

# Brittle Diabetes: Clinical Characteristic Features and Outcome, Study of Fifty Patients Admitted to Ibn Sina-Teaching Hospital, Sirte-Libya

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## Abstract

**Background/ Objective:** There is few data on the clinical grounds of brittle diabetic patients in Libya. Such patients are enormously costly in terms of health care resources in Libya. In this study we tried to determine the underlying etiologies as well as precipitating factors in brittle diabetic patients who were admitted to medical department in Ibn Sina Hospital, Sirte-Libya.

**Material and Methods:** A retrospective study of all brittle diabetic patients admitted to the medical department in the period of March 2005 to February 2010. Patients age, gender, occupation, marital status, body mass index, hemoglobin A1c (glycosylated hemoglobin) concentrations, sub types of brittle diabetics and presence of diabetic complications as well as underlying causes were recorded.

**Results:** A total of 7184 patients were admitted, 50 (0.69%), out of them were defined as brittle diabetics. The mean age was  $28.58 \pm 12.16$  years with male to female ratio of (1.1:5.1). Admission with recurrent ketoacidosis was the commonest subtypes of brittleness (62%) followed by recurrent hypoglycaemia (22%) lastly mixed brittleness 16%. Depression was the common underling problem among patients with recurrent ketoacidosis (52%), mental retardation (28%), severe personality disorder (7%), stress reaction (7%), dementia (3%) and congenital anomaly of urinary tract (3%). Sheehan's syndrome was the most underling disease in patients with recurrent hypoglycaemia (28%), chronic renal failure (27%), Addison's disease (18%), factitious hypoglycaemia (9%) and Shmidts (48%). According to occupational, 48% were students, housewife (30%), Teachers (6%), female office worker (6%), Nurse (4%) and jobless (4%).

**Keywords:** Brittle Diabetes, Recurrent Ketoacidosis, Recurrent Hypoglycaemia, Mixed Brittleness.

## 1. Introduction

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Brittle diabetes is a term used to describe an uncommon subgroup of type1 diabetes, characterized by glycaemic instability of any type leading to life disruption [1], and recurrent and/or prolonged hospital admission [2]. Most patients have recurrent attacks of diabetic ketoacidosis (DKA) and are usually young females [3,4]. A smaller number however, are known to suffer almost exclusively recurrent hypoglycaemia requiring admission to hospital [5,6]. No exclusive study of series of carried out in Libya. In wider reports of series of patients with brittle diabetes, Tattersall described 14 such patients [7] and 5 were reported by Gill [8].

**Patients and materials:** The medical files of diabetic patients who were admitted to different medical units in Iben Sina Teaching hospital, Sirte, from March 2005 to February 2010, has been reviewed. Type of diabetes mellitus, patient's age, gender were recorded. Histories of marital status, occupation, presence of diabetic complications were recorded. Underlying causes of brittleness has been recorded too.

## 2. Method

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A total number of 7184 admissions to different medical units in Iben Sina teaching hospital, Sirte, were recorded during five years period. Eight hundred eighty nine (889), out of total admissions were diabetics, 50 patients out of 889 were defined as brittle diabetics, which constituted (5.6%) of total diabetic patients admission and (0.69%) of the total admissions, more than 96% of them were Libyans. The mean age was 28.58±12.16 year with male to female ratio of (1.1:5.1). There was female predominance in our study (82%). About (32%) of our patients , their age were from 10-19 years, 22% their age ranged between 30 to 39 years, 12% of the patients were between 40 to 49 year, 4% were between 50 to 59 years., while 2% were above 60 years old, as showed in Figure 1.

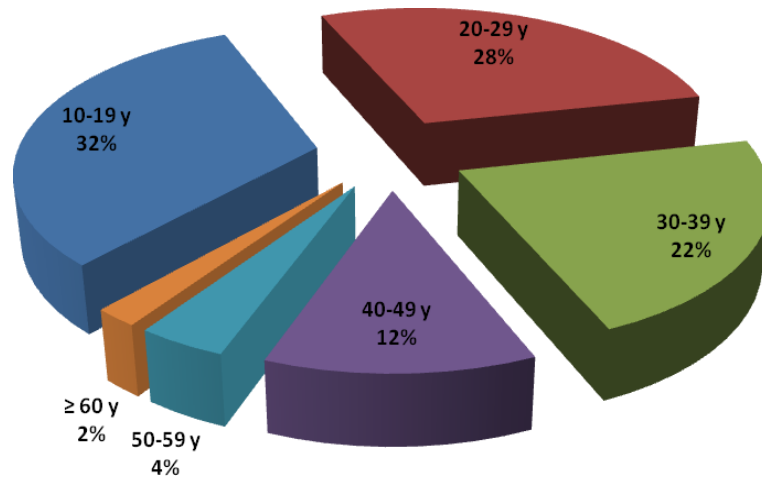


Figure 1. Age Distribution of studied patients in years

Most of our studied patients were unmarried (74%). Most of our patients were students (48%), 30% were housewives, teachers and female office workers were (6%) each, 4% unemployed, 4% were nurses while social workers only 2%.

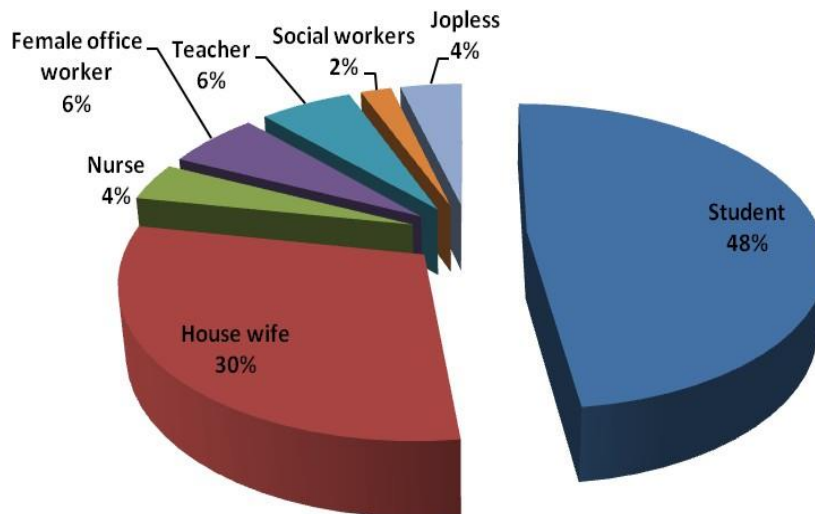


Figure 2. Distribution of studied patients according to their occupation

Regarding body mass index (BMI) 42 patients (84%) body mass index was less than 18.5 (underweight), 4 patients (8%) had BMI of 18.5 to 24.9 (normal BMI), 3 patients (6%) BMI was 25 -29.9 (over weight), while 1 patient (2%) BMI was 30-34.9 (obesity grade 1) (Table 1).

**Table 1.** Distribution of studied patients according to body mass index

Body mass index	No	%
Under weight ( $< 18.5$ )	42	84
Normal weight (18.5 – 24.9)	4	8
Over weight (25 – 29.9)	3	6
Obesity grade 1 (30 – 34.9)	1	2
Obesity grade 2 (35 – 39.9)	Nil	Nil
Morbid Obesity ( $\geq 40$ )	Nil	Nil

Among those patients with recurrent ketoacidosis, their mean Hb A<sub>1c</sub> was 11.76±0.71 (Table. 2), those with recurrent hypoglycemia mean HbA<sub>1c</sub> 9.14±1.02 and mixed Brittleness 11.84±1.64.

**Table 2.** Mean concentration of Haemoglobin A<sub>1c</sub> in studied patients

Type of Brittleness	Glycoside haemoglobin A <sub>1c</sub> (Mean±SD) (gm%)
Recurrent Ketoacidosis	11.76±0.71
Recurrent Hypoglycemia	9.14±1.02
Mixed Brittleness	11.84±1.64

Chronic renal failure was the most underlying disease in patients with recurrent hypoglycemia represent 8 (36.4%) patients, Sheehan's syndrome 5 (22.7%) patients, Addison's disease 3 (13.6%) patients, factitious hypoglycemia 2 (9%) patients, patients not taking their food after insulin injection were 2 (9%), and Shmidt's syndrome was in 2 (9%) patients as shown in Figure 3.

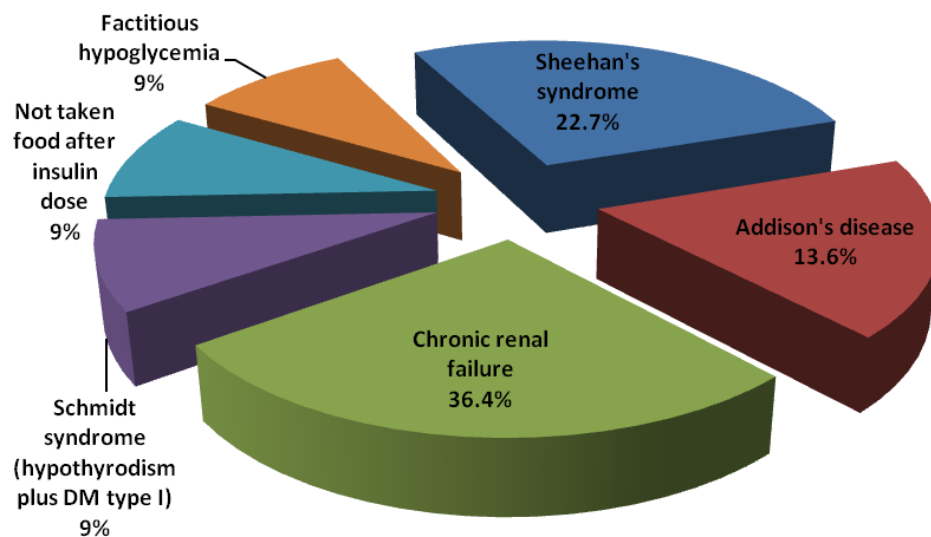


Figure 3. Distribution of studied patients according to causes of recurrent hypoglycemia

Among those with recurrent ketoacidosis, the most common underlying disease was depression 4 (53.9%), mental retardation in 6 (23.1%) patients, severe personality disorder 2 (7.7%) and congenital anomaly of urinary tract was 1 (3.8%) patients as showed in Figure 4.

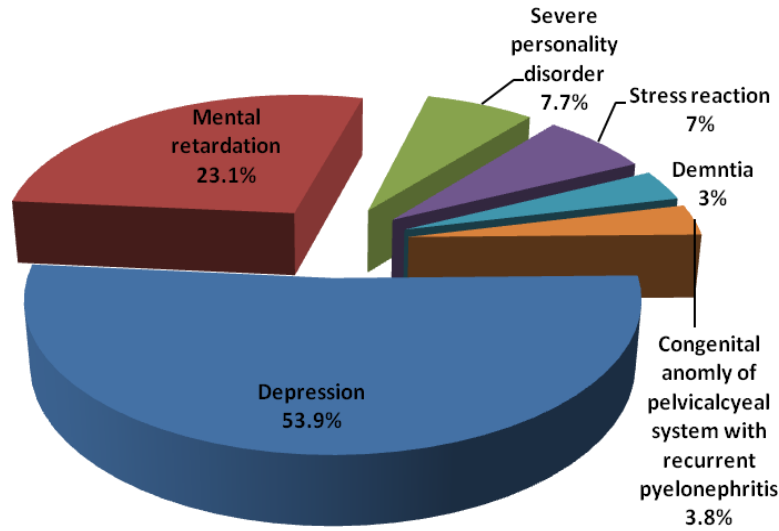


Figure 4. Distribution of studied patients according to causes of recurrent ketoacidosis

The most frequent complications among our patients was diabetic nephropathy followed by diabetic retinopathy while less frequent encountered complication was urinary tract infections, skin infection and peripheral vascular diseases as shown in Figure 5. The most frequent presenting features of brittle diabetes were recurrent ketoacidosis (62%), recurrent hypoglycemia (22%), while mixed brittleness in 16%.

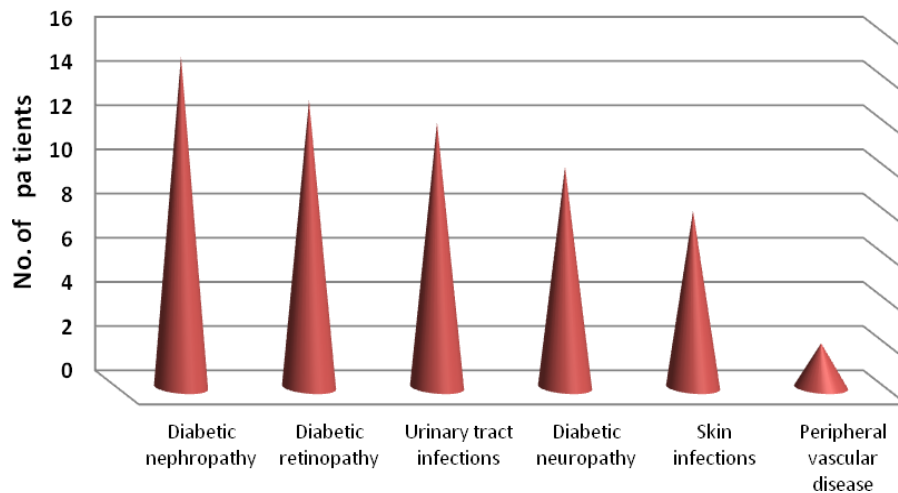


Figure 5. Distribution of studied patients according to complications of diabetes among brittle patients.

### 3. Discussion

These patients all had severe brittle diabetes with frequent and regular admissions, indeed at that time of our study; some had been continuously hospitalized for many weeks. As compared with previous studies [6, 8] the present finding confirms the brittle behavior in most young females (82%) and that recurrent diabetic ketoacidosis is the commonest presentation in our study (62%). The female predominance is of considerable interest. Young female diabetics in general have poorer glyceamic control [9], and more frequent hospitalization [10] than their male counterparts. They are also at increased risk of developing eating disorders such as anorexia nervosa. It has been suggested that, perhaps for social and cultural reasons young female diabetics may resolve psychosocial conflict by disrupting glyceamic control to withdraw into disease role [12].

Analysis of reasons for hospitalizations (Figure 6) revealed marked polarizations of admission patterns. 62% had recurrent diabetic ketacidosis while 22% had recurrent hypoglyceamis and 16% had mixed glyceamis instability. The causes of recurrent ketoacidosis were varied in our study but includes psychosocial problems, inter current illness, mental retardation and dementia many believed that psychological and social factors are the single most important cause accounting one third of cases in one series (13%), 61% in another [14], 80% in another study [15], respectively. The cause in 66% of our patients was thought to be psychosocial problem, including depression 52%, severe personality disorder (7%), and stress reaction (7%) respectively.

We did not use a specific protocol for treating brittle diabetes, but the tendency to become more stable was unlikely to be home monitoring of blood glucose concentrations, better education or multiple injections. Several of our patients had psychiatric intervention but the main stabilizing factor seemed to be removal of the stress either by leaving home or getting married, especially around 74% of our patients were single.

One male had unsatisfactory relation with his father with no family support, but his condition was improving after his aunt taken care of him. His hospitalization admissions and duration became less during last 2 years.

Another young female had congenital anomaly of urinary tract with recurrent pyelonephritis, also her brittleness getting better in terms of admission frequency and duration of stay when she did urological intervention that corrected her anomaly.

Most definition of brittle diabetes include patient with recurrent hypoglycemia and most causes of brittle hypoglycemia in our study seemed to be organic in nature. (28%) of our patients underlying disease was Sheehan's syndrome, chronic renal failure in (27%). Addison's disease was (18%), Schmidt syndrome (9%), and (9%) of our patients the underlying cause are strongly suspected of deliberately inducing hypoglycemia (factious hypoglycemia), deliberate induction of hypoglycemia has been described by other groups [16, 17, 18].

Our trial to manage of recurrent hypoglycemia due to organic causes for example in CRF, we used low dose insulin to keep the patient nearly normoglycemia and avoid unnecessary hypoglycemia in addition to renal replacement therapy, and if it is due to endocrine disease example Schmidt's syndrome, Addisons disease, Hypopituitarism, myxedema and Sheehan's syndrome to treat the deficiency state of each. All types of brittle diabetes are characterized by female excess, high prevalence of psychosocial problems and factious instability. Fortunately both hyper and hypoglycemia [14,19,20] brittle diabetes has a strong tendency to resolve or at least improve with the passage of time. Specific therapeutic options are relatively limited, [13,21] and as Tatters all has observed 'treatment may simply be questioned of sharing the patients frustrations and anxieties [22].

## 4. References

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