Alexithymia impact on type 1 and type 2 diabetes: A case-control study

Impact de l’alexithymie sur le diabète de type 1 et de type 2: étude cas–témoin

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Abstract

Objectives. – This paper focus on studying the prevalence of alexithymia in diabetes type 1 and type 2 and its impact on diabetes’s clinical and therapeutic characteristics. We also studied the relationship between alexithymia and emotional disorders in diabetics. Materials and methods. – The study involved a sample of 125 diabetic patients, among whom 50 had type 1 and 75 had type 2 diabetes mellitus compared with respectively 70 and 52 control subjects matched for age and sex. Alexithymia was assessed using the Toronto Alexithymia Scale, while emotional disorders were evaluated using the Hospital Anxiety and Depression Scale. Results. – Type 1 diabetics were more alexithymic than controls while type 2 diabetics had higher cognitive component score than control subjects. Alexithymic type 1 diabetics had a higher average of fasting blood sugar than non-alexithymic patients did (\(P = 0.021\)). Moreover, with type 1 diabetes, erectile dysfunction was associated with difficulties in identifying feelings (\(P = 0.012\)). We found that the presence of depression was a predictor of alexithymia in type 1 diabetes (\(\beta = 1.78, P = 0.04\)) and the presence of psychiatric history was indicative of the presence of alexithymia in type 2 diabetes (\(\beta = 2.09, P = 0.042\)). Conclusion. – Given the impact of alexithymia on diabetes types 1 and 2, the detection and treatment of alexithymic subjects are important for a better prognosis of diabetic disease.

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Keywords: Alexithymia; Psychiatric complications; Depression; Diabetes

Résumé

Objectifs. – Les objectifs de notre étude étaient d’étudier la prévalence de l’alexithymie chez les diabétiques type 1 et type 2 et son impact sur les caractéristiques cliniques et thérapeutiques du diabète ainsi que d’identifier les liens entre l’alexithymie et les troubles affectifs chez les diabétiques. Matériels et méthodes. – L’étude concernait un échantillon de 125 diabétiques, composé de 50 de type 1 et 75 de type 2 comparés respectivement à 70 et 52 témoins appariés selon l’âge et le sexe. L’alexithymie était évaluée à l’aide de l’échelle du Toronto Alexithymia Scale à 20 items et les troubles émotionnels à l’aide du Hospital Anxiety and Depression Scale. Résultats. – Les diabétiques de type 1 étaient plus alexithymiques que les sujets témoins alors que les diabétiques de type 2 présentaient un score plus élevé à la composante cognitive que les témoins. Les diabétiques de type 1 alexithymiques avaient une glycémie à jeun moyenne environ deux fois supérieure à celle des patients non alexithymiques (\(p = 0.021\)). Par ailleurs, la dysfonction érectile était liée à des difficultés à identifier les sentiments chez les diabétiques de type 1 (\(p = 0.012\)). Nous avons constaté que la présence de dépression chez les diabétiques de type 1 était un facteur prédictif de l’alexithymie (\(\beta = 1.78 ; p = 0.04\)) et que la présence d’antécédents psychiatriques prévoyait la présence de traits alexithymiques chez les diabétiques de type 2 (\(\beta = 2.09 ; p = 0.042\)). Conclusion. – Étant donné l’impact de l’alexithymie sur le diabète de types 1 et 2, le dépistage et la prise en charge des sujets alexithymiques s’avèrent importants pour un meilleur pronostic de la maladie diabétique.

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Mots clés : Alexithymie ; Complications psychiatriques ; Dépression ; Diabète

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1. Introduction

Alexithymia, which etymologically means "the inability to express emotions in words", is a concept linked to the field of psychosomatic medicine. This psychopathological dimension is characterized by the difficulty to identify and express one’s feelings, to differentiate them from bodily sensations. Alexithymia is said to imply poor fantasy and imagination as well as a pragmatic cognitive style [1]. A dichotomy was proposed to distinguish primary alexithymia and secondary alexithymia [2]; primary alexithymia is considered as “innate” and stable over time. It is a personality “trait” of neurobiological origin. This form of alexithymia is a predisposing factor to the onset of psychosomatic conditions [3]. Secondary alexithymia is the consequence of traumatic factors. It is defined by a state, which appears during stress (often due to a severe medical condition or to a disaster), or in the presence of impaired emotional development in children with preverbal age. Secondary alexithymia is characterized by the use of defense mechanisms (especially denial) that would protect the patient from difficult experiences such as the emotional significance and the severity of his disease [4].

