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Cognitive-behavioural interventions in a patient with an anxiety disorder related to diabetes

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Abstract

This study extends the data on the efficacy of cognitive interventions for patients with chronic medical problems and describes the case of a 37-year-old woman with an anxiety disorder related to diabetes. The effects on panic frequency, use of safety behaviour and related beliefs were investigated after the introduction of two main cognitive-behavioral interventions. The results are consistent with predictions from the cognitive model of panic. This case demonstrates the usefulness of directly challenging the 'meaning' of the feared situation in order to produce clinically significant improvements in the management of physical disease.

Keywords: Cognitive interventions; Anxiety; Safety behaviour; Diabetes; Chronic medical problems

1. Introduction

Diabetes mellitus is a chronic medical condition that requires sufferers to engage in a lifelong therapeutic self-care regime to maintain control over blood glucose (BG). The short-term goal is to prevent either low or high BG with the longer-term aim of reducing the risk of developing chronic physical complications (Thomas, 1993). Self-monitoring is essential and patients are taught to recognize symptoms of low BG and treat them with consumption of rapidly absorbed carbohydrates. Hypoglycaemia is a condition characterized by BG values less than 4 mmol/l

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and produces unpleasant physical and affective symptoms (Irvine, Cox, & Gonder-Frederick, 1992). Insulin-dependent diabetes mellitus (IDDM) patients are required to continually monitor BG to reduce the risk of such an episode occurring.

An increased prevalence of psychological disturbance has been reported among individuals with diabetes (Popkin, Callies, Lentz, Colon, & Sutherland, 1988). Anxiety disorders in patients with IDDM have been linked to poor glycaemic control (Berlin, Bisserbe, & Eiber, 1997) which has been found to be related directly to fear of hypoglycaemia (Irvine et al., 1992) and is one of the main obstacles to adherence to a therapeutic regime (Cox, Irvine, Gonder-Frederick, Nowacek, & Butterfield, 1987). The aversive nature of hypoglycaemia may encourage IDDM patients to maintain elevated BG to avoid such an experience (Surwit, Feinglos, & Scovern, 1983). They over-eat at the earliest signs of low BG and it is this behaviour which leads to poor glycaemic control and hence to greater risk of long-term diabetic complications.

Fear of hypoglycaemia is often associated with difficulty in discriminating between symptoms of anxiety and of low BG for this patient group (Polonsky, Davis, Jacobson, & Anderson, 1992). Many of the earlier signs of hypoglycaemia are similar to those of anxiety and may include dizziness, shakiness, palpitations, lack of coordination, poor concentration and slurred speech. Difficulty discriminating between these symptoms and those of anxiety (due to the physiological effects of autonomic arousal) has been linked to the development of more serious anxiety disorders (Green, Feher, & Catalan, 2000).

Treatment of anxiety disorders in patients with IDDM has been reported to be particularly complicated by the fact that these individuals are likely first to consider physical symptoms in terms of glucose control and are 'conditioned' to come up with a 'diabetic explanation' (Steel, Masterton, Patrick, & McGuire, 1989). As they are required to self-monitor closely and are often highly sensitized to physical changes (Irvine et al., 1992), misattribution of symptoms of anxiety as hypoglycaemia and vice versa could have very significant behavioural, physical and social consequences.

Clark (1999) has highlighted the role of safety-seeking behaviours in maintaining negative thinking and preventing self-correction of distorted beliefs. A safety-seeking behaviour is performed in order to prevent or minimize a feared catastrophe and clearly the response of eating food at the earliest sign of low BG would appear to fall within this context. Also, the cognitive model of panic (Clark, 1999) states that patients over-estimate danger due to the anticipated consequences of the feared event. Individuals misinterpret anxiety symptoms as dangerous because of the beliefs they have about the meaning of the bodily events, e.g. individuals fear having a 'hypo' because it represents a threatening event, such as loss of personal control. In order to challenge directly such beliefs, exposure to feared situations and sensations is a key component of cognitive therapy for panic disorder.

