Psychological impact of hypoglycaemia

The hidden depths of the type 2 diabetes iceberg

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Hypoglycaemia is a concern to many people with type 2 diabetes, particularly as it is the most common side effect of some glucose-lowering therapies. Although the immediate risks to the individual are evident and usually manageable, the psychological impact is often less visible but more pervasive, with long-term implications for both self-management and quality of life.

Hypoglycaemia occurs when blood glucose levels fall below the normal physiological range (i.e. ≤3.9 mmol/L).[1] Treating mild hypoglycaemia with fast-acting carbohydrates can prevent it from becoming severe, which is defined as requiring the active assistance of another person for recovery (e.g. help with administering carbohydrates or glucagon).[1] Although severe hypoglycaemia can have devastating immediate physical consequences (including collapse, injury and coma), the psychological impact can be more enduring.[2] Fear of hypoglycaemia can lead to compensatory behaviours that compromise diabetes self-management and/or quality of life.[3]

Risk and frequency of hypoglycaemia

Hypoglycaemia is rare in the early years following the diagnosis of type 2 diabetes. However, a longer duration of diabetes is associated with progressive beta cell failure, necessitating initiation and then intensification of medications to maintain blood glucose levels within the target range. Although the risk of hypoglycaemia is well established in people with type 1 diabetes,[4] it is less well known and often

Key points

- **Hypoglycaemia is a significant side effect of insulin therapy and some oral glucose-lowering agents (e.g. sulfonylureas).**
- **Hypoglycaemia is often thought to be associated with type 1 diabetes only; however, twice as many people with type 2 diabetes use insulin in Australia than people with type 1 diabetes, and many more use sulfonylureas.**
- **Experiencing hypoglycaemia can lead to fear of hypoglycaemia and reduced quality of life.**
- **People with type 2 diabetes often apply compensatory behaviours to reduce their risk of hypoglycaemia and their fear of it. These behaviours include reducing and/or omitting medication doses, avoiding physical activities and more frequent snacking.**
- **It is important for healthcare professionals to show respect, sensitivity and support to enable the person with diabetes to talk openly about their experiences and concerns regarding hypoglycaemia.**
- **With specialist support, people with diabetes can address their fear of hypoglycaemia without compromising their long-term diabetes outcomes.**

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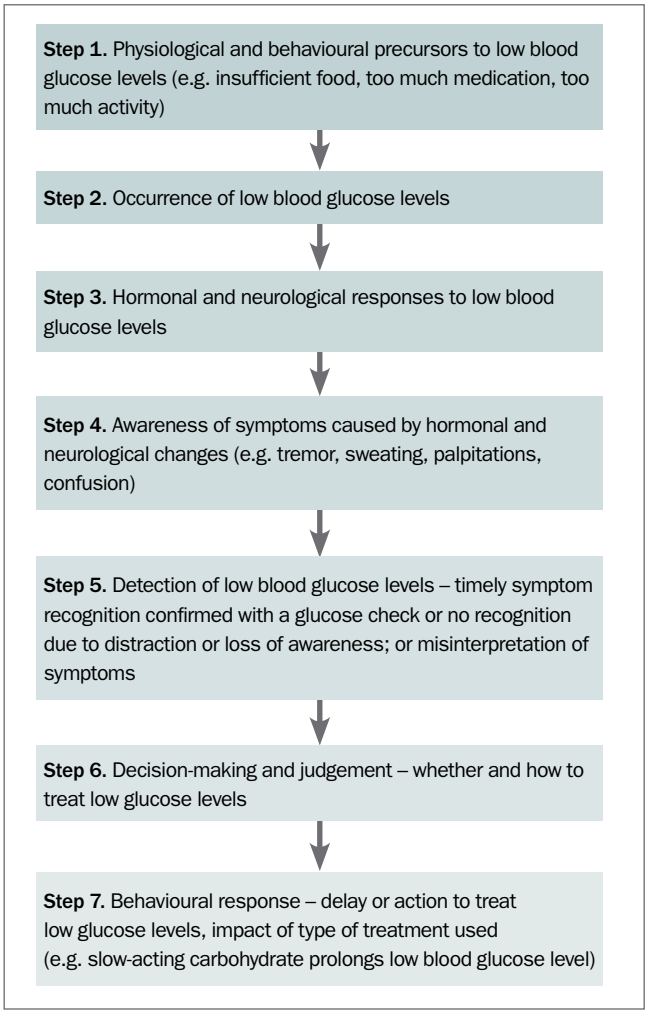