Because of difficulties identifying their emotions and differentiating them from bodily sensations accompanying physiological reactions, alexithymic subjects are likely more prone to somatic diseases [5]. In this context, diabetes mellitus is itself a stressful condition that generates emotional reactions. Indeed, patients with diabetes are required to perform a set of adjustments including understanding their disease and its treatment as well as self-observation skills, self-monitoring and self-adjustment of treatment [6]. These difficulties brought about by diabetes often cause persistent emotional disorders.

Most studies investigating the relationship between alexithymia and diabetes mellitus were conducted on patients with type 1 diabetes. Chatzi et al. [7] demonstrated a higher prevalence of alexithymia in patients with type 1 diabetes than in control subjects (22.2% versus 7.6%; OR = 4.6). Fukunishi [8] also found a higher prevalence of alexithymia among patients with end-stage renal disease due to type 1 diabetes compared to patients with end-stage renal disease due to other conditions. Nevertheless, few studies involved patients with type 2 diabetes. Aslan et al. [9] found an average alexithymic score on the Toronto Alexithymia Scale-26 of 12.5 ± 3.5 among sixty type 2 diabetes patients.

Few studies examined the links between alexithymia and depression or anxiety in individuals with diabetes [10].

The aims of our study were to compare the prevalence of alexithymia in patients with diabetes (both type 1 and type 2) with healthy controls and to examine the impact of alexithymia on the clinical course and the therapeutic specificities of diabetes (type 1 and type 2). Links between alexithymia, depression and anxiety in patients with diabetes were also examined.

2. Methods

A descriptive and analytic cross-sectional study was performed involving 125 patients with diabetes. The population included 50 outpatients with type 1 diabetes and 75 outpatients with type 2 diabetes, followed-up at the Endocrinology department in Hedi Chaker university hospital in Sfax, Tunisia, over a period of 6 weeks. Patient recruitment was weekly. In this study, all participants had given their consent to participate in the study and were interviewed by the same investigator to standardize the results.

Patients aged less than 15, those with a secondary diabetes, a major cognitive impairment or a mental retardation and those who refused to participate in the study were excluded. Nineteen patients (15.2%) have declined to participate in this study.

Given the different etiopathogenesis of each type of diabetes, we divided patients into two groups: type 1 diabetes (T1D) and type 2 diabetes (T2D). Each group was separately compared to controls. Controls were recruited among a sample that included parents of patients as well as volunteers among medical students, medical and paramedical health professionals. We only included controls those who fulfilled the following eligibility criteria: no established diagnosis of diabetes, no psychiatric disorder with ongoing treatment and no major disability. The T1D group (50 patients) was compared to with 70 controls and T2D group (75 patients) was compared to 52 controls.

The study groups did not differ significantly from the control groups for age (P = 0.4 for the T1D group; P = 0.6 for the T2D group) or gender (P = 0.2 for the T1D group; P = 0.08 for the T2D group).

A structured questionnaire was used to collect sociodemographic (age, gender, marital status, school level, family support, participation in family activities, the presence or not of friendly relationships, job) and clinical data (personal psychiatric or medical history, age of onset of diabetes, complications of diabetes: macroangiopathy, retinopathy, nephropathy, peripheral neuropathy and erectile dysfunction, quality of follow-up: follow-up was considered regular if at least the three last visits were regular). Glycemic control was assessed according to blood glucose and HbA1c levels. Diabetes was considered balanced if HbA1c < 7% and/or fasting glucose ≤ 6 mmol/L. Alexithymia was measured dimensionally, using the 20-item Toronto Alexithymia Scale (TAS-20) [11]. This instrument was chosen given its factorial stability and its psychometric properties [11]. The TAS-20 is conventionally divided into three subscales that assess three dimensions:

- F1: difficulty identifying feelings;
- F2: difficulty describing feelings;
- F3: externally-oriented thinking.

