Patients’ experience of admission to hospital with diabetic ketoacidosis and its psychological impact: an exploratory qualitative study

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Abstract

The primary aim of this study was to better understand patients’ experience of admission to hospital with diabetic ketoacidosis (DKA) and its psychological impact. The secondary aim was to improve our service provision for patients following an episode of DKA.

Forty patients who had been admitted to hospital with DKA were invited to participate. Four patients agreed to take part (three female, one male; mean age 34 years, range 21–49 years). All participants had type 1 diabetes. Participants completed a semi-structured interview and psychometric questionnaires. Descriptive statistics were generated for demographic and questionnaire data. Interview transcripts were qualitatively analysed using thematic analysis.

The thematic analysis showed three important themes: Consequences of DKA; Recognising and Managing DKA; and Hospital Experience. The theme of Recognising and Managing DKA highlighted that only one participant recognised insufficient insulin as a trigger for DKA, and other people first recognised symptom severity in every case. The theme Hospital Experience seemed to support a number of studies that have found poor provision of care for those presenting with DKA.

It is important to note that there were only four participants who contributed, which limited the conclusions that can be drawn. It appeared some patients lack understanding of what DKA is. It seems that better provision of information on DKA needs to be given to both the individual and their family members. There was some evidence that an admission for DKA is a marker for follow-up psychological assessment. Copyright © 2013 John Wiley & Sons.

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Key words
diabetic ketoacidosis; screening; psychological consequences; cognitive model; post-traumatic stress disorder, PTSD

Introduction

Diabetic ketoacidosis (DKA) is a serious and potentially fatal complication of type 1 diabetes. In those with existing diabetes, insulin omission, infection or other acute illness can immediately trigger DKA1 and this may be life-threatening.

In 2011, the Joint British Diabetes Societies2 published a guideline for the management of DKA in adults. This document is timely as a number of studies have found poor provision of care for people presenting with DKA (e.g. Sola et al.3)

Psychosocial issues and DKA. In a review of diabetes and behavioural medicine research, Gonder-Frederick et al.4 conclude that diabetes self-management and metabolic control are a complex process affected by a wide range of psychosocial factors, including personal health beliefs, coping abilities, psychopathology and social support. However, while we are gaining a better understanding of some of the key psychosocial factors that can influence diabetes management, there are currently no published data on the experiences of patients admitted to hospital with DKA and its psychological consequences. One such consequence may be post-traumatic stress disorder (PTSD).

Post-traumatic stress disorder. According to the Diagnostic and Statistical Manual of Mental Disorders,5 PTSD is an anxiety disorder comprising symptoms of: repeated re-experiencing of the traumatic event; avoidance of reminders; emotional numbing; and, persistent hyper-arousal. These symptoms develop following exposure to an event that involved actual or threatened death or serious injury, and elicited a reaction of intense fear, helplessness or horror. In a review of PTSD following physical illness and medical treatments, Tedstone and Tarrier6 found that PTSD may arise...
following the onset of some physical illnesses that are sudden, unexpected and immediately life-threatening and, as such, meet the criteria for a traumatic event. This would include DKA, but none of the reviewed studies investigated this.

**Psychological distress in patients following an episode of DKA.** It had been observed by the authors of this paper that some individuals had been referred to a health psychology department for treatment of significant distress following an episode of DKA requiring admission to hospital. Clinical impressions were that a theme among the patients was presentation of post-traumatic stress characterised by ongoing, disabling anxiety, intrusive memories of their DKA, and secondary depression. These individuals had improved following following cognitive-behavioural interventions for PTSD.

There are a number of cognitive-behavioural theories of PTSD (see Brewin and Holmes for a review). However, the relationship between psychological and physiological factors in DKA is complex and current models do not take this, nor the nature of diabetes management, into account. Furthermore, it is not clear that PTSD symptoms are the only possible psychological consequence of DKA.

