

Hypoglycemia and Food Insecurity: The Vicious Circle

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Chronic non-communicable diseases represent the greatest burden of health in industrialized countries and a rapidly growing problem in underdeveloped countries. The poorest countries are the most affected, since 80% of deaths from chronic diseases occur in low and middle income countries where most of the world's population lives. Approximately 1,200 million people in the world live in extreme poverty. This group is less healthy and has greater exposure to risks than economically favored groups. Even in high-income countries, those who suffer from poverty are more vulnerable to chronic diseases. Poor people often fall into a vicious circle of poverty and poor health. The relationship between chronic disease and poverty is bi-directional: there is a path from poverty to chronic health problems, and another in the opposite direction. The loss of income, the costs of treatment and marginalization due to chronic health problems adversely affect the economic status of those with chronic diseases [1].

Diabetes Mellitus as a chronic disease is not the exception. Lower-income populations are hit harder by the diabetes epidemic, not only in prevalence but also on the risk of complications [2-4]. It is estimated that approximately 425 million people worldwide suffer from diabetes, 79% of them, live in low-medium income countries [5]. The prevalence of diabetes in Argentina is greater in lower-income than in higher-income groups (10.3% vs. 7.3%) [6]. Food Insecurity is one of the mechanisms by which poverty may predispose people with low socio-economic status to worse control and higher rates of complications. In 1974 the United Nations Food and Agriculture Organization (FAO) defined food security as "the right to have access to sufficient nutritional and culturally acceptable food choices" [7]. According to the latest data from the Social Debt Observatory of the Argentine Catholic University (Observatorio de la Deuda Social Argentina (ODSA), Universidad Católica Argentina, UCA), reported in 2014 the prevalence of food insecurity among households located in the country's main urban centers was 13.8% [8].

Adults' suffering from food insecurity the risk of developing severe hypoglycemia is twice greater as a result of their inability to obtain food combined with the use of their own hypoglycemic medication [9-12]. Several studies have shown that social vulnerability resulting from food insecurity, low socioeconomic status, low schooling and poor sanitary education is an independent risk factor for hypoglycemia, even after conventional predictors are controlled [13-20]. In fact, low socioeconomic status confers a risk of hypoglycemia similar to that attributed to insulin use [21].

In vulnerable populations, a socioeconomic vicious circle has been described, in which hypoglycemia is responsible for missed work (absenteeism) and a reduction in labor productivity leading to increased unemployment and food insecurity, which further increase the risk of hypoglycemia [22].

The "food insecurity cycle", explains how food insecurity may increase the risk of hyperglycemia and hypoglycemia in patients with diabetes. Hyperglycemia can occur as a result of inability to obtain adequate food or to excessive consumption during relatively sufficient food periods (i.e., first days of the month). In the other hand, hypoglycemia may occur when meals are skipped or when caloric intake is reduced due to inadequate food supply (last days of the month) [9]. Social vulnerability and food insecurity is a real phenomenon in many countries facing economic crises and in populations with insufficient incomes to obtain adequate diabetes treatment.

Despite the consequences of food insecurity, the best way to address it is not known. One of the proposed solutions is the Supplemental Nutrition Assistance Program (SNAP) formerly known as the Food Stamp Program, provides food-purchasing assistance for low- and no-income people living in the United States [23]. It is a federal aid program, administered by the U.S. Department of Agriculture, under the Food and Nutrition Service (FNS), though benefits are distributed by each U.S. state's Division of Social Services or Children and Family Services. This is a very promising approach, which has been proposed by the Centers for Medicare & Medicaid Services in the United States. SNAP has demonstrated to eliminate the monthly cycle of hypoglycemia. This is seen reflected in an observational study where patients with lower-income had an increased risk of emergency room visits or inpatient hospitalizations for hypoglycemia during the last week of each month, compared with earlier weeks. The increased risk of end-of-the-month hypoglycemia was mitigated during a period of increased federal nutrition program benefits from 2009 through 2013 [24].

At present, many countries are facing economic crises and a large number of people are losing their jobs or have insufficient incomes to maintain an adequate treatment for diabetes, especially as far as nutrition is concerned. Thus, addressing this group of patients poses a real challenge as they are in a special situation of vulnerability to develop hypoglycemia. Physicians should consider modifying their diabetes treatment plans to avert hypoglycemia among persons with food insecurity, as recommended in the recently updated American Diabetes Association's standards of care [25].



In addition, it is essential to promote the development of nutrition assistance programs in vulnerable populations to mitigate the negative effects of food insecurity in patients with diabetes.

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