

GLOBALIZATION AND NUTRITION IN BOTSWANA TO COMBAT TYPE 2 DIABETES MELLITUS

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ABSTRACT

The goal of this paper is to discuss nutrition and globalization efforts to combat Type 2 Diabetes Mellitus (T2DM) in Botswana and globally. The specific focus of my paper is to describe the global perspective of T2DM and overnutrition leading to obesity; provide evidence of diabetes prevalence and how the disease interplays with global nutrition interventions; discuss globalization and nutrition in Botswana aimed at combatting T2DM; provide an overview of diabetes in Botswana; discuss partnerships for globalization of resource integration and food supply chain management; and describe recommendations to combat the prevalence of diabetes from a global perspective.

Keywords: Nutrition, Diabetes, Nutrition intervention, Global health, Botswana

INTRODUCTION

GLOBAL PERSPECTIVE ON TYPE 2 DIABETES MELLITUS (T2DM) AND OVERNUTRITION LEADING TO OBESITY

Diabetes is increasingly becoming a widespread disease across nations around the world and most markedly, in low- and middle-income countries according to the World Health Organization. In the global spectrum, diabetes prevalence rates increased from 104 million in 1980 to 422 million in 2014 according to the World Health Organization. Among adults over the age of 18 have an increased rate of prevalence from 4.7% to 8.5% in 2014 (Diabetes, 2018). The pathology of T2DM is associated with inadequate amounts of insulin produced by the human body or when insulin resistance has developed. This leads to unregulated levels of blood glucose which, in effect, may lead to morbidity and mortality if not controlled. The short- and long-term complications of the disease include hypoglycemia, hyperglycemia, micro- and macrovascular complications. T2DM is one category of diabetes and globally, is the one that accounts for many people living with the disease around the world. There is gestational diabetes (which affects pregnant women), Type 1 Diabetes Mellitus (which affects children and young adults), and uncommon forms—monogenic diabetes (an inherited form of diabetes) and cystic fibrosis-related diabetes. T2DM is positively linked to diet which is the cornerstone of an individual's overall environment and that which has a major influence on health and disease prevention. There are a range of factors that contribute to the onset of T2DM, including lifestyle, environmental, and familial factors. There are many nations across the world that lack supportive environments, healthcare access, and affordable health services to combat and/or delay the onset of T2DM and individuals living in low-and middle-income countries are at the greatest risk for morbidity and mortality from the disease due to the paucity of these key factors. The risk factors associated with T2DM are linked to gene-expressions (which are inheritable) and metabolic factors (which are modifiable). T2DM threatens the well-being and quality of life and imposes large economic burdens which can be detrimental and have perpetual adverse effects.

One the most significant risk factors linked to T2DM is overweight and obesity and the adaptation of overnutrition links to obesity. Overnutrition, which occurs when there is frequent or habitual overconsumption of nutrients based on dietary patterns that threaten an individual's

health, is most threatening in low-, middle-income countries around the world however is also apparent in high-income regions drawing on the notion that it does not discriminate. In low- and middle-income regions, however, overnutrition is strikingly increasing leading to disproportionate rates of morbidity and mortality as it relates to T2DM—which is due, largely in part, to poverty and the lack of access to essential nutrients that sustain good health. In middle- to high-income regions, dietary patterns, overnutrition, and food choices play a considerable role in T2DM and the complications that are associated with the disease. In the current literature, overnutrition is attributed to having long-lasting effects from childhood into adulthood. The cycle of overnutrition affects nutritional status resulting in decreased productivity and malfunctioning of adequate health and physiologic development, education, socioeconomic power as well as physiological growth. To combat global T2DM, its health complications, and its risk factors, public-private partnerships and multicomponent interventions are necessary. In general, diabetes is a priority non-communicable disease (NCD) in the global economy and is being targeted by world leaders in the Political Declaration on the Prevention and Control of NCDs led by the World Health Organization. It is the charge of world leaders to join forces to affect a colossal disease prevention and health promotion strategy targeting diabetes in all its forms in a way that is cost-effective, evidence-based, affordable, population-wide, and multi-sectoral.

