Immediate and 8-Month Impact of a Medical Educational Course for General Practitioners on Knowledge About Schizophrenia and Its Treatment: Results of a 3-Phase Study From Brescia, Italy

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Objective: To test the efficacy of a training course on the diagnosis and treatment of schizophrenia, tailored for the general practitioner.

Method: A course, in a 3-session format, was given to 215 primary care doctors from the city of Brescia and its province, in Italy. All 706 doctors working in primary care were asked to participate. Of these doctors, 30.5% took part in the study. The first session (215 doctors) assessed baseline knowledge of schizophrenia (June 2002), the second (173 doctors) gave formal teaching and assessed post-lesson knowledge (October 2002), and the third (130 doctors) evaluated the retention of knowledge after 8 months (July 2003). The main outcome measures were total number of schizophrenia symptoms identified, total number of antipsychotics identified, and knowledge about antipsychotic-related adverse events.

Results: Post-lesson, general practitioners could identify 6.5 more symptoms ($p < .001$) and 4.9 more antipsychotics ($p < .001$). Compared to baseline, 71.5% vs. 15.4% of doctors had a good knowledge of antipsychotic-related adverse events. Although a loss of knowledge was found after the 8-month follow-up, knowledge at the endpoint was significantly higher than at baseline for the 3 main outcome variables ($p < .001$).

Conclusion: The teaching course on schizophrenia for general practitioners was effective, and the knowledge gained after teaching was stable across time.

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Most patients with schizophrenia or schizophrenia spectrum disorders are cared for by psychiatric services, but general practitioners (GPs) continue to play a major role after the process of deinstitutionalization from psychiatric hospitals. Indeed, GPs deal with these patients' physical health problems, often sharing the care with psychiatrists; in some cases, they are the only provider of care. As GPs are sometimes the first professional consulted after a psychotic outbreak, they could contribute to reducing the duration of untreated psychosis.[1–6]

Although these issues make continuing education of GPs on schizophrenia and its treatment a basic and necessary need, research on the effects of training on this issue is largely lacking.

We planned a 3-phase educational course with the aim of investigating basic knowledge about schizophrenia; immediate, post-lesson learning; and retention of information after an 8-month follow-up. Baseline knowledge was reported in a previous article[7]; doctors' awareness of symptoms, risk factors, drug treatment, and adverse events was relatively poor. Better knowledge was shown by those who had attended previous courses on psychiatry,

had read books in the last 2 years, and knew of diagnostic criteria in psychiatry. This study reports data on the effects of the educational course and the associated variables.

METHOD

Study Group

The health care system in Italy has structured primary care according to a capitation payment system and single-handed practices.[8] GPs are the gatekeepers for access to specialist care. Most have no additional staff, and specialists do not compete with primary care doctors. Most of the time patients do not book their visit, and go whenever they feel in need. If symptoms are severe, patients have direct access to the emergency rooms of main hospitals.

The local Health Authority (Regione Lombardia) had funded a project on early diagnosis, prevention, and treatment of schizophrenia (Project 153). As part of this project, we focused on GPs as professionals possibly involved in the early diagnosis of schizophrenia.

The study was planned with the Italian College of General Practitioners, since we considered it important to understand what GPs perceived as their learning needs about schizophrenia. Two focused meetings with leading figures of the Italian College of General Practitioners took place in order to design a shared learning project that focused on the teaching content.

The study involved 215 of the 706 GPs who work in the city of Brescia and its province. Before the first assessment phase, letters were sent to all GPs in the catchment area to give details of the study design and to ask for their participation in a teaching course devised for research purposes and the assessment of reliability data.

In the first evaluation (baseline), conducted in June 2002, participants completed a questionnaire to assess their baseline knowledge about schizophrenia. No formal teaching was given, and the results were reported in a previous article.[7]

Four months after the baseline evaluation, in October 2002, GPs took a half-day teaching course and completed the same questionnaire (post-lesson). A reliability test-retest study took place during this second session; a random subgroup of doctors was asked to re-rate the questionnaire before starting the teaching session.

