ORIGINAL ARTICLES

Alexithymia in Diabetes Mellitus

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Abstract

Background
Diabetes mellitus is a chronic, progressive disease with complex therapy protocols requiring major coping efforts from patients to achieve and maintain glycaemic control in order to reduce risk of diabetic complications. Disease coping strategies including good knowledge of diabetes and high ability of self-care have been reported to be impaired by alexithymic features. Alexithymia is a psychological construct characterised by inability to express emotions verbally, poor imagination and operational thinking, leading to failure in psychological self-regulation.

Objective
To compare prevalence of alexithymia and mean Toronto Alexithymia Scale-26 (TAS-26) scores in diabetic patients with non-diabetic controls; to investigate the association of alexithymia with glycemic control in diabetes.

Method
In this cross- sectional study, TAS-26 scores of 193 diabetic patients and 49 non-diabetic controls were compared. Disease related factors were obtained from patient records. Alexithymia was used as a continuous (mean TAS-26 scores) and semi-quantitative (dichotomised into non-alexithymic 11>TAS-26 scores>11 and alexithymic individuals) variable. Descriptive data are presented as mean±SD, median (range) or %. Differences in means were compared via Independent-Samples T Test and One-Way ANOVA. Proportions were analysed with chi-square test and odds ratios (OR) were calculated via cross tabulation with a confidence interval (CI) of 95%. $P<0.05$ was considered statistically significant.

Results
The control group was similar with respect to age, gender and education with the diabetic group. In the diabetic study population (n=193, male/female: 42/58%, age 54.2±14.0 years, median diabetes duration 7 years (1-32 years), postprandial blood glucose (PBG) 243±110 mg/dl, HbA_1c 7.3±3.6%) prevalence of alexithymia was significantly higher than in the control group (65 % in diabetics vs. 45 % in controls, $p=0.011$; mean TAS-26 score 12.3±3.7 vs. 10.6±3.6, $p=0.004$, respectively). Poor postprandial glycaemic control ($p=0.002$), female gender ($p=0.026$), combination therapy ($p=0.037$) and poor educational level ($p=0.005$) were positively associated with TAS-26 scores in diabetic individuals. Alexithymic diabetic patients were less educated (OR=1.2, $p=0.046$) and under worse glycaemic control (OR=2.4, $p=0.005$) compared to their non-alexithymic counterparts.

Introduction

Diabetes mellitus is a chronic disease with rising prevalence worldwide, representing a serious disease burden for societies. Adaptation to diabetes mellitus, which is known to affect metabolic control, is determined by the patient's perception depending on his/her life style, emotions and experiences and can be promoted by communicating information about the condition through professional, social and peer support.[1,2,3,4] Poor metabolic control, on the other hand, is associated with higher incidence of diabetic complications.[5]

Alexithymia is characterised by inability to express emotions verbally, poor imagination and operational thinking. It is not considered a psychiatric illness, but a personality trait, which may impair communication.[6] Poor ability to be aware of and to cope with emotions may make alexithymic individuals vulnerable to continuous stress[7] and prone to develop physical illnesses[8] which, in consequence, results in alexithymia being discussed as a potential underlying cause of psychosomatisation.[9]

There are few studies in the medical literature investigating the relationship of alexithymia with diabetes mellitus and most of them have been conducted with insulin dependent diabetic patients.[10, 11, 12, 13, 14, 15] It has been reported that alexithymia is frequently associated with diabetes mellitus[10, 11, 12, 13, 15, 16, 17, 18, 19] and that alexithymic diabetic individuals are prone to high levels of perceived stress[13, 15] which further impairs their already blunted ability to regulate emotions and monitor signals from their body and thus, may result in poor metabolic control.[10, 11, 12, 15, 16, 17]

The hypothesis of the present study was that alexithymia is more prevalent in diabetic individuals compared to non-diabetic controls and that among diabetic patients; alexithymic individuals have poorer glycaemic control compared to their non-alexithymic counterparts.

The aim of this study was to assess the prevalence of alexithymia and its association with metabolic control and other sociodemographic and disease related factors in a diabetic study population; furthermore, to compare TAS-26 scores and prevalence of alexithymia of diabetic patients with non-diabetic controls.