The first two subscales of the TAS match the emotional component of alexithymia whereas the third one is more linked to the cognitive component. Subjects whose TAS-20 score ≥ 61 were considered alexithymic [12]. A dialectal Arabic validated version of Hospital Anxiety and Depression Scale (HAD) was used [13]. The thresholds were those proposed by Lepine et al. for both subscales: anxiety and depression (≥ 10 for each).

SPSS version 11 for Windows was used to enter and analyze statistical data. Means and standard deviations for quantitative variables were calculated. Means were compared with the
3. Results

3.1. Socio-demographic data among patients with diabetes

Mean age of patients with T1D was 28.5 ± 9.6 years (range: 15–58) whereas patients with T2D were aged 50.8 ± 7.9 years (range: 27–63). The female gender was predominant for both T1D (64%) and T2D (65%) groups. Sixty percent (60%) of T1D patients were single whereas the majority of T2D patients were married (84%). Most patients were literate (94% among T1D and 80% among T2D). More than the half of patients with diabetes had an average socioeconomic level (60% among T1D and 58.7% among T2D). In the T1D group, 26% were employed, 12% were students and 40% were joblessness. Half of the T2D group were jobless and 22.7% were workers. Twenty-eight (28%) of T1D and 42% of T2D reported not having a family support. Furthermore, 26% of T1D and 42.6% of T2D reported having no friends.

3.2. Clinical and therapeutic data among patients with diabetes

In our study, the average age on onset was 18.6 ± 8.2 years among T1D and 40.1 ± 7.8 years among T2D. The median duration of illness was 9.5 ± 7.1 years among T1D and 8.7 ± 6.8 years among T2D. More than two thirds of the patients had a poor glycemic control (74% among T1D and 71% among T2D). Regarding diabetes complications, only 18% of patients with T1D had complicated diabetes versus 62% in the T2D group (Table 1). Fourteen patients with T2D (20%) and 10 patients with T1D (19%) had personal psychiatric history. According to HADS, 72% of patients with T1D were anxious and 30% had depression. Among the T2D group, 58.7% were anxious and 33.3% had depression.

Most patients with T1D (94%) and most with T2D (98.6%) were regularly followed-up at the outpatient clinic. Most (90% of T1D and 92% of T2D) claimed they had a good compliance with the prescribed treatment.

3.3. Prevalence of alexithymia

Patients with T1D had significantly higher alexithymia scores than controls (OR = 3.1; CI = [1.408; 6.931]). This result was in particular due to significantly higher scores in the F2 and F3 components (Table 2). In comparison with controls, young patients with T1D (aged 18–30) and women were more likely to be alexithymic (with respectively P = 0.014 and P = 0.026 with OR = 2.1; CI = [1.060; 4.435]).

According to the categorical approach, patients with T2D were not significantly more alexithymic than controls. However, they scored significantly higher on the F3 (cognitive) component scale (Table 3). No significant association was found between alexithymia and T2D according to gender or age.

<table>
<thead>
<tr>
<th>Table 1</th>
<th>Different complications according to the type of diabetes.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>T1D</td>
</tr>
<tr>
<td>Macroangiopathy (+)</td>
<td>3 (6)</td>
</tr>
<tr>
<td>Macroangiopathy (−)</td>
<td>47 (94)</td>
</tr>
<tr>
<td>Retinopathy (+)</td>
<td>1 (2)</td>
</tr>
<tr>
<td>Retinopathy (−)</td>
<td>49 (98)</td>
</tr>
<tr>
<td>Neuropathy (+)</td>
<td>7 (14)</td>
</tr>
<tr>
<td>Neuropathy (−)</td>
<td>43 (86)</td>
</tr>
<tr>
<td>Erectile dysfunction (+)</td>
<td>2 (11.1)</td>
</tr>
<tr>
<td>Erectile dysfunction (−)</td>
<td>16 (88.9)</td>
</tr>
</tbody>
</table>

T1D: patients with type 1 diabetes; T2D: patients with type 2 diabetes; n (): number of patients (%); (+): yes; (−): no.

