

Hypoglycemia - Low Blood Glucose - Underestimated and Unexplored Problems in People with Type 2 Diabetes

Janeth Leksell^{1, 2, 5*}, **Andersson M**^{2, 3} and **Carlsson BM**^{2, 4}.

¹School of Health and Social Studies, Dalarna University College, Falun, Sweden

²The Swedish Association of Diabetes Specialist Nurses (SFSD)

³Solljunga hälsan, Örkelljunga, Sweden

⁴SÄS Skene hospitals, Skene Sweden

⁵Department of Nursing, Medical Sciences, Uppsala University, Uppsala, Sweden

Abstract

The aim: was to ascertain the frequency of self-reported hypoglycemia among people with type 2 diabetes; a further aim was to determine how participants received information about hypoglycemia, if hypoglycemia led to restriction in daily life and how to cope with hypoglycemia.

Method: Telephone interviews with 3750 randomly selected individuals living in Sweden, were conducted during a period of 6-10 weeks; 202 people reported type 2 diabetes (prevalence more than 5%). Structured interviews were conducted using a questionnaire in order to fulfill the aims.

The results: showed that approximately one-third (n = 56) stated that in recent years they had experienced symptoms of hypoglycemia, with an average of nine times in the past year and some participants reported experiencing symptoms up to 40 times in the past year. Participants appeared well informed about situations that might cause low blood glucose level. Furthermore, they

expressed restrictions in daily life and used appropriate strategies for managing hypoglycemia, such as eating more or take less insulin. Based upon the results we concluded that the presence of perceived hypoglycemia is relatively common and a complex problem in people with type 2 diabetes. Diabetes nurses should ask patients about their experiences of hypoglycemia and how and if hypoglycemia causes problems in daily life, and discuss possible strategies.

Keywords: Hypoglycemia; Type 2 diabetes

***Corresponding Author:** Janeth Leksell, School of Health and Social Studies, Dalarna University College, S-791 88 Falun, Sweden, Tel: +4623778482; Fax: +4623778482; E-mail: jle@du.se

Introduction

The Swedish Association of Diabetes Specialist Nurses (SFSD) emphasizes and argues that type 2 diabetes is a serious disease that may lead to heart attack, stroke, eye problems, kidney disease, decreased quality of life and nerve damage, if it is not taken seriously [1-5]. High blood glucose has no function and an important goal in treating type 2 diabetes is to normalize blood glucose through diet and advise on physical activity, drugs to help insulin function, and /or decreased release of insulin, or through external insulin delivery [6,7]. Achieving the balance between high or low blood glucose is challenging [4,8]. Studies on low blood glucose in people with type 2 diabetes are difficult to compare due to the rate of hypoglycemia and different definitions, data collection methods, drug type/regimens, and patient populations [9,10]. In a review from 2007 [10], the authors concluded, "There is no consensus definition of hypoglycaemia in diabetes, and a variety of criteria have been used to define hypoglycaemic events. An early, very practical, definition of hypoglycaemia was the presence of Whipple's triad: decreased plasma glucose concentration, symptoms compatible with hypoglycaemia and rapid attenuation of those symptoms by correction of the low glucose. With the recognition of hypoglycaemia occurring without subjective awareness, this definition requires the addition of 'and signs' to the 'symptoms' of item two, but otherwise remains relevant to current practice [10].

Common symptoms of low blood glucose value are sweating, hunger, fast heartbeat, tremor, anxiety, or behavioral changes: these symptoms may also be considered as anxiety attacks. Self-reported low blood glucose that is not diagnosed through a blood glucose test can be easily confused in comparison

with other types of health problems, which might create a fear of low blood glucose level, a fear which is not always related to low blood glucose level [11]. This in turn can present an obstacle to optimizing the blood glucose balance [11]. People who have repeated hypoglycemia problems reported a lower quality of life, less treatment satisfaction, and were more depressed than people not suffering from hypoglycemia [12-16].

The aim of this study was to ascertain the self-reported frequency of self-reported hypoglycemia, information about hypoglycemia, restrictions in daily life related to hypoglycemia, and strategies for addressing or avoiding hypoglycemia, among people with type-2 diabetes.

Methods Design

The study was designed as a cross-sectional survey.

Sample and procedure

Telephone interviews with 3750 randomly selected individuals living in Sweden, from a patented Directory, were conducted during a period of 6-10 weeks. The cross-sectional study was conducted in cooperation with research market company TNS/SIFO. The first question when calling the 3750 randomly selected individuals was: Do you have type 2 diabetes verified by the Medical Doctor? If the answer was yes, the next question was if they were interested in answering questions regarding diabetes duration, medical treatment and hypoglycemia. The number who had type 2 diabetes and who would not answer further questions is unknown. For how long time did you have the diagnosis type 2 diabetes? Do you need treatment for your diabetes? What kind of treatment? Two hundred and two people reported they had type 2-diabetes (prevalence more than 5%), which was in accordance with Swedish prevalence studies.

Structured interviews

Structured interviews (telephone interviews) were conducted using a questionnaire [Box 1] developed by diabetes nurses in collaboration with SFSD.

