Diabetes care in South Africa: A tale of two sectors

'It was the best of times, it was the worst of times, it was the age of wisdom, it was the age of foolishness, it was the epoch of belief, it was the epoch of incredulity, it was the season of light, it was the season of darkness, it was the spring of hope, it was the winter of despair, we had everything before us, we had nothing before us … '. These famous words penned by Charles Dickens in 1859 captured the spirit of the Age of Revolution in Europe in the late 18th century. However, they could also be used to describe the disparate provision of diabetes care in present-day South Africa. Some of our patients have access to most of the new therapeutic agents, are provided with home blood glucose testing apparatus, and have access to multidisciplinary diabetes care teams. Many others are less fortunate. As will be discussed, the 'where' of diabetes care has a powerful influence on outcomes.

Around the world, the treatment of type 1 diabetes is evolving. Patients are learning techniques that permit them to accurately match insulin and carbohydrate intake at meals. Structured educational approaches such as the Dose Adjustment for Normal Eating (DAFNE) course are becoming more widespread, and greater reliance on novel insulins and technology is apparent. In the developing world, however, little or no structured care exists. While much has been written on the provision of insulin for people with type 2 diabetes, this editorial focuses on those with type 1 diabetes.

Two papers[1,2] in this issue of SAMJ clearly reveal the polar ends of the diabetes treatment spectrum. One deals with the provision of insulin pumps to a group of well-controlled young people who are undoubtedly fully acquainted with this technology and who also receive their care in the private (self-funded) sector. The other reports on outcomes when inexpensive insulin is used in a group that has little or no access to self-monitoring of blood glucose, and that attends an outpatient facility at a hospital in the state sector.

In recent years, following the publication of several guidelines for the treatment of diabetes, it is obvious that we have entered the era of 'individualised treatment'. By implication, the previously held notion that 'one size fits all' may need to be abandoned. Segal and colleagues[1] correctly state that treating diabetes is costly and consumes large resources, in terms of both treatments and personnel. In Africa, diabetes is fast emerging as an important non-communicable disease. In their review of diabetes in sub-Saharan Africa, Mbanya et al.[3] highlight the consequences of the erratic availability of antidiabetic therapies and the complications that arise from this. They plead, among other needs for the treatment of diabetes, for greater provision of generic drugs. Biosimilar pharmaceuticals are biological medicines derived from genetically engineered organisms using recombinant DNA technology. The first biosimilar pharmaceutical produced in 1982 for clinical use was recombinant human insulin (Humulin; Eli Lilly). Biosimilars are not interchangeable with originator molecules or with each other, as are other small-molecule generic drugs, as they are far more difficult to manufacture. The use of living organisms introduces an inherent variability in the manufacturing process, and any changes in this process will have clinical consequences. Biosimilars can therefore never be identical to the original molecule. For biosimilar insulins, the administration device should also be considered.

In their paper, the Biosulin equivalence in standard therapy (BEST) investigators are careful to point out the differences between generic and bio-identical/similar products.[1] It appears from their small study that, using an inexpensive insulin and relying on HbA1c data alone in the absence of regular self-monitoring of blood glucose, a person with diabetes can 'get by'. This would appeal to health economists and would certainly fulfil some of the needs of the continent. The take-home message is clear: using less expensive insulin can make sense economically without compromising glycaemic control as measured by HbA1c. The BEST study demonstrates that the biosimilar product Biosulin provides clinically useful outcomes and therefore goes a long way in reassuring us about its role as a potential therapeutic option.

However, do young people with diabetes want to use human insulin? Are they satisfied with the limitations these products place upon them? It appears that in the developed world, teenagers with type 1 diabetes are beginning to use novel technologies as one means of improving treatment adherence and glycaemic control.[4] Furthermore, a review by Rys and co-workers[5] found that using rapid-acting insulin analogues was associated with greater treatment satisfaction and a modest improvement in glycaemic control. Are these factors not also important for young people in Africa with diabetes?

Additionally, the significant intra- and inter-patient patient variability seen when using NPH insulin makes it unlikely that the HbA1c data in Segal et al.'s clinical trial[1] accurately reflect the quality of glycaemic control in these patients. The population of

type 1 patients was sourced mainly from the state sector, and they were not provided with the means to perform any self-monitoring of blood glucose. We therefore know nothing of their glycaemic flux or the status of their hypoglycaemic awareness, particularly given that the mean duration of type 1 diabetes was 7.2 years.

What is obvious here is that patients with the financial means will inevitably be commenced on or converted to analogue insulins, will score higher on satisfaction scores, and are likely to be using a smart mobile phone, insulin pump or other technology to augment their treatment regimen. But any person with sub-optimal glycaemic control, and not plagued by recurrent hypoglycaemia, cannot and should not be automatically placed upon these more expensive insulins in the hope that diabetes control will improve. Diabetologists have previously provided us with the insight that poor glycaemic control is generally a patient problem, and not an insulin one.[6]

In the second paper in this issue,[2] Marran and Segal clearly point out the limitations of current dosing algorithms for the provision of prandial insulin. In clinical practice, optimising the postprandial glucose level is particularly challenging. Moving from a trial environment to the 'real world' will now be a further challenge. By acknowledging that type 1 diabetes is not always an 'easy-to-treat' condition, and considering the number of tasks that people with diabetes have to master, it seems only fair to make enhanced provision for aiding them in the quest to optimise their glycaemic control and improve their quality of life. How do we best meet these needs? Ahola and Groop[7] cite several reasons, including patient- and environment-specific factors, for persistent sub-optimal diabetes control. They advocate that as many of these factors as possible should be identified. One additional means to assist in improving glycaemic control might be use of a 'sensor-augmented' insulin pump that provides real-time continuous glucose monitoring together with an insulin pump. Robust data exist in support of this approach.[8] Marran and Segal used this tool successfully in a resource-replete population, and provided extraordinary information that would not have been available by finger-prick testing alone. Clearly, this tool is not for all and by no means replaces routine self-monitoring of blood glucose. The investigators' findings here are similar to those recently published.[9,10] What is required, going forward, is a re-engineering of our advice regarding fat and carbohydrate consumption at meals, and optimising of insulin doses to match intake.

A very recent 'report card'[11] on the state of diabetes control in the USA reveals a positive trend in terms of improving glycaemic control, although there is much that remains to be done. Here in South Africa, as in the USA, we can and must continue to make every effort, through careful stewardship of resources and effective utilisation of multidisciplinary diabetes treatment teams, to enable all people with type 1 diabetes to achieve similar glycaemic control and improved health outcomes.

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