DIABETES FACTS AND HOW DIABETES AND NUTRITION INTERVENTIONS ARE ADDRESSED GLOBALLY

The World Health Organization put into place global targets, also known as the global monitoring framework, for the prevention and control of T2DM (and other NCDs) that ought to be reached by 2025. There are nine (9) global targets for T2DM, an NCD, as illustrated in Table 1 ("About 9 voluntary global targets", 2018).

Table 1

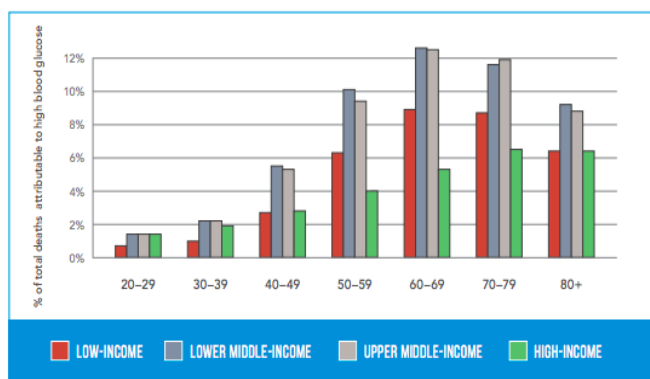
25% relative reduction in the overall mortality from cardiovascular diseases, cancer, diabetes, or chronic respiratory diseases
10% relative reduction in the harmful use of alcohol, as appropriate, within the national context

10% relative reduction in prevalence of insufficient physical activity
30% relative reduction in mean population intake of salt/sodium
30% relative reduction in prevalence of current tobacco use
25% relative reduction in the prevalence of raised blood pressure or contain the prevalence of raised blood pressure, according to national circumstances
Halt the rise of diabetes and obesity
50% of eligible people receive drug therapy and counseling (including glycemic control) to prevent heart attacks and strokes
80% availability of the affordable basic technologies and essential medicines, including generics, required to treat major NCDs in both public and private facilities

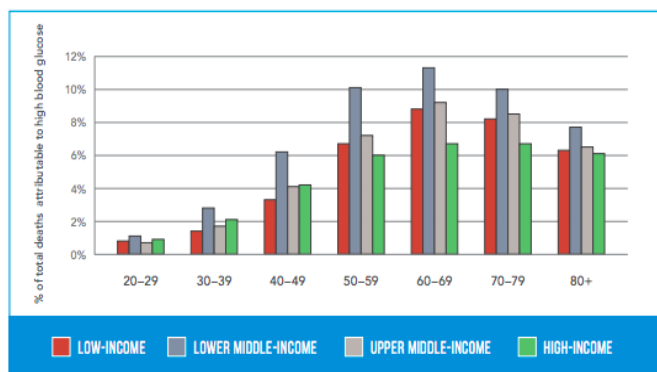
The percentage of mortality rates associated with T2DM risk factors (and, hyperglycemia) are strikingly high in low- and lower middle-income countries compared to high-income countries as illustrated in Figures 1a and 1b.

Figures 1a-1b. Percentage of all-cause deaths attributed to high blood glucose, by age and country income group, 2012, World Health Organization (World Health Organization, "Global Report on Diabetes").

