Computerized assessment of common mental disorders in primary care: effect on clinical outcome

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Objective. A randomized controlled trial was conducted to examine the clinical effectiveness of providing general practitioners (GPs) with the results of a self-administered computerized assessment of common mental disorders.

Method. Attenders at a general practice in a deprived inner city area of South London were identified using case finding questionnaires. Six hundred and eighty-one subjects were randomly allocated to three groups which differed in the information provided to the GP: 1) no additional information was given to the GP; 2) the results of the 12 item General Health Questionnaire (GHQ) were given to the GP (the GHQ is a paper and pencil questionnaire that assesses common mental disorders); 3) the results of a self-administered computerized assessment (PROQSY) of common mental disorders were provided for the GP.

Results. Clinical outcome was assessed using the 12-item GHQ. Consultations with the GP, prescriptions and referrals within and outside the practice were also recorded. The group in whom the GP received the results of the computerized assessment showed a modest clinical improvement, relative to the other two groups after 6 weeks. There was no difference in clinical outcome between the groups at 6 months. There appeared to be no increase in consultations or prescriptions in the computerized assessment group.

Conclusions. Self-administered computerized assessments for psychiatric disorder have potential as a means of improving the clinical outcome of patients in primary care. It is likely that the effectiveness of the approach would be greatly increased by linking the results of computerized assessments to clinical practice guidelines, tailored to the individual patient by means of computerized technology.

Introduction

Anxiety and depression of clinical severity, the common mental disorders, affect up to a third of all general practice attenders.[1] Primary care physicians only recognize about 50% of those with these conditions, largely because most patients with common mental disorders present only their physical complaints.[2] This may lead to prolonged mental ill-health and inappropriate use of medical care for physical complaints.[3,4] It has been estimated that each of the 30 000

general practitioners (GPs) in the United Kingdom sees 300–600 anxious and depressed patients each year, a number far beyond the capacity of any likely specialist mental health service.[5] There is therefore a need for the introduction into primary care of specialist knowledge on the detection and diagnosis of common mental disorders.

Training packages have been developed which enhance GPs' consultation skills,[6] but these only increase the rate of detection of psychiatric disorder in general practice by 10–20%. Much larger improvements have been achieved using self-administered case finding questionnaires such as the General Health Questionnaire (GHQ) that can be easily completed and scored within minutes and have a sensitivity and specificity of about 90%.[7] Case finding questionnaires such as the GHQ are not used routinely in clinical practice, largely because controlled trials have indicated that these are of little benefit in the absence of any guidance on patient management.[1,8,9] Combining case finding

with additional clinical information for GPs could improve the primary care of common mental disorders.

Computers are now a familiar sight in primary care in the United Kingdom. Although these are mostly used to aid practice management they are increasingly being used in the consultation. There has also been interest in developing self-administered computerized assessments for psychiatric disorder[10] and there is now evidence that computerized assessments of common mental disorders have satisfactory reliability and validity in comparison with standardized interviews administered by a psychiatrist.[11-14] In addition, they are acceptable and easy to use for patients and require virtually no staff supervision.[11,15]

Self-administered computerized assessments are in effect glorified multiple choice questionnaires that allow branching questionnaires to be administered, thus enabling a thorough assessment without the presentation of redundant questions. The PROQSY assessment[11] (Figure 1) was used in this study. This includes an

PROQSY ASSESSMENT

This computerised assessment should not be used to guide management unless it is combined with a clinical assessment.

19/2/1991
Questionnaire CISR.SCR
Subject is example

Total Score 19*
 A score of 12 or more indicates a clinically significant level of distress

Duration of Main Symptom Between 3 months and 1 year

Social Impairment: None

Main symptom: Depression

Somatic Symptoms 0
Worry over Physical Health 0
Fatigue 3*
Sleep Problems 2*
Irritability 2*
Poor Concentration 1*
Depression 3*
Depressive Ideas 2*
Phobias 3*
Worry 2*
Anxiety 1
Panic 0
Compulsions 0
Obsessions 0
Elation 0
Ideas of Reference 0

 * indicates clinically significant symptom

Subject feels life isn't worth living
Becomes depressed about housing
Becomes worried about work or absence of work (including studying)
Subject has lost weight

FIGURE 1 *An example of the output from the computerized assessment, PROQSY, and given to the GP*

assessment of individual symptoms which provide some diagnostic information, together with comments on suicide risk and sources of worry and depression. Self-administered computerized assessments therefore provide general practitioners with a great deal more valuable information than that provided by case-finding questionnaires such as the GHQ. This extra information is collected outside the consultation and at little additional cost in GP time.