Materials and Methods

A cross-sectional, multi-centre study was performed at two different diabetes outpatient clinics in Turkey, the Department of Family Medicine, University of Kocaeli and the Division of Diabetes, Istanbul Medical Faculty, Istanbul University. The drop out rate due to incomplete data was 11% (n=24). Thus, 193 patients took part in the final evaluation. Eligibility criteria were being diagnosed with diabetes mellitus[20] at least 1 year ago, regular (every 2-3 months) attendance at the diabetes outpatient clinic during the preceding year, age over 18 years, no severe disability related to diabetes and no psychiatric comorbidities with ongoing treatment.

Sociodemographic parameters and personal and family medical history were investigated via a short, self-reported questionnaire. Disease related factors were obtained from medical records. A historical control group was composed by consecutively extracting data of sixty patients with various reasons for encounter not related to diabetes verified from patient records who, upon informed consent, had previously volunteered to complete the TAS-26 and who fulfilled the following eligibility criteria: age over 18 years, no established diagnosis of diabetes, no psychiatric disorder with ongoing treatment and no major disability.

Due to incomplete answers and/or clinical data, eleven cases dropped out, with a remaining forty-nine control subjects. Alexithymia was measured dimensionally, using the Turkish version of the 26-item Toronto Alexithymia Scale (TAS-26), translated and validated by Dereboy. The Turkish version features 26 yes/no items, with a score range between 0-26 and an alexithymia cut-off value of >11.[21] This cut-off value was used to dichotomise diabetic patients and non-diabetic controls into alexithymic and non-alexithymic individuals.[22] Educational level was dichotomised as "low" (below 5 years first level primary school education) and "high" (8 years second level primary school and higher). Diabetic patients were dichotomised as having poor (PBG>180 mg/dL or HbA1c>7%) or acceptable/good (PBG<180 mg/dL or HbA1c<7%) glycaemic control according to postprandial blood glucose and HbA1c levels, respectively.[23] Diabetic individuals were also categorised by their diabetic therapy regimen as receiving combination therapy (diet and oral blood glucose lowering agent(s) and insulin) or not (all other therapy options: diet only, diet and oral blood glucose lowering agents, diet and insulin).

The study was conducted in accordance with the Second Declaration of Helsinki, all subjects having given their informed verbal consent. Statistical analyses of the data were performed on an IBM compatible pc via SPSS 10.0 v. software. Descriptive results are presented as mean ± standard deviation, median (range) or percent. Independent-Samples T test and One-Way ANOVA were used to compare differences in means, and chi-square test was applied to non-parametric variables. Odds ratios (OR) were calculated via cross tabulation with a 95% confidence interval (CI). Pearson correlation coefficient was calculated for HbA1c and postprandial blood glucose. Statistical significance was set at a *p*-value <0.05.

Results

TAS-26 scores and alexithymia in diabetic individuals and non-diabetic controls

Data of 193 diabetic cases and 49 non-diabetic controls took part in the final evaluation. There was no signficant difference in terms of age, gender and educational level between diabetic individuals and controls (Table I). Diabetic patients had higher TAS-26 scores compared to non-diabetic controls. Sixty five percent of diabetic patients proved to be alexithymic, which was significantly higher than the prevalence of alexithymia in the control group (45%). General characteristics of cases and controls are shown in Table 1.

Diabetic study population

General Characteristics

The diabetic study population was predominantly female and had a good educational level (Table 1). Most of the patients were Type 2 diabetic, overweight and under poor glycaemic control, with a diabetic complication rate of 43%. More than half of the diabetic study population was treated with insulin and nearly half of them had participated in diabetes patient education (Table II).

Table I General characteristics of diabetic patients and non-diabetic control subjects

	Total n=242	Non-diabetic n=49	Diabetic n=193	*p*-value
Age, years (range)	54.0+13.1 (14-82)	53.6+9.3 (45-70)	54.2+14.0 (14-82)	0.724*
Gender m/f, n (%)	106/136 (44/56)	25/24 (51/49)	81/112 (42/58)	0.254** χ^2=1.30
Education high/low, n (%)	139/103 (57/ 43)	27/22 (55/45)	112/81 (58/42)	0.711** χ^2=0.137
TAS-26 score (range)	12.0±3.7 (3-23)	10.6±3.6 (3-22)	12.3±3.7 (3-23)	*0.004**
Alexithymic, n (%)	147 (61)	22 (45)	125 (65)	*0.011*** χ^2=6.47 *OR 2.3 (95% CI 1.2 to 4.3)*