<table>
<thead>
<tr>
<th>Table 2</th>
<th>Prevalence of alexithymia in patients with type 1 diabetes.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Type 1 diabetes</td>
</tr>
<tr>
<td></td>
<td>Present</td>
</tr>
<tr>
<td>Alethymia</td>
<td>23 (46)</td>
</tr>
<tr>
<td></td>
<td>27 (54)</td>
</tr>
<tr>
<td>F1</td>
<td>18.6 ± 8.3a</td>
</tr>
<tr>
<td>F2</td>
<td>13.8 ± 5.4a</td>
</tr>
<tr>
<td>F3</td>
<td>22.2 ± 5.9a</td>
</tr>
</tbody>
</table>

n: number of subjects (%); F1: difficulty identifying feelings; F2: difficulty describing feelings; F3: externally-oriented thinking.

a Mean ± standard deviation.
b Pearson Chi² test.
c Independent-samples t-test.

<table>
<thead>
<tr>
<th>Table 3</th>
<th>Prevalence of alexithymia in patients with type 2 diabetes.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Type 2 diabetes</td>
</tr>
<tr>
<td></td>
<td>Present</td>
</tr>
<tr>
<td>Alethymia</td>
<td>18 (24)</td>
</tr>
<tr>
<td></td>
<td>57 (76)</td>
</tr>
<tr>
<td>F1</td>
<td>17.6 ± 7.3a</td>
</tr>
<tr>
<td>F2</td>
<td>11.9 ± 5.1a</td>
</tr>
<tr>
<td>F3</td>
<td>22.7 ± 4.9a</td>
</tr>
</tbody>
</table>

n: number of subjects (%); F1: difficulty identifying feelings; F2: difficulty describing feelings; F3: externally-oriented thinking.

a Mean ± standard deviation.
b Pearson Chi² test.
c Independent-samples t-test.
Patients with T1D reported having worse family support ($P = 0.021$) and fewer friends ($P = 0.004$) than controls. Similarly, patients with T2D had worse family support ($P = 0.01$) and fewer friends ($P = 0.004$) than controls.

### 3.4. Impact of alexithymia on diabetes

No significant association was found between glycemic control and alexithymia in either group. However, alexithymic patients with T1D had a fasting blood glucose about twice as high as their non-alexithymic counterparts ($14 \pm 87.3$ mmol/L versus $8 \pm 5.98$ mmol/L; $P = 0.021$).

In the T1D group, patients with alexithymia (21.7%) had complications more commonly than patients without alexithymia (14.8%), but the difference was not statistically significant ($P = 0.7$). The F1 score (difficulty identifying feelings) was associated with erectile dysfunction ($P = 0.012$). Alexithymia had no impact on the occurrence of complications in patients with T2D (66.7% among alexithymic versus 52.6% among non-alexithymic, $P = 0.2$).

In the T1D group, age of onset of diabetes was earlier in alexithymic patients but without significant difference. In the T2D group, no significant correlation was found between alexithymia score and age of onset ($r = -0.09$, $P = 0.4$). Similarly, no association was found between duration of diabetes (both type 1 and 2) and alexithymia.

In the T1D group, F3 score (externally-oriented thinking) was associated with irregular follow-up and worse adherence ($P = 0.032$). In the T2D, no association was found between alexithymia and the quality of follow-up. However, compliance was worse among alexithymic versus non-alexithymic patients ($P = 0.027$), in particular in those with difficulty identifying feelings ($P = 0.03$) and externally-oriented thinking ($P = 0.01$).

### 3.5. Alexithymia, diabetes, depression and anxiety

In the T1D group, six patients (26.1%) with alexithymia reported having a history of psychiatric illness versus four (14.8%) among patients without alexithymia ($P = 0.4$). In the T2D group, psychiatric history was more commonly positive in patients with alexithymia (44.4% versus 10.5%, $P = 0.003$). We found a positive correlation between the overall alexithymia score and both anxiety ($r = 0.374$, $P = 0.008$) and depression scores ($r = 0.410$, $P = 0.003$). The same correlations were also found in the group of T2D with respectively ($r = 0.312$, $P = 0.007$) for anxiety and ($r = 0.389$, $P = 0.001$) for depression.