Cognitive-behavioural interventions based on the cognitive model of panic have proven efficacy (Clark et al., 1994). As treatment of anxiety disorders in patients with diabetes is complicated by a condition which in itself produces symptoms similar to anxiety, cognitive models of anxiety and interventions based on their assumptions could have a central role in their management. Single-case reports are now being published highlighting the effectiveness of cognitive interventions in reducing panic attacks, avoidance behaviours and fear of hypoglycaemia for this group of patients (Green et al., 2000; Piaggesi et al., 1991; Steel et al., 1989).

The purpose of the present study was to examine the effectiveness of cognitive-behavioural interventions in a patient with an anxiety disorder related to diabetes with panic attacks by applying active ingredients of cognitive therapy for panic disorder to a case complicated by a chronic medical condition. This study adds to previous case-reports by examining the usefulness of incorporating a routine clinical procedure used in diabetic clinics into a theory-driven psychological panic management procedure.

2. Method

2.1. Subject

The patient was a 37-year-old woman who was referred to an NHS Clinical Psychology Department for treatment of anxiety by her general practitioner at the suggestion of the local hospital Diabetic Service. She had been diagnosed to have IDDM at 8 years old and had since been under the care of the diabetic medical services. Referral to Clinical Psychology was triggered by increasing episodes, over the previous 12 months, of poor diabetic control whereby the patient had been maintaining high levels of BG because she was afraid of experiencing hypoglycaemia. The problem started following a short period of dieting when the patient was trying to lose weight and had experienced low BG on a couple of occasions and this had reminded her of 'frightening episodes' earlier on in the physical disease when she had experienced hypoglycaemia. She was describing a number of physical sensations, experienced on a daily basis, which she believed were evidence of imminent hypoglycaemia, but when tested using a glucometer were found not to be due to low BG. Despite this, she was treating the symptoms by eating food and this led to poor management of the physical disease and an in-patient hospital admission for ketoacidosis (a symptom of high BG). The patient had not received previous psychological treatment and was not taking psychotropic medication. At the time of referral to clinical psychology, panic attacks and fear of hypoglycaemia were the main presenting problems that required treatment.

2.2. Measures

The assessment process involved both clinical interview and the collection of the following: (i) *Self-report inventories* were completed at each of the assessment points during the study and included the Beck Depression and Anxiety Inventories (BDI: Beck, 1988; BAI: Beck, Epstein, Brown, & Steer, 1988) and the Hypoglycaemia Fear Survey (HFS, Cox et al., 1987). (ii) *Daily diaries* were kept from baseline to follow-up and provided structure for the recording of physical symptoms, BG levels and behavioural responses. These were reviewed with the therapist to identify which symptoms were present, the BG rating at the time (which had been recorded using a portable glucometer) and whether food was eaten in direct response to symptoms. The data were gathered within this framework to allow the patient and the clinical psychologist to discuss the attributional process that led to the eating of food. The *frequency* and *severity* of daily panic attacks were recorded on a scale of 1–10 (1 = mild symptoms, 10 = severe symptoms). The recordings of panic attacks were the main dependent anxiety

measure. (iii) *Two main beliefs which were selected as cognitive dependent variables* based on her worst fears and were assessed on two rating scales at weekly intervals. These were determined by asking the patient about the worst catastrophe that could occur during an anxious episode and if this did happen what would be the meaning of it for her. How much she believed each 'fear' was rated in each session. The beliefs were: "*These symptoms are due to imminent hypoglycaemia*" and "*Hypoglycaemia will lead to loss of behavioural control*" recorded on a scale of 1 = "Do not believe the thought at all"; 10 = "Completely convinced the thought is true". (iv) *A measure of glycaemic* control was taken routinely during the study. The evaluation of glycaemic control pre/post-intervention was felt to be an appropriate, indirect measure of clinical outcome. As part of her routine diabetic care the patient had a blood test taken every 8 weeks to measure glycosylated haemoglobin (HbA_1). The HbA_1 reflects the mean glucose level over the previous 6–8 weeks and provides an extensive overview of therapeutic compliance. Levels below 8% represent good BG control, 8–11% moderate control, and greater than 11% poor control (Higgens, 1994).

