

Diabetes: fitness to work

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BACKGROUND

Diabetes mellitus is one of the most common endocrine diseases, and one of the leading causes of mortality in the world. The disease is characterised by the body's inability to utilise glucose effectively. It can be due to insulin resistance by the body, or by pancreatic beta cell dysfunction, amongst other things.¹

Type 1 diabetes is thought to be an autoimmune disease affecting the beta cells in the pancreas, which leads to low or no insulin production.¹ Type 2 diabetes can be a combination of insulin resistance, decreased insulin production and/or excessive secretion of glucagon.² Individuals with the disease are either insulin dependent or non-insulin dependent.

Fitness to work in the presence of diabetes mellitus is a contested issue, especially for insulin-dependent individuals.

Statistics

The International Diabetes Federation (IDF) estimated that 537 million adults (20–79 years of age) were living with diabetes in 2021.³ They report that three in four adults with diabetes live in low- or middle-income countries.³ The IDF reported that, as of 2021, the adult population living with diabetes in South Africa was 11.3% – equivalent to more than 4 million adults.⁴

The Global Burden of Disease Study (2019) reported that 41 million people die from non-communicable diseases (NCDs) every year.⁵ Diabetes contributed to around 1.5 million of the deaths worldwide, as reported in 2019.⁶

The mining industry is held accountable, to an extent, by the Minerals Council South Africa as well as the Department of Mineral Resources and Energy (DMRE). The Council established the Masoyise Health Programme, which was implemented in 2018. The programme has recently adopted a 'wellness approach', which is now not only aimed at TB and HIV but has expanded to include NCDs and occupational lung diseases, with the aim of improving the overall health and wellness of employees.⁷

Mines were expected to screen all employees for diabetes in 2022. In its 2022 annual report, the Minerals Council reported that the industry had improved remarkably from previous years.⁸ More than 80% of employees were reported to have been screened for diabetes in 2022 (improved from the 59% in both 2021 and 2020).⁸

Minimum standard of fitness

A 'blanket approach' should be avoided when deciding about fitness to work, and each case should be judged on its own merit. The minimum standard of fitness code of practice⁹ is a good reference tool.

According to the document 'Guidelines for a mandatory code of practice on minimum standards of fitness to perform work on a mine', caution should be exercised when deciding on fitness to work for individuals diagnosed with diabetes mellitus.⁹



Dr LM Mahlare addressing the 2023 MMPA Annual Congress

Photograph: courtesy of MMPA

As per Table 1 and Box 1, sourced from the minimum standard of fitness code of practice (CoP), fitness category 1 and 2 employees diagnosed with diabetes and working on the surface can be deemed fit if their diabetes is controlled. This applies to both insulin- and non-insulin-dependent diabetics (IDDM and NIDDM).⁹

Category 3 employees with controlled NIDDM who work underground are considered fit for their occupation. However, those who have IDDM are deemed unsuitable to work underground except under exceptional circumstances, which is at the discretion of the occupational medicine practitioner (OMP).⁹

Category 4 employees, who are "drivers of non-passenger and ordinary goods conveyance and work involving heavy or potentially dangerous machinery", can be deemed fit to work if they have NIDDM and are controlled. However, the minimum standard states that individuals with IDDM are unsuitable to be placed in this work.⁹

Category 5 employees, who are "passenger and dangerous goods conveyance drivers", according to the CoP, are unsuitable to be placed if diagnosed with either IDDM or NIDDM.⁹

Table 1. Minimum Standard of Fitness code of practice – Mining

Parameter	No hazard	Mines/works surface	Mines underground	Surface or underground	
Fitness category	1	2	3	4	5
Frequency of examination	3 yearly	Annual	Annual	Annual	Annual
Minimum age (years)	16	18	18	21	21
Diabetes	Well controlled Diabetes – OK Well controlled NIDDM – OK IDDM – OK, depending on hazards exposure. Adequate sugar control for the work environment		Well controlled NIDDM – OK IDDM – Unsuitable, except in special circumstances (Refer OMP)	Well controlled NIDDM – OK IDDM – Unsuitable	NIDDM/IDDM – Unsuitable

Source: *Guideline for a mandatory code of practice on the minimum standards of fitness to perform work on a mine, 2016⁹*
(Annexure 1: Minimum Standards Table – for compliance)

Box 1. Minimum standard of fitness to perform work at a mine (from original document)
Diabetes mellitus

Diabetics may be employed in such occupations as the OMP may consider safe having regard to their condition. Insulin dependent diabetics should not work underground except under exceptional circumstances where the OMP is satisfied that all required health or safety concerns have been met. Well-controlled, mild non-insulin dependent diabetics may be certified fit to work in a particular category of work underground. Well-controlled, mild non-insulin dependent diabetics may be certified fit to work by the OMP as drivers for non-passenger or ordinary goods conveyance.