### 3.6. Linear regression

To study the factors most significantly associated with alexithymia in patients with diabetes in a multivariate model, we conducted a binary logistic regression where the alexithymia was considered as the dependent variable and the other factors as explanatory variables. In the T1D group, the results of the logistic regression showed that only depression was significantly associated with alexithymia (Table 4). In the T2D group, the logistic regression concluded that the variable “friends” was negatively associated with alexithymia, whereas the “personal psychiatric history” variable was positively associated with alexithymia (Table 5).

### 4. Discussion

#### 4.1. Alexithymia and diabetes

In our study, the prevalence of alexithymia was 46% in patients with T1D, significantly higher than in the general population ($P = 0.004$, OR = 3.1). This prevalence is similar to proportions reported in the literature varying between 12.5% and 48% [8,10,14]. The association between alexithymia and T1D could be explained by an over representation of primary alexithymia in patients with T1D, source of greater vulnerability to emotional stress [15] that interferes in both the onset and the course of diabetes [16]. The association could also be explained by a high level of secondary alexithymia. Indeed, the onset of T1D is very often acute and symptomatic requiring an immediate and mandatory treatment and change in lifestyle [17]. Other factors that could be a source of secondary alexithymia in T1D include the impact of the onset of the disease at a young age as well as exposure to stressors such as hospitalization, serious complications leading to chronic stress [18].

In contrast with T1D, the lack of relationship between alexithymia and T2D in our study may be due in part to the different pathogenesis of this disease. Indeed, heredity, obesity and age
are important risk factors for T2D [19], suggesting a lower impact of primary alexithymia in the onset of T2D. Moreover, T2D is more common [20], with often a later silent onset [6,21]. It is therefore more acceptable. It is usually experienced, at least initially, as a cardiovascular risk factor rather than a disease [22]. Furthermore, the absence of insulin injections (at least initially) is perceived as less constraining. Therefore, management and acceptance of T2D exposes patients to secondary alexithymia less than T1D thus suggesting a lower prevalence of alexithymia in patients with T2D. However, we found that, according to a dimensional approach, patients with T2D presented higher F3 (externally-oriented thinking) scores than controls. The difference in the expression of alexithymic traits in patients with T2D compared with patients with T1D, who also showed higher scores in emotional components, is due in part to a different education style. Indeed, being older, patients with T2D probably received a more conservative education repressing the expression of emotions.

The impact of social and family environment can be seen through links between alexithymia and gender. Indeed, in comparison with controls, women with T1D were more likely to be alexithymic. This finding might be related to our socio-cultural context in which diabetes is more acceptable for men but it would be more debilitating for young women because of a heavier impact on family as well as on professional and social lives.

When studying the impact of alexithymia on diabetes both in dimensional and categorical approaches, we found no association between worse glycemic control and alexithymia. In the literature, the results are not equivocal. Most studies [9,23–26] showed an association between alexithymia and the quality of glycemic control. Topsever et al. [23] found that alexithymic patients with diabetes (both types 1 and 2) had a less balanced diabetes than their non-alexithymic counterparts (71.7% vs. 28.3%, \( P = 0.005 \)). Lumley et al. [25] found the F2 score (difficulty describing feelings), was statistically associated with higher HbA1c (\( P = 0.031 \)) in patients with T1D. In contrast with the results of these studies, and consistently with our results, Friedman et al. [10] and Chatiž et al. [7] found no relationship between glycemic control and alexithymia in patients with T1D. The absence of a statistical association between alexithymia and glycemic control in our population (both T1D and T2D groups) could be due to patients being exclusively recruited from a public hospital that essentially drains patients with poorly controlled diabetes.

When studying the relationship between alexithymia and therapeutic characteristics, we found an association between the cognitive component of alexithymia and poorer therapeutic compliance in both groups (T1D and T2D). Several studies [7,14,24] showed that alexithymia was a predictor of poorer compliance in patients with T1D. In alexithymic patients with T2D, poor compliance may in part be due to a lack of social support [6]. Besides, alexithymic patients with T2D in our study reported having fewer friends than their non-alexithymic counterparts (\( P = 0.007 \)). Moreover, we found that the lack of friends was a factor associated with alexithymia in patients with T2D. It would be important to consider this anamnestic element (lack of friends and social isolation) to detect patients at risk, given its significant impact on compliance. In addition, alexithymia might interfere with the therapeutic alliance by lack of communication between the alexithymic patient and the doctor. This alliance is a key determinant of adherence to treatment [27] and to appropriate metabolic control [28]. The most obvious implication of these findings is the need for optimal psychological support in diabetic patients as part of a multidisciplinary approach, given the importance of therapeutic compliance in the course and the prognosis of the disease [29].