*Independent-Samples T Test
**Chi-square Test

Table II Clinical characteristics of the diabetic study population

Diabetes Type T1DM/T2DM n (%)	39/154 (20/80)
Diabetes Duration Median (range) years	7 (1 - 32)
Combination Therapy[a] yes/no n (%)	14/179 (7/93)
HbA_1c %	7.3±3.6
PBG mg/dL	243±110
Glycaemic Control[b] poor/good n (%)	127/66 (66/34)
BMI kg/m^2	45.7±28.8
Any Diabetic Complication yes/no n (%)	83/110 (43/57)
Diabetes Patient Education yes/no n (%)	92/101 (48/52)
Smoking yes/no n (%)	42/151 (22/78)

[a] Combination therapy (diet + oral glucose lowering agent(s) + insulin)
[b] Glycaemic control (poor PBG≥180 mg/dL, good PBG<180 mg/dL)

Table III Significant characteristics associated with TAS-26 scores and alexithymia

	TAS-26 score	*p*-value	Alexithymic n=125	Non-alexithymic N=68	*p*-value
Gender m/f	11.6±3.4 vs. 12.8+3.8	*0.026**			0.095**
n (%)			47 vs. 78 (58.0 vs. 69.6)	34 vs. 34 (42.0 vs. 30.4)	
Education high/low	11.7+3.4 vs. 13.2±3.9	*0.005**			*0.046** OR=1.2
n (%)			66 vs. 59 (59.0 vs.72.8)	46 vs. 22 (41.0 vs.27.2)	*95% CI 1.02 to 1.62*
Combination Therapy no/yes	12.2+3.7 vs. 14.3±2.8	*0.037**			-
n (%)			113 vs.12 (63.1 vs.85.7)	66 vs. 2 (40.8 vs. 14.3)	
Glycaemic control good/poor	11.2±3.5 vs. 12.9+3.7	*0.002**			*0.005** OR=2.4
n (%)			34 vs. 91 (51.5 vs. 71.7)	32 vs. 36 (48.5 vs. 28.3)	*95% CI 1.3 to 4.4*
PBG mg/dL	-	-	261.5±115.4	211.5±94.2	*0.003**

* Independent-Samples T Test
** Chi-Square Test

Gender Differences

Compared to their male counterparts, female diabetic patients were less educated (OR 4.0, 95% CI 2.1 to 7.6, $p<0.001$), more overweight (BMI 30.0±5.0 kg/m^2 vs. 27.3±4.2 kg/m^2, $p<0.001$), more often isolated systolic hypertensive (OR 1.3, 95% CI 1.01 to 1.76, $p=0.038$) and more prone to alexithymia, as indicated by higher TAS-26 scores (12.8±3.8 in females vs.11.6±3.4 in males, $p=0.026$).

Factors associated with TAS-26 scores and Alexithymia

Female gender, poor educational level, combination therapy and poor glycaemic control were positively associated TAS-26 scores (Table III). Factors such as age, diabetes duration, diabetes type, conventional vs. intensive insulin therapy, alcohol and tobacco consumption, BMI, HbA_1c, comorbidities and presence of diabetic complications were not significantly associated with TAS-26 scores.

Alexithymic individuals were characterised by low education and poor glycaemic control (Table III). Although, HbA_1c levels were correlating with PBG levels ($r=0.35$, $p=0.001$), this did not translate into a significant difference in means of HbA_1c levels between alexithymic and non-alexithymic patients ($p=0.926$). Characteristics of diabetic patients by alexithymia are presented in Table III.

Discussion

Main results

The main results of the present study were a high prevalence of alexithymia in diabetic individuals as compared to similar, non-diabetic controls and an association of low education and poor glycaemic control with the presence of alexithymia among diabetic patients. Thus, both of the study hypotheses were supported by our findings.

