Cost-effectiveness of the introduction of an organized adherence program for type 2 diabetes in Hungary

Zsolyom A T, Nagy B L, Nagyjavosi L S, Dessewffy Z, Steiner T G T C, Kaló Z L, Vokó Z L

1. Syeneon Research Institute, PhD, Department of Health Policy and Health Economics, Eötvös Loránd University; 2. Health Sciences doctoral school, University of Debrecen; 3. Novartis Hungary; 4. St. John’s Hospital and North-Buda United Institutions, 2nd Dept. Intern. Med.-Diabetology; 5. St. Christopher’s Clinic, Department of Endocrinology; 6. Faculty of Social Sciences, Social Policy Ph.D. Programme, Eötvös Loránd University

BACKGROUND

The Syeneon health economic model®123,13 was developed to predict long-term effects of screening, treatment and control of type 2 diabetes, by taking into account baseline patient characteristics, history of complications, changes in physiological parameters, diabetes treatment and management strategies and screening programs. The model takes into account the information needs of decision makers about diabetes management and capable of analyzing the consequences of macro-level policy interventions.

OBJECTIVE

The aim of this analysis was to assess the cost-effectiveness of introducing a public health program to increase SIME and patient’s adherence in comparison to not having a program, i.e. receive standard care only. The education program is planned to be implemented in Borsod-Abauj-Zemplén (BAZ) county, which has a much worse health status than the national average.

METHODS

The Syeneon diabetes model® uses individual level Markov simulation method to depict patient pathways. The model follows the entire lifespan of seniors and records important phases of the disease and related interventions. Patients are expected to progress from one state to the next according to the progression and diabetes-related care (Figure 1). The first, the screening section of the model records the effects of screening for T2DM. The second, disease progression and treatment section of the model replicates recurrent complications of diabetes, i.e. coronary heart disease, retinopathy, macular oedema, nephropathy, neuropathy, and non-diabetic peripheral vascular disease, stroke and leukaemia.

From the sample of the European Health Interview Survey (EHIS)® for Hungary, randomly selected individuals between the age of 40-74 with known diabetes were picked (10,000 times) and ‘walked’ through the model. The age and gender specific distribution and the mortality of sample population was adjusted to that of Hungarian health system.

The patient adherence program under investigation consists of three main elements. The first improves doctor-patient relationship through more frequent meetings in the first 3 years. Without the education program patients with diabetes meet their general practitioners (GPs) every 3 months for check-up and to get their prescriptions. In this adherence program, monthly meetings allow GPs to have more control over the progression of the patients’ HbA1c levels. Furthermore, more frequent consultations may result in better doctor-patient relationships.

The second and third elements of the education program are group-based interventions. The former is a yearly educational training led by a diabetologist with the aim of widening the patient knowledge on the disease and its complications, and the possible effects of non-adherence on the disease progression. The training also includes education on diabetic devices, e.g. insulin application, monitoring the glycated haemoglobin levels, etc.

The third element of the adherence program is a Diabetes Club Meeting led by a diabetologist where diabetic patients can discuss their problems, concerns and experience. Meetings are organized biannually during the patients’ lifetime.

Without an organized patient education program 41% of the patients with known diabetes were assumed to have lower than the target HbA1c level®. The education program improves patient adherence by 10 percentage points (based on Olveb-Neto et al.) and increases the proportion of diabetic patients achieving the target HbA1c level to 72% (Figure 1). Patients reaching the target HbA1c level enjoys the benefits of efficient treatment, while patients not reaching target HbA1c are assumed not to benefit from treatment. Following the recommendation of the Hungarian National Diabetes Association, the target HbA1c level is %7, except for special cases, where %8.

In this computational model, the baseline mortality characteristics, i.e. mean (SD) values of physiological parameters and prevalence of diabetes complications are summarized in Table 1. Further model parameters are provided elsewhere®. Cost of the education program included GP, diabetologist and nurse fee, administration costs (printing and postage information letter), and costs of diabetic devices, i.e. blood glucose meter, test strips, lancing device.

RESULTS

Introduction of an organized patient education program for the 40-74 age group in BAZ county for patients with diabetes was estimated to be a dominant strategy.

Table 2 and Table 3 show lifetime results of patients with and without the adherence program. Introduction of the education program improves the health of the patients with type 2 diabetes. The program increases lifetime QALYs, i.e. total QALYs per patient were estimated to be 5.483 compared with 5.480 QALYs per patient not involved in an adherence program. Life expectancy with and without diabetes-related complications are extended through better blood glucose control, i.e. more diabetic patients reach the target HbA1c level. Non-adherent patients have higher HbA1c levels and face higher risk for diabetes-related complications, e.g. stroke, neuropathy or retinopathy (see Table 2 and Table 3 and Figure 2).

Table 4 shows the number of patients with diabetes-related diseases, e.g. diabetic retinopathy or neuropathy, and the number of events of diabetic complications were higher in individuals without adherence program with the introduction of the program the number of events decreased. The proportion of non-adherent patients who had severe vision loss compared to 4,033 without the education program. Improved patient adherence had the least effect on the development of peripheral vascular disease, the number of patients with PVD by decreased by 8% compared to no treatment education.

DISCUSSION AND CONCLUSION

Organized adherence program was predicted to be cost-effective compared with no program in Hungary, BAZ county, for the 40-74 age group. The education program contributes to better patient adherence, resulting in better health and less disease-related complications. In general, our results showed consistently better health outcome with organized adherence program, with the exception of background retinopathy. In this case the effect of the program was likely to be minor, and the minimally increased number of cases is likely to be due to the effect of chance in the simulation process. The Syeneon diabetes model is capable to analyse the effect of complex interventions in the management of diabetes. This time it provided evidence for the cost-effectiveness of an organized patient adherence program.

Acknowledgements

The authors would be thankful to the support of Novartis Hungary Ltd.