2.3. Formulation

The patient was assessed by a clinical psychologist using both the self-report data from diaries and inventories described. A core feature to the patient's problem was the misinterpretation of physical symptoms of anxiety as a warning sign of imminent hypoglycaemia. She particularly feared any symptoms of hypoglycaemia not just because of their medical consequences, but because she believed they would lead to loss of behavioural control (she would become irritable and rude) and ultimately humiliation. She therefore responded to any physical symptoms which might indicate imminent hypoglycaemia with a safety behaviour (eating food inappropriately). The patient met the DSM-IV criteria for anxiety disorder due to a general medical condition (Diabetes) with panic attacks. Although she exhibited some depressive symptoms these were described as being related to the belief that she lacked personal control in the management of her diabetes. She did not meet the DSM-IV diagnostic criteria for a depressive disorder and treatment of her anxiety disorder was considered the primary intervention. An integrated approach between the Diabetic Service and Clinical Psychology Department was required as panic disorder was initiated and maintained within the context of her medical condition. Set within a cognitive-behavioural framework, treatment was approached jointly as both medical and psychological variables had to be addressed within a bio-psychological perspective.

2.4. Experimental design

The study extended a simple A–B design to include a second treatment phase, C. A pre-treatment baseline of 3 weeks was considered sufficient, as stable trends in measures were evident. Following this, two hypotheses were generated based on Clark's model of panic (1999) and treatment interventions were designed to test these: (1) Panic symptoms were maintained due to misinterpretation of anxiety as evidence of imminent hypoglycaemia and this belief continued despite non-occurrence of the event due to the use of 'safety behaviour' (eating food in response to anxiety). (2) A key belief concerns the assumption that should a hypoglycaemic episode

occur, it would lead to loss of behavioural control and ultimately humiliation and embarrassment for her.

2.5. Procedure

Treatment sessions were carried out by the first author (SB) over two clinical sites. The first was the Clinical Psychology Department where most of the treatment took place. The second clinical site was the Diabetic Clinic where session 11 (first session of phase C) was carried out. There were no specific psychology sessions linked to the Diabetic Service, although both departments were on the same hospital site. The clinical psychologist (SB) made initial contact with the nurse specialist who monitored the patients' diabetes, and they remained in regular contact throughout the remainder of the study. During the 3-week baseline, the patient attended weekly for collection of diary data and to make appropriate belief ratings. No treatment was given at this time.

The second phase of intervention (B) was the first part of the two-stage treatment plan and was designed to test the first hypothesis. It consisted of exposure in vivo and the elimination of safety behaviours whereby the patient attended every 2 weeks for seven sessions. The rationale was outlined to the patient and the role of safety behaviours in maintaining panic was explained in the context of eating food which in turn prevents disconfirmation of distorted beliefs about body symptoms. She was advised not to respond immediately to all physical symptoms by eating food, but to check her BG using a portable glucometer. On medical advice, a cut off point was agreed on a BG rating below which the patient would treat appropriately by eating food. Above this point, she was advised that the symptoms were due to anxiety and not dangerous and she must not engage in the safety behaviour. Full education was provided on the nature of anxiety and she was taught relaxation exercises and instructed to use them when the BG rating indicated that symptoms were not due to imminent hypoglycaemia.

The third phase of intervention (C) was the second stage of the treatment plan and focused specifically on the second hypothesis, that experiencing hypoglycaemia would lead to loss of control, embarrassment and humiliation. It was based on exposure to her main fear and lasted for three sessions. It involved setting up a controlled behavioural experiment within the diabetic clinic with the support of the diabetic clinical team. The experiment was designed to directly test the belief that hypoglycaemia would lead to loss of control by exposing the patient to a hypoglycaemic episode. The first session of phase C (session 11) consisted of the described 4-h experiment and involved the patient being injected with enough insulin to allow her BG to drop gradually until she experienced hypoglycaemia. During the session her BG was monitored every 30 min by the nurse and she provided belief ratings every 15 min; "*How much do you believe hypoglycaemia will lead to loss of control?*" was recorded on a scale of 1 = unlikely, 10 = highly likely and "*How confident are you that you can recognize and manage hypoglycaemia?*" on a scale of 1 = not confident, 10 = very confident. Inducing hypoglycaemia in this way is an intervention occasionally used within a diabetic clinic to help those newly diagnosed with IDDM to recognize and treat symptoms of low blood sugar (Piaggesi et al., 1991). The session was audio taped in order to use the information gained from the experiment as 'evidence' for challenging negative thoughts and to maximize cognitive change in two further sessions until belief ratings stabilized.