Comparison of TAS-26 scores and alexithymia in diabetic patients with non-diabetic controls

There are only three studies comparing diabetic patients' alexithymia scores/alexithymia prevalence with non-diabetic controls, which have all produced results in accordance with the finding of the present study. Abramson et al. [16] have shown that diabetic patients were significantly more often alexithymic than non-diabetic controls. Fukunishi found a higher prevalence of alexithymia in bulimia nervosa patients with end stage renal disease due to diabetes mellitus than in those due to

other causes.[13] In their study, Yucel and colleagues[19] aimed at comparing alexithymia scores of patients affected by a disease with a strong psychosomatic aspect like irritable bowel syndrome (IBS) with scores of patients suffering from a chronic disease with subsequently developing psychiatric co-morbidity like diabetes, hypothesising that IBS patients would score higher in TAS-26 scores than diabetic patients. They found no significant difference in TAS-26 scores between diabetic and IBS patients, although diabetic patients scored somewhat higher. This finding indicates as strong association of diabetes with alexithymic features, comparable to a psychosomatic disorder like IBS, which can be interpreted as a further explanation for the high prevalence of alexithymia in the present study. The fact that alexithymia prevalence among control subjects in the present study was also high can be explained by a higher "baseline" alexithymia prevalence of Turkish individuals.

Cihan assessed the rate for alexithymia among healthy Turkish individuals as 27%, which was significantly higher compared to age and sex matched study groups in western populations.[24]

TAS-26 scores and alexithymia in diabetic individuals

Other studies dealing with the subject of alexithymia in diabetic individuals revealed results similar to our data with respect to mean TAS-26 scores and/or prevalence of alexithymia.

Fukunishi conducted a series of studies about psychosocial features and quality of life with insulin dependent diabetic patients (IDDM) on hemodialysis, where he also measured alexithymia. He reported a baseline alexithymia prevalence of 50-53% with an increase of 32-36% after two years in a prospective cohort of end stage renal disease (ESRD) diabetic patients.[11] In another cross-sectional study by the same author, alexithymia prevalence in diabetic haemodialysis patients is described as high as 83%[10] and alexithymia is shown to remain prevalent in these patients even in the presence of good quality of life scores in the psycho-social dimensions.[12] The high alexithymia prevalence rates described by Fukunishi can be explained by the advanced stage of diabetes as expressed by presence of a secondary diabetic complication (ESRD), leading to functional loss and limitation of activities and participation for the patients and their families. In a recent study, Manfrini et al.[15] have assessed the prevalence for alexithymia in a younger, type 1 diabetic study population as 48%, which can be interpreted similar to our result, as alexithymia can be considered highly prevalent in the study of Manfrini and colleagues. In a study conducted with 60 Turkish type 2 diabetic patients, Aslan and colleagues[17] assessed a mean TAS-26 score of 12.5±3.5, which is nearly identical with our figure. This similarity can be explained by the predominantly type 2 diabetic sample in the present study. Other studies featuring Turkish diabetic patients such as those by Ozkan et al. [18] and Yucel et al. [19], irrespective of age and diabetes type, have produced TAS-26 scores very similar to our result (11.9±3.6 and 11.33±3.90, respectively). In contrast, Friedman et al. [14] have assessed a surprisingly low prevalence of alexithymia, similar to the French general population in a sample of IDDM patients. This can be explained by younger age, low rates of diabetic complications, lack of exposure to stressful factors like hospitalisation and severe somatic complaints and better educational level (over two thirds of the patients were high educated) of the study population.

Factors associated with TAS-26 scores and alexithymia in individuals

Sociodemographic factors

According to the results of the present study, poorly educated, diabetic women were prone to have alexithymic features. None of the studies conducted with diabetic patients explicitly report a significant relationship of gender and/or educational level with alexithymia, but age, gender and education have been shown to be determinants of alexithymia in various other studies of non-diabetic study populations. Surprisingly, our study revealed female gender to be positively associated with TAS-26 scores, whereas, the classical gender related risk factor for alexithymia is being male.[25,26,27] As female diabetic individuals in the present study population displayed an unfavourable education status (see results) compared to males, the above finding might be a type1-error, confounded by education, which is also supported by the fact that the gender difference in TAS-26 scores did not translate into a difference in the prevalence of alexithymia. Education was found to be associated with TAS-26 scores as well as with the presence of alexithymia. In the medical literature, the association of education and alexithymia is dealt with some controversy, [28] but most of the studies are in accordance with our result, reporting higher levels of alexithymia in low educated individuals. [9, 26, 27, 29] Filiz and colleagues have shown that the previously reported association of alexithymia and essential hypertension[30], [31] was absent in a highly educated academic study population,[32] which can also be interpreted to be in accordance with our result, as high education was

associated with lower rates of alexithymia in our diabetic sample.