Therefore, because of the exploratory nature of this study, a generic physical illness cognitive model (based on the Cognitive Model of Dysfunctional Illness Behaviour) was used to inform the development of hypotheses about factors that may have a role in psychological distress following DKA (see Figure 1).

The generic cognitive model of distress after DKA includes symptoms of physiological arousal that accompany anxiety. These symptoms are similar to some of the symptoms of DKA – for example, breathlessness or palpitations – so could be misinterpreted. In addition, the model includes possible safety behaviours – for example, blood glucose testing – recommended by health professionals but may become overly relied upon by individuals as a way of coping. This model provided a framework for designing a qualitative study to investigate the experience of DKA.

**Aims**

The primary aim of this study was to better understand patients’ experience of admission to hospital with DKA and its psychological consequences. The secondary aim was to inform our current service provision for patients following an episode of DKA with a view to improving clinical care.

**Method**

**Participants.** Forty patients who had been admitted to hospital with DKA were invited to participate. Four patients agreed to take part (three female, one male; mean age 34 years, range 21–49 years). All participants had type 1 diabetes (mean duration 12 years, range 4–19 years). All participants were white British.

Of the 36 patients who did not choose to participate, four were excluded later in the recruitment process as information from the hospital admission on diagnosis was incorrect. Of the 32 patients remaining, demographic data are as follows: 19 female, 13 male; mean age 31 years, range 21–53 years; all diagnosed type 1 diabetes; 21 white British, one mixed British, 10 ethnicity unknown.
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<th>Patient</th>
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HADS = Hospital Anxiety and Depression Scale; IES = Impact of Event Scale; PDS = Post-traumatic Stress Diagnostic Scale; PTSD = post-traumatic stress disorder.

Table 1. Summary of questionnaire data

Measures. Participants took part in a semi-structured interview comprising six sections: previous experience of DKA; perceived triggers and contributing factors for the most recent episode of DKA; thoughts about that episode of DKA; the impact of that experience on mood and psychological wellbeing; sense of control over DKA; and coping strategies for DKA. The interview schedule was developed based on the proposed cognitive model of emotional distress following DKA (see Figure 1).

Participants completed the Impact of Event Scale (IES) and the Symptom Severity Score of the Post-traumatic Stress Diagnostic Scale (PDS). These questionnaires measured post-traumatic stress reactions with sub-scales assessing both intrusion and avoidance symptoms. Studies found acceptable internal consistency, test-retest reliabilities and concurrent validity suggesting that the measures are psychometrically sound (e.g., Foa et al.; Sundin and Horowitz). Participants also completed the Hospital Anxiety and Depression Scale (HADS), a widely used self-report questionnaire designed to measure anxiety and depression symptoms.

Procedure. All patients admitted to hospital with DKA were identified from hospital records. The inclusion criteria were:  

- Patient had a primary diagnosis of type 1.
- Patient had previously been admitted to hospital and stayed in for at least 24 hours as a result of an episode of DKA that did not occur at the time of diabetes diagnosis.
- Patient was aged over 16 years.
- DKA episode was more than three months past.

The exclusion criteria were:

- Patients who had another life-threatening illness, e.g., cancer.
- Patients who had multiple health problems that could account for major symptoms.

Patients who agreed to take part attended a taped interview with a researcher lasting 1–1.5 hours where they also completed the questionnaires. They were able to withdraw consent at any time.

Analyses. The transcripts of the interviews were qualitatively analysed using the method of thematic analysis. Thematic analysis involves identifying, analysing and reporting patterns (themes) within data. It minimally organises and describes your data set in (rich) detail. To increase the credibility of the findings, two of the research team members were involved in the thematic analysis.

Results

Questionnaire data

Table 1 provides a summary of questionnaire data. Scores were obtained on the HADS, IES and PDS for the four participants.

Due to the small sample, statistical analyses were not performed but it can be seen that one participant scored in the clinical range for PTSD on both the IES and the PDS, and also had moderate symptoms of anxiety and depression (Table 1). This patient was offered further psychological support.

