Unreliability of reports of hypoglycaemia by diabetic patients

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In those with diabetes the importance of hypoglycaemia as a cause of considerable illness and occasionally death has been increasingly recognised as patients have struggled to maintain tight control of their blood glucose concentration to prevent long term diabetic complications.¹ Whether human insulin decreases the awareness of hypoglycaemia and increases severe hypoglycaemic episodes is debatable.² The evidence has largely depended on patient recall, which may be uncertain when cerebral function is impaired during hypoglycaemia. We therefore measured the reliability of retrospective questionnaires by asking patients and their partners about hypoglycaemia.

Subjects, methods, and results

We questioned consecutive patients attending diabetic clinics in two hospitals over four weeks, including in the study only those with a partner or close relative at home. Patients completed a questionnaire in the clinic and were given a related version for their partner to complete and return by post. Those not returning questionnaires were contacted by telephone, and if they then failed to respond they were excluded from further analysis. We defined severe hypoglycaemia as an attack resulting in coma or needing outside help. Unawareness of hypoglycaemia was defined as absent (all episodes recognised), partial (some episodes unrecognised), or complete (all episodes unrecognised). Strengths of agreement were measured by calculating the κ statistic.³

We received 159 questionnaires from the partners of the 291 patients who initially participated. One hundred and thirteen patients (60 women) had type I diabetes (mean duration 16 years, mean age 43 years) and 46 (26 women) type II diabetes (mean duration 12 years, mean age 58 years). The partners comprised 56 wives, 47 husbands, 15 mothers, nine friends, and 32 other relatives. Most patients (123 out of 155) reported that they had not had any severe hypoglycaemic attacks in the previous four years; 21 reported having had one attack and eight at least four attacks in the previous year and three were experiencing one episode a month. Of those reporting no severe hypoglycaemia, 16 partners had observed a severe attack in the previous year and four reported that severe episodes had occurred over four times a year. The κ statistic measured 0.48 (95% confidence interval 0.63 to 0.33). Of 152 patients who answered the section on awareness of hypoglycaemia, 21 reported partial unawareness of hypoglycaemia and 24 complete unawareness (table). Twenty partners of the 107 patients who reported normal awareness disagreed, five stating that

their diabetic partners were totally unaware of hypoglycaemia and 15 that their partner was only partially aware of it. The κ statistic measured 0.20 (0.32 to 0.007).

Comment

Patients with diabetes and their partners disagree about the frequency and nature of hypoglycaemic episodes. This was most obvious in the reported frequency of unawareness of hypoglycaemia, for which the κ statistic of 0.2 indicates particularly poor agreement.³ The true prevalence of complete unawareness presumably lies between 3% (where both parties agreed) and 22% (the sum of estimates from patients and partners). In a few cases some patients who claimed to have almost no hypoglycaemia were thought by their relatives to be having frequent severe episodes.

Since hypoglycaemia impairs cerebral function patients are likely to be unreliable witnesses and to underestimate the frequency with which they experience hypoglycaemia. Nevertheless, the wide difference of opinion revealed by our survey casts doubt on the reliability of previous estimates of unawareness of hypoglycaemia obtained in self reported questionnaire studies. These studies have fuelled the controversy surrounding the introduction of human insulin, and perhaps the uncertainty of the data explains the wide variation in the results from different groups.^{4,5}

Our study suggests that questioning patients alone does not provide an accurate record of clinical hypoglycaemic episodes and that patients' relatives and partners should participate in future studies of this type.

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3 Brennan P, Silman A. Statistical methods for assessing observer variability in clinical measures. *BMJ* 1992;304:1491-4.

4 Teuscher A, Berger WG. Hypoglycaemia unawareness in diabetics transferred from beef/porcine insulin to human insulin. *Lancet* 1987;ii:382-5.

5 Hepburn DA, Eadington DW, Patrick AW, Coledge N, Frier BM. Symptomatic awareness of hypoglycaemia: does it change on transfer from animal to human insulin? *Diabetic Med* 1989;6:586-90.

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ONE HUNDRED YEARS AGO

MUCH DANGER AND LITTLE GLORY.

In commenting at the beginning of the football season upon the large number of casualties which were occurring in connection with football matches in this country, we ventured on the estimate that football was more dangerous than foxhunting, which we are assured, upon a good authority, possesses all the glory of war, and only five and twenty per cent. of its danger. We were, however, hardly prepared for the results of statistics of so many of the football casualties which occurred in the course of the week in which Thanksgiving Day took place in America, as the *Philadelphia Medical News* has been able to collect. In this list are 4 deaths and 14 cases of severe injury, including such cases as insanity from head injury, fracture of the leg, effusion on the brain, 5 cases of fracture, the seat of which is not mentioned; a case in which a player was taken from the field unconscious and is not expected to live, but of which no further details are given, and a case of severe injury to the spine, which is also expected to end fatally. We are told that in a game between "teams" of two of the leading seats of learning in the country, 7 men out of 22 had to be taken from the field, a far larger proportion of casualties than at Waterloo or Gravelotte. This is a crisp way of putting it, and draws attention in a striking manner to the dangers that attend this game when played as it sometimes is. (*BMJ* 1895;ii:213.)

Agreement between patients' and partners' rating of awareness of hypoglycaemia

Patient	Partner			Total
	Normal awareness	Partial awareness	Unawareness	
Normal awareness	87	15	5	107
Partial awareness	12	6	3	21
Unawareness	11	9	4	24
Total	110	30	12	152