Disease related factors

Among disease related factors, combination therapy and poor glycaemic control were associated with higher TAS-26 scores. Poor glycaemic control was also related to the presence of alexithymia. Complex diabetes therapy protocols such as combination therapy with insulin, oral agents as well as diet, require a high level of compliance.

This may cause anxiety and stress in the diabetic patients and sometimes even their families. Even more so, in individuals with alexithymic features who are less capable of taking care of themselves and prone to higher levels of perceived stress, which might impair their already blunted emotional perception and body awareness, leading to poor glycaemic control.[15] Another feature of alexithymia is the inability to express emotions verbally which leads to suppressed emotions because of impaired affect regulation.

It has been hypothesised that suppression of emotion might impair patients' ability to manage their diabetes which, in turn, leads to a difficulty in regulating blood glucose levels.[16] Accordingly, it has been claimed that alexithymic individuals may develop physical illnesses due to deregulated autonomic and neuro-endocrine systems caused by un-modulated emotions.[8] The fact that alexithymia was associated with poor glycaemic control seems to support this hypothesis. However, due to the cross-sectional design of the present study, it is not possible to draw any conclusions on causality.

Aslan and colleagues[17] have shown that poorly controlled type 2 diabetic patients had a significantly higher TAS-26 means score compared to patients with good metabolic control, which is supported by our results. Friedman et al.[14] surprisingly could not verify any relationship between glycaemic control and alexithymia in a type 1 diabetic study population, although the study group was under poor metabolic control (mean HbA_1c level 8.6±1.7%).

The results of the present study add to the understanding of alexithymia being generally associated with poor glucose control in diabetic individuals, reflected in the current medical literature.

Limitations of the study

The cross-sectional design of this study does not allow for any conclusion on causality, which would be necessary to clearly identify the position of alexithymia in the aetiology of poor glycaemic control. Furthermore, limited sample size may have lead to false positive (positive association between female gender and TAS-26 scores) or false negative (no association between HbA_1c as continuous or semi-quantitative variable and TAS-scores/alexithymia) results. The fact that no other psychometric tools were used as comparison/external validation for TAS-26 scores/alexithymia, especially with respect to results being biased by eventual co-existing depression, might be considered a cause for systematic bias. However, to prevent confounding of results by psychiatric (co-)morbidity, these conditions were explicitly applied as exclusion criteria to both, diabetic patients as well as control subjects.

Conclusions and Clinical Complications

The high prevalence of alexithymia among diabetic individuals is an indicator for its importance in the approach to diabetic patients. The fact that alexithymic features, as well as the presence of alexithymia seem to be related to glycaemic control might be of value in terms of risk stratification of the individual diabetic patient for developing diabetic complications. Prospective studies with larger sample sizes are required to gain further insight into the complex relationship of affect regulation and disease prognosis in diabetes mellitus.

REFERENCES

1.Bradley C: Towards an integration of psychological and medical perspectives of diabetes management. In: Alberti K, Krall LP, eds. The Diabetes Annual. 2nd ed. Amsterdam: Elsevier,1986: 169–184.

2.Shillitoe RW ed. Psychology and Diabetes. Psychological Factors in Management and Control. London: Chapman and Hall, 1988.

3.Helz JW, Templeton MD. Evidence of the role of psychological factors in diabetes mellitus: a review. Am J Psychiatr 1990; 147: 1275–1282.

4.Holmes DM . The person and diabetes in psychological context. Diabetes Care 1986; 9: 194–206.

5.Herman WH, Crofford OB. The relationship between diabetic control and complications. In: Pickup JC, Williams G, eds. Textbook of Diabetes. 2nd ed. Oxford: Blackwell Science Ltd, 1997: 41.1.

6.Lesser IM. A review of the alexithymia concept. Psychosom Med 1981; 43(6): 531–543.