Qualitative data

Three themes were derived from the qualitative data: (1) Recognising and managing DKA; (2) Hospital experience; and (3) Consequences of DKA.

Theme 1: Recognising and managing DKA. This theme describes the difficulties patients had in recognising early symptoms of DKA and taking appropriate action. It also describes patients’ understanding of the triggers precipitating factors for their episode of DKA.

Triggers. Patients identified a variety of triggers to DKA. These included illness, lifestyle factors and psychological state. None of the participants at the time recognised insulin omission or insufficient insulin as a trigger for DKA. Only one participant recognised the importance of sufficient insulin retrospectively.

‘Maybe I wasn’t looking after myself very well … Had my body been a bit stronger, may have been able to fight the infection and it may not have led to the DKA.’

‘What did you think was the cause of DKA on that occasion?’

‘It was like the stomach bug and not being able to have enough insulin.’

Others recognise DKA. In each case, patients reported that other people first recognised the severity of the symptoms and the need to seek medical help. In two cases, patients were found unconscious and taken to hospital. In the other two cases, it was family members who telephoned for medical advice.

‘It was my client who actually said “I think you should go home.”’

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Lack of understanding of DKA. Patients did not recognise their symptoms (e.g. vomiting, tiredness, laboured breathing) as early signs of DKA. They also reported not knowing how to manage illness and diabetes. One patient had never heard of DKA.

‘I’d never been made aware of the knowledge of ketoacidosis.’

Theme 2: Hospital experience. This theme describes patients’ experiences of medical treatment from their initial point of contact with the NHS through to specialist inpatient care. Patients identified inadequacies in care prior to admission to the diabetes ward. However, on the diabetes ward, care was reportedly satisfactory or good for patients.

Pre-diabetes ward. Two patients who sought telephone medical advice (either from the out-of-hours doctor or from NHS Direct) were advised to attend the walk-in centre. Both of these patients reported waiting long periods of time for appropriate care. The two other patients were found unconscious by family members and were taken to hospital by ambulance.

‘It was an emergency and was not being treated as an emergency.’

On the diabetes ward. Those patients who mentioned the diabetes ward described their experience as positive. One patient described staff as competent. Another reported that the support they received from the diabetes specialist nurse was helpful.

‘Everything was fine once I was on the diabetes ward.’

Theme 3: Consequences of DKA. This theme describes patients’ experiences of the consequence of DKA, including emotional, behavioural and cognitive outcomes, the impact on their family, and the effect on their sense of control and thoughts of mortality.

Emotional consequences. Patients described varying emotional consequences of DKA. One patient reported improved mood following DKA because their diabetes control had improved as a result of the hospital admission. Other patients reported negative mood following DKA, including feeling fearful, moodiness, depression, irritability and emotional numbing.

‘I don’t think I’ve cried properly since it happened.’

Behavioural consequences. Patients described actions taken to prevent the recurrence of DKA. These included both short-term strategies, such as monitoring blood glucose regularly and checking for ketones, and long-term lifestyle changes, such as increasing exercise, giving up smoking and becoming more aware of their diet.

‘I was told to take my insulin even for breathing.’

‘I learnt that I have to do urine samples as well as blood sugars.’

Cognitive consequences. Patients described the impact of their experience of DKA on their thinking. Two patients reported being very vigilant about their diabetes control. One of these patients described being aware of signs of illness and feelings of paranoia about DKA. One patient described trying to block out the experience.

‘I’m worried; I keep thinking it may happen again.’

Family. Patients described the impact of their episode of DKA on their family. They reported the emotional, cognitive and behavioural effects on their family members and changes in their relationships. One patient described a loss of independence since their hospital admission and feeling reliant on others to remember insulin and medication. Another patient described their family members prompting them to check their blood glucose and take their insulin.

‘Without a prompt from them [family] it would be easy to slip into old habits.’

Control. Two patients thought that they had little control over preventing a recurrence of DKA. One participant reported improved diabetes control since their admission to hospital. Another was confident that they would cope better with another episode of DKA.