Women



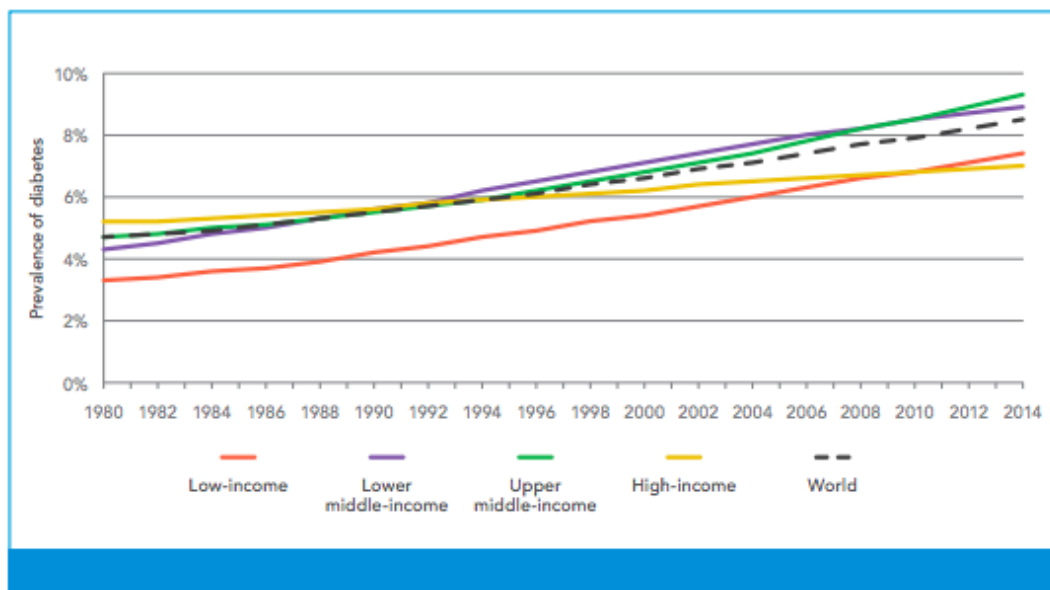
Men



The prevalence of T2DM is increasing in an upward trend across countries, and in particular, in low-income and lower middle-income countries around the world as illustrated in Figure 2.

T2DM was the eighth leading cause of death in both men and women in 2012. The World Health Organization reports that diabetes prevalence has increased twofold since 1980. The greatest attributable risk factor to the onset of T2DM is obesity-induced insulin resistance and hyperglycemia (where hyperglycemia accounts for 43% of all deaths before the age of 70).

Figure 2. Trends in prevalence of diabetes, 1980-2014 by country income group, World Health Organization (World Health Organization, "Global Report on Diabetes").