7.Krystal H. Integration and Self–Healing: Affect, Trauma, Alexithymia. Hillsdale, NJ: Analytic Press, 1988.

8.Webb E, Sokol MS, Zerbe KJ. Alexithymia in Medical and Psychiatric Illness. In Taylor GJ, Bagby RM, Parker JDA Disorders of Affect Regulation: Alexithymia in Medical and Psychiatric Illness. University Press, Cambridge: 1997.

9.Wise TN, Mann LS, Mitchell JD, et al. Secondary alexithymia: an empirical validation. Compr Psychiatry 1990; 31(4): 284–288.

10.Fukunishi I. Psychosomatic aspect of patients on hemodialysis: 2. Alexithymic trait of hemodialysis patients with diabetic nephropathy. Psychother Psychosom 1989; 58: 58–65.

11.Fukunishi I. Psychosomatic aspects of patients on hemodialysis: 3. Clinical usefulness of alexithymia. Psychother Psychosom 1990; 54 (4): 214–20.

12.Fukunishi I. Psychosomatic aspect of patients on hemodialysis: 4. The relationship between quality of life and alexithymia. Psychother Psychosom 1990; 54: 221–8.

13.Fukunishi I. Alexithymic characteristics of bulimia nervosa in diabetes mellitus with end–stage renal disease. Pschol Rep 1997; 81(2): 627–633.

14.Friedman S, Vila G, Even C, et al. Alexithymia in insulin–dependent diabetes mellitus is related to depression and not to somatic variables or compliance. J Psychosom Res 2003; 55: 285–287.

15.Manfrini S, Bruni R, Terminio N, et al. Alexithymia in subjects with type 1 diabetes. Diabetologia 2005; 48(Suppl.1): S323–S324 (abstract).

16.Abramson L, McClelland DC, Brown D, et al. Alexithymic characteristics and control in diabetic and healthy adults. J Nerv Ment Dis 1991; 179(8): 490–94.

17.Aslan SH, Diler RS, Alparslan ZN, et al. Diabetik hastalarda depresyon, kaygi, aleksitimi ve kan sekeri kontrolü (Depression, anxiety, alexithymia and blood glucose control in diabetic patients). Çukurova Üniversitesi Tip Fakültesi Dergisi (Journal of Çukurova University Medical Faculty) 1997; 22: 48–52.

18.Ozkan S, Turgay M. Tip I–II Diabetik hastalarda psikiyatrik morbidite ve hastalikla basetme güçlükleri (Psychiatric morbidity and difficulties in coping with disease in type I and type II diabetic patients). In: Ozkan S ed. Konsültasyon Liyezon Psikiyatrisi (Consultation and Liaison Psychiatry). Istanbul: 1994–1995.

19.Yucel B, Turgay M, Gurel Y, et al. Irritabl barsak sendromu ve diabetes mellitusta aleksitiminin degerlendirilmesi (Evaluation of alexithymia in irritable bowel syndrome and diabetes mellitus). Istanbul Tip Fakültesi Mecmuasi (Istanbul Medical School Journal) 1998; 66(1).

20.Expert Committee on the Diagnosis and Classification of Diabetes Mellitus: Report of the Expert Committee on the Diagnosis and Classification of Diabetes Mellitus. Diabetes Care 1997; 20 (1): 1183–1197.

21.Dereboy I F: Alekstimi öz–bildirim ölçeklerinin psikometrik özellikleri üzerine bir çalisma (A study on psychometric properties of self–reported alexithymia scales). Thesis 1990, Ankara

22.Dereboy IF. Aleksitmi: Bir gözden geçirme (Alexithymia: a review). Türk Psikiyatri Dergisi (Turkish Journal of Psychiatry) 1990; 1 (3): 157–165.

23.American Diabetes Association Position Statement. Standards of Medical Care in Diabetes. Diabetes Care 2003; 26 (Suppl.1): S33–S50.

24.Cihan R: Psikosomatik bir hastalik olan esansiyel hipertansiyonda aleksitimi (Alexithymia in a psychosomatic disease: essential hypertension). Unpublished Thesis 1997, Ankara: 38–42.

25.Salminen JK, Saarija¨rvi S, Toikka T, et al. Prevalence of alexithymia and its association with sociodemographic variables in the general population of Finland. J Psychosom Res 1999; 46: