

# Impact of Hypoglycaemia Kits in Mental Health Settings

## Abstract

Hypoglycaemia management kits (HMKs) are increasingly recognised as a crucial component of care in mental health hospitals, particularly for patients with diabetes or those on medications that affect glucose metabolism. Emerging evidence suggests that the implementation of HMKs in these settings has significant benefits in both clinical and psychological outcomes. Properly stocked kits, which typically include glucose tablets, glucagon, and syringes, enable quick and effective treatment of hypoglycaemic events, reducing the risk of severe complications such as seizures, coma, or death.

Studies show that patients with mental health conditions, especially those taking antipsychotic medications, are at increased risk of developing metabolic disturbances, including hypoglycaemia. HMKs help mitigate these risks, improving patient safety and contributing to better management of comorbid conditions. Additionally, the presence of these kits can alleviate anxiety among patients and staff, enhance confidence in managing medical emergencies, and reduce the burden on healthcare professionals by preventing preventable hospitalizations.

While data on long-term outcomes is still limited, current evidence supports the integration of HMKs into standard care protocols within mental health hospitals as a means of improving both physical and mental health outcomes, and promoting a more holistic, patient-centred approach to care. Further research is needed to refine guidelines and assess the cost-effectiveness of HMK use in this population.

## Keywords

Hypoglycaemia management kits; mental health hospitals,

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## Background

Hypoglycaemia caused by insulin or insulin secretagogues (i.e. sulfonylureas, meglitinides) can cause distressing and potentially debilitating complications. It is therefore imperative that events are reduced in frequency and severity, recognised safely, and treated quickly. Hypoglycaemia is a dangerous occurrence in individuals with mental health conditions. Individuals with type 1 diabetes and those with type 2 diabetes treated with insulin or insulin secretagogues should be screened for impaired awareness of hypoglycaemia (IAH). Fear of hypoglycaemia (FoH) is an underestimated problem for individuals living with diabetes and has negative impacts on mental health (for individuals living with diabetes, caregivers, and support persons) and can lead individuals living with diabetes to target higher BG values, to overtreat hypoglycaemia, and to avoid activities and social situations that may result in hypoglycaemia.

Individuals at high risk for severe hypoglycaemia, such as those treated with insulin, should be prescribed glucagon, along with provision of counselling on administration technique for their support persons. Continuous glucose monitoring (CGM) should be used in conjunction with a structured educational program to detect and prevent hypoglycaemia for those at high risk of hypoglycaemia, IAH, or FoH.

## Definition and Frequency of Hypoglycaemia

An alert value of  $<3.9$  mmol/L can be used as a cutoff to classify hypoglycaemia in individuals with diabetes treated with insulin and/or insulin secretagogues. Hypoglycaemia is very common; up to 65% of individuals with either type 1 or type 2 diabetes (treated with insulin or insulin secretagogues) self-report at least 1 episode of hypoglycaemia each year, with a higher incidence in people with type 1 diabetes [1]. Hypoglycaemia is rare in individuals with type 2 diabetes who are not using insulin or insulin secretagogues, although it may still occur.

The initial symptoms of hypoglycaemia are usually adrenergic, followed by neuroglycopenic symptoms, though individuals with impaired counter-regulatory responses to hypoglycaemia and IAH may not exhibit adrenergic symptoms prior to neuroglycopenic symptoms, even with low glucose levels. Factors contributing to this phenomenon include the effects of medications, challenges in adhering to diabetes treatment, alcohol intake, exercise, and fluctuations in hunger signals [2].

Hypoglycaemia can be divided into two types, i.e. primary hypoglycaemia when hypoglycaemia is the main diagnosis for admission, whereas secondary hypoglycaemia if hypoglycaemia occurs during hospitalisation. Hypoglycaemia during hospitalisation or secondary hypoglycaemia may arise from various risk factors, such as advanced age, comorbid diseases, type of diabetes, previous history of hypoglycaemia, body mass index, hyperglycaemia therapy given, as well as other risk factors such as inadequate glucose monitoring, unclear or unreadable physician instructions, limited health personnel, limited facilities, prolonged fasting and incompatibility of nutritional intake and therapy administered. [3]

Hypoglycaemia can lead to medical and non-medical impacts, such as increased mortality, cardiovascular disorders, cerebrovascular disorders, and increased health care costs and length of stay. Hypoglycaemia can lead to symptoms such as irritability, confusion, and anxiety; symptoms that can mimic psychiatric disorders [4], thus education within mental health facilities is vital.