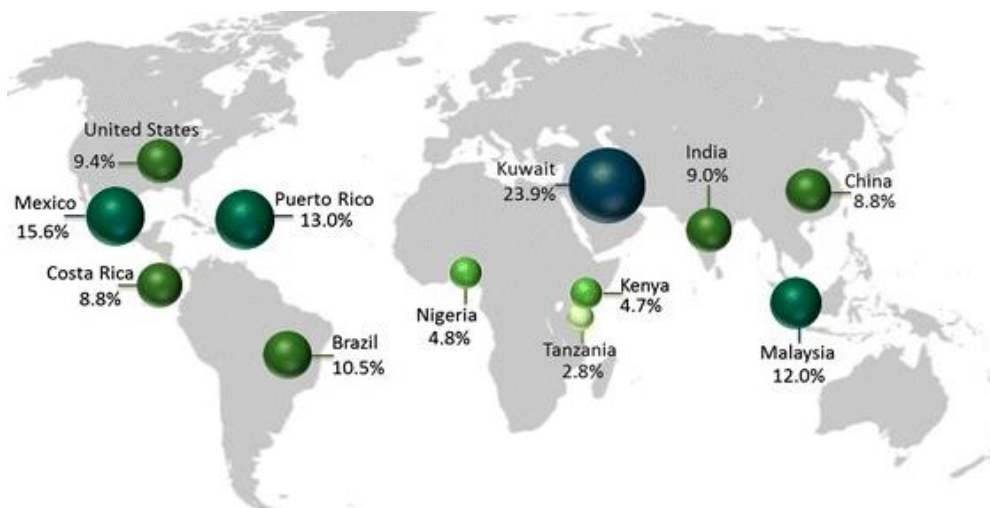


The global diabetes death toll (which includes T2DM variants) was estimated to be 1.5 million in 2012 and those living with the disease (18 years and older) were estimated at 422 million in 2014. There is an increasing rate of T2DM risk factors and the greatest increase is attributable to obesity (where more than 1 in 10 adults were classified as obese in 2014). The World Health Organization contends that the prevalence of physical inactivity leads to obesity and this is on the rise and continues to be a growing concern. The World Health Organization reported that prevalence rates associated with physical inactivity is highest in high-income countries and double the rate in low-income countries. In an effort to address T2DM globally, both the World Health Organization and the Food and Agriculture Organization contend that multicomponent intervention packages are the solution to combatting the disease. These intervention packages include promoting healthy diets, healthy dietary patterns, and physical activity. The approach behind the intervention package emphasizes it as a life-course towards prevention of T2DM via

regular and adequate levels of physical activity and healthy dietary patterns and replacing saturated fatty acids with polysaturated fatty acids; limiting saturated fatty acid intake to less than 10% of total energy intake (and 7% for at-risk groups) and achieving adequate intakes of dietary fiber through the regular consumption of micronutrients; reducing the intake of free sugars to less than 5-10% of total energy intake; participating in 75-150 minutes of physical activity and muscle strengthening in a week.

In addition to multicomponent intervention packages, there are global initiatives, like the Global Nutrition and Epidemiologic Transition Initiative, which targets diabetes prevention and reduction of prevalence rates via assessing the carbohydrate quality of staple foods. There are 11 countries participating in this initiative, including Nigeria, Brazil, Tanzania, India, Malaysia, Kenya, China, Mexico, Cost Rica, Kuwait, Puerto Rico, and the USA as illustrated in Figure 2 (Mattei, et al., 2015). The premise behind this initiative is to consider cultural beliefs in nutrition intervention approaches to combat diabetes, T2DM, and to use this approach to develop culturally-appropriate dietary interventions to prevent the onset of T2DM. The target diet recommended is one that is rich in carbohydrates (e.g., corn, potatoes, and cassava). The countries illustrated in Figure 3 have varying diabetes prevalence rates.

Figure 2. Prevalence of diabetes, 20-79 age group, 2011, Global Nutrition and Epidemiologic Transition Initiative (Mattei, et al., 2015).



Similar to the multicomponent intervention packages recommended by the World Health Organization and the Food and Agricultural Organization, the Global Nutrition and Epidemiologic Transition Initiatives is another advocate in T2DM prevention as it aims to promote health and prevent the disease and other NCDs based on diet modifications. In contrast to multicomponent intervention packages, another arm of this initiative aims to address the modification of eating behaviors via sensorial factors, affordability and availability of food and meal plans, societal norms, and personal beliefs.

DISCUSSION

GLOBALIZATION AND NUTRITION IN BOTSWANA TO COMBAT TYPE 2 DIABETES MELLITUS

Botswana is only one of many prospering countries in Africa, yet it is plagued with persistent overnutrition (and undernutrition) due, mostly in part, to poverty and an incredibly unreliable health system. Malnutrition, in general, influences metabolic parameters, morbidities such as T2DM and eventually mortality. Nutrition-related factors are largely attributed to T2DM and complications associated with the disease and overnutrition plays a critical role in nutrition and diet as factors to tackle the disease. In Botswana, because of constrained resources, the country is battling how to tackle increasing T2DM prevalence rates. Botswana is among African countries that are highly affected by diabetes due to constrained resources and this is adding to the diabetes endemic. In 2012, World Diabetes Day took place in Gaborone, Botswana and the Deputy Director in the Ministry of Health, John Botsang, attested that there were 96,000 people living with diabetes in Botswana marking Botswana as having a national prevalence rate of 8.25% compared to 4.3% across other countries in Africa (Botswana Daily News, 2013). Between 2000 and 2015, Botswana was among 24 African countries ranked as the second highest country with the largest diabetic percentage rates.

