Targeted screening for diabetes in community chiropody clinics

G.V. GILL, M. LISHMAN, E. KACZMARCYK and S. TESFAYE

From the Diabetes Centre, Walton Hospital, Liverpool, and North Mersey Community Trust Chiropody Agency, Liverpool, UK

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Summary

Population screening for diabetes mellitus is of uncertain value. We therefore assessed the value of screening amongst community chiropody clinic attenders in Liverpool. All attenders aged between 40 and 75 years during a 3-month period were offered screening by urine glucose self-testing, 2 hours post-prandially, backed up with glucose tolerance tests (GTT) for positive respondents. Of 1058 patients screened, 11 (1.0%) reported positive results, of whom four (0.4% of total) had diabetes, and two had impaired glucose tolerance (IGT). Screening costs were £1 per person, £2.06 per ‘positive’ person, and £34.46 for each newly diagnosed patient. The screening procedure was simple and highly cost-effective, but the diagnostic returns were only moderate. This may have been because of a high rate of known diabetes amongst the chiropody clinic attenders (17.3%). In view of this, routine widespread diabetes screening in chiropody clinics cannot at present be recommended.

Introduction

Diabetes is a relatively common chronic condition in the UK, which consumes around 5% of the NHS budget annually—mostly due to the management of its associated complications. Most patients have the non-insulin-dependent (NIDDM) variety of the disease, and have usually had the condition for some time before diagnosis. The question therefore arises as to whether screening of the asymptomatic population for diabetes may allow early detection and perhaps prevention of future complications. However, there is no ideal simple test with clear diagnostic cut-off values to diagnose diabetes, and the hypothesis that early control of NIDDM reduces the risk of complications remains likely but not yet proven (as opposed to the situation in IDDM—a disease where abrupt onset excludes it from the screening process). Perhaps because of these difficulties, diabetes population-screening projects have yielded variable results.

In the UK, the British Diabetic Association (BDA) has advised on NIDDM screening methods, and discussed difficulties in interpreting the various available tests. This paper suggests that screening in groups at ‘higher risk’ (e.g. the obese, those with a family history, Indo-Asians, etc.) may be more appropriate. The American Diabetes Association (ADA) concurs with this ‘high-risk’ policy.

We decided therefore to examine the cost-effectiveness of diabetes screening in adults attending community chiropody clinics in a large UK city; using a simple self-testing procedure which has previously proved successful. Patients with known foot problems may have an increased likelihood of having diabetes, and thus constitute a potential ‘high-risk’ group not previously investigated.

Methods

During a 3-month period, all patients attending Liverpool Community Chiropody Clinics not previously known to have diabetes, were offered screening. The exercise was centrally organized, but implemented by clinic chiropodists, who kept lists...
TEST YOURSELF FOR DIABETES

Diabetes is a common disease which can cause problems if not detected or treated. People with foot problems are at greater risk of diabetes.

Check yourself for diabetes as follows:

1. With this card is a test strip wrapped in foil.
2. This will detect sugar in the urine.
3. Test yourself TWO HOURS AFTER YOUR MAIN MEAL.
4. Unwrap the test strip - one end has a pink pad.
5. As you pass urine, put this end of the strip into the urine stream.
6. Keep it in the urine stream for a second or two only.
7. Watch the colour of the pad for the next 10 seconds.
8. If a purple or blue colour appears, this is POSITIVE.
9. A positive test does not necessarily mean you have diabetes.
10. You do need further tests however, to arrange these:

RING (051) 529 4646 BETWEEN 9.00AM & 12 MID DAY WEEKDAYS

Figure 1. Patient information card for urine glucose self-testing.

of those screened. The testing system used was adapted from that of Davies et al.\textsuperscript{7} Screening was restricted to adults between the ages of 40–75 years, who were invited to undergo screening by testing a 2 h post-prandial urine sample for glucose by Clinistix (Ames Technicon). Patients were provided with a simple information card, stapled to which was a foil-wrapped Clinistix strip. The card is shown in Figure 1, and the information contained was reinforced by the chiropodists. Patients obtaining positive results were asked to phone into the co-ordinating hospital chiropody department. The telephone was manned by hospital chiropodists, with medical advice also available if necessary. All those reporting positive results were brought to the hospital for a glucose tolerance test (GTT), performed and evaluated according to World Health Organisation criterion.\textsuperscript{8} Patients were informed of the result by letter, and those with abnormal results were recalled for appropriate treatment and/or advice. Local general practitioners (GPs) were informed of the screening programme in general, and also of any patients of theirs recalled for GTTs, together with the results and any action considered necessary.

Results

These are detailed in Table 1. Of the 1443 patients eligible by age (i.e. 40–75 years), 249 (17.3%) were already known to have diabetes. Of the remainder 1058 accepted screening, and 11 (1.0%) phoned in with positive Clinistix results. All 11 had a GTT, of whom four had diabetes (0.4% of total cohort screened), two had impaired glucose tolerance (0.2% of the total) and five had normal results.

The costs incurred were very modest, as shown in Table 2. The cost for each person screened was 11p, for each ‘positive’ person £2.06, and for each newly diagnosed diabetic patient £34.46. Manning the telephone was not included in the costs, as the telephone was in the hospital chiropody department, and calls did not significantly interfere with the routine work.

Discussion

Although doubts remain as to the value of early, pre-symptomatic treatment of NIDDM, screening for the disease is attractive and popular. A major diffi-
Diabetes screening in chiropody clinics

Diabetes screening in chiropody clinics is disappointing. The lack of a test of sufficient sensitivity and specificity is one of the difficulties. Random blood glucose (RBG) levels have been popular, but results have been generally disappointing. The study by Bourne et al. on New Zealand general practice patients uncovered only a small number of new diabetic patients, and there were several false positive and negative results. An earlier Australian study examined the effectiveness of RBG mass screening using glucose meters, but true assessment of detection rates was difficult because of a low questionnaire response rate on positively screened patients (53%). One important point from this study was that false positives were a problem—some people with RBG levels in excess of 15 mmol/l turned out not to have diabetes. This was presumably related to inaccuracies in the meter-read blood glucose values. A recent UK study by Simmons and Williams has critically assessed RBG screening for NIDDM using various ‘cut-off’ values, in different ethnic groups. The authors concluded that RBG was a ‘poor test for diabetes’ due to low sensitivity, though performance was a little better in ethnic groups with relatively high NIDDM prevalence. The 2 h postprandial BG level appears a better screening test than RBG, but still has misassignment problems. Glycosylated haemoglobin has also been used for NIDDM screening, but it is expensive, and methodology varies greatly geographically. Swai and colleagues, in a study from Tanzania, used serum fructosamine and fasting blood glucose, and found both unsatisfactory.

These various difficulties led Davies et al. to use the simple technique of self-tested post-prandial glycosuria, using Clinistix (which give a positive or negative result only); and investigating positively screened subjects with a GTT. In a UK general practice setting, 0.7% of subjects screened proved to have NIDDM, and the sensitivity of the test was 93%. Self-testing methods such as this do have the problem of ‘throw-away’, i.e. some subjects not using the test provided and/or not reporting results. In our experience, a high level of organization and enthusiasm of clinic staff is needed to encourage compliance; but in the end it is impossible to know the magnitude of the compliance problem.

It has been suggested that screening may be more useful and appropriate in high-risk or high-prevalence groups, and the recent results of RBG screening in biethnic populations support this. For this reason, our study was targeted to a group of middle-aged patients with foot problems (i.e. community chiropody clinics), and thus perhaps likely to have a high diabetes prevalence. Using a postprandial urine self-testing technique based on that of Davies et al., we detected 4/1058 (0.4%) new NIDDM patients, compared with 8/1167 (0.7%) in the Ipswich general practice study using a similar technique. This slightly disappointing result is probably due to the very high proportion of known patients with NIDDM (17.3%) in our group (only 2.4% in the Ipswich study had known diabetes). The patients we screened may therefore have been a ‘selected’ sub-group of relatively low diabetes prevalence.

The value of targeted screening may thus depend on the proportion of already known diabetic patients in the particular population, and this may need to be known. Screening of a chiropody clinic population without this information cannot, on the basis of our results, be at present recommended. We would however agree with Davies et al. that self-testing by post-prandial urinalysis is a simple and efficient means of diabetes screening. By ‘handing out’ the test strips (rather than posting them), and by patients phoning in positive results (rather than sending them back by post), we were able to reduce costs further. In the Ipswich study, the screening cost was 59p per subject, and £81 per case detected. Our costs were 11p per subject and £34 per new NIDDM patient found (see Table 2). A final problem worth mentioning in this, and other diabetes screening projects, is the anxiety caused to patients with ‘false-positive’ results. We informed such patients of the normal GTT results as soon as possible, but there are nevertheless likely to be some temporary adverse psychological effects.

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References