Concerns have been expressed that using computers in this way within primary care may have a damaging effect on the relationship between doctor and patient.[16] One must also take account of any possible increase in workload for the GP in using such methods. On the other hand, improved detection may reduce inappropriate use of medication and referral for physical complaints as well as improve the outcome for the patient.

The aims of this study were therefore to examine the effect of providing GPs with the results of a computerized assessment, PROQSY, on the clinical outcome for patients with common mental disorders. In addition we wished to examine the effect of this intervention on consultation rate, referrals and prescriptions. It has been recommended that the GHQ is used as a case finding questionnaire in primary care.[17] Providing the GP with the results from PROQSY was therefore compared with the GHQ. In practice, computerized assessments of psychiatric disorder are too lengthy, taking between 15 and 45 minutes, for use on all primary care attenders. We therefore used a two stage procedure in which the GHQ was used to identify likely cases of common mental disorders amongst general practice attenders and this was followed by the computerized assessment. It was considered that this would be a more realistic method of implementing this approach in primary care.

Methods

The practice in a deprived area of South East London was a teaching practice with six partners and two trainees and at the time of the study had 9587 patients on its list. After agreement on the protocol was reached with the doctors in the practice, there was no additional education or information provided to the GPs about how to use the feedback from the GHQ or PROQSY assessment. DS was one of the partners at the practice.

Consecutive attenders between the ages of 18–70 were asked to complete a 12-item GHQ before seeing their doctor. Informed consent was obtained by the research assistant (JB). Patients who were unable to complete the GHQ-12 unaided due to poor literacy in English or were too unwell to be able to co-operate were excluded. Demographic data including marital status and occupation (from which social class was derived) were

also obtained at this time. Three surgeries were selected during each week of the study using a random number table to ensure that a representative sample of days of the week and morning and afternoon surgeries were included. Patients who attended more than once during the study were included on the first occasion only.

Before the patient consulted with their GP, the GHQ-12 was scored by a research assistant and those who scored ≥ 2, the usual case definition using the GHQ,[7] were entered into the study and randomly allocated using random numbers in blocks of nine to one of three groups:

1) *Control*. No further action. In order to ensure the GP was blind to the presence of psychiatric disorder in the control group, 200 patients who scored less than 2 on the GHQ-12 had their notes tagged as if they were in the study.

2) *GHQ*. The GHQ-12 was placed in the GP notes before the index consultation without any instructions to the GP as to action to be taken.

3) *PROQSY*. The GP asked the patient to complete the computerized assessment PROQSY either immediately after the consultation or to make an appointment to do this within the following seven days. The assessment result was placed in the notes. The GP was also reminded to ask the patient to consult again within one week of completing the PROQSY to discuss the result.

The GP was asked to complete an encounter sheet at the index consultation which recorded: the presenting complaint; who initiated the consultation, patient or doctor; whether the consultation was for a physical or psychological problem or a mixture of both; prescriptions; referrals; and whether the GP believed the patient had psychiatric symptoms which warranted action either by themselves or a mental health professional.

Patients were sent a GHQ-12 by post at 6 weeks, 3 months and 6 months after the initial consultation to assess clinical outcome. Encounter sheets were placed in the notes of all patients in the study and at all consultations over the next 6 months, GPs were asked to record all the above process and outcome measures.