OVERVIEW OF DIABETES MELLITUS IN BOTSWANA

The condition of being diagnosed with or having risk-factors for diabetic conditions and T2DM is a result of diet and nutrition—namely, overnutrition. According to the World Health Organization, malnutrition is defined as the inadequate consumption or overconsumption of micro- and macronutrients leading to overweight, obesity, diabetes and other NCDs.

Malnutrition affects 1.9 billion adults who are obese and 462 million who are underweight and is an endemic occurring around the world increasingly—largely in low-income countries (World Health Organization, 2017). In Botswana, there are variations of reports on the prevalence rate of diabetes in being a large contributor to malnutrition. The Botswana’s Ministry of Health, in 2013, reported that “around 32,000 adults (20-70) years) [were living] with diabetes” (Ministry of Health, n.d.). In another report, published by the International Diabetes Foundation, 52,000 cases of diabetes among adults were said to have occurred in Botswana in 2017 (International Diabetes Foundation, 2018). In a fourth report published in 2015 by the International Food Policy Research Institute, information reported about diabetes is noted as “not available” regarding availability and state of implementation of guidelines and protocols for managing diabetes (International Food Policy Research Institute, 2015). The variances in data reported on diabetes prevalence rates in Botswana is concerning and moreover, disturbing as it implies that there are no uniform quantitative data, on both the overall estimate and population segments (e.g., adults and children), diagnosed with T2DM or at-risk for diabetes and metabolic conditions associated with the disease. The issue with these inconsistencies suggest that Botswana lacks more than just healthcare prevention to combat T2DM, but it also lacks sufficient data reporting and records on the prevalence of NCDs. This implies that diabetic conditions and variants linked to T2DM may likely be far worse than what has been reported. Moreover, it suggests that there are obvious unreliable and inaccurate reports of diabetes prevalence rates. What is clear is that there is a problem in Botswana in addressing diabetes prevalence strategically and there is also unique opportunity to identify barriers and implement effective nutrition interventions. In early 2018, an article described Botswana as being a country that is anxious to address malnutrition but that lacks sufficient resources to approach the problem and “accurately and consistently track [NCD] data on how the situation is changing” across the country for individuals diagnosed or at-risk for malnutrition and associated chronic health conditions such as diabetes (Tshipa, 2018). Because of insufficient resources, Botswana is stifled in being able to provide health services, among other life-saving treatments, to its people.

