Growing global burden of type 1 diabetes needs multitiered precision public health interventions

Serena Jingchuan Guo,
Hui Shao

Center for Drug Evaluation and Safety, Department of Pharmaceutical Evaluation and Policy, University of Florida College of Pharmacy, Gainesville, FL 32610-0496, USA

Diabetes is a public health crisis, and diabetes-related health and economic burdens have been rising globally over the past decades, with the growth being the most striking in low-income and middle-income countries (LMICs).[1] Most studies in estimating diabetes burdens have been focused on type 2 diabetes with scarce evidence on type 1 diabetes.[2] Type 1 diabetes faces the challenges of misdiagnosis, underdiagnosis, high risk of complications, and premature mortality.[3]

Profiling the epidemiology of type 1 diabetes globally, and addressing gaps in terms of diagnoses, treatment, and complications will provide crucial information for the policy makers to better understand the disease burden and design corresponding public health interventions to improve the health outcomes of the type 1 diabetes population. To address this knowledge gap, Gabriel Gregory and colleagues[4] estimated and projected the global burden of type 1 diabetes worldwide using a Markov model approach. Gregory and colleagues' study found that about 8·4 million individuals had type 1 diabetes in 2021, with one fifth from LMICs. This number would increase to 13·5–17·4 million in 2040, with LMICs bearing the highest rate of increase.

One unique feature of the study is the estimation of missing prevalent cases for type 1 diabetes, which is defined as the additional number of individuals who would be alive if type 1 diabetes mortality rate matched that of the general population. The authors found the missing prevalence to be 3·75 million, the majority of cases attributed to premature mortality and 0·6 million due to non-diagnosis. They also observed a huge variation in life expectancy after the diagnosis of type 1 diabetes worldwide, largely depending on the country's economic status. This study identified the current gaps in health care in LMICs, highlighting the need to improve both early diagnosis of type 1 diabetes and diabetes management to reduce disease-associated complications and mortality.

Early diagnosis of type 1 diabetes in children and adolescents is vital to avoid life-threatening diabetic ketoacidosis, which can increase the risk of mortality and long-term morbidity. The proportion of children with diabetic ketoacidosis at diagnosis of type 1 diabetes varies substantially across the world (approximately 13–80%), with LMICs having

hui.shao@ufl.edu .

the highest rate of diabetic ketoacidosis upon diagnosis and associated premature death.[5] Although developing infrastructure for the early detection of type 1 diabetes is important, previous studies suggested that public campaigns targeting both caregivers and healthcare professionals can also effectively improve early diagnoses of type 1 diabetes. Countries should examine and evaluate their gaps in care and design country-specific interventions to improve type 1 diabetes diagnoses in children and adolescents.

The management of type 1 diabetes relies heavily on insulin to avoid major morbidity and mortality caused by hyperosmolar hyperglycaemic states and ketoacidosis and to reduce the risks of long-term macrovascular and microvascular complications. Due to limited competition among only three insulin manufacturers, the cost of insulin remains high and has been increasing sharply in past decades. According to a previous report, the insulin affordability issue persists in both LMICs and high-income countries, and many LMICs have substantial barriers to insulin access.[6] The increasing global burden of type 1 diabetes, as suggested by Gregory and colleagues, calls for worldwide actions to alleviate the insulin access and affordability issues.

Potential solutions are multifaceted, many of which depend on a country's economic and policy environment.[7] In brief, countries need to strengthen the price regulation and reimbursement policy for insulin while building subsidy programmes to ensure insulin access and to cope with the growing demand for insulin. Meanwhile, optimising the insulin supply chain between manufacturers and patients while seeking alternative treatment options (eg, biosimilar products) will also improve the current situation. For example, reducing the number of parties involved in the supply chain can effectively reduce administrative costs and prevent price inflation driven by specific stakeholders (eg, pharmaceutical benefit managers). Biosimilar insulin products, if proven to have comparable effectiveness and safety profile to generic insulin, can substantially reduce insulin costs for both patients and the health-care system.

Country-specific multifaceted policies and intervention strategies are needed to address the growing global burden of type 1 diabetes. The study by Gregory and colleagues highlights the current gaps in care and provides valuable information to be used to design such precision public health interventions.

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