‘I think at some point it’ll definitely happen again ... Probably 99.9%.’

Thoughts of mortality. Patients described thinking they were going to die when they were in DKA. They also said that other family members had also thought this. It seemed that their experiences had increased their awareness of their own mortality.

‘I don’t look to the future much to be honest.’

Discussion

Before discussing the results of this study it is important to note that there were only four participants who contributed. In the context of qualitative research this means that it is unlikely that saturation was reached. The following discussions should be read in the light of this. However, the detailed experience of these four patients deserves some consideration.

Three themes emerged from the thematic analysis: ‘Recognising and managing DKA’, ‘Hospital experience’, and ‘Consequences of DKA’.

The theme of ‘Recognising and managing DKA’ highlighted that only one participant recognised insufficient insulin as a trigger for DKA and other people first recognised symptom severity in every case.

The sub-theme ‘Pre-diabetes ward’ in the theme of ‘Hospital experience’ would seem to support a number of studies that have found poor provision of care for people presenting with DKA, although this is only the perspective of two participants.

The theme ‘Consequences of DKA’ provides some new information on the psychological impact of DKA. The sub-theme ‘Thoughts of mortality’ shows that patients’ experience of DKA is consistent with its categorisation as a traumatic experience, as defined by DSM-IV criteria, since they reported thinking they were going to die. Furthermore, one participant scored in the clinical range on both the IES and PDS, indicating they may have PTSD.

The sub-theme of ‘Control’ highlighted the participants’ varying beliefs about their ability to prevent recurrence of DKA. It seems that their confidence may have been influenced by their post-DKA diabetes care.

Theoretical implications. Our small sample size precluded further comment on the hypothesised cognitive model of emotional distress in DKA.

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From the findings, possible additions to the proposed model are irritability (Emotions), worry and hypervigilance (Cognitive).

Clinical implications. Participants in this study will have been offered education on diabetes management (including sick-day rules) at diagno-
sis, and have access to structured edu-
cation classes as required. However, it appeared some patients have limited understanding of what DKA is, its early signs, and how to manage these. One participant suggested that there be a booklet provided to patients with diabetes specifically about DKA rather than simply on sick-day rules. The current diabetes education curric-
ulum may benefit from review in the light of these findings. It seems that better provision of information on DKA needs to be given to both the individual and their family members. This is consistent with the findings of a review by Bagg et al.16

It seems that an admission for DKA is a marker for follow-up medical appointments, which should incorporate assessment of psychologi-
cal distress, including but not limited to PTSD. One idea would be to develop a user-friendly screening tool that could be administered on the ward or at the follow-up appointment.

Limitations. As discussed previously, the major limitation of the study is that only 11% of potential partici-
pants agreed to participate. This suggests that these patients may be a

Key points

- There are currently no published data on the experiences of patients admitted to hospital with DKA and its psychological consequences
- Clinical impressions of patients who had experienced DKA were of post-traumatic stress disorder (PTSD) presentations
- Three themes were derived from the qualitative data: (1) Recognising and managing DKA – other people first recognised symptom severity in every case; (2) Hospital experience – seemed to support studies that have found poor provision of care for people presenting with DKA; (3) Consequences of DKA – provided new information on psychological impact, including that patients’ experience of DKA is consistent with its categorisation as a traumatic experience
- Clinical implications are that some patients have limited understanding of what DKA is, early signs, and how to manage these
- It seems that admission for DKA is a marker for follow-up medical appointments, which should incorporate assessment of psychological distress, including but not limited to PTSD

this would de-stigmatisate psychology in diabetes services and may encourage more patients to access this type of support and participate in future psychological research.

The study did not manage to access patients who have recurrent DKA episodes. The experience of these patients is even less understood and warrants further investigation.

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ing and data analysis for this project, and also Roseann Hatton for her help with interviewing participants.

Declaration of interests

There are no conflicts of interest declared.

References

4. Gonder-Frederick LA, et al. Diabetes and behav-


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