PARTNERSHIPS FOR GLOBALIZATION OF RESOURCE INTEGRATION AND FOOD SUPPLY CHAIN MANAGEMENT

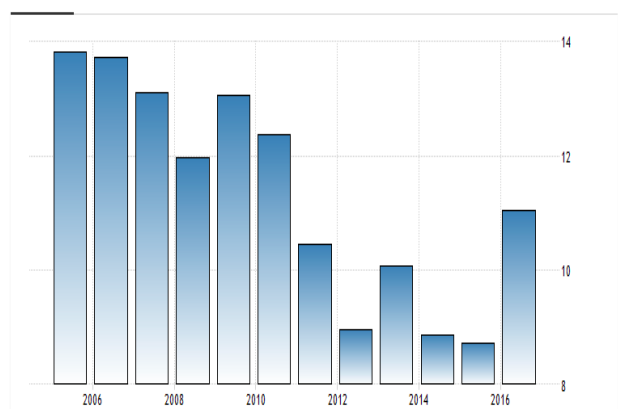
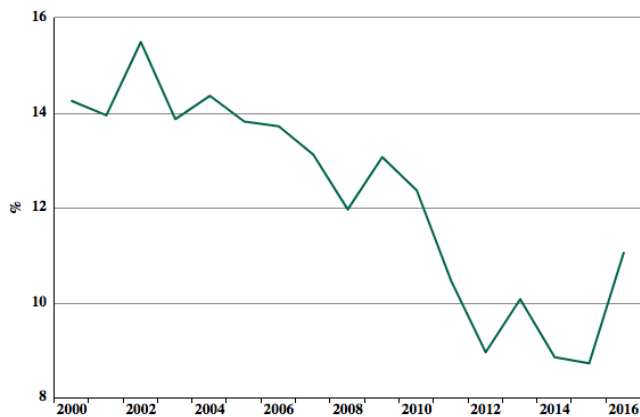
A key component to combatting morbidities and mortalities associated with overnutrition resulting from diabetes is the globalization of resource integration and partnerships for food supply chain management of services and goods across countries that proliferate the availability of health services, treatment, and food supplements to promote health and prevent disease. To this end, globalization is important as it works as a conduit to both promoting effective health transitions common to all countries in the world and being a benefactor through these efforts. Another key component is nutrition globalization; nutrition, as we know it, is a disease prevention mechanism that considers interventions that delay or prevent morbidities to combat mortality associated with disease. Nutrition globalization considers combatting morbidities and mortalities via modifying dietary patterns, increasing variety of foods in markets, growing food supply chains, and growing global marketing and imports of food products (Jacobensen, 2014).

There are opportunities for international partnerships around the world to promote globalization efforts to increase variety of foods in markets, grow food supply chains, and grow food imports however there are limitations. In the last decade, food imports to Botswana have declined up until 2016 as illustrated in Tables 1 and 2. This is attributable to the decrease in horrid climate changes over the last two years which devastated agricultural production. Since local crop production is scarce, due largely to confined landscapes, Botswana relies on neighboring countries, like South Africa, Sub-Saharan Africa, as well as countries distant to its borders, like Europe and East Asia, to augment their food supply via food imports.

Table 1. Trading Economics, The World Bank

Table 2. Kanoema World Data Atlas

(Trading Economics, n.d.; Botswana Food imports, 1960-2017)



As reported by the African Food Security Urban Network, Botswana may never become self-sufficient in local crop production due to its horrid climate change (Acquah, 2013) and confined landscape stretching from eastern and northern borders of the country. Nutrition globalization for Botswana becomes a challenge not just from agriculture production but also food imports. In a recent publication issued in April 2018 by the Botswana Gazette, Botswana is expected to pay more for food in 2018 due to being forced to rely on international food imports who are capitalizing on the country's declining agricultural development. These impediments are devastating to the people of Botswana in their efforts to compete in globalization and especially to its most vulnerable people, the poor. If Botswana remains stifled in its ability to compete in the global economy when it comes to nutrition globalization, this would prompt greater concerns for being able to combat malnutrition and associated chronic health conditions, diabetes in particular. Moreover, despite its growing economy, Botswana would face challenges beyond food supply to food accessibility and food quality which prompts even greater concerns for food security. All levels of the global economy should recognize that globalization can benefit population health and nutrition interventions by encouraging best practices in how we treat and develop a health food supply. The opportunities for international partnerships to promote globalization would then require collaborative relationships with government entities, businesses, NGOs, and public and private entities.

OPPORTUNITIES TO COMBAT MALNUTRITION AND DIABETES MELLITUS

The importance of food security and how individual households can improve their health and safety to food consumption plays a role in combatting malnutrition and chronic health conditions, like diabetes mellitus, and in ensuring that food is consistently free from contamination that would otherwise make it not safe to consume. Food security is important at the household level because it is the cornerstone to ensuring that each member of the household

is practicing how to maintain and consume safe food and ensuring households contain a safe and sufficient food supply year-round. The opportunities to combat malnutrition and diabetes mellitus require households to have sufficient land for homestead food production, income to be positioned to produce and consume food supply and have other necessary resources that help produce a variety of nutrient-rich foods. Beyond the production of rich food sources, the importance of best practices within the household to promote food and nutrition security is also key; these include how household members share food, prepare food, store food, practice good hygiene, practice good health care, and how care is given to women and children of the household. The emphasis here is that the absence of food and nutrition security leads to malnutrition, which is a serious threat to all household members and can have long-lasting effects that are detrimentally hard to break.

