibitor; (2) a current or previous diagnosis of any psychotic disorder; (3) any contraindications as listed in the prescribing information for citalopram; (4) a primary diagnosis of alcoholism or substance abuse, medically unstable patients or patients with organic brain condition, and active or recent history of neoplasm; (5) active suicidality; (6) a failure to respond to previous antidepressant therapy; (7) treatment with any antidepressant within the past 2 weeks except for fluoxetine, for which a period of 5 weeks was required; (8) participation in an investigational drug trial during the last 4 weeks; (9) patients who, in the opinion of the treating physician, were not likely to remain under medical care for the expected duration of treatment; or (10) pregnancy, breastfeeding, and childbearing potential without adequate contraception.

Educational Intervention

The 2 educational programs (general and enhanced) were developed by a psychiatrist (S.P.K.), a family physician (B.A.L.-H.), and a nurse (C.M.M.). The programs were designed as a small group information format in which discussion among participants was encouraged. Both programs addressed the epidemiology, neurobiology, clinical presentation, diagnosis, and treatment of depression and general information about the use of citalopram in treating depression. In addition, the enhanced program focused on more specific strategies for improving recognition and treatment of depression such as use of a diagnostic tool or a symptom assessment tool, recommended dosing of citalopram, and relapse prevention. The Dalhousie Depression Diagnosis Checklist (DDDC) was developed by the study team reflecting an abbreviated version of the DSM-IV criteria tailored specifically to address time barriers of busy primary care physicians. Similarly, a Side Effect Symptom Checklist (SESC) was also developed, consisting of potential side effects of citalopram in order to systematically assess side effects. Primary care physi-

cians in the enhanced group were taught the benefits of the use of these tools to enhance their diagnostic and management skills. These assessment tools were provided to the physicians of both groups as part of the educational resource package.

The enhanced program also focused more on practical clinical issues such as how to initiate and discontinue treatment with citalopram. Primary care physicians in the enhanced group were instructed to initiate citalopram with a starting daily dose of 20 mg except in the elderly, for whom the dose should be initiated at 10 mg. They were also told to hold the dose for a minimum of 4 weeks prior to increase in order to allow for maximum therapeutic response. Recommendations to use the practical tools regularly, especially early on in the management of the illness, were made. Finally, physicians were told to discontinue the drug gradually according to patient tolerance. The primary care physicians in the general group were not detailed on the practical tools during the education program. Additionally, the education component of the citalopram dosing consisted simply of teaching physicians about the drug efficacy range from 20 to 60 mg. The time for program delivery was approximately 60 minutes for the general program and 75 minutes for the enhanced program. All physicians received the same written take-home study material following the educational intervention.

Figure 1. Dalhousie Depression Diagnosis Checklist

Symptom	Level of Suspicion	DDDC ≥ 5	Yes	No
Depressed mood				
Decreased interest				
Decreased pleasure/enjoyment				
Decreased energy				
Decreased concentration				
Feelings of guilt, hopelessness, or worthlessness				
Decreased appetite				
Sleep problems, especially early wakening				
Thoughts that life is not worth living				
Suicidal thoughts or plans				

Inquire about each of the above symptoms. A positive response is scored if the symptom has been present continuously for 2 weeks or more (except for the last item).

Study Measures

Knowledge test. A 25-item questionnaire was designed to measure physicians' knowledge of depression, and the same questionnaire was administered pretraining and posttraining. It comprised 2 parts: 1 tested general knowledge of depression (11 questions), and the other examined depression treatment (14 questions). This test, developed by the study team (general practice nurse and psychiatrists), has not been validated against any gold standard primary care psychiatric knowledge test; there is no such standard that we are aware of. The face validity, however, appears to be high. Primary care physicians' feedback on the content informed us that it was a reasonable review of everyday knowledge.

Endpoints. The primary endpoints of the study were: (1) systematic diagnosis of depression—defined as the use of a depression screening tool (the DDDC; Figure 1), which was provided to all participants; (2) physicians' diagnosis of MDD compared with patients' self-reported mood symptoms, as scored on the DDDC; and (3) optimization of pharmacologic management, defined as proper dose initiation, dose maximization, duration of treatment, concomitant psychotropic drug use, and monitoring of adverse events. Secondary endpoints included the following: (1) patient satisfaction with treatment, (2) patient compliance, (3) withdrawal from the study, (4) treatment outcome, (5) use of adjunctive psychotherapy, and (6) number of office visits.