OMP: occupational medicine practitioner

Source: *Guideline for a mandatory code of practice on the minimum standards of fitness to perform work on a mine (Section 8.5.3.1), 2016⁹*

SOME CONCERNS REGARDING DIABETES AND FITNESS TO WORK
Hypoglycaemia

The major concern about individuals who have diabetes, regarding fitness to work, is the occurrence of hypoglycaemia while on duty.¹⁰ A severe hypoglycaemic episode is associated with an effect on cerebral function, and can lead to transient cognitive dysfunction, seizures, reduced level of consciousness, or coma.¹¹ It is worth noting that the major cause of hypoglycaemia is the use of insulin, often related to inappropriate use (dosage, administration, timing with food, etc.).^{11,12}

Hypoglycaemia can also be associated with some oral hypoglycaemic agents, primarily sulphonylureas.¹³ Under normal circumstances, every individual has counterregulatory mechanisms in the event of hypoglycaemia. This happens via glycogenolysis as well as gluconeogenesis, where the body will find other means to increase or maintain a normal plasma glucose level until a food or other source of glucose is introduced into the body. Thus, hypoglycaemia takes place mainly in the presence of defective counterregulatory mechanisms or hormone regulation.¹¹

Some individuals with diabetes, especially those with longstanding poorly controlled disease and on insulin, often do not have a functional counterregulatory mechanism, putting them at risk of severe hypoglycaemia. Some individuals have hypoglycaemia unawareness, which is mostly linked to repeated episodes of hypoglycaemia – a state where the body is desensitised to hypoglycaemic episodes for various reasons.¹¹

Under normal circumstances, hypoglycaemic individuals experience symptoms that would alert them to ingest something to elevate their blood sugar levels. These include sweating, irritability, tachycardia, fatigue, difficulty concentrating, light headedness, etc. With time, this can extend to confusion, slurred speech, incoordination, and other symptoms. If hypoglycaemia is not addressed, it can lead to seizures, loss of consciousness, or coma.¹⁴

Individuals with hypoglycaemia unawareness often only present at the later stage when they have neuroglycopenia, and exhibit some of the neurological symptoms mentioned above.¹¹

Hypoglycaemia in the workplace, especially in high-risk areas, can lead to fatal or serious injuries, not only for the employee, but also for colleagues.

Fatigue

A South African study, published as 'Contributors to fatigue of mine workers in the South African gold and platinum sector' by Dr Jodi Pelders and Prof. Gill Nelson, listed common contributors to fatigue; diabetes was one.¹⁵ It is well documented that diabetes can lead to fatigue. The mechanism involved is thought to be the disruption of the body's ability to absorb sugar, which is needed for energy. Therefore, individuals who are uncontrolled would have a high blood sugar level, but their cells would be deficient of sugar, leading to fatigue.¹⁶ Polyuria, in association with high blood sugar, can lead to dehydration, which is also a major contributor to fatigue.¹⁶ This further emphasises the need to control diabetic individuals, as fatigue can be detrimental, particularly in the mining industry in which there are high-intensity jobs, long working hours, and awkward shift work. Even in the absence of diabetes, these factors lead to fatigue.

Other concerns

There are other multiple factors of concern regarding diabetes, which should be addressed individually, with each patient. Patients need to be educated about these problems and how to avoid or control them. These factors include target organ damage, hyperglycaemia, and/or increased risk of diabetic ketoacidosis. Appropriately fitted safety shoes are essential for diabetic workers, especially in the presence of peripheral neuropathy. There is a risk of diabetic foot that is characterised by small, often unnoticed pressure ulcers.¹⁰

Newer molecules

Glucagon-like peptide-1 receptor agonists (GLP-1 RAs) are a relatively new treatment for diabetes. Most are injectable and should not be confused with insulin when assessing fitness to work.