Patients completed the PROQSY[11,14] assessment either straight after the GP consultation or at a convenient time within the next week, in a quiet alcove off the waiting room. The research assistant (JB) helped them to get started and was then available to answer any questions. Patients took on average 20 minutes to complete PROQSY. The questionnaire on the version of PROQSY used in this study was the revised Clinical Interview Schedule (CIS-R)[18] as used in the recent National Survey of Psychiatric Morbidity.[19]

Analysis
The reason for consultation was coded by the GP on a 5-point scale: 1, psychological; 2, mainly psycho-

logical with some physical; 3, mainly physical with some psychological; 4, physical; and 5, administrative. Responses 1 and 2 were coded as a psychological reason for consultation and responses 3 and 4 as a physical reason.

For prescription rates, psychotropic drugs were defined as those pharmaceuticals contained within Sections 4.1, 4.2, 4.3 and 4.4 of the British National Formulary. It therefore included benzodiazepine drugs in addition to tricyclic and other antidepressants.

For referral rates, 'psychological' referrals were defined as those referrals made to hospital-based psychiatrists or psychologists, community psychiatric nurses, and the practice-attached psychiatrists or psychologist. The remainder were classified as physical referrals.

An intention to treat analysis was performed in which missing values were substituted by the value for the nearest previous assessment point. The GHQ was scored in the Likert manner (the four responses scored 1, 2, 3, 4 in turn)[7] in order to treat the outcome as a continuous variable and thus increase statistical power. The GHQ was also used as a dichotomous variable in order to aid interpretation, though this reduced the power. Those scoring 2 or more on the GHQ using the traditional scoring method were defined as cases of common mental disorders. The program STATA[20] was used for the analysis. Non-parametric analyses (Kruskal-Wallis) were performed for the consultation, prescription and referral rates.

Results

One thousand nine hundred and thirty-seven subjects were screened in 64 surgeries. Eight hundred and fifty-one eligible subjects scored over the GHQ threshold we were using and of these 60 refused or had no spectacles and 86 could not complete the questionnaire for educational or language reasons. Two hundred and twenty-seven subjects were recruited to the three randomized groups. The characteristics of the subjects are described in Table 1 and there appear to be no important differences between the three groups in their characteristics at baseline. It is worth noting that the group in which the GPs were given GHQ feedback had a higher proportion of subjects who were divorced, separated or widowed; a group who tend to have worse mental health.

Thirty-seven subjects (16.4%) of the PROQSY group did not complete the PROQSY assessment, but are still included in the analysis. Seven of these were unable to complete the assessment because of language, reading or other problems. The numbers of subjects followed up at the three follow-up times are shown in Table 2. Those in the control group were more likely to be followed-up at the 3-month assessment ($P = 0.08$).

TABLE 1   *Randomization: Sociodemographic variables at study entry for subjects in the three study groups*

	Control	GHQ	PROQSY	P value
Sample size at study entry	227	227	227	
% female	67.8	69.6	71.4	$\chi^2 = 0.67$, df = 2, $P = 0.7$
Age	37.4 (sd 13.8)	39.5 (sd 14.0)	38.7 (sd 13.5)	F = 1.33; df = 2,673; $P = 0.3$
% manual occupations	48.2	48.4	44.4	$\chi^2 = 0.65$, df = 2, $P = 0.7$
% widowed, separated or divorced	13.3	22.4	18.6	$\chi^2 = 10.9$, df = 8, $P = 0.2$
GHQ score at study entry	28.5 (sd 6.05)	28.7 (sd 5.41)	28.2 (5d 5.57)	F = 0.43; df = 2,672; $P = 0.7$

TABLE 2   *Numbers (%) of subjects followed-up in the three study groups*

	Control	GHQ	PROQSY	P value
6 weeks	157 (69.2)	156 (68.7)	161 (70.9)	$\chi^2 = 0.3$, df = 2, $P = 0.6$
3 months	157 (69.1)	134 (59.0)	145 (63.9)	$\chi^2 = 5.1$, df = 2, $P = 0.08$
6 months	135 (59.5)	135 (59.5)	133 (58.6)	$\chi^2 = 0.05$, df = 2, $P = 0.98$

The clinical outcome of subjects is shown in Table 3. The mean GHQ score was lower in the PROQSY group at 6 weeks and at 3 months. There were no statistically significant differences between groups at 6 months. At the 6-week point, there was a mean difference of 0.92 (95% CI 0.07–1.78) between the PROQSY and control groups. At 3 months there was a mean difference of 0.86 (95% CI −0.04–1.76) between the PROQSY and control groups. The GHQ can also be used to define cases of common mental disorders (see Method) though one would expect this method of analysis to reduce statistical power. The difference in proportions of cases between the PROQSY group and the control group at 6 weeks was 5.3% (95% CI −3–14%; PROQSY 69.2%, control 74.5%).

