# Chapter 2
# A Review of Type 1 Diabetes (T1D):
## To Assist Patients' and Carers' Understanding of This Condition

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## ABSTRACT

*The diagnosis of Type 1 Diabetes (T1D) will come as an unwelcome surprise to most people. Within a short period of time, the person will have to come to understand and manage this chronic illness. The terminology associated with the T1D condition will also be totally new to the person: diabetes mellitus, pancreas, hyperglycaemia (hyper), hypoglycaemia (hypo), bolus (fast acting insulin), basal (slow acting insulin), ketones and blood glucose levels. The purpose of this article is to assist newly diagnosed patients' understanding of T1D, people who are already living with T1D, carers of people with T1D, partners and family members of someone with T1D, work colleagues, and friends who participate in the same sporting activities or go on holiday with a person who has T1D. In addition, this article reviews how people living with T1D can still enjoy exercise and maintain the best quality of life possible; whilst controlling the blood glucose levels in their body for the rest of their lives to prevent the onset of complications associated with diabetes.*

## INTRODUCTION

The diagnosis of T1D at any age can be quite shocking. Particularly to an individual or parent who has had no close previous contact with anyone with the condition. "85% of newly-diagnosed patients have no family history of the disease" (Atkinson & Eisenbarth, 2001, p. 224). The diagnosis of T1D, a debilitating autoimmune disease (Wen et al., 2008), has increased substantially over the last thirty years

(Atkinson & Eisenbarth, 2001), and continues to increase (Ang et al., 2017; O'Hara et al., 2017), to the extent that it is now considered to be a global epidemic (Ahmed et al., 2018; Noor, Khan, & Ahmad, 2017; O'Loughlin, McIntosh, Dinneen, & O'Brien, 2010).

T1D is a life-long medical condition requiring frequent monitoring of blood glucose levels throughout the day, constant vigilance of every morsel the patient consumes and other lifestyle choices are necessary to effectively manage this condition (Dinneen, 2010). In addition, the patient or carer must have an appreciation of the effect that personal exercise choices may have on blood glucose levels and how to manage the precise dose of insulin administered to cover for the possible reduction in blood glucose levels experienced during exercise.

Even if a person with Type 1 Diabetes takes great care and manages to keep their blood glucose levels as close to normal as possible, there is still no guarantee that they will not suffer from complications due to diabetes later on in life. Basically, the person has the power to control/modify all of the risk factors through tight monitoring of blood glucose levels, diet, exercise, life style choices, etc. The only factor that is non-modifiable is the fact that a person diagnosed with T1D has it for life, everything else that effects blood glucose levels are modifiable. The pancreas of a person with Type 1 Diabetes no longer produces insulin or produces insufficient doses of insulin to control the amount of glucose in the blood. Therefore, the challenge is to balance insulin doses and everything else (food and drink intake, exercise, sleep, stress, illness, and so forth) to maintain blood glucose levels as near to normal as possible.

T1D is challenging to manage as so many different variables influence the level of glucose in one's blood at any single point in time. "Crucial to achieving glycaemic control is an understanding of the effect of diet, physical activity, and insulin on blood glucose levels" (Jackson et al., 2015, p. 1959). The administration of the most suitable dose of insulin to cover the amount of carbohydrates consumed and the level of activity in which the person engages is paramount to achieving good glycaemic (blood glucose level) control in order to avoid other medical complications in the future. The administration of the most suitable dose is also crucial to ensure that the person who has T1D does not experience a severe hypoglycaemia episode (hypo).

"Type 1 diabetes is a chronic disease in which individuals are unable to produce insulin, which is essential for regulating blood sugar" (Byrne et al., 2012, p. 3), that is characterised by hyperglycaemia and the harm it may cause to the body (Fowler, 2008). Hyperglycaemia means that there is too much glucose in the person's blood stream, which can, if left untreated, lead to other medical complications in later life. Hyperglycaemia can also lead to Diabetic Ketoacidosis (DKA) in the short term. DKA is a life-threatening condition that may affect people who are diagnosed with Type 1 or Type 2 diabetes. Alternatively, a person may present at a Hospital's Accident and Emergency Department with DKA, this being the first sign that they are in fact suffering from diabetes. DKA happens when the levels of glucose (sugar) in the blood rise to dangerous levels because the pancreas is unable to produce sufficient insulin to regulate the level of glucose in the blood. Therefore, the body cannot access glucose from the blood for energy, tissue production and repair, instead the body starts to breakdown stores of fat that are present in the body. This process leads to the production of ketones. The presence of ketones can turn the blood acidic. Acidic blood can make a person feel very unwell, and subsequently if untreated can lead to DKA, a diabetic coma or even death.

The background section discusses the worldwide incidence of T1D and some of the symptoms experienced during the sudden onset of T1D. The section on the diagnosis of T1D includes brief explanations of the following: Self-Monitoring of Blood Glucose (SMBG); blood glucose levels; HbA1c; the use of insulin to control the blood glucose level; acceptable blood glucose level; unique treatment plan

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