In our population (both T1D and T2D), alexithymia, taken as a whole, had no impact on the complications of diabetes. Our results are consistent with those reported in the literature [7,10,23]. Furthermore, we found that patients with T1D with difficulty identifying feelings (F1 component), had more commonly reported erectile dysfunction. In the literature, the link between alexithymia and sexual disorders was highlighted (regardless of diabetes) [30]. The association between erectile dysfunction and emotion regulation confirms the importance of the emotional dimension of human sexuality, especially the importance of the individual ability to sense and communicate emotions. Finally, alexithymia could delay treatment of sexual disorders given its likely impact on the ability to perceive and express one’s discomfort.

### 4.2. Alexithymia, diabetes and psychiatric comorbidities

In our population (both T1D and T2D), alexithymic patients were more anxious and depressed than non-alexithymic individuals. Several studies [2,31–35] showed an association between alexithymia, depression and anxiety. However, this association was rarely examined in patients with diabetes. The study by Friedman et al. [10] showed an association between depression and alexithymia in patients with T1D (\( r = 0.33, P = 0.009 \)). Other studies [2,33] reported an overlap between alexithymia and affective disorders. Links between anxiety, depression and alexithymia raise the question of the similarity of symptoms between these three disorders. For instance, affective flattening is found both in alexithymia and depression, making one a reflection of the other. Similarly, the inability to distinguish between feelings and bodily sensations in anxiety is also referred to as the emotional component of the TAS [36]. The existence of a conceptual overlap between alexithymia and affective disorders especially depression does not help explain whether alexithymia is a cause or consequence of these disorders [2]. Our result raises the question of alexithymia as a potential vulnerability factor to depression. Prospective studies among patients with psychiatric or medical illness showed that alexithymia observed during depression remains stable even following remission of depression [1,31]. However, Farges and Farges [2] state that, to show that alexithymia is a vulnerability factor to depression in patients with somatic illness longitudinal studies are needed, but studies have never been performed. In our study, we found, through multivariate analysis, that depression was associated with alexithymia in patients with T1D and that the existence of psychiatric history was associated with the presence of alexithymia in patients with T2D. The observed alexithymia is probably secondary reflecting a coping strategy to face a
stressful situation rather than a personality trait. Therefore, this type of alexithymia could decline over time once the triggering factors disappear (disease, alcohol dependence) [33]. However, in patients with chronic debilitating disease such as diabetes, secondary alexithymia may become permanent [37] and can, hence, not be distinguished from primary alexithymia.

The limitations of our study were the cross-sectional nature of the study hindering the distinction between primary and secondary alexithymia, the recruitment of participants solely from a public hospital, and the subjectivity of the assessment of certain parameters such as the quality of social support and the therapeutic compliance. One can suggest that the patients not included could have some characteristics in connection with the alexithymia or depression. This could explain their refusal.

5. Conclusion

From this work, some recommendations might be concluded. Hence, it is important:

- to identify individuals “at risk” since assessing alexithymia and taking it into account could improve the prognosis of diabetes;
- to improve the quality of the doctor-patient relationship in alexithymic patients with diabetes, given their communication difficulties, in order to avoid rejection of the patient by his physician and to optimize adherence;
- to propose an appropriate psychological management of alexithymic patients with diabetes to promote emotional awareness by focusing on verbal and nonverbal expression;
- to involve the family and the social environment in the management of alexithymic patients with diabetes who have difficulty maintaining their social network given the importance of such a network in determining therapeutic compliance;
- to screen these patients for depression and anxiety which are common and might exacerbate alexithymia thus affecting the course of the diabetic illness.

Disclosure of interest

The authors declare that they have no conflicts of interest concerning this article.

References