Figure 1. The biopsychosocial model proposes seven steps that combine to determine a person's risk of severe hypoglycaemia.[11]

under-recognised in those with type 2 diabetes. This is likely because the risk of hypoglycaemia varies considerably with treatment type, intensity and duration of diabetes, and cognitive decline.[5,6]

People with insulin-treated type 2 diabetes report a mean of one episode of mild (self-treated) hypoglycaemia per week or 42 episodes per year.[7] About 7% of people using sulfonylureas and as many as one in four using insulin (for at least five years) have experienced a severe hypoglycaemic event in the past year.[5] Furthermore, the risk of both mild and severe hypoglycaemia increases with longer use of insulin therapy in people with type 2 diabetes.[5] After at least five years of insulin use, the risk for severe hypoglycaemia is similar to that for people with type 1 diabetes with short diabetes duration (less than five years).[5] Reported incidence is 0.44 severe events/person year.[8] As in type 1 diabetes, the distribution is skewed, with a small number of people experiencing the majority of events.

Finally, it should be noted that some people report 'pseudo-hypoglycaemia', defined as experiencing symptoms that are typical

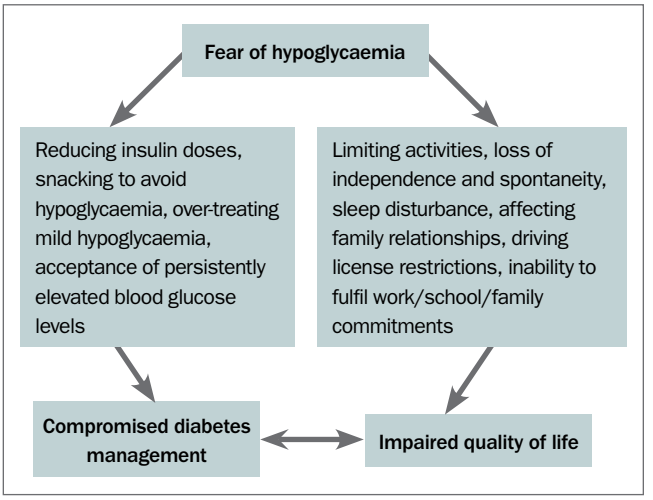

Figure 2. Impact of fear of hypoglycaemia.

of hypoglycaemia when their actual blood glucose level is in the normoglycaemic range.[1] This can happen, for example, if the person is more accustomed to their glucose level being above target range. Although this presents no acute physiological risk to the person, it has a similar impact on psychological well-being and self-management to actual hypoglycaemia.

Causes of hypoglycaemia

Hypoglycaemia is caused by the relative imbalance between glucose, insulin and activity levels. A retrospective analysis of patients experiencing hypoglycaemic episodes found that exercise was the third most frequent cause in those with insulin-treated type 2 diabetes.[9] As increased physical activity is beneficial for reducing HbA_{1c} levels and risk of complications, this presents challenges for people trying to optimise their self-care.[10] Looking beyond the imbalance between glucose, insulin and activity levels, a person's risk for severe hypoglycaemia is influenced by hormonal, psychological and behavioural processes (Figure 1).[11]

Importantly, many people worry about their risk of long-term, diabetes-related complications and they may overestimate that risk, such that some may deliberately run their glucose levels low in an attempt to avoid the onset of long-term complications, which they fear more than hypoglycaemia.[12-14]

Psychological impact of hypoglycaemia

Fear of hypoglycaemia and emotional well-being

Many people with type 2 diabetes worry about hypoglycaemia.[15] It is one of the most common sources of diabetes distress in people with type 2 diabetes in Australia.[12] Being concerned about hypoglycaemia is both rational and adaptive, as it keeps the individual alert for symptoms and motivated to take action. However, if these concerns start to impact on the person's diabetes self-management and quality of life, the person most likely experiences 'fear of hypoglycaemia' (Figure 2).