All of those who completed the teaching session were then randomly assigned to 2 groups: one group was mailed a brochure reporting all the slides used in the teaching course; the other group did not get the brochure until the end of the last meeting. The third and last session took place 8 months later, in July 2003, and no further teaching was given. Although the main goals of the study were to test the effectiveness of the teaching and the retention of information over time, we also tested if the supplementary brochure could affect the information retained over time.

Instrument

The project design and the building of a specific instrument to measure basic knowledge before and after teaching were by E.S. In brief, a structured, self-report questionnaire, the Schedule for the Assessment of Knowledge about Schizophrenia (SAKS, available from the authors on request), was given at baseline, after the teaching session, and at follow-up. In this study, we report data for those 130 GPs who completed all 3 evaluations.

The aim of the SAKS is to investigate GPs' knowledge about schizophrenia. It is structured into 3 main areas: (1) clinical knowledge, (2) drug therapy, and (3) antipsychotic-related adverse events. Section 1 lists a series of 61 psychiatric symptoms and signs, 27 of which are commonly found in schizophrenia and may be clustered as positive, negative, or general symptoms. The outcome variable for this section was the total number of correctly labeled schizophrenia symptoms (range, 0–27).

Section 2 lists a series of 68 psychotropic drugs marketed in Italy, including 15 antipsychotics, 22 antidepressants, 19 benzodiazepines, 6 mood stabilizers, 4 "neurotrophics" (i.e., drugs such as vitamins), and 2 anticholinergics. GPs were asked to select those drugs used to treat the psychotic symptoms of schizophrenia. From this section, an overall score corresponding to the total number of antipsychotics identified was used for analysis (range, 0–15).

Section 3 includes 4 questions about some of the most common and potentially dangerous adverse events occurring during therapy with antipsychotics, i.e., prolactin elevation, agranulocytosis, and extrapyramidal symptoms (EPS), and their treatment. The outcome variable was binary, defining the quality of knowledge about adverse events ("good knowledge" was defined as at least 3 right answers out of 4).

The time needed to complete the SAKS was about 1 hour. As reported in the previous article, the test-retest of the SAKS produced fairly good reliability values for the main outcome measures.[7]

Statistical Analysis

The change in GPs' knowledge over time was measured with a univariate analysis of variance for repeated measures for the 2 main continuous variables (total number of schizophrenia symptoms and total number of antipsychotics known). Analysis of associations was based on the sociodemographic and curricular variables that were found to be associated with baseline knowledge: age, sex, previous courses on psychiatry, books on psychiatry read, and knowledge of diagnostic criteria.[7] These variables, together with whether the GP received the

Table 1. Key Sociodemographic Variables, Academic Learning, Specialty, and General Knowledge of Psychiatry of 130 GPs Completing All Evaluations (baseline, post-lesson, 8-month follow-up)

Variable	Value
Age, mean (SD), y	48.5 (6.0)
Sex, female, % (N)	43.8 (57)
Type of specialty, % (N)	
Psychiatry, neurology, child neuropsychiatry	3.1 (4)
Internal medicine (or similar)	50.8 (66)
Surgery (any)	20.0 (26)
Other	4.6 (6)
None	21.5 (28)
Length of time working as GP, mean (SD), y	18.12 (7.49)
Examination on psychiatry taken during medical education, % (N)[a,b]	77.5 (100)
Courses on psychiatry taken (at least 1 course in the last 5 years), % (N)	36.2 (47)
Read books on psychiatry (at least 1 in the last 2 years), % (N)	40.0 (52)
Know diagnostic criteria in psychiatry, % (N)	
ICD or DSM known	54.6 (71)
DSM known[c]	52.0 (64)
ICD known[c]	12.2 (15)
At least 1 type of diagnostic criteria used in clinical work, % (N)[b]	37.2 (48)

[a]Since 1978, psychiatry has been a basic module in Italian medical schools. Before 1978, it was only optional.
[b]129 GPs responded to this item.
[c]123 GPs responded to this item.
Abbreviation: GP = general practitioner.

brochure, were entered as intersubject factors; linear contrast analysis was used to compare the 3 sets of data.