The consultation rate was similar in all three groups of subjects (Table 4). There was no evidence that the consultation rate was higher in the PROQSY group. Rates of doctor and patient initiated consultations were similar in all three groups and there was no difference in the reasons for consultation between the groups. In particular, there was no sign that psychological reasons for consultation became more common in the PROQSY or GHQ groups. The number of prescriptions for medication did not differ between the three groups (Table 5). There was no evidence for a reduction in the prescription rates of physical medication or any increase in the rates of prescription of psychotropic medication.

The referrals both within and without the practice were monitored. There was no increase in referrals to mental health specialists (Table 6). There was however a suggestion that the rate of referral to other professionals apart from mental health professionals were increased in the PROQSY group. The difference between the control group and PROQSY group was 6.7% (95% CI −0.6–13.8).

Discussion

The results of the study indicate that there is a probable small improvement in clinical outcome for patients with

TABLE 3   *Clinical outcome in the three study groups: mean GHQ scores (95% CI) and at the three follow-up points*

	Control	GHQ	PROQSY	ANOVA
Study entry	28.5 (27.7–29.3)	28.7 (28.0–29.4)	28.2 (27.5–28.9)	
6 weeks Mean GHQ	26.6 (25.7–27.5)	27.2 (26.3–28.1)	25.7 (24.8–26.5)	F = 3.1; df = 2,675; P = 0.04
3 months Mean GHQ	26.4 (25.4–27.5)	27.0 (25.4–27.5)	25.5 (23.8–25.8)	F = 2.6; df = 2,675; P = 0.07
6 months Mean GHQ	25.9 (24.2–26.6)	26.8 (25.7–27.9)	25.4 (24.2–26.3)	F = 2.1; df = 2,675; P = 0.12

TABLE 4   *Consultation rates in the three study groups during the 6-month follow-up*

	Control	GHQ	PROQSY	P value, Kruskal Wallis
Mean (SD) number of consultations	2.99 (2.91)	3.33 (3.02)	3.31 (3.53)	χ^2 = 1.49, df = 2, P = 0.5
Mean (SD) number of doctor initiated consultations	1.18 (1.87)	1.40 (1.98)	1.30 (1.95)	χ^2 = 1.69, df = 2, P = 0.4
Mean (SD) number of patient initiated consultations	1.79 (1.88)	1.92 (2.01)	1.91 (2.18)	χ^2 = 0.82, df = 2, P = 0.7
Mean (SD) number of physical consultations	2.26 (2.26)	2.39 (2.40)	2.33 (2.41)	χ^2 = 0.19, df = 2, P = 0.9
Mean (SD) number of psychological consultations	0.65 (1.62)	0.84 (1.92)	0.79 (2.07)	χ^2 = 0.19, df = 2, P = 0.09

TABLE 5   *Prescriptions for psychotropic and other drugs in the three study groups*

	Control	GHQ	PROQSY	P value, Kruskal Wallis
Mean (SD number of psychotropic drug prescriptions	0.44 (1.58)	0.55 (1.43)	0.66 (2.33)	χ^2 = 1.0, df = 2, P = 0.6
Mean (SD) number of non-psychotropic drug prescriptions	2.89 (3.32)	3.43 (4.75)	2.93 (3.70)	χ^2 = 0.6, df = 2, P = 0.7

TABLE 6   *Percentage of subjects with referrals to professionals, both within and outside the practice*