These endpoint measures were either taken directly from the current diagnostic criteria (the DDDC reflects the DSM-IV criteria) or, in the case of the SESC, reflected expected standard measures in the primary care setting.

Baseline visit. Following patient provision of informed consent, physicians completed an initial medical history, a physical, and laboratory assessments, conforming to their usual clinical practice. Concomitant medication use was documented. Citalopram, in doses provided at the discretion of the physician, was initiated in all patients for the treatment of MDD.

All patients were asked to complete a confidential 10-item yes/no questionnaire based on DSM-IV depression criteria to self-assess depressive symptomatology. To score positive for depression, patients had to report depressed mood or loss of interest or pleasure during the past 2 weeks and answer "yes" to at least 4 other DSM-IV symptoms. In addition, patients were asked to confidentially complete a 5-item questionnaire regarding their satisfaction with the treatment and to rate their responses on a 0-to-4 scale (0 indicating the lowest level of satisfaction). Self-assessments were then placed in the sealed envelope and mailed directly to the research team by the patients.

Follow-up visits. For the next 6 months, physicians recorded all office visit information related to the depressive disorder for each patient that participated in the study, including all information regarding pharmacotherapy and adverse events. Except for inclusion/exclusion criteria, no specific guidelines were provided to physicians pertaining to their management of the depressive disorder. The rationale for this was to capture each study physician's clinical management of MDD consistent with real-life practice.

Termination visit. At study termination, each patient completed the same questionnaires in the same confidential manner as at baseline and mailed them directly to the research team. In addition, patients were asked to estimate the percentage of time that they took the medication as prescribed. If patients discontinued medication treatment prior to the end of the 6-month study period, physicians were asked to follow patients on an as-necessary schedule until the expected duration of their follow-up had they remained in the study. Patients who were followed by their family physicians for 6 months from study entry were considered to have completed the study regardless of whether or not they had discontinued treatment with citalopram. Physicians were asked to document the reason for premature medication discontinuation.

Clinical Chart Analysis

Monitors independent of the study delivery and education teams reviewed physician chart documentation of every patient enrolled in the study. The following data were collected: (1) demographics; (2) baseline information (psychiatric history, medical and medication history including contraception); (3) physician's documentation of a diagnosis of depression as well as the recorded symptoms consistent with the diagnosis of depression. (4) information regarding antidepressant treatment (dose in mg/day, date started, dates of dosing changes, duration of pharmacotherapy); (5) concurrent prescription of any other antidepressants or psychotropic drugs or use of electroconvulsive or other therapies; (6) use of diagnostic and adverse events checklists, as well as the occurrence of serious adverse events; (7) time to first visit and total number of visits; (8) termination of the study (date and reasons for termination); (9) presence of any contraindications to the use of citalopram; (10) any deviations from protocol; and (11) completeness of source document.

Data were collected for a period of 6 months following the baseline visit.

Statistical Analyses

To examine whether the mean of a single variable differed between the physicians/patients in the general group and the physicians/patients in the enhanced group, an independent 2-sample t test was used. When the Levene test for equality of variances was rejected, the separate-variance t test was applied. To assess knowledge differences pretraining and posttraining, a paired-sample t test was used. To analyze depression self-assessment and patient satisfaction questionnaires, scores obtained at baseline and at the end of the study were compared with a paired-sample t test. Differences in proportions between the patients in the 2 teaching programs were evaluated by the chi-square test. In 2-by-2 tables, in which expected cell sizes were less than 5, the Fisher exact test was used. Reported differences were considered significant at $p < .05$ with a confidence interval of 95%. Data were analyzed using the Statistical Package for the Social Sciences (SPSS release 8.0.0, Chicago, Ill., SPSS).