- Have you had symptoms of hypoglycemia in the past year? (Yes/No/Don't know)
- Approximately how many times have you had symptoms of hypoglycemia in the last year? (Number of times in the last year)
- Are your symptoms of hypoglycemia related to treatment? (Yes/No/Don't know). If yes, how many hypoglycemic events have you had the past year? (Number of times the last year)
- To what extent does hypoglycemia limit you in your daily life? (Yes/No/Don't know)
- Have your doctor or nurse asked you if you have had hypoglycemia? (Yes/No/Don't know)
- Have you from your doctor or diabetes nurse received information on the risk of hypoglycemia? (Yes/No)
- Have you from your doctor or diabetes nurse received information on the underlying causes of hypoglycemia? (Open answering)
- What can you do to avoid hypoglycemia? (Open answering)
- Have you had the opportunity of blood glucose testing with meter and strips? (Yes/No) If yes, has the nurse/doctor informed you how often you should perform the test?

Box 1. The questionnaire used in the current study

Ethics consideration

Participation in the survey was voluntary and participants were informed that at any time during the interview refuse to continue participating. The response to the questionnaire was anonymous; it means that no response can be linked to a specific person.

Statistical analysis

Descriptive analysis was performed. The results were presented as percentage distribution.

Results

The majority of the participants, 56% (n=113), had had a diagnosis for more than six years [Table 1]; however, 3% (n=6) did not know for how long they had had a diagnosis.

Table 1. Duration of diabetes in the participants with type 2 diabetes.

Duration of diabetes (years)	All participants =202(number and %)
Unknown	6 (3)
< 1	6 (3)
1-5	77 (38)
6-10	53(26)
11-20	45(23)
>20	15 (7)

The participants reported that the most common treatments were Metformin (n = 75; 37%), a combination of insulin and Metformin, or insulin alone (n = 59; 29%). One in five (n = 40; 20%) were treated with diet and exercises and some had Sulphonurea-treatment preparations (n = 10; 5%). A few had other treatment (n = 7; 4%) or were unaware of the treatment (n = 11; 5%).

Based upon the respondents' answers, the results were categorized into different themes: frequency of hypoglycemia, information about hypoglycemia, restrictions in daily life related to hypoglycemia, and strategies for addressing or avoiding hypoglycemia.

Frequency of hypoglycemia

Twenty eight percent (n = 56) stated that in recent years they had experienced symptoms of hypoglycemia, with an average of nine times in the past year but some participants reported experiencing symptoms up to 40 times in the past year. A comparison of perceived hypoglycemia related to treatment indicated that among participants treated with insulin in combination with other treatment or only insulin (n = 59), 44% (n = 26) had experienced hypoglycemia in the past year, whereas, those treated with diet and exercise or metformin (n=115), 26% (n = 30) reported symptoms of hypoglycemia. None of those treated with SU reported symptoms of hypoglycemia.

Information about hypoglycemia

A majority (60%) of participants had stated that they received information on how to manage hypoglycemia and had been informed that hypoglycemia could occur if meals were missed, too much insulin was taken, or in connection with physical activity. In addition, almost all participants taking drugs that could cause hypoglycemia had been informed about the possibility of blood glucose testing.

Restrictions in daily life related to hypoglycemia

Among those participants who experienced hypoglycemia, 21% (n = 12; seven treated with insulin and five with diet/exercise or metformin) considered that hypoglycemia was as a limitation to employment, especially as they experienced fatigue and a feeling of not being able to perform tasks satisfactorily. Hypoglycemia also limited the possibility to perform physical activities.

Strategies for addressing or avoiding hypoglycemia

Participants complained they had to eat more often or change the dose of insulin.

Discussion

Many people with type 2-diabetes reported symptoms of hypoglycemia in the past year, even those treated with diet or metformin. In a Swedish cross-sectional study from 2005 [8], the frequency of hypoglycemia was 37%, the participants were treated with oral medications such as metformin or SU. In another Swedish cross-sectional study from 2009 [17], the frequency of hypoglycemia was 20%, the participants were treated with insulin or insulin and oral medications. In our study, 33% of participants reported symptoms of hypoglycemia. In the study by Lundqvist [8], hypoglycemia was verified with a blood glucose test. This raised the question as to whether the participants in the present study, and in the study by Pettersson et al [17], were really convinced that they had had hypoglycemia. Some participants treated by only diet and exercise or metformin experienced hypoglycemia, and these findings require further attention, as self-reported hypoglycemia may be confused with other health problems such as anxiety [9].

We also suggest that qualitative interview add more deep information about the named phenomena. However, the concept of low blood glucose, hypoglycemia, needs to be emphasized in patient education, particularly whether it is actually hypoglycemia the participants have had. In type 2 diabetes, hypoglycemia is a key issue, as it does lead to increased calorie intake, which in turn, can cause weight gain and disease progression.

Hypoglycemia in people with type -2 diabetes or fear of hypoglycemia creates difficulties in managing everyday life and might decrease quality of life [12-16]. Related data of current study is limited, although participants expressed fatigue and a feeling of not being able to perform tasks satisfactorily. Participants with diabetes used appropriate strategies for managing hypoglycemia, such as eating more or take less insulin, and appeared well informed about situations that can cause low blood glucose. However, there is a balance between dealing with hypoglycemia and weight gain and nurses need to be more competent in informing patients about the treatments that involve the risk of hypoglycemia and about strategies for avoiding hypoglycemia.

One limitation of the present study was that participants were asked whether hypoglycemia had occurred in the past year. As, it might be difficult to remember exactly what happened in the past year, there was a possibility that the participants reported hypoglycemia that occurred several years ago.

Conclusion

As the presence of perceived hypoglycemia is relatively common and a complex problem among people with type 2 diabetes, diabetes nurses should ask patients about their experiences of hypoglycemia and how and if hypoglycemia causes problems in daily life.

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