

International exchange

'Diabetes in the community': a nationwide diabetes improvement programme in primary care in Israel

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ABSTRACT

Introduction Diabetes is a chronic disease that is on the increase, and it continues to be a challenge to large health maintenance organisations.

Participants All the primary care providers (1500 physicians and 2050 nurses) to approximately 150 000 diabetics nationwide participated.

Methods A nationwide intervention using quality improvement methods was implemented during the years 1996–1999 in 1190 clinics. Process indicators measured performances of various interventions at the local steering team level. Outcome indicators included the number of diabetic patients reporting to the central register, the number of reported HbA_{1c} tests, and indicators of diabetic care (e.g. HbA_{1c}, fundus, feet, microalbuminuria and blood pressure). Multifacet interventions included guidelines, organisational changes, multidisciplinary steering teams, continuing medical education sessions, care maps, clinical pathways, follow-up and feedback. The outcomes were measured using reports from laboratories and the central

register of chronic diseases, and by manual reviews of medical records.

Results The number of diabetics who reported to the central register rose from 20.2/1000 (1995) to 42.3/1000 (1999). There was improvement from 1.5- to 3-fold for all care indicators. The rate of annual testing for HbA_{1c} rose from 22.3% to 62.8%, blood pressure from 53.7% to 79.4%, and low-density lipoprotein cholesterol from 22.7% to 54.7%. The number of HbA_{1c} tests/year/patient rose from 0.48 to 1.84. There was no improvement in diabetes control.

Conclusions We attribute the interventional programme's success to tailoring interventions to existing working conditions, using multidisciplinary steering teams, and multidisciplinary educational interventions.

Keywords: diabetes, glycemic control, multifaceted interventions, primary care, quality of care

Introduction

Diabetes mellitus (DM) is one of the major health problems in the community, with serious effects on morbidity and mortality.¹ It is a chronic disease that

has a major impact on the length and quality of life, and is the main cause of blindness, end-stage renal failure, and amputation of the lower extremities in the

Western world.²⁻⁴ According to the results of the United Kingdom Prospective Diabetes Study (UKPDS), good glycaemic control may prevent or postpone complications and improve the patient's quality of life.⁵ Monitoring, glycaemic, lipid and hypertension control, prevention and early detection of complications are, therefore, the mainstays of diabetes care.^{5,6}

Clalit Health Services is the largest health organisation in Israel, insuring 58% of the population (3 700 000 members), including 75% of the diabetic patients nationwide.⁷ The primary care clinics treat about 80% of Clalit's diabetic members. Patients with uncontrolled diabetes, those who are insulin dependent, and patients who explicitly prefer to be treated by diabetes specialists are referred to diabetes centres (they comprise 20% of the diabetic population according to a 1999 internal survey). The primary care staff includes 1500 physicians; general physicians (GPs), family physicians (excluding paediatricians), 2050 nurses, administrators and pharmacists.

In 1995, Clalit conducted a number of small internal surveys. We approached 200 primary care physicians and asked them to review five records of randomly chosen diabetic patients on their list. The results were startling: only 15–33% of the patients had had an HbA_{1c} test at least once in the previous two years, 44% had undergone blood pressure examinations, 13–23% had had fundus examinations, and 51% had been tested for cholesterol. Considering that the central chronic diseases register, which receives data from the physicians' annual reports, reported that there were 70 000 diabetic patients as of 10 December 1995, these findings portend grave consequences to a sizable population.

In 1996, Clalit adopted the St. Vincent Declaration, and proceeded to implement its recommendations in all its primary care clinics.⁸ We inaugurated the 'Diabetes in the community' programme that was conducted during 1996–1999. Its aims were to improve diabetes detection and to enhance patient follow-up as well as control of their diabetes and adjunct illnesses (e.g. high blood pressure, excessive cholesterol levels).

We now present the results of the programme in terms of the outcome indicators consisting of the number of diabetic patients reporting to the central register, the number of reported HbA_{1c} tests, the indicators of diabetic care (e.g. HbA_{1c}, fundus, feet, microalbuminuria and blood pressure measurements).

