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EDITORIAL

Obesity and co-morbidities in type 2 diabetes: An opportunity to bend the Health Care Cost Curve



Obesidad y comorbilidades de la diabetes tipo 2: una oportunidad para controlar la curva de costes de la asistencia sanitaria

Obesity has long been known as a driver and predictor of the increasing global prevalence of type 2 diabetes mellitus. The World Health Organisation (WHO) has projected that more than 532 million people will develop diabetes by 2030. In Spain the evidence on the incidence of type 2 diabetes is limited due to insufficient data.¹ However, it is recognized that both the incidence and the prevalence of type 2 diabetes are increasing and the age at diagnosis is decreasing. A recent national survey found that the prevalence of type 2 diabetes in Spain is 13.8% (95% CI 12.8–14.7%).² This prevalence can be subdivided into patients who have been diagnosed (7.8%) and those not yet diagnosed (6%). A lower prevalence of 10.3% has been reported in Catalonia and the prevalence of undiagnosed type 2 diabetes was 6.7% in this area. The national survey supported the association between diabetes and obesity. Spain's obesity prevalence rate of 28.2% ranks among the highest in the OECD countries.

Diabetes is generally a disease with a high level of comorbidity and this has to be addressed in the treatment strategy.³ The high level of comorbidity with other chronic diseases is a challenge to the single-disease and fragmented focus in the health system and represents an increasing economic burden. Comorbidity may not be adequately addressed in the current structure of health care systems.⁴ Hospital-based systems such as DRGs are unable to capture the entire morbidity profile of patients and ignore the important impact of comorbidities. These systems focus on episodic categorization and only capture hospitalized patients and fail to address the non-hospitalized population which represents the majority of any given population. Complementary systems to hospital systems that address the entire medical experience for an individual over a period of time are needed to estimate the morbidity profile of a patient and the related economic burden. According to the literature outpatient care profiling systems such as the ACG system may assist health-care systems to better identify undiagnosed type 2 diabetic individuals,

estimate cost of care and implement care coordination more effectively.⁵

It is a challenge to identify undiagnosed type 2 diabetic individuals for proactive treatment plans and monitoring. Often, the diagnosis of ischaemic heart disease, renal disease and peripheral vascular disease is not obtained from standard registers. The latter may, among others, be due to different focus from different specialties. Thus, a diabetic individual transferred to an orthopaedic surgical department for an amputation will not necessarily be equipped with a diagnosis of diabetes. To address the diabetes epidemic a small number of countries have established a national diabetes register based on existing administrative records.⁶ One advantage of this approach is that the entire population is covered by uniform inclusion criteria. Another is that the misclassification is believed to be small. Other countries conduct epidemiological surveys and/or combine data from different databases and national patient registers. Both approaches will, to some extent, serve to improve the identification and registration of type 2 diabetes patients, but the true burden of diabetes remains unknown.

This issue of Rev Clin Esp features an article on the clinical and economic characteristics associated with type 2 diabetes.⁷ The article by Sicr s-Mainar et al.⁷ represents an effort to combine data from different databases in which the obesity-related expenses in diabetics are described and analyzed. Sicr s-Mainar et al.⁷ confirm that obesity per se is a major driving factor for the cost of co-morbidities that focus. However, the population described is biased by the fact that the obesity and diabetes groups are much older than the control group. Also, it seems surprising that only 3% of these individuals suffer from diabetic neuropathy which is far from that reported in the literature.⁸

Epidemiological data suggest that diabetics in the same age range have a much higher rate of complications, including both obese and overweight individuals. Overall, it

is a matter of concern that different populations turn out to have very variable levels of complications. A high economic burden comes from the number of amputations performed in the diabetic community and this should be added on top of those expenditures reported by Sicr s-Mainar et al.⁷

As Sicr s-Mainar et al.⁷ note in their discussion section their study of clinical and economic characteristics associated with type 2 diabetes has strength and weaknesses. It is a strength of the study that it applies recognized risk-adjustment/casemix instruments such as resource utilisations bands based on Adjusted Clinical Groups and the Charlson index to adjust for casemix. In contrast to most of the Spanish studies relating to cost of diabetes that only address healthcare cost, another advantage is that the present study includes labour productivity losses.

Application of risk screening tools is a promising method, even though some criticism has been raised towards the different comorbidity indices.^{5,9} Among the recognized methods are the Charlson and Adjusted Clinical Groups indices. A surprisingly low Charlson index was found by Sicr s-Mainar et al.⁷ and probably illustrates the difficulties in achieving accurate information from databases. Sicr s-Mainar et al.⁷ measure general comorbidities in three different ways: mean number of diagnoses, Charlson index and resource utilization bands. Apparently, the index condition (DM2) was included in all of the three measures of comorbidity. However, it could be argued that comorbidity measures should exclude the index condition.¹⁰ Comorbidity is morbidity in addition to an index condition rather than a general morbidity measure such as the standard Charlson and Adjusted Clinical Groups casemix measures. It could also be argued that the index condition should be excluded before the application of resource utilisation bands to describe DM2 patients' comorbidity burden. This may be one reason why the Danish resource utilisation band measure of type 2 diabetes patients by additional morbidity burden seems to be lower (2.2 rather than 2.9). It can also be discussed whether the above-mentioned types of riskscreening tools based on retrospective information are appropriate for planning and compatible with the goal of personalized medicine.¹¹

The Spanish literature on clinical and economic characteristics associated with type 2 diabetes is fragmented and outdated according to a recent review and the article by Sicr s-Mainar et al.⁷. In general, the rather extreme disparity has been related to differences in patient sampling, demographic factors, diabetes prevalence, variations in definitions and registration systems, access to care, and quality of healthcare systems.¹² Numerous reports on the co-existence of other medical disorders in obese and/or diabetics exist and their contribution to mortality and morbidity holds a high level of prediction and stresses the cardiovascular momentum of diabetes.

Obesity is a strong predictor for developing diabetes which is also the case for cancer.⁸ The handling of cancer adds to the economic burden from obesity. It can be argued whether obesity is the primary factor driving the costs of type 2 diabetes patients, but it is clear that obesity and type 2 diabetes are closely related. The respective contribution to the economic burden of obesity from diabetes and cancer may be hard to disentangle, but a common denominator is cardiovascular disease leading to increased morbidity

and mortality. In treating diabetes another mortality-related factor is hypoglycaemia. A recent trial¹³ shows that type 2 diabetes patients' risk of hypoglycaemia-related mortality was increased by 3.4 times that for persons without the disease. A loss of labour productivity should be added to the economic burden in work-active individuals.

It should be stressed that not all obese individuals will develop diabetes. However, the data supplied by Sicr s-Mainar et al.⁷ imply that obesity is an independent factor in the expenses tied to the diabetic population. Even though the message is somewhat blurred by confounding, the data deserve credit.

Even a slight weight-loss can achieve profound improvement in metabolic regulation¹⁴, and an increasing number of training programmes available as applications for smartphones could potentiate the effect of training programmes.¹⁵

Strong evidence shows that physical inactivity increases the risk of major non-communicable diseases such as type 2 diabetes as well as the medical and non-medical costs.^{16,17} The literature also indicates that lifestyle changes was more effective than pharmacological intervention.¹⁶ Nevertheless, we need more evidence on the effect of lifestyle changes, anti-obesity drugs and bariatric surgery in the obese diabetic population.

Until more unambiguous evidence has been established about the best way to prevent or at least reduce type 2 diabetes, we have to focus on finding solutions for vulnerable patients and consider diabetes in the obese individual as a further complication and economic burden of society.

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