	Control	GHQ	PROQSY	P = value
% (95% CI) referrals to a psychological practitioner	3.5 (1.5–6.8)	5.7 (3.1–9.6)	4.0 (1.8–7.4)	χ^2 = 0.88, df = 2, P = 0.6
% (95% CI) referrals to other practitioners	15.4 (11.0–20.8)	11.5 (9.1–18.3)	22.5 (17.2–28.4)	χ^2 = 7.24, df = 2, P = 0.03

common mental disorders in primary care, if case finding is combined with a more detailed self-administered computerized assessment. Providing the GP with the results of the GHQ did not have any apparent influence on outcome. In this study, the participating GPs were not given any extra guidance about how to use the results of the GHQ, and the lack of any effect is in agreement with previous work using the GHQ as a case finding questionnaire.[1] In contrast, providing the results of the computerized assessment appeared to influence clinical outcome, even when no additional education was provided for the GPs. Though the PROQSY assessment was more effective in influencing outcome than feedback from the GHQ, the clinical improvement observed was modest, about 5% (95% CI −3–14%) at the 6–week follow-up and there was little or no difference over the longer term. There is certainly no evidence that using computerized assessments in this way is harmful or damaging. On the other hand, further development of the feedback generated by the computer could enhance the modest clinical improvement that was observed.

In this pragmatic trial it is not possible to say which aspect of the intervention was effective. For example, for practical reasons those completing the PROQSY assessment were asked to return for an extra appointment. However, the PROQSY group did not have an increased rate of consultation over the 6 months of the study. There did not appear to be any difference between the groups in consultation or prescription rates, even when psychological consultations or prescriptions were examined separately. It is difficult therefore to understand why the PROQSY intervention improved outcome, unless it changed other aspects of the relationship between doctor and patient.

It is also important to estimate the likely influence of case finding in general practice on the overall resources used within primary care and outside. There did not appear to be any overall increase in consultation rate, nor in the rate of prescription. There was still no apparent increase in rates when only psychological consultations and prescriptions were considered. However, there was some evidence that the PROQSY group received more referrals for physical reasons. We had originally expected that the number of referrals for psychological reasons would increase, and the number of physical referrals would decrease. Amongst the possible explanations for this unexpected result are that it is a chance finding or that perhaps the presence of a more standardized assessment of psychological health also drew attention to physical problems that needed further investigation or treatment.

Potential uses of computerized assessments in primary care
The results of this study suggest that there is potential for further developing the use of self-administered com-

puterized assessments in primary care. Guidelines for the treatment of common mental disorders have been developed[21-23] and research in other areas of medicine suggests that guidelines are most effective if they are combined with patient-specific prompts.[24-26] Computer based clinical decision support is a means of providing guidelines tailored to the individual patient which can be provided at the time the patient is consulting.[27] Using computers to provide guidelines also prevents the physician's desk becoming overrun with a large number of paper based guidelines.

Psychiatric diagnosis in primary care is notoriously unreliable because of the difficulty in standardizing measurement of psychiatric disorder.[28] Self-administered computerized assessments are an inexpensive method of obtaining standardized information within primary care about the mental health of patients. Computerized decision support, based upon a computerized assessment, could be used in a variety of ways within primary care. First as a 'second opinion': the GP could ask subjects to complete the assessment if a psychiatric disorder is suspected or to provide extra information and guidance on management.[8] Patients complete the assessment outside the consultation in their own time and return for a further consultation with the GP to discuss the results. The second use would be in conjunction with a case finding questionnaire such as the GHQ; given to patients when they register with the GP as new patients, opportunistically or at post-natal checks. There would also be potential for use by other members of the primary health care team, for example, health visitors and practice nurses.

Conclusion

Using computers in this way may strike an uneasy note with many practitioners, both GPs and psychiatrists. The treatment of psychiatric illness can not be reduced to a few self-administered questionnaires on a computer, combined with an algorithm for treatment. Nor is this article meant to suggest otherwise. Another particular concern must be the possibility that the introduction of computerized assessments into clinical practice will change the nature of the doctor–patient relationship for the worse. It cannot be repeated often enough that it is important that such computerized assessments are carefully evaluated, in order to investigate whether they have a beneficial outcome and to investigate the possibility that they might do harm.[16]

Though there may be dangers in applying computers to clinical work in primary care there is also potential. The results presented here suggest that using self-administered computerized assessments for common mental disorders may be a fruitful method for improving the care of these common and disabling conditions within primary care.

Acknowledgements

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