Table 1. Demographic Characteristics of Physicians (N = 65) and Physicians' Knowledge of Depression Before and After an Educational Intervention Program

	Educational Intervention Program	
Variable	Enhanced	General
Sex		
Total N, M/F	16/19	19/11
%,[a] M/F	25/29	29/17
Ratio, M:F	0.9:1.0	1.7:1.0
Age group, %,[b] M/F		
31–40 y	37.5/35.0	30.0/8.3
41–50 y	37.5/60.0	30.0/83.3
> 50 y	25.0/5.0	40.0/8.3
Mean duration of practice, y, M/F	25/20	24/21
Pretest value, mean ± SD[c]		
%	80.67 ± 6.73	82.06 ± 7.01
Score	20.17 ± 1.68	20.52 ± 1.75
Posttest value, mean ± SD[c]		
%	89.26 ± 4.83*	88.48 ± 3.28*
Score	22.31 ± 1.21	22.12 ± 0.82

[a]Percentage of total N of physicians.
[b]Percentage within sex group in this educational intervention program.
[c]The pretest and posttest questionnaires each included 25 questions. The "%" represents the percentage of questions answered correctly and the "score" represents the actual score (out of a possible score of 25) on the tests.
*$p < .0001$, when compared with pretest.

RESULTS

Of the 606 enrolled patients, 327 were in the enhanced group and 279 were in the general group. Most patients were female (73% in the enhanced, 72% in the general group) and middle-aged (median age = 41 years in the enhanced group, 40 years in the general group; range, 18–85 years in the enhanced group, 18–73 in the general group).

Knowledge test

Analysis of the 25-item pre-intervention test showed that all physicians in the study demonstrated high baseline knowledge of depression (Table 1) and that enhanced and general groups did not differ significantly in their mean scores. Following the educational program, a statistically significant knowledge improvement was found in both study groups ($p < .0001$).

Primary Endpoints

Recording of depression diagnosis. As shown in Table 2, physicians in the enhanced group used the depression diagnostic tool (DDDC) significantly more frequently than physicians in the general group (58.3% versus 32.1%, $p < .0001$). Additionally, physicians in the enhanced group were significantly more likely to record the diagnosis of depression in those patients whose self-

Table 2. Study Endpoints by Educational Intervention Program[a]

Endpoint	Educational Intervention Program: Enhanced	Educational Intervention Program: General	p Value
Primary			
Recording of depression, % of patients			
DDDC used	58.3	32.1	< .0001
MDD documented	98.4	67.8	< .0001
Pharmacologic management			
Initial dose (mg) of citalopram, % of patients			
2.5	0	0.4	.28
5	1.3	4.0	< .05
10	25.2	44.9	< .0001
20	73.3	50.4	< .0001
25	0.3	0	.36
30	0	0.4	.28
Maximum dose (mg) of citalopram, % of patients			
10	0.9	6.7	< .0001
20	56.8	56.3	.92
30	12.3	13.1	.78
40	23.0	18.7	.20
50	1.3	1.1	.88
60	4.4	2.6	.24
80	0.3	0	.36
Duration of treatment, mean ± SD, d	137.71 ± 57.63	136.35 ± 61.12	.78
Concomitant psychotropic drugs, % of patients			
Any	42.8	36.2	.10
Benzodiazepines	25.2	19.9	.12
Zopiclone	9.6	8.1	.51
Trazodone	3.7	4.0	.84
Use of adverse events checklist, % of patients	24.6	1.8	< .0001
Secondary			
Patient satisfaction score, mean ± SD			
Baseline	15.36 ± 3.53	15.94 ± 3.59	.08
Study end	16.57 ± 3.35	16.84 ± 3.44	.43
Compliance ≥ 80%, % of patients	86.7	86.3	.48
Withdrawal from study, % of patients			
Lost to follow-up	11.8	8.5	.18
Adverse event	7.1	5.9	.54
Treatment failure	1.9	2.2	.77
Other	9.9	8.8	.64
Treatment outcome, mean ± SD			
Initial score	7.11 ± 2.04	7.53 ± 1.97	< .05
Terminal score	2.53 ± 2.87	2.38 ± 2.99	.64
Adjunctive psychotherapy, % of patients	29.3	54.2	< .0001
No. of office visits, mean ± SD	5.31 ± 2.27	6.34 ± 2.83	< .0001

[a]327 patients and 35 physicians were in the enhanced group, and 279 patients and 30 physicians were in the general group.
Abbreviations: DDDC = Dalhousie Depression Diagnosis Checklist, MDD = major depressive disorder.

report was consistent with DSM-IV major depressive disorder (98.1% versus 70.3%, p < .0001).