These agents are protective against hypoglycaemia, unlike insulin. They stimulate the secretion of insulin only after glucose is introduced into the body. Thus, when blood glucose is low, they cease to stimulate insulin secretion. However, when blood glucose is elevated, they also inhibit the secretion of glucagon, and stimulate the secretion of insulin. These agents are neuroprotective, lower blood pressure and cholesterol, and are linked to weight reduction, all of which contribute to a reduction in all-cause mortality.¹⁷

Examples of this class of treatments include liraglutide, dulaglutide, semaglutide, and exenatide. It should be noted that an oral semaglutide was recently approved by the US Food and Drug Administration (FDA).¹⁷ Semaglutide has recently attracted media attention due to abuse by non-diabetic individuals.¹⁸ It must be noted that in some countries, semaglutide and other GLP-1 RAs are registered for treatment of obesity.¹⁹ However, in South Africa, they are currently registered only for treatment of diabetes. Nevertheless, there is currently inadequate stock for diabetic patients as non-diabetics are reportedly using it off-label and without a prescription via the 'black market'.¹⁹ Using the medication off-label and without a prescription, and without monitoring by a qualified medical practitioner, can lead to severe adverse events, such as gastrointestinal-related diarrhoea and vomiting,¹⁷ and, although rare, pancreatitis and cholecystitis.¹⁸

CASE LAW

IMATU and Mr M vs City of CPT

In 2005, the City of Cape Town was taken to court by a Mr M and Independent Municipal and Allied Trade Union (IMATU) after he was declared unfit for his job due to having IDDM.²⁰ Mr M was a 31-year-old male who had been diabetic for more than 20 years. He had been a volunteer reservist firefighter at Fish Hoek since 1991 when at high school. In 2003, he successfully interviewed to become a firefighter. However, after a medical examination, Dr J declared him unfit and unsuitable for the position, although he noted that Mr M was physically fit and had good vision. He attributed his decision to the risk of hypoglycaemia associated with insulin.

Mr M and the union contested the finding. He was referred to a principal medical specialist who supported Dr J's decision. The specialist stated that he had not examined the patient, but that his decision was based solely on the risk of hypoglycaemia associated with the use of insulin. The case was escalated to senior human resources, and then to the Commission for Conciliation, Mediation and Arbitration (CCMA), where it still could not be resolved.

Ultimately, the case landed in the Labour Court, where it was established that the last hypoglycaemic episode was close to 20 years ago, in the first year of diagnosis. It was also noted that, in the years Mr M worked as a reservist, there had been no report of hypoglycaemia. The court ruled that the employment policy of refusing to employ individuals with IDDM as firefighters was unfair discrimination, and that each case should be looked at separately with its own merits.

EMPLOYEE RIGHTS IN THE MINE

The Mine Health and Safety Act includes an instruction to "safeguard the health and safety of mine employees and communities affected by mining operations".²¹ Section 20 of the Act speaks to the rights

of employees to dispute findings of unfitness to perform work. An employee is entitled to appeal to the Medical Inspector in the event of a decision taken that he/she is unfit for an occupation, or against any finding contained in an exit certificate. The appeal must be lodged within 30 days (or 90 days after an exit examination); exceptions may apply at the Medical Inspector's discretion. All employees should be made aware of this right.²²

CONCLUSION

There should be no blanket approach in making decisions regarding employees' fitness to work. Occupational medicine practitioners should familiarise themselves with disease processes as well as complications associated with each condition. The final decision of fitness should not be made on the worst-case scenario or out of fear. As Dr Dipalesa Mokoboto (Department of Mineral Resources and Energy Medical Inspector) said at the Mine Medical Professionals Association (MMPA) Annual Congress in 2023, "The decision of fitness is made using the minimum requirements of the job, not the maximum".

Another experienced OMP, Dr Selborne Marhanele, had the following to say (personal communication, 30 January 2024):

"A few aspects need to be considered when assessing the suitability of employees with diabetes mellitus to perform certain categories of work. The duration of impairment, viewed in conjunction with the experience of the employee in a certain occupation or type of work, may enable the employee to perform such work safely and without risk to their own or fellow employees' health or safety. Experience in a particular occupation may compensate for impairment, allowing the employee to continue working effectively without any increased risk to health or safety. Closely related to duration is the employee's insight into their condition, which should also be considered in assessing fitness to work. Insight leads to, inter alia, early recognition of symptoms, earlier intervention, and better control in the long run leading to reduced risk of unwanted events such as hypoglycaemic episodes. In declaring an employee fit to work, the OMP should also consider any anticipated deterioration in the condition and possible increase in risk. The OMP may therefore set strict conditions that include closer supervision and monitoring in the workplace, and more frequent medical surveillance."

A decision about fitness is not to be taken lightly, as it has consequences for the worker. Employers have a moral obligation to ensure that their wellness programmes are strengthened to increase awareness about non-communicable diseases in the mine, and to motivate employees to lead healthy lifestyles. A healthy lifestyle, coupled with weight loss, has proven to have benefits in reducing cardiovascular risk factors in patients with diabetes.²³ The programmes need to facilitate employees to take care of their chronic conditions prior to complications arising. Failure to do so may have financial consequences for both the employee and employer.

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