1. Reasons why people fear hypoglycaemia

Physical consequences
- Unpleasant symptoms
- Loss of consciousness
- Risk of injury (to self and others)
- Risk of occurrence during sleep (without waking)
- Risk of cardiac arrhythmia
- Risk of sudden death

Psychological consequences
- Mood (e.g. irritability, confusion)
- Loss of personal control
- Guilt
- Frustration
- Worries about cognitive impairment

Social consequences
- Embarrassing self in front of others
- Dependence on others
- Impact on daily work/study activities
- Impact on family life
- Interpersonal conflicts
- Impact on leisure activities

2. Signs that a person may be experiencing fear of hypoglycaemia

- Compensatory behaviours – e.g. lowering the dose of insulin or glucose-lowering medications, reducing physical activity, frequent snacking
- Not implementing 'agreed' treatment changes to lower blood glucose levels
- Excessive daily glucose checking
- Acceptance of persistently high blood glucose levels
- Avoidance behaviours – e.g. limiting exposure to certain (social) situations in which hypoglycaemia may be more likely or would be more challenging if it did occur

Fear of hypoglycaemia is a specific and extreme reaction that may develop for many reasons (Box 1). Research has shown consistently that occurrence and severity of hypoglycaemia is associated with fear of hypoglycaemia.[16,17] Even one traumatic hypoglycaemic event, especially one complicated by loss of consciousness or injury (to self or others), can have a lasting emotional impact.[18]

Fear may also be disproportionate to the actual risk of hypoglycaemia. This was shown in a study of more than 1500 adults with type 2 diabetes, in which there was no difference in the level of fear of hypoglycaemia experienced by those using sulfonylureas, which are associated with more frequent hypoglycaemic events, compared with other oral medications not associated with hypoglycaemia.[19]

Diabetes management and outcomes

Approximately half of people with type 2 diabetes for whom insulin is clinically indicated report being 'not very' or 'not at all' willing to begin insulin therapy, and concerns about hypoglycaemia contribute to their reluctance.[20] Furthermore, the GP's apprehension about risk of hypoglycaemia is also recognised as a contributor to clinical inertia.[21] Fear can drive acceptance of persistently higher glucose levels, which places the person at risk of long-term complications.[22] Some people adopt 'compensatory' or 'avoidant' behavioural strategies to avoid hypoglycaemia and reduce their fear of it. These strategies include reducing the dose or omitting glucose-lowering medication, reducing physical activity or snacking continually to maintain higher blood glucose levels. Importantly, avoidance behaviours are as common in people with type 2 diabetes who are not using insulin (30%) as in those who are using insulin (35%).[23] In addition, it has been observed that 57% of people with type 2 diabetes modified their insulin dose after a severe episode of hypoglycaemia and 43% modified it after a mild or moderate episode.[18]

Reducing the dose of insulin occasionally (e.g. when attending an important meeting) will not have a major impact on long-term diabetes outcomes. However, over time, these 'one-off' compensatory behaviours can evolve into habitual diabetes management. Reducing physical activity has detrimental consequences for managing glucose levels, weight, physical fitness and overall health. Defensive eating (e.g. snacking to avoid hypoglycaemia) increases calorie intake, which can be particularly frustrating for someone trying to lose weight or prevent weight gain. It is difficult to consume the exact amount that will reduce blood glucose levels to within target range without then leading to hyperglycaemia, and so this often results in a distressing, vicious cycle of over-corrections.

Quality of life

Hypoglycaemia has negative impacts on quality of life. For example, nocturnal hypoglycaemia not only disrupts both quantity and quality of sleep but has a knock-on effect on energy levels and mood (e.g. irritability) the next day.[7] In turn, this can have negative impacts on work and leisure pursuits, and physical functioning generally.[2] Hypoglycaemia, even when mild and self-treated, can interrupt work or leisure activities. It has recently been reported that a nonsevere event leads to a median loss of 60 minutes of work time in people with type 2 diabetes.[7] Hypoglycaemia can also compromise personal relationships and the lives of family members, for example, with sleep disturbances or worrying about the person's safety when alone or about their behaviour in public.

