Stress and the Development of Type 2 Diabetes in Adults

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Socioeconomic deprivation and life course adversity increase the risk of type 2 diabetes (T2D) in adults (1,2). While dietary intake is typically implicated as a mediator, there is another important pathway: the stress response. The onset of an external challenge (a "stressor") results in the release of catecholamines (epinephrine, norepinephrine) within seconds, and glucocorticoids (primarily cortisol) within minutes (3). By raising blood glucose and impairing the body's ability to remove glucose from the bloodstream, the stress response promotes immediate energy for fight-or-flight and prepares the body to deal with injury (4,5).

While the biologic half-life of catecholamines is short (10 to 100 seconds), the half-life of cortisol ranges from 60 to 120 minutes (5,6). This has implications for the impacts of chronic stress on the mind and body. Ongoing abuse, discrimination, and deprivation can result in excess cortisol and high blood glucose levels over extended periods (1,2,7,8). Cortisol excess promotes the accumulation of visceral fat and adversely impacts mental health and behaviour (depression, hyperphagia) (4,9,10). Over time, the cumulative effects of excess cortisol impair glucose tolerance, promote central obesity, depress the individual's mood, and dramatically increase T2D risk (10,11). This is demonstrated most clearly in Cushing's syndrome—the syndrome of chronic glucorticoid overproduction—with up to 50% of patients developing T2D depending on the severity of the underlying hypercortisolism (11).

In Canada, the 2022 age-standardized prevalence of diabetes was 12% among racialized and 7% among non-racialized adults (12). Discrepancies were greatest among Indigenous (17%) and racialized men (14%) as compared to non-racialized men (9%) (12). Viewed through the lens of the biologic stress response, these differences are not surprising. Rather, they signal the disproportionate burden of social and economic stress borne by Indigenous and other racialized groups in Canada. Interventions that address stress and social adversity are needed to prevent and promote the remission of T2D in these populations.

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