Compliance in black patients with non-insulin-dependent diabetes mellitus receiving oral hypoglycaemic therapy

H. L. VENTER, P. H. JOUBERT, G. N. FOUKARIDIS

Summary

Poor compliance with drug therapy is an important cause of therapeutic failure. Sixty-eight black patients with non-insulin-dependent diabetes mellitus receiving oral hypoglycaemic agents were interviewed and various factors, such as age, sex, degree of control and type of therapy, were recorded by means of a questionnaire. Compliance was determined by qualitatively assessing urine for the presence of the drugs. An alarmingly high incidence of non-compliance of 65% was found, which could still be an under-estimation because of the long half-life of one of the drugs involved — chlorpropamide. Although interesting trends were noted, no statistically significant differences between compliant and non-compliant patients were found. In the light of the high incidence of non-compliance, a larger and more detailed study seems to be warranted to identify problem areas and to plan appropriate interventions.

Patients and methods

Sixty-eight black patients attending the Diabetic Clinic at Ga-Rankuwa Hospital, near Pretoria, were randomly selected to participate in the study. The patients were assessed by means of a questionnaire, which provided information regarding age, sex, number of drugs taken, and degree of control. Metformin and chlorpropamide were assessed by quantitative determinations of these drugs in urine samples by means of high-pressure liquid chromatography (HPLC). In 20 patients receiving oral hypoglycaemic therapy chlorpropamide only and 11 metformin only, two other almost equally important reasons for non-compliance are unwanted side-effects and patients' forgetfulness. Yet the other, undoubtedly important, general reasons for non-compliance are involuntary factors, e.g. age, number of drugs taken, and degree of control. We hoped to establish the major factors associated with poor compliance in an attempt to identify contributing factors to see whether compliance could be improved.

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TABLE I. REASONS FOR NON-COMPLIANCE

<table>
<thead>
<tr>
<th>Category</th>
<th>Specific reasons for non-compliance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disease</td>
<td>Psychiatric illnesses</td>
</tr>
<tr>
<td>Regimen</td>
<td>Complexity, degree of behavioural change, duration</td>
</tr>
<tr>
<td>Therapeutic facilities</td>
<td>Inconvenient and inefficient clinics</td>
</tr>
<tr>
<td>Doctor-patient relationship</td>
<td>Inadequate supervision, patient dissatisfaction</td>
</tr>
<tr>
<td>Patient</td>
<td>Inappropriate health beliefs, previous or present non-compliance with other regimens, family instability</td>
</tr>
</tbody>
</table>

*After Haynes.*
Patients receiving chlorpropamide only  
(N = 15)  
Subjects meeting this criterion were non-compliant in 50% of cases according to negative urinary sample determinations for chlorpropamide. The mean (± SD) serum glucose level for these patients was 9,68 ± 5,1 mmol/l. The concordant values for the compliant and non-compliant patients were 9,1 ± 5,36 mmol/l and 10,39 ± 5,7 mmol/l, respectively (P = 0,05). Fifty-eight per cent of the non-compliant group were women, and the average duration of the illness was 2 years less than that of the compliant group. A significant increase in body mass was found in the compliant patients compared with non-compliant patients (73,7 ± 10,4 kg v. 66,1 ± 8,6 kg (P = 0,0313)).

Patients receiving metformin only  
(N = 11)  
In this group 36% of patients were non-compliant. The mean (± SD) serum glucose level was 6,96 ± 2,60 mmol/l. A slightly lower value for non-compliant than for compliant patients (6,8 ± 3,1 mmol/l v. 6,94 ± 2,35 mmol/l) was found (P = 0,05). Ninety-two per cent of the non-compliant patients were women, and the average duration of the illness was 2,5 years less than that of the compliant group. Although statistically insignificant, there was a trend for the mean body mass to be lower among compliant patients (81,04 ± 6,04 kg v. 84,85 ± 9,4 kg).

Patients receiving both chlorpropamide and metformin (N = 42)  
The patients receiving both chlorpropamide and metformin were non-compliant in 78% of cases. They were compliant for chlorpropamide in 45,2% of cases and for metformin in 66,7% of cases. Eighty-six per cent in the non-compliant group for chlorpropamide, also receiving metformin, were compliant for metformin. Among the non-compliant group for metformin 72,7% of patients, who also received chlorpropamide, were compliant for chlorpropamide. The mean (± SD) serum glucose level was 9,24 ± 4,01 mmol/l and the average duration of diabetes was 5,55 ± 4,36 years.

Discussion  
This pilot study had many limitations, e.g. the fact that the 68 patients were assessed only once, and that the only contact with the patient consisted of a single interview (with the only aim being to gather information for completing a questionnaire). The method employed in this study differs to a significant extent from the more elegant design of the study conducted by Buchanan et al.1 It must be remembered that there is no infallible method for the measurement of compliance. Even direct measurements, e.g. urinary excretion of drugs, have certain limitations. One should consider the fact that chlorpropamide is excreted very slowly in the urine; the elimination half-life of chlorpropamide is 35 hours.2 After therapy for 16 days, 20 additional days may be required for clearance of the drug from the blood; therefore many patients, appearing to be compliant, might actually be non-compliant (i.e. taking drugs irregularly). A non-compliance figure of 65% (the present study) is therefore still very conservative and might well be much higher.

Despite the shortcomings, some interesting observations were made. It was found that compliance had no influence on mean serum glucose levels; for example no differences in mean serum glucose levels between compliant and non-compliant patients receiving chlorpropamide only were found. This is in accordance with the findings of Eshelman.3 Although the mean serum glucose levels of patients receiving metformin were marginally lower for the non-compliant than for the compliant patients, the standard deviation was greater (3,11 v. 2,35 in the non-compliant group; this indicates a wider distribution of individual serum glucose levels among the patients who were non-compliant for metformin.

Gordis4 stated that there is no correlation between compliance and age, sex, educational status, occupation, income or population group. We found some differences in compliance regarding age, sex, duration of illness, drug dosages, time since last dose and serum glucose levels (Table II), but these differences were not statistically significant. This calls for more elaborate studies, which should include more patients.

The only statistically significant difference in the present study, viz. a difference in mean body mass, was found between chlorpropamide-compliant and chlorpropamide-non-compliant groups; a likely explanation for this finding is the fact that chlorpropamide is known to stimulate the appetite and to cause an increase in body mass, probably because it (as well as the other sulphonylureas) causes degradation of the β-cells in the endocrine pancreas, increasing the rate of secretion of insulin, and also an increase in the number of insulin receptors.6 This study should be seen as exploratory, and the results, although interesting, should be seen in this light. Since the incidence of non-compliance is high, further more elaborate and methodologically more refined studies addressing this problem in black patients with type II diabetes mellitus receiving oral hypoglycaemic drugs are indicated.

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