Small-scale food production, which occurs when there is limited or decreased agricultural production or growth in a region that makes it difficult or impossible to harvest and farm, is another factor that is important to addressing opportunities to combat malnutrition and diabetes mellitus. For example, in Botswana, farming has become a major problem for local townships in the last two years due to climate change and limited landscapes across the country's borders which force the country to rely on international food imports which are often unaffordable or if affordable, drive up costs of local produce in the country's markets. There are limitations with small-scale food production which include deterioration of soil fertility; poor sanitation that devastates harvesting plants and livestock; lack of irrigation; insufficient gardening and cultivation; lack of community mobilization of food production; natural disasters; and urbanization. Effective strategies that mitigate these issues collectively require cross-collaboration with farmers, pastoralists, and local community leaders to for capacity building and the sharing of resources and knowledge to promote sustainable food production.

Homestead food production and the utilization of the household to grow fresh health foods while maintaining low costs in food production is key to identifying opportunities to combat malnutrition and diabetes mellitus prevalence in Botswana. These are not only key to improving household food security but also to providing an avenue for poor households to combat food depletion year-round. Additionally, homestead food production promotes a healthy diet by

supplying a routine supply of food items that provide supplemental nutrients that are affordable and easily accessible.

RECOMMENDATIONS

RECOMMENDATIONS TO COMBAT THE PREVALENCE OF DIABETES FROM A GLOBAL PERSPECTIVE ACCORDING TO THE WORLD HEALTH ORGANIZATION

The World Health Organization recognizes the global endemic of diabetes and the large-scale domino effect it has on economies, communities, families, and individuals, among others. There is a concerted effort across the globe where countries are joining forces to develop effective and scalable strategies to target the diabetes endemic with a steadfast approach via political influences. The political impetus towards developing effective solutions is comprised in the World Health Organization Global Action Plan 2012-2020 as well as the Sustainable Development Goals (from the United Nations prioritization efforts to eliminate disease, poverty, hunger, and literacy as part of its 2030 agenda) and the United Nations Political Declaration on NCDs. These joint efforts formulate recommendations that are in place to reduce diabetes in its threat to human life. The World Health Organization seeks to establish multi-sectoral commissions across the globe that will ensure countries preserve their commitment, share resources, and promote advocacy towards developing and implementing solution-oriented actions to combat diabetes—and, T2DM which carries the greatest number of morbidity and mortality. Additional recommendation from the World Health Organization to combat the prevalence of diabetes include plans to engage ministries of health around the globe to put into practice strategic leadership roles and standardized targets that ensure national policies address diet (and in particular, overweight and obesity) and raising awareness of health risks and healthy foods from childhood through adulthood; ensure policies and legislation developed to raise awareness and combat diabetes is fully funded and implemented; develop supportive cohorts and social environments for physical activity; strengthen responsive rates to diabetes and other NCDs at a primary level of care; implement improved guidelines that address early diagnosis and managing diabetes; ensuring equitable and affordable access to health services and medicine to combat diabetic conditions; and invest in outcome evaluations that monitor the progress and efficiency of implemented solutions intended to combat diabetes. It is of great consequence to

nations and to the global economy that these recommendations from the World Health Organization are fully funded and implemented and through multicomponent interventions, significant differences can be achieved that benefit economies, communities, families, and individuals who are burdened by diabetes. Collectively, multicomponent interventions can have a perpetual effect to hinder the increasing prevalence rate of diabetes, and in particular—T2DM, and thus promote health and improve the lives of individuals diagnosed with the disease.

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