For the categorical outcome variable (knowledge of adverse events), the change in knowledge was measured with χ^2 analysis; a logistic regression analysis was then performed that considered the final follow-up performance as the dependent variable; age, sex, brochure received, courses taken, books read, and knowledge of diagnostic criteria were the predictive and independent variables. All statistics were performed using the SPSS package.[9]

RESULTS

Sample

Of the original group evaluated at baseline (N = 215),[7] 130 GPs participated in all 3 evaluations (attrition rate 39.5%). The mean age (48.5 vs. 49.2 years; t = 0.88, p = NS) and years spent as GPs (18.12 vs. 18.88; t = 0.56, p = NS) of those who remained in the study were not significantly different when compared to those of dropouts; women had a higher retention rate (69.5% vs. 54.9%; $\chi^2 = 3.95$, $p < .05$).

Table 1 summarizes the main sociodemographic variables and academic curricula, together with the GPs' general knowledge of psychiatry. Only one third had already taken courses on psychiatry, 40% had read at least 1 book on psychiatry in the last 2 years, and more than half knew of diagnostic criteria in psychiatry.

Immediate Learning

Table 2 reports the change in knowledge for the same GPs across time, at baseline and after the teaching session. Doctors exposed to teaching improved significantly in terms of the total number of schizophrenia symptoms identified (baseline 20.6, post-lesson 27.1; $F = 193.3$, $p < .001$), the total number of antipsychotics identified (baseline 5.8, post-lesson 10.7; $F = 380$, $p < .001$), and the number of GPs with a good knowledge of adverse events (baseline 15.4%, post-lesson 71.5%; $\chi^2 = 63.1$, $p < .001$).

Long-Term Learning

Table 2 also reports the overall performance of the GPs 8 months after the lesson and includes comparisons of follow-up with baseline (overall retention of information over time) and follow-up with post-lesson (loss of new information with time).

Although a loss of information was detected at follow-up, scores were higher when compared with baseline for total schizophrenia symptoms (baseline 20.6, follow-up 25.2; $F = 76.5$, $p < .001$) and total antipsychotics known (baseline 5.8, follow-up 9.9; $F = 97.7$, $p < .001$). Knowledge about antipsychotic adverse events was good in 57.7% of GPs at follow-up compared with 15.4% at baseline ($\chi^2 = 42.0$, $p < .001$).

Associated Variables

Table 3 reports the associations found in the multivariate analyses. In the repeated-measures analysis of variance, the total number of antipsychotics known was associated with having versus not having the brochure (at baseline, 5.9 with the brochure vs. 5.7 without the brochure; post-lesson, 10.4 with the brochure vs. 11.0 without the brochure; at follow-up, 10.4 with the brochure vs. 9.4 without the brochure) ($F = 4.9$, $p < .01$), with female sex (at baseline, 5.4 for women vs. 6.1 for men; post-lesson, 11.0 for women vs. 10.4 for men; at follow-up, 10.4 for women vs. 9.5 for men) ($F = 6.3$, $p < .01$), and with no books on psychiatry read (at baseline, 5.2 for no books read vs. 6.6 for books read; post-lesson, 10.6 for no books read vs. 10.7 for books read; at follow-up, 9.9 for no books read vs. 9.7 for books read) ($F = 3.9$, $p < .05$).

In the logistic modeling, good knowledge of antipsychotic-related adverse events for those who had the brochure was 2.8 times that in those without ($p < .05$) and 3.4 times more prevalent in women compared to men ($p < .01$). No interaction was found between sex and brochure.

DISCUSSION

The main results of our study can be summarized as follows. From the point of view of immediate learning of new information, this teaching course about schizo-

Table 2. Performance of GPs at Baseline, Post-Lesson, and Follow-Up on SAKS Parts 1, 2, and 3 (clinical, drug therapy, and antipsychotic-related adverse events)

Domain	Baseline (A)	Post-Lesson (B)	Follow-Up (C)	A vs B	A vs C	C vs B
Total no. of schizophrenia symptoms identified, mean (SD) (range, 0–27)	20.64 (4.99)	27.13 (2.58)	25.22 (4.82)	F = 193.3[a]**	F = 76.5[a]**	F = 16.9[a]**
Total no. of antipsychotics identified, mean (SD) (range, 0–15)	5.78 (2.90)	10.68 (2.77)	9.87 (3.55)	F = 380.0[a]**	F = 97.7[a]**	F = 6.7[a]*
Good knowledge of antipsychotic adverse events,[b,c] % (N)	15.4 (19)	71.5 (88)	57.7 (71)	χ^2 = 63.12**	χ^2 = 41.95**	χ^2 = 5.69*