3. Results

3.1. Baseline recordings

Fig. 1 shows that during baseline the patient reported having frequent (mean = 9 weekly) and severe (on scale of 1–10, mean = 8) panic attacks and responding to these on every occasion with a safety behaviour (eating food).

Fig. 2 shows that she had absolute belief (100%) at baseline that symptoms were due to imminent hypoglycaemia and that this would lead to loss of control.

Diary recordings of high levels of anxiety, low mood and fear of hypoglycaemia were confirmed by caseness scores on the BAI ('severe' range), BDI ('severe' range) and a high score on the HFS.

3.2. Impact of phase B

The impact of phase B on anxiety and use of safety behaviour can be assessed by comparing ratings of the severity and frequency of panic attacks at baseline, with ratings at the end of this phase (Fig. 1). These data show that exposure and the stopping of safety behaviours were associated with a reduction of panic frequency and severity. By the end of this phase, the patient recorded a weekly mean of two episodes of panic, with a mean severity rating of 4. The use of safety behaviours had been eliminated (eating food in response to anxiety). The impact of phase B on the two 'belief ratings' used as cognitive dependent variables can be assessed by comparing these ratings at baseline to those recorded at the end of this phase (Fig. 2). Phase B

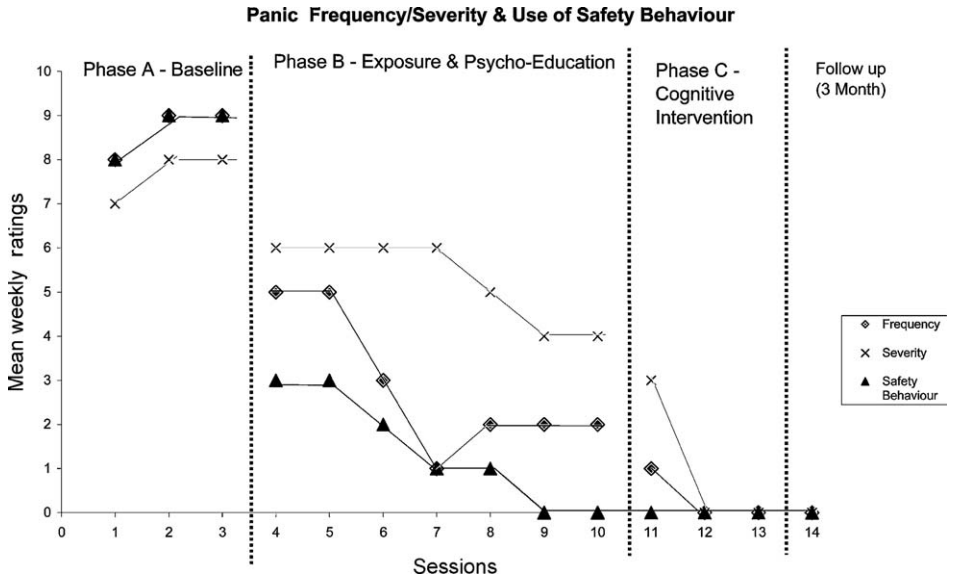

Fig. 1. Mean weekly ratings of panic attack frequency/severity and use of safety behaviour taken from daily diaries, across baseline and interventions B and C. *Note*: Baseline sessions were weekly; sessions during both intervention phases were bi-monthly; the follow-up session took place 3 months from the end of phase C.