Optimization of pharmacologic management. Dose initiation. Significant between-group differences were noted in the mean initial dose of citalopram (17.31 ± 4.57 mg in the enhanced group vs. 14.88 ± 5.42 mg in the general group; p < .0001) and initiation of pharmacotherapy with the recommended starting dose (73.3% in the enhanced group, 50.4% in the general group; p < .0001). Significantly more physicians in the general group initiated pharmacotherapy with 5 mg and 10 mg of citalopram (5 mg, p < .05; 10 mg, p < .0001).

Dose maximization. Significant between-group differences were noted in the mean maximum citalopram dose (28.00 ± 11.69 mg in the enhanced group, 25.80 ± 11.14 mg in the general group; p < .05) and in the percentage of patients who were prescribed 10 mg as their maximum dose (0.9% enhanced, 6.7% general; p < .0001). At study completion, a significantly higher number of patients in the enhanced group were taking the recommended daily dose of citalopram—20 mg/day (98.1% enhanced, 91.9% general; p < .0001)—and significantly more of the general group were taking less than the recommended daily dose of citalopram (30.5% enhanced, 53.7% general; p < .0001).

Duration of treatment. The mean duration of treatment was not significantly different between groups (137.71 ± 57.63 days enhanced vs. 136.35 ± 61.12 general).

Concomitant psychotropic use. The proportion of patients receiving concomitant psychotropic medications was not significantly different between groups (42.8% enhanced, 36.2% general; p = .10). In both groups, benzodiazepines were the most frequently prescribed psychotropics (25.2% enhanced, 19.9% general; p = .12), followed by zopiclone (9.6% enhanced, 8.1% general; p = .51), and trazodone (3.7% enhanced, 4.0% general; p = .84).

Monitoring of adverse events. Significantly more physicians in the enhanced group (24.6%) than in the general group (1.8%) used an adverse events checklist to identify side effects (p < .0001). Eighteen serious adverse events were identified in the total sample (8 enhanced, 10 general; p = .40), 1 of which was judged by the treating physician to be "probably related" to citalopram use (neuromuscular weakness and myoclonic jerking, enhanced group).

Secondary Endpoints

Patient satisfaction. Patient satisfaction with treatment was significantly enhanced at study end in both groups (p < .0001 enhanced, p < .005 general).

Compliance. Patient compliance with treatment (defined as patient self-report of taking medications as pre-

scribed equal to or greater than 80% of the time) was similar in both groups (86.7% enhanced, 86.3% general; p = .48).

Withdrawals. There were no significant between-group differences in percentage of patients terminating their treatment prematurely, nor were there any significant between-group differences in the reason for premature treatment discontinuation.

Treatment outcome. After 6 months from baseline, a significant improvement in the number of self-reported DSM-IV diagnostic depressive symptoms was observed in both groups (enhanced group initial vs. terminal score, p < .0001; general group initial vs. terminal score, p < .0001). There were no significant between-group differences in outcome.

Adjunctive psychotherapy. Patients in the enhanced group were referred less frequently for adjunctive psychotherapy than patients in the general group (29.3% compared with 54.2%, p < .0001).

Office visits. Patients in the enhanced group made significantly fewer office visits (5.31 ± 2.27) than those in the general group (6.34 ± 2.83) (p < .0001).

DISCUSSION

This study evaluated the impact of brief educational programs on Canadian family physicians' knowledge about depression and on their clinical performance in the care of depressed patients. Our results demonstrate improved knowledge of depression following the educational programs. They also suggest that the enhanced program, which focused on specific and practical information about depression management, significantly improved family physicians' diagnostic skills and treatment of depression.

Although numerous reports have emphasized a lack of clinical benefits from brief interventions (reviewed in references 47–50), our study is in accordance with those showing that well-planned and well-designed brief educational programs on depression in primary care[17,26,29,61] and brief educational programs on various other topics[62–66] can change physicians' knowledge and behavior. Many of these programs are based on a one-to-one approach[29,63–66] and can be costly for large-scale implementation. The present study and other studies suggest that group educational sessions can be an effective and less costly alternative.[17,26,61,62,66]

Inadequate knowledge has been repeatedly presented as a major obstacle to the recognition and treatment of depression.[1,2,7,51,67] Although increasing clinicians' knowledge alone appears to be insufficient to improve outcome,[47,51–54] it represents a first step toward improved clinical practice. The physicians in this study showed high baseline knowledge of depression. Despite a potential ceiling effect, a statistically significant knowledge improvement comparable in both groups was demonstrated following educational programs. The level of knowledge was similar in both groups pre-intervention and post-intervention. Therefore, if there was a change of behavior, one could make an assumption that the differences in the education programs were responsible at least in part for the observed change. It was of interest, then, to determine if the type of education intervention provided altered physicians' behavior and conferred any treatment or outcome advantages on patients. Physicians in the enhanced group identified depressed patients on the basis of DSM-IV diagnostic criteria significantly more frequently than physicians in the general group. They were also significantly more likely to use a symptom-based diagnostic checklist (the same checklist was available to both groups) and to document a depression diagnosis in the clinical chart. These findings suggest that a brief targeted educational intervention can improve primary care physicians' diagnostic and recording skills. Since it is estimated that up to 70% of individuals with depression who present to primary care practitioners are not correctly diagnosed,[1,7] the improvement in diagnostic skills observed in those physicians who received the more targeted training is a promising finding.

The physicians in the enhanced group also used the side effects measurement tool significantly more frequently than those in the general group (the same tool was available to both groups). Since physicians often react to side effects by discontinuing the drug or lowering the dose below the therapeutic range,[2] the use of this tool is also important for optimal delivery of antidepressant medication. Moreover, adequate management of side effects has been shown to improve patients' compliance with treatment.[7] However, as the results of this study demonstrate, simply providing the physician with the tool is not likely to lead to its clinical use. Targeting an educational session toward an understanding of the use of the clinical tool is much more likely to be associated with its incorporation into clinical practice.

In pharmacologic management, the enhanced group was significantly more likely to prescribe the recommended antidepressant dose (dose initiation). Additionally, the enhanced group was less likely to use doses that have not been associated with substantive clinical effect (such as 5 and 10 mg of citalopram daily). A number of studies have reported significant deficiencies in the use of antidepressant medications by primary care physicians.[2,9,68–71] Two recent randomized intervention trials found that more than 50% of patients in the "treatment-as-usual" group remained depressed 1 year later, in contrast to a 70% or greater recovery rate in the intervention group,[14,32] suggesting that inadequate medication dosing by primary care practitioners may be associated with suboptimal clinical outcome. It has been reported that inappropriate antidepressant use may contribute not only to poor treatment outcomes, but also to significant increases in health care costs.[72–74] One should point out, however, that 1 study disputes this statement.[54]

An unexpected finding of our study was the effect of the enhanced program on other health service delivery components. The primary care practitioners who received the enhanced program provided significantly fewer office visits per patient and referred significantly fewer patients for adjunctive psychotherapies. However, there was no difference in symptomatic treatment outcome in this group of patients compared with the group who received more office visits and more adjunctive psychotherapy. The reason(s) for these differences are not known but could be associated with a greater confidence in the use of a new medication by physicians who received specific information about depression management compared with those with more general education.

Study Limitations

There are several limitations to our study. First, the physicians in the study were volunteers, interested in depression treatment and thus likely to be more educated about the illness and its treatment than those primary care practitioners without this interest. The effect of such volunteer bias might underestimate the true value of the educational programs. Replication of this study with physicians of varying degrees of knowledge and motivation is needed to fully understand the generalizability of the results. A second, important limitation of this study was the absence of a control group of practices that had not been exposed to any educational program. Therefore, we cannot exclude the possibility that other factors, not related to the educational programs received by the physicians, could have affected the results. Third, since the knowledge test was not designed to examine the program-specific differences, we were not able to evaluate the impact of each educational program on knowledge improvement. Fourth, a specific anxiety measure was not included in the study. Since most patients with depression in primary care settings also experience significant anxiety symptoms and often meet full criteria for anxiety disorders, in future studies the addition of screening for anxiety comorbidity would improve the study design. Finally, this evaluation examined only the short-term effects of the educational programs. Further study is needed in order to determine whether the beneficial effects are maintained over a longer period of time.

CONCLUSION

Although there are limitations to this study, they do not invalidate our conclusion that a well-designed, directional, brief, simple, and low-cost educational program can increase family physicians' knowledge of depression, improve their diagnostic skills, and optimize their treatment of depression.

Drug names: citalopram (Celexa), fluoxetine (Prozac and others), trazodone (Desyrel and others).

REFERENCES

1. Ballenger JC, Davidson JRT, Lecrubier Y, et al. Consensus statement on the primary care management of depression from the International Consensus Group on Depression and Anxiety. J Clin Psychiatry 1999;60(suppl 7):54–61
2. Goldman LS, Nielsen NH, Champion HC. Awareness, diagnosis, and treatment of depression. J Gen Intern Med 1999;14:569–580
3. Zung WWK. The role of rating scales in the identification and management of the depressed patient in the primary care setting. J Clin Psychiatry 1990;51(suppl 6):72–76
4. Katon W, Von Korff M, Lin E, et al. A randomized trial of psychiatric consultation with distressed high utilizers. Gen Hosp Psychiatry 1992;14:86–98
5. Rush AJ, Golden WE, Hall GW. Clinical Practice Guideline: Depression in Primary Care. Rockville, Md: US Dept Health Human Services, Agency for Health Care Policy and Research; 1993. AHCPR publication No. 93-0550
6. Sartorius N, Üstün TB, Lecrubier Y, et al. Depression comorbid with anxiety: results from the WHO study on psychological disorders in primary health care. Br J Psychiatry 1996;168(suppl 30):38–43
7. Docherty JP. Barriers to the diagnosis of depression in primary care. J Clin Psychiatry 1997;58(suppl 1):5–10
8. Rost K, Zhang M, Fortney J, et al. Persistently poor outcomes of undetected major depression in primary care. Gen Hosp Psychiatry 1998;20:12–20
9. Simon GE, VonKorff M. Recognition, management and outcomes of depression in primary care. Arch Fam Med 1995;4:99–105
10. Andersen SM, Harthorn BH. The recognition, diagnosis, and treatment of mental disorders by primary care physicians. Med Care 1989;27: 869–886
11. Magruder KM, Norquist GS. Structural issues and policy in the primary care management of depression. J Clin Psychiatry 1999;60(suppl 7): 45–51
12. Rutz W. Improvement of care for people suffering from depression: the need for comprehensive education. Int Clin Psychopharmacol 1999;14(suppl 3):S27–S33
13. Simon G, Ormel J, VonKorff M, et al. Health care costs associated with depressive and anxiety disorders in primary care. Am J Psychiatry 1995;152:352–357
14. Schulberg HC, Block MR, Madonia MJ, et al. Treating major depression in primary care practice: eight month clinical outcomes. Arch Gen Psychiatry 1996;53:913–919
15. Cohen-Cole SA, Boker J, Bird J, et al. Psychiatric education improves internists' knowledge: a three-year randomized, controlled evaluation. Psychosom Med 1993;55:212–218
16. O'Hara MW, Gorman LL, Wright EJ. Description and evaluation of the Iowa depression awareness, recognition, and treatment program. Am J Psychiatry 1996;153:645–649
17. Butler R, Collins E, Katona C, et al. Does the teaching programme improve general practitioners' management of depression in the elderly? J Affect Disord 1997;46:303–308
18. Kelly C. The effects of depression awareness seminars on general practitioners knowledge of depressive illness. Ulster Med J 1998;67:33–35
19. Van Os TWDP, Ormel J, van den Brink RHS, et al. Training primary care physicians improves the management of depression. Gen Hosp Psychiatry 1999;21:168–176
20. Kick SD. An educational intervention using the Agency for Health Care Policy and Research depression guidelines among internal medicine residents. Int J Psychiatry Med 1999;29:47–61
21. Meredith LS, Jackson-Triche M, Duan N, et al. Quality improvement for depression enhances long-term treatment knowledge for primary care clinicians. J Gen Intern Med 2000;15:868–877
22. Moore JT, Silimperi DR, Bobular JA. Recognition of depression by family medicine residents: the impact of screening. J Fam Pract 1978;7:509–513
23. Zung WW, King RE. Identification and treatment of masked depression in a general medical practice. J Clin Psychiatry 1983;44:365–368
24. Magruder-Habib K, Zung WW, Feussner JR, et al. Management of general medical patients with symptoms of depression. Gen Hosp Psychiatry 1989;11:201–206
25. Magruder-Habib K, Zung WW, Feussner JR. Improving physicians' recognition and treatment of depression in general medical care: results

from a randomized clinical trial. Med Care 1990;28:239–250
26. Andersen SM, Harthorn BH. Changing the psychiatric knowledge of primary care physicians: the effects of a brief intervention on clinical diagnosis and treatment. Gen Hosp Psychiatry 1990;12:177–190
27. Callahan CM, Hendrie HC, Dittus RS, et al. Improving treatment of late life depression in primary care: a randomized clinical trial. J Am Geriatr Soc 1994;42:839–846
28. Callahan CM, Dittus RS, Tierney WM. Primary care physicians' medical decision-making for late-life depression. J Gen Intern Med 1996;11:218–225
29. Pond CD, Mant A, Kehoe D, et al. General practitioner diagnosis of depression and dementia in the elderly: can academic detailing make a difference? Fam Pract 1994;11:141–147
30. Hannaford PC, Thompson C, Simpson M. Evaluation of an educational programme to improve the recognition of psychological illness by general practitioners. Br J Gen Pract 1996;46:333–337
31. Van Eijk ME, Avorn J, Porsius AJ, et al. Reducing prescribing of highly anticholinergic antidepressants for elderly people: randomized trial of group versus individual academic detailing. Br Med J 2001;322: 654–657
32. Katon W, Von Korff M, Lin E, et al. Collaborative management to achieve treatment guidelines: impact on depression in primary care. JAMA 1995;273:1026–1031
33. Katon W, Robinson P, Von Korff, et al. A multifaceted intervention to improve treatment of depression in primary care. Arch Gen Psychiatry 1996;53:924–932
34. Roter DL, Hall JA, Kern DE, et al. Improving physicians' interviewing skills and reducing patients' emotional distress: a randomized clinical trial. Arch Intern Med 1995;155:1877–1884
35. Worrall G, Angel J, Chaulk P, et al. Effectiveness of an educational strategy to improve family physicians' detection and management of depression: a randomized controlled trial. CMAJ 1999;161:37–40
36. Czerwinski BS, Hyman DJ, Jones EV, et al. Physician education in hyperlipidemia management: the impact on collaboration. South Med J 1997;90:685–690
37. Morriss RK, Gask L, Ronalds C, et al. Clinical and patient satisfaction outcomes of a new treatment for somatized mental disorder taught to general practitioners. Br J Gen Pract 1999;49:263–267
38. Tiemens BG, Ormel J, Jenner JA, et al. Training primary-care physicians to recognize, diagnose and manage depression: does it improve patient outcomes? Psychol Med 1999;29:833–845
39. Bellamy N, Goldstein LD, Tekanoff RA. Continuing medical education-driven skills acquisition and impact on improved patient outcomes in family practice setting. J Contin Educ Health Prof 2000;20:52–61
40. Blackstien-Hirsch P, Anderson G, Cicutto L, et al. Implementing continuing education strategies for family physicians to enhance asthma patients' quality of life. J Asthma 2000;37:247–257
41. Inui TS, Yourtee EL, Williamson JW. Improved outcomes in hypertension after physician tutorials: a controlled trial. Ann Intern Med 1976;84:646–651
42. Maiman LA, Becker MH, Liptak GS, et al. Improving pediatricians' compliance-enhancing practices: a randomized trial. Am J Dis Child 1988;142:773–779
43. Katon W, Rutter C, Lundman EJ, et al. A randomized trial of relapse prevention of depression in primary care. Arch Gen Psychiatry 2001;58:241–247
44. Clark NM, Gong M, Schork MA, et al. Impact of education for physicians on patient outcomes. Pediatrics 1998;101:831–836
45. Wells KB, Sherbourne C, Schoenbaum M, et al. Impact of disseminating quality improvement programs for depression in managed primary care: a randomized controlled trial. JAMA 2000;283:212–220
46. Rost K, Nutting P, Smith J, et al. Improving depression outcomes in community primary care practice: a randomized trial of the QuEST intervention. J Gen Intern Med 2001;16:143–149
47. Davis DA, Thomson MA, Oxman AD, et al. Changing physician performance: a systematic review of the effect of continuing medical education strategies. JAMA 1995;274:700–705
48. Davis DA, Thompson MA, Oxman AD, et al. Evidence for the effectiveness of CME: a review of 50 randomized controlled trials. JAMA 1992;268:1111–1117
49. Kroenke K, Taylor-Vaisey A, Dietrich AJ, et al. Interventions to improve provider diagnosis and treatment of mental disorders in primary care: a critical review of the literature. Psychosomatics 2000;41:39–52
50. Thompson C, Kinmonth AL, Stevens L, et al. Effects of a clinical-practice guideline and practice-based education on detection and outcome of depression in primary care: Hampshire Depression Project randomized controlled trial. Lancet 2000;355:185–191
51. Greco PJ, Eisenberg JM. Changing physicians' practices. N Engl J Med 1993;329:1271–1273
52. Oxman AD, Thompson MA, Davis DA, et al. No magic bullets: a systematic review of 102 trials of interventions to improve professional practice. CMAJ 1995;153:1423–1431
53. Lin EH, Simon GE, Katzelnick DJ, et al. Does physician education on depression management improve treatment in primary care? J Gen Intern Med 2001;16:614–619
54. Higgins ES. A review of unrecognized mental illness in primary care: prevalence, natural history, and efforts to change the course. Arch Fam Med 1994;3:908–917
55. Williams ME, Connolly NK. What practising physicians in North Carolina rate as their most challenging geriatric medicine concern. J Am Ger Soc 1990;38:1230–1234
56. Leclere H, Beaulieu MD, Bordage G, et al. Why are clinical problems difficult? general practitioners' opinions concerning 24 clinical problems. CMAJ 1990;143:1305–1315
57. Pereles I, Russell ML. Needs for CME in geriatrics, pt 2: physician priorities and perceptions of community representatives. Can Fam Phys 1996;42:632–640
58. Glasser M, Gravdal JA. Assessment and treatment of geriatric depression in primary care settings. Arch Fam Med 1997;6:433–438
59. Slotnik HB, Lichtenauer DF, Raszhowski RR. Rethinking continuing medical education. J Cont Educ Health Prof 1995;15:8–22
60. Toews J, Lockyer J, Addington D, et al. Improving the management of patients with schizophrenia in primary care: assessing learning needs as a first step. Can J Psychiatry 1996;41:617–622
61. Pfaff JJ, Acres JG, McKelvey RS. Training general practitioners to recognize and respond to psychological distress and suicide ideation in young people. Med J Aust 2001;174:222–226
62. Fischer LR, Conboy KS, Tope DH, et al. Educating health professionals: a hepatitis C educational program in a health maintenance organization. Am J Manag Care 2000;6:1029–1036
63. Avorn J, Soumerai SB. Improving drug-therapy decisions through educational outreach: a randomized controlled trial of academically based "detailing." N Engl J Med 1983;308:1457–1463
64. Ray WA, Blazer DG, Schaffner W, et al. Reducing long-term diazepam prescribing in office practice: a controlled trial of educational visits. JAMA 1986;256:2536–2539
65. De Santis G, Harvey KJ, Howard D, et al. Improving the quality of antibiotic prescription patterns in general practice: the role of educational intervention. Med J Aust 1994;160:502–505
66. Figueiras A, Sastre I, Tato F, et al. One-to-one versus group sessions to improve prescription in primary care. Med Care 2001;39:158–167
67. Schulberg HC, McClelland M. A conceptual model for educating primary care providers in the diagnosis and treatment of depression. Gen Hosp Psychiatry 1987;9:1–69
68. Quitkin FM. The importance of dosage in prescribing antidepressants. Br J Psychiatry 1985;147:593–597
69. Little JD. Effect of recommended dosage range on the prescribing of antidepressants. Australian and N Z J Psychiatry 1995;29:304–308
70. Katon W, Von Korff M, Lin E, et al. Population-based care of depression: effective disease management strategies to decrease prevalence. Gen Hosp Psychiatry 1997;19:169–178
71. Rojas-Fernandez C, Thomas VS, Carver D, et al. Suboptimal use of antidepressants in the elderly: a population-based study in Nova Scotia. Clin Ther 1999;21:1937–1950
72. Rutz W, Carlsson P, von Knorring L, et al. Cost-benefit analysis of an educational program for general practitioners by the Swedish Committee for the prevention and treatment of depression. Acta Psychiatr Scand 1992;85:457–464
73. Rutz W, von Knorring L, Walinder J. Long-term effects of an educational program for general practitioners given by the Swedish Committee for the Prevention and Treatment of Depression. Acta Psychiatr Scand 1992;85:83–88
74. Santiago JM. Commentary: the costs of treating depression. J Clin Psychiatry 1993;54:425–426