Although compensatory or avoidant behaviours can compromise diabetes management, they can also impair quality of life. For example, people may avoid work, leisure or family activities that rely heavily on physical exertion. One study showed that older women with type 2 diabetes were more likely to give up driving than women without type 2 diabetes,[24] with clear consequences for independence and leisure pursuits. Snacking to avoid hypoglycaemia can mean the person is then not hungry when it is time to

enjoy a meal with family or friends, compromising important aspects of quality of life such as dietary freedom, enjoyment of food and social life.[25]

Role of healthcare professionals in supporting a person with fear of hypoglycaemia

Healthcare professionals can look for several signs indicating that a person may be experiencing fear of hypoglycaemia (Box 2). Fear of hypoglycaemia often goes unrecognised because asking about an experience of hypoglycaemia is not yet part of the clinical agenda; one-third of people with insulin-treated type 2 diabetes report that their healthcare professionals never ask about hypoglycaemia.[7] Fear of hypoglycaemia can be assessed using the validated Hypoglycemia Fear Survey-II Worry subscale.[26] Items relate to a range of worries that people with diabetes may experience to varying degrees. High item scores can be used to initiate conversations about the person's concerns and what is needed to reduce their fear of hypoglycaemia.

Recent studies have found that 55 to 85% of people with insulin-treated type 2 diabetes rarely or never inform their GP or specialist about their hypoglycaemic events.[7,18,27] People with diabetes may be reluctant to discuss their fear or experience of hypoglycaemia with healthcare professionals because they are:

- worried about the risk of losing their driver's license or job
- embarrassed about losing control of their behaviours and emotions
- concerned that a healthcare professional would expect them to know how to avoid hypoglycaemia.

Conversations about hypoglycaemia need to take place in a respectful and sensitive way to enable the person to talk openly. One of the most crucial things a healthcare professional can do is to acknowledge the person's concerns, as dismissing them can result in loss of trust. Healthcare professionals can share their understanding that it is common for people with diabetes to worry about hypoglycaemia and acknowledge the impact of hypoglycaemia (mild or severe) on people's lives.

As noted above, a person may experience fear of hypoglycaemia in the absence of actual hypoglycaemia and irrespective of their HbA_{1c} levels. Healthcare professionals can explain that a certain level of concern is adaptive – nature's way of motivating the person to act appropriately to avoid a severe event and its consequences – but fear needs attention. It is important to distinguish between their actual and perceived risk;[28] actual risk can be minimised through optimal self-management education, whereas high fear combined with low actual risk is best addressed through appropriate fear-management strategies.[29,30] If the person is purposefully maintaining glucose levels above target range to avoid hypoglycaemia, the consequences this may have for their long-term health need to be explained without threat or judgement, and alternative strategies to reduce their fear discussed.

With specialist support, the person with diabetes can address their fear of hypoglycaemia without compromising their long-term diabetes outcomes. Credentialed diabetes educators, endocrinologists or psychologists with expertise in diabetes can help the person to develop a step-wise plan to restore their confidence and regain personal control, including:

- helping the person to gain a more accurate understanding of his or her personal risk of hypo/hyperglycaemia
- providing support to change unhelpful beliefs and behaviours
- providing diabetes self-management education, more advanced hypoglycaemia management training or specialist advice on how to incorporate exercise and physical activity safely
- reviewing the person's current diabetes management regimen and discussing the role of technologies (e.g. short-term use of continuous glucose monitoring to highlight glycaemic patterns).

Conclusion

Healthcare professionals often underestimate the prevalence and impact of hypoglycaemia in adults with type 2 diabetes. Both risk and frequency depend on the individual's clinical characteristics, decisions and behavioural responses. Concern about hypoglycaemia is an adaptive response to the threat that hypoglycaemia represents to the person, in terms of physical, social and psychological consequences. However, fear requires attention, as it will compromise quality of life and/or diabetes self-management. Healthcare professionals need to be aware of and address the psychological impact of hypoglycaemia, and work with the person to implement a step-wise plan to manage his or her risk of hypoglycaemia and/or fears. **ET**

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A list of references is included in the website version of this article (www.endocrinologytoday.com.au).

Further reading

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