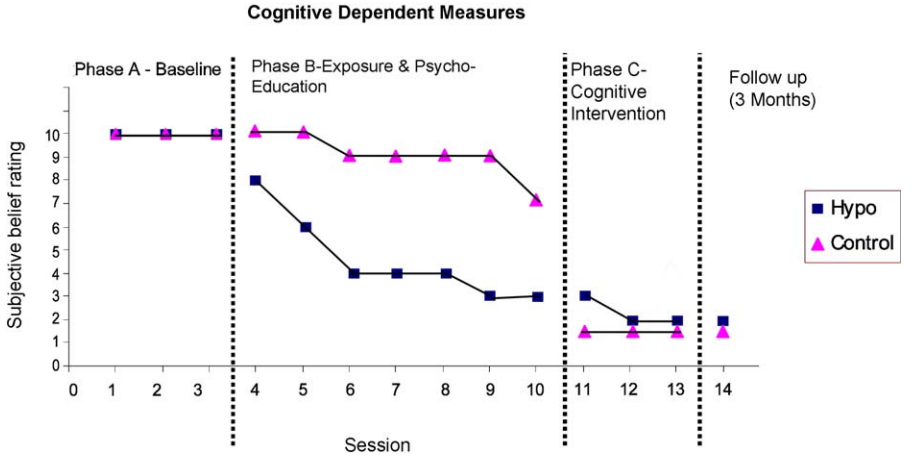

Fig. 2. Belief ratings regarding 'risk of hypoglycaemia' and 'loss of control' across each intervention phase. *Note*: Baseline sessions were weekly; sessions during both intervention phases were bi-monthly; the follow-up session took place 3 months from the end of phase C.

was associated with a reduction in the belief that symptoms were due to hypoglycaemia (reduced from 10 to 3) but to less change in the belief that if a hypo were to occur, it would lead to loss of control (reduced from 10 to 7).

3.3. Impact of phase C

The impact of phase C on the anxiety recordings and belief ratings can be assessed by comparing ratings at the end of phases B and C. Figs. 1 and 2 show that phase C led to a further reduction in anxiety (no episodes of panic recorded) and resulted in a substantial reduction in the belief that hypoglycaemia would lead to loss of control (reduced from 7 to 1). Belief that symptoms were due to 'a hypo' continued to fall (reduced from 3 to 2). Fig. 3 displays the results of the belief ratings during the single session behavioural experiment.

It appears from inspection of Fig. 3 that there is a clear shift in both belief ratings during the session. To assess whether such change is statistically significant, the data were analyzed using the interrupted time-series analysis procedure (Crosbie, 1993). Belief that 'hypoglycaemia will lead to loss of control' reduced from 7 to 1 over the session ($F = 1.07$, $p = 0.37$). Confidence in managing hypoglycaemia increased from 2 to 9 ($F = 1.16$, $p = 0.34$) by the end of the session. Although these results represent a high degree of clinical significance for the patient, neither was statistically significant.

3.4. Self-reported change

The patient's self-reported anxiety, depression and fear of hypoglycaemia were inspected. All scores reduced from baseline to the end of phase C (BAI from 23 to 9, BDI from 27 to 14, HFS from 79 to 60). Using Jacobson's Reliable Change Index (Jacobson & Truax, 1991) each of the pre/post-intervention measures was statistically significant. By 3-month follow-up, self-report

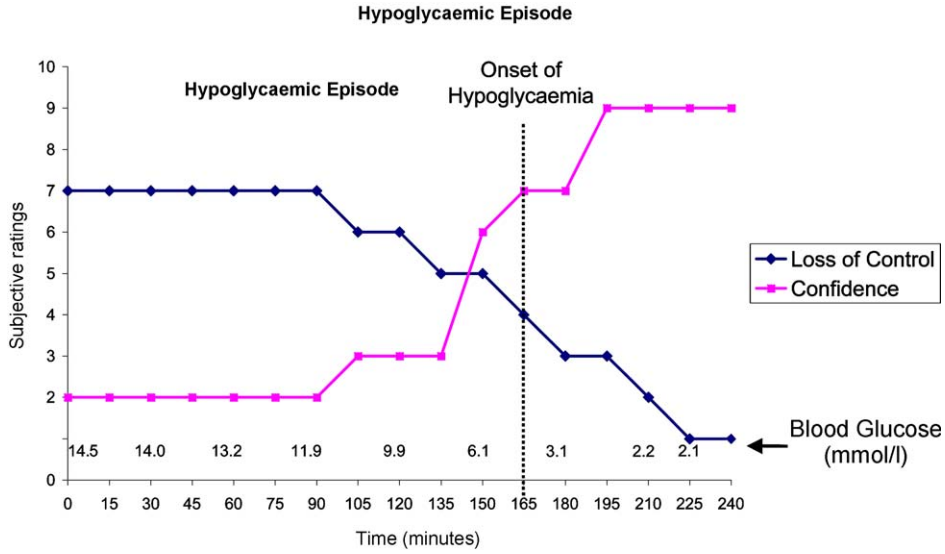

Fig. 3. Displays belief ratings regarding '*loss of control*' and '*confidence*' across the experimental session (duration 240 min) starting when insulin was given. Time in minutes and BG recordings are displayed at base of graph.