## The preventive strategies of inpatient hypoglycaemia

Inpatient hypoglycaemia is a preventable condition by performing some actions, such as appropriate monitoring blood glucose level, ensuring adequate dietary intake, adjusting the dose insulin administered with nutritional intake or patients' clinical condition, using basal bolus insulin regimen rather than oral anti-diabetic agent for

hospitalized patient and also recognising precipitating factors of inpatient hypoglycaemia.

There are some precipitating factors for inpatient hypoglycaemia that make physicians should pay more attention, such as the patients that had insulin or sulfonylurea therapy, received IV insulin therapy to treat high potassium level, had multiple organ failure and/or sepsis, had a history of hypoglycaemia, and also had any other non-diabetic drugs that can induce hypoglycaemia, such as quinolone, clarithromycin, metronidazole, trimethoprim-sulfamethoxazole, quinine, pentamidine,  $\beta$ -blocker, angiotensin converting enzyme inhibitor, angiotensin receptor blocker, and tramadol. In addition, daily evaluation of blood glucose level and adjustment insulin dose should be applied to the patients that had improvement in clinical condition, and also to them that had high dose steroid therapy in a short period of time. [5]

Educating patients, family members, and hospital staffs about how to recognize the risk factors, symptoms and treatment for hypoglycaemia could be an alternative way to reduce the incidence of inpatient hypoglycaemia. Kilpatrick et al in a prospective cohort-intervention study in 2011 had found that alert process (divided the subjects into high risk and low risk of hypoglycaemia), when combined with a good collaboration of educated and trained nurses-physician, resulted in a significant decrease by 68% in the rate of severe hypoglycaemia in hospital.[6]

### Preventing Hypoglycaemia in Mental Health Hospitals

The occurrence of hypoglycaemia in patients with mental health conditions is notably higher compared to the general population, driven by both metabolic disturbances related to the mental health conditions themselves and the treatments commonly prescribed. Several factors contribute to this increased risk:

### *Antipsychotic Medications and Metabolic Side Effects*

Many patients with severe mental health conditions, such as schizophrenia or bipolar disorder, are prescribed antipsychotic medications, especially second-generation (atypical) antipsychotics. These drugs are associated with significant metabolic side effects, including weight gain, insulin resistance, and altered glucose metabolism. These effects can increase the risk of both hyperglycaemia and hypoglycaemia, especially when combined with other factors like poor dietary habits or inconsistent meal patterns. Antipsychotic drugs are often linked to increased incidence of hypoglycaemia. Complaints of hypoglycaemia resemble the sedative effect of antipsychotics. As such, clinicians may overlook hypoglycaemia in patients with psychiatric disorders.

There are a variety of hypotheses on how APD cause hypoglycaemia:

- (1) Weight gain and dyslipidaemia caused by APD might increase insulin resistance, meaning that excess insulin is secreted, causing hypoglycaemia.
- (2) The quantity of basal insulin secreted by pancreatic beta cells might be enhanced by APD, which might cause hypoglycaemia.
- (3) APD might work as an antagonist of muscarinic receptors such that insulin secretion might continue even after the glucose level has returned to normal, which might cause hypoglycaemia. However, the mechanism is not fully understood, and more research is needed. [7]

### *Polypharmacy and Interactions*

Patients with mental health conditions often take multiple medications, not only for their psychiatric symptoms but also for comorbidities such as hypertension or diabetes. The use of medications that affect insulin sensitivity (e.g., mood stabilizers like lithium) or interact with antipsychotics (such as antidepressants or anticonvulsants) can increase the risk of hypoglycaemia. For example, certain antidepressants or mood

stabilizers may alter glucose regulation, exacerbating the risk of low blood sugar, particularly if the patient also has diabetes or is being treated with insulin or oral hypoglycaemic agents.

#### *Disrupted Eating Patterns*

Mental health conditions, particularly mood disorders, eating disorders, or schizophrenia, can lead to disordered eating habits, such as poor appetite, inconsistent meal timing, or neglect of regular nutrition. These eating patterns contribute to fluctuations in blood glucose levels, including episodes of hypoglycaemia, particularly when medications like insulin or oral hypoglycaemic agents are taken without sufficient food intake.

#### *Diabetes and Comorbidity*

Patients with severe mental health disorders, especially those on antipsychotic medications, are at higher risk of developing type 2 diabetes due to the metabolic side effects of the drugs. Conversely, individuals with pre-existing diabetes and psychiatric comorbidity (e.g., depression, bipolar disorder) may face challenges in managing both their diabetes and mental health. Factors such as non-adherence to treatment, irregular glucose monitoring, and improper medication adjustment can lead to hypoglycaemic episodes.

#### *Inpatient and Acute Care Settings*

In inpatient psychiatric care settings, patients may be at increased risk of hypoglycaemia due to irregular mealtimes, the stress of hospitalization, and the management of medications. Staff may also overlook the risks associated with hypoglycaemia in patients without a clear history of diabetes or metabolic issues, leading to a delay in recognition and treatment.

#### *Prevalence and Studies*

The exact prevalence of hypoglycaemia in mental health populations varies across studies, but research suggests that the risk of hypoglycaemia is elevated among psychiatric

patients. For example, studies have shown that up to 20-30% of patients with schizophrenia or bipolar disorder on antipsychotics may develop glucose dysregulation, which can lead to hypoglycaemic episodes. In addition, patients with diabetes who also have a mental health condition face a higher risk of hypoglycaemia compared to diabetic patients without psychiatric comorbidities.

Lower hypoglycaemia awareness is associated with greater depression symptoms putting patients in mental health settings at increased risk. [8] Recurrent hypoglycaemia in diabetes leads to mood changes and cognitive impairment. Anorexic individuals may experience deficits in cognitive functioning and psychiatric comorbidities, including affective disorders and anxiety.[9]

The Joint British Diabetes Societies for Inpatient Care and Royal College of Psychiatrists [11] recommend that mandatory training is given on the management and avoidance of hypoglycaemia, and that mental health settings adhere to best practice tariffs to reduce the inconsistency of the management of hypoglycaemic episodes. The prompt treatment of hypoglycaemia in health facilities is often hindered by the lack of accessible glucose supplies despite the associated risks. To address this issue effectively it is suggested that standardised "hypoglycaemia kits" be introduced across all hospital wards. These kits would contain glucose tablets, juice, a glucometer, and emergency instructions. By having these kits readily available on each ward, nurses would be able to promptly respond to instances of hypoglycaemia during patient care. As stated by George et al [10], empirical evidence shows that implementing hypoglycaemia boxes, known as 'hypo boxes', can significantly improve the administration of glucose and reduce associated risks in hospital settings. These interventions are cost effective and greatly enhance safety.

The increasing occurrence of hypoglycaemia resulting from the increased use of

medications highlights the importance for mental health facilities to have the necessary resources and capabilities to effectively address this issue. By centralising glucose sources and instructions within hypoglycaemia boxes, we can enhance the safety of wards for patients who are particularly vulnerable to low blood sugar levels. It is highly recommended that all mental health hospitals promptly adopt this intervention, which helps protect people's lives.

### Future

Standardising point-of-care (POC) testing, nursing protocols, meal delivery, and formulary restriction are useful tools to prevent hypoglycaemia. Informatics and real-time alert processes are highly effective tools to reduce hypoglycaemia but require a significant investment in time and infrastructure as well as clear policies on how alerts are acted upon. Computerized dosing support technology and continuous glucose monitoring (CGM) technology are an emerging area of investigation showing promising results. [12]

### Cygnets Kewstoke Hypoglycaemia Box / Kits

#### Checklist

- 1) Fast acting glucose shots x2 bottles ('Lift' or similar)
- 2) Fast acting glucose chews x2 tubes ('Lift' or similar)
- 3) Glucogel fast acting dextrose gel x2
- 4) Jelly babies x1 large pack/x5 small packs
- 5) Hypo instruction sheet.

(Intramuscular Glucagon kept locked in cupboard)



Physical health lead in Kewstoke provided training and awareness on hypoglycaemia on a regular basis in the Kewstoke Academic Training Programme.

From the left Dr Sunday Udensi, Dr Karl Solangbalansay, Carole Pettitt, Dr Sai Achuthan, Dr Philip Illah-Williams

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