Methods

The interventions were divided into four groups, each comprising a small 'plan-do-study-act' cycle.⁹⁻¹¹ Each

district steering team and the district management received annual feedback on the year's performance, which was then measured both by process indicators (performance of organisational tasks), and by outcome indicators which consisted of follow-up of diabetic patients according to guidelines, control of diabetes and control of related diseases.¹²⁻¹⁶ Family physicians were appointed to head the district steering teams and the central headquarters team.

Each year had defined goals and specified interventions (Table 1).

Measurement of outcomes

The outcomes of the programme were measured by three methods:

- the annual number of diabetics in the central register. The central register draws data from the physicians' annual manual report, the automated drugs utilisation report and hospital reports according to coding system ICD9¹⁷
- the average number of HbA_{1c} tests per diabetic patient per year. The data were supplied by the Clalit laboratories and divided by the number of reported diabetic patients in that year^{16,18}
- a manual review of individual clinical records of diabetic patients.^{19,20}

Survey methods

The first review of the care indicators was conducted in 1997 with 867 diabetes patients nationwide, and the results were conveyed to the district managements. We now report the results of the second review, which took place at the end of 1999. The inclusion criteria were patients diagnosed as having diabetes prior to 1996 and treated in the same primary care clinic from 1996 until study closure in December 1999.

In 1999, of a total of 7000 diabetes patients nationwide who were chosen randomly from the central register, 4015 met the inclusion criteria for the current analysis. The response rate was 82.5%: 3314 questionnaires were filled in and 2938 (88.7%) patients were successfully entered into the data processing system. The same indicators and variables were collected retrospectively for each patient for each year, i.e. 1995 (before the intervention programme project began), 1997 and 1999.

A data collection sheet was prepared containing demographic data on each participating patient, on the reviewer, and on the quality of diabetes care. The patient's demographic data included their identification number, age, the year diabetes was diagnosed, the treatment given, whether the patient was in the care of a diabetes clinic, the number of visits to the primary care clinic, and relevant details of the primary

Table 1 Action plan

1996	1997	1998
Multidisciplinary steering teams at all levels of the organisation	Strengthening of the multidisciplinary steering teams at all levels of the organisation	Strengthening of the multidisciplinary steering teams at all levels of the organisation
Representative of the programme in every primary care clinic	Preparation of diabetes care maps in primary care	Implementation of diabetes care maps in primary care
Removal of restrictions on HbA _{1c} , lipidogram, and microalbumin testing	Local register of diabetic patients in every clinic, updating of central register of chronic diseases	Continuous follow-up on the numbers of patients in central register
Diabetes guidelines and their distribution to every physician	Preparation of clinical pathways for treatment of diabetic patients in primary care	Implementation of clinical pathways for treatment of diabetic patients in primary care
Continuous communication with district steering teams	Continuous communication with district steering teams	Continuous communication with district steering teams
Annual feedback on performance	Annual feedback on performance	Annual feedback on performance
Compulsory continuing medical education for primary care providers 'Diagnosis and follow up of diabetes patients'	Compulsory continuing medical education for primary care providers 'Oral medications for type 2 diabetes'	Compulsory continuing medical education for primary care providers 'Insulin treatment for type 2 diabetes'
Annual appraisal of the continuing medical education programme	Annual appraisal of the continuing medical education programme	Annual appraisal of the continuing medical education programme

care clinic. Table 2 lists the care indicators that were evaluated in order to assess the quality of patient care at three points in time.

Glycaemic control was evaluated according to HbA_{1c} levels. According to the study guidelines, they should have been recorded at least once during the previous year. The local district team was responsible for carrying out the review. The retrieved data that were gathered from the medical records of the randomly chosen patients are presented as real numbers and percentages as analysed using SPSS for Windows, with the chi-squared test having been applied for statistical significance in categorical variables. In order to further support these findings, we checked the total yearly number of HbA_{1c} tests that had been performed in Clalit's laboratories.

Results

Number of diabetic patients in the central register

The number of diabetics who reported to the central register rose from 20.2/1000 (1995) prior to programme initiation to 42.3/1000 (1999), an increase of 217% ($P < 0.0001$).²¹

Number of HbA_{1c} tests performed annually per patient

The number of HbA_{1c} tests performed annually in Clalit's laboratories increased from 0.48 test per patient (70 000 patients) in 1995 to 1.85 tests per patient in 1999 (152 000 patients), representing an increase of 385% ($P < 0.0001$). The nominal increase was 836%.

Table 2 Quality of follow-up according to process indicators of annual exam and changes in performance over time

	1995 (%)	1997 (%)	1999 (%)
Care indicator			
Weight check	25.8	35.3	52.2*
Height check	21.5	31.0	48.0*
Blood pressure	53.7	66.5	79.4*
Fundus examination	48.6	59.8	66.8*
Foot examination	31.2	44.9	59.6*
Fasting blood glucose	63.8	76.3	87.5*
HbA _{1c} examination	22.3	44.5	62.8*
Cholesterol level	51.6	66.2	79.8*
HDL cholesterol	27.8	45.4	60.9*
LDL cholesterol	22.7	38.0	54.7*
Triglycerides	47.4	62.4	76.4*
Urine analysis	48.6	59.2	67.1*
Microalbumin urine test	9.5	22.7	39.8*

* $P < 0.0001$; HDL, high-density lipoprotein; LDL, low-density lipoprotein
 $n = 2938$

Results of medical records review

Data from the medical records on 2938 randomly chosen diabetic patients were entered into the data processing system and used for the current study.

Demographic data

There were 1310 males (44.6%) and 1628 females (55.4%) in the study cohort. There was an over-representation of the 56–65 years age group (61.3%), an under-representation of the 75+ years age group (17.7%), and 21% of the diabetic patients were younger than 56 years of age.

Diabetes monitoring at the primary care clinics

A statistically significant improvement in diabetes monitoring was recorded in all indicators of care ($P < 0.0001$, Table 2). There was a substantial rate of improvement in all the indicators of diabetes follow-up between baseline and study closure, with the greatest change being recorded in the testing of microalbumin (Table 2).

Diabetic patients without follow-up

From 1995–1999, the number of diabetic patients who were not followed up annually decreased two-fold: from 30.9% (907 patients) in 1995 to 15.6% (458 patients) in 1999 ($P < 0.0001$).

Control of diabetes and related diseases

Diabetes control according to HbA_{1c} analysis

We did not find any improvement in diabetes control according to HbA_{1c} measurements (Table 3). The quality of diabetes control did not improve, even when the rates of annual testing for HbA_{1c} rose almost three-fold.

Control of related diseases

This parameter was not investigated in depth (see below).

Table 3 Diabetes control over time according to HbA_{1c} measurements

HbA _{1c}	1995		1997		1999	
	<i>n</i>	(%)	<i>n</i>	(%)	<i>n</i>	(%)
<7	199	(30.4)	425	(32.5)	523	(28.3)
7–8.4	193	(29.5)	405	(31.0)	572	(31.0)
>8.5	263	(40.2)	478	(36.5)	750	(40.7)

Discussion

Diabetes mellitus is a serious chronic disease whose incidence and prevalence is growing in both developed and developing countries.²² Since the majority of patients in Israel are treated at the primary care level, the quality of care in the community clinics has significant impact on disease management, control and complications.

In 1995, Clalit Health Services had conducted a number of internal surveys on the status of the discovery, care and follow-up of its diabetes patients, and the results were alarming. Thus, we decided to implement an interventional programme whose aim during the first 3 years was to lead to considerable improvement in these shortcomings in the primary care setting.

The continuing medical education programme that was activated during 1996–1998 concentrated mainly on these aspects, with feedback to the providers consisting mainly of data on follow-up as the result of the introduced measures. Our study shows major achievements in the quality of all follow-up procedures, but not in the control of diabetes. Most impressive was the rate for the HbA_{1c} annual testing, which rose from 22.3% in 1995 to 62.9% in 1999. Moreover, the number of diabetic patients with no follow-up decreased by almost two-fold (from 30.9% in 1995 to 15.6% in 1995).^{17,23–25} The rate of diagnosed patients rose from 20.2/1000 (1995), prior to programme initiation, to 42.3/1000 (1999). Despite those improvements in performance of the follow-up, the glycaemic control did not seem to improve during the first study period. We sought to explain this gap and came to the impression that there is a ‘missing piece’ in the improvement programme: almost no attention was given to the skills to control diabetes and related diseases. Our results showed that we achieved the goals for which we planned the intervention – improving the diagnosis of diabetes in the community and improving the follow-up of diabetes patients in primary care. We did not, however, devote enough efforts to improving the self-confidence and the skills of primary care providers for

improving diabetes control. We also did not encourage the providers to create partnerships with the patients, but focused mainly on the technical issues of the disease. According to a recent model of disease management, patients’ partnership is critical to long-term control of chronic disease.^{26,27} After analysing these results, we decided to concentrate on the issue of the control of diabetes in the next steps of our programme.

Recent reports describe that other improvement programmes have encountered the same problem: the Medicare Health Care Quality Improvement Program (Georgia, USA) describes a significant improvement in follow-up, but without mentioning improvement in glycaemic control.²⁸ In a Canadian study, Majumdar *et al* reported improvement in the follow-up of diabetes, but, again, without improvement in HbA_{1c} levels, and Harwell *et al* (Montana, USA) demonstrated similar results as well.^{29,30}

The design of our programme was stepwise: the first years were devoted to building the infrastructure and updating the basic knowledge of all primary care providers on issues concerning diagnosis and follow-up of patients with diabetes. The continuing medical education sessions, which were our main interventions, and the organization of providing feedback to the steering teams in the districts were specifically focused on these issues. Improvement in the control of diabetes was not one of our targets during the first three years, but it will be a major goal in the next stage of the programme.

Overall, we appraise our programme as having been successful because all the planned interventions brought the expected results.

We attribute the success of the programme to the following features:

- using interdisciplinary steering teams at all organisational levels
- appointing family physicians to head the district steering teams and central headquarters team³¹
- providing the staff in primary care clinics with tools for follow-up and disease management (i.e. diabetes care maps)

- changing the structure of diabetes care by empowering nurses to take part in the follow-up of diabetes patients (part of the clinical pathway)
- encouraging shared care of diabetes patients in the community (among nurses, family physicians and diabetes centres).

Scoring the effectiveness of individual interventions is difficult since we measured the results retrospectively at the end of each year. What we have demonstrated is that large-scale quality improvement programmes are feasible, and that they do not require incentives. Ongoing re-evaluation, continuity and feedback are imperative. Others have shown that each intervention contributes to the ultimate success of the programme.^{31–35}

A final word

In diabetes care, changes attained by the providers alone are not enough, and there is a need to build a partnership with the patients as well. Only a mutual effort of the caregivers together with the patients will bring long-term improvement in the follow-up and control of diabetes and related diseases.^{20,26,27}

ACKNOWLEDGEMENTS

We would like to thank all the major participants who helped implement the Clalit Health Services 'Diabetes in the community' programme: **Headquarters:** Dr M Wiener, Dr M Lapidot, Mrs D Levin CHES MPH, Mrs Sh Gan-Noy MA, Mrs D Weiss, Mrs I Poraz MSc MHA RD, Mrs R Meir RNMA, Professor M Shapiro. **Districts:** *Jerusalem:* Dr M Mazar, T Yemini RNBA, Dr A Corcos, Dr N Nubani, R Meir RNMA, Mrs R Hazan, Mrs N Timsith; *Tel-Aviv:* Dr T Segal, Dr E Stern, Mrs K Kei, Mrs R Weitz, Mrs A Barkay, Mr H Lizobski; *Dan-Petach Tikvah:* Dr K Friedlander, Dr L Liberman-Adler, Dr M Lapidot, E Rav-Niv RNMA, I Avisar RNBA, Y Raick RNBA, Mrs D Goldshtein, Mrs M Averbuch; *Haifa:* Dr B Itzhak, Dr O Menuchin, Mrs R Goren, Mrs J Eyal, Mrs I Bukai; *Merkaz:* Dr G Plotkin, Dr Koslovski, Mrs R Amit, Mrs R Abel, Mrs S Arbel, Mrs D Averbuch; *Southern:* Dr Z Lis, Dr I Harman, Mrs M Mezuyanim, Mrs M Rodnay, Mrs P Rosso; *Sharon-Shomron:* Mr E Abu-Hussien, Dr C Norymberg, Dr Sh M Giveon MPH, Dr Z Agbaria, Mrs A Avni, Mrs P Shimoni, Mrs R Laufer, Mrs A Ganor, Mrs P Levin; *Northern:* Dr B Dagan, Mr R Atrash, Mrs S Badarna, Mrs G Israeli, Mrs M Vainshtein.

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CONFLICTS OF INTEREST

None.

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Received 12 January 2005

Accepted 11 April 2005