[a]Analysis of variance for repeated measures tested for interactions with "brochure," "courses," "books on psychiatry read," and "knowledge of diagnostic criteria," linear contrast analysis for comparison of pairs.
[b]A logistic regression analysis for this categorical variable is reported in Table 3.
[c]123 GPs responded to this item.
*p < .05.
**p < .001.
Abbreviations: GP = general practitioner, SAKS = Schedule for the Assessment of Knowledge About Schizophrenia.

Table 3. Variables Associated With Improvement in Knowledge at the End of Follow-Up

Variable	Brochure	Age	Sex	Books on Psychiatry Read	Previous Courses Attended	Knowledge of Diagnostic Criteria
Total no. of schizophrenia symptoms identified	NS	NS	NS	NS	NS	NS
Total no. of antipsychotics identified	F = 4.90[a]**	NS	F = 6.25[a]**	F = 3.94[a]*	NS	NS
Good knowledge of antipsychotic adverse events	B = 1.01* Exp(B) 2.75[b]	NS	B = 1.22** Exp(B) 3.38[b]	NS	NS	NS

[a]Analysis of variance for repeated measures.
[b]Logistic regression analysis.
*p < .05.
**p < .01.
Abbreviation: NS = nonsignificant.

phrenia devised for GPs produced a significant post-lesson improvement in knowledge. The 3 main outcome variables all improved after teaching.

Our study also reports significantly stable knowledge after an 8-month follow-up for the main outcome variables (total schizophrenia symptoms known, total antipsychotics known, good knowledge of antipsychotic adverse events). Although a significant loss of knowledge was detected after time, the comparison with baseline knowledge always showed a significant overall improvement.

Supplementation with a brochure was more effective on treatment-related variables, such as knowledge of antipsychotic drugs and adverse events. When financial constraints force cuts in expenses, the use of didactic tools seems to help in the learning of stable information.

Comparison with other studies is not easy, since, to our knowledge, this is the first study assessing the outcome of a teaching course on schizophrenia given to GPs. The only published study on learning schizophrenia by GPs was that of Toews et al.,[10] which primarily assessed "learning needs." Most of the recent reports have dealt with teaching about depression in primary care.[11,12] It is of note that the format of our training course is similar to the World Psychiatric Association training modules,[11] used in a 4- to 8-hour, 1-day seminar and focusing on diagnoses, available treatments, and dosing and side effects of antidepressants. The knowledge component (outcome variable) in that study consisted of a scale made up of 8 items based on a clinical vignette, and the sum of the correct responses was used to produce a total score. After 1-month retesting, there was a "modest" but statistically significant increase in knowledge (from 6.0 to 6.3).[11]

Among the strengths of our study are the reporting of original data on teaching information about schizophrenia to GPs and the follow-up of participants 8 months later to evaluate the retention of new information.

Some limitations of our study must also be emphasized. Although our study showed a change in knowledge about schizophrenia and its treatment, which was stable over time, this does not necessarily reflect a change in real-life identification of schizophrenic patients and their proper management. In our previous report, it emerged that the prevailing choice of GPs about the best treatment for new-onset schizophrenia was the referral to psychiatric services. As part of a larger study, we are testing through case-register data whether the referral of new patients to the psychiatric services in our city has changed after the implementation of the course.

Another limitation is that the now well-known metabolic effects of second-generation antipsychotics were not included in the questionnaire; at the time the study was designed, these were not widely known.

Furthermore, doctors who stayed in the study for the 3 assessments were probably the most motivated to learn

more about schizophrenia. Comparison of those who stayed and those who left did not show significant differences in mean age or years of practice, although more women participated in the final evaluation. However, sex was included in the multivariate analyses.

A further step in our study will be to fully evaluate patients who are thought by GPs to be in the early stage of schizophrenia. This will provide a tool for interaction between primary care doctors and psychiatrists that involves discussion of "real-life" patients so that different conditions for teaching may be tested.[13]

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