measures continued to show improvements and were at non-clinical levels (BAI and BDI were in normal ranges and HFS was below the mean score for a diabetic population).

3.5. *Glycaemic control*

At baseline, the patient's HbA_1 was 9.7% and by the end of phase C this had reduced to 9.2% and remained at this level at follow-up. This represents a reduction and therefore an improvement from pre/post-intervention. Although 0.5% may not appear significant (the patient did not change from the category of 'moderate' to 'good' control), an important clinical issue is that her BG stabilized, having been previously erratic.

4. Discussion

This single-case study demonstrates the efficacy of cognitive-behavioural intervention in a patient with panic attacks related to the chronic medical condition of diabetes. The first treatment phase (elimination of the safety behaviour) had a significant effect on anxiety and reduced the belief that symptoms were catastrophic. The second phase of treatment targeted her fear of hypoglycaemia and focused around a behavioural experiment in which hypoglycaemia was induced. This resulted in a reduction in the belief that hypoglycaemia would lead to a loss of control and an increase in confidence in recognizing and managing symptoms of low BG. The changes in behaviours and beliefs which maintained anxiety and indirectly led to poor glycaemic control were significantly changed. It would appear that eliminating the inappropriate treatment of anxiety symptoms by eating food has led to a small improvement in glycaemic

control. However, a variety of lifestyle factors are likely to impact on overall glycaemic control and 'over-eating' in response to physical sensations is just one of them, e.g. life-style behaviours such as smoking, drinking alcohol and activity level will affect glycaemic control.

Psychological factors may not be directly related to the etiology of chronic medical problems, but are important aspects to consider in understanding individual differences in coping with treatment plans that require life-long self-regulation. Theorizing by Leventhal describes a 'common-sense' interplay between cognitive and emotional representations of illness that, in turn, determine coping responses (Leventhal, Diefenbach, & Leventhal, 1992; Leventhal, Meyer, & Nerenz, 1980: see also Moss-Morris et al., 2002). In the present case, it is readily seen how the addressing of cognitions by CBT can lead to effective change in emotional state, behaviour and coping.

Adequate self-care for patients with IDDM requires individuals to carry out a range of essential tasks and non-compliance with self-management has been found to be influenced by factors such as negative mood states, poor motivation and low levels of confidence in personal ability to cope with the condition (White, 2001). Depression in particular is likely to have a negative impact on self-care ability and has been found to independently predict mortality rates among elderly diabetics (Black & Markides, 1999). Psychological approaches have been demonstrated to be useful, not just in treating co-morbid disorders, but to aid in the management of diabetes itself (Trigwell & Peveler, 1998).

Given the increased incidence of psychological disturbance in this patient group and awareness of the potential for treatment to improve their situation, psychological aspects should be included routinely in the overall assessment of these patients (Mitchell, Catalan, McIntosh, & Feher, 2000; Zambanini, McIntosh, Mitchell, Catalan, & Feher, 1999). However, access to psychological services for patients with chronic medical problems varies depending on how they are provided and organized locally. Given the evidence base for cognitive-behavioural treatment approaches for psychological problems associated with diabetes, an integrated approach is required that allows psychologists and diabetic clinical teams to work alongside each other providing high quality, comprehensive services.

The result of the present single-case study adds to recent evidence highlighting the role that mental health professionals should have within the management of diabetes in optimizing levels of self-care and in formulating and treating co-existing psychological problems. The routine provision of psychological services for patients with diabetes requires adequate resources and should be appropriately funded if diabetic clinics are to manage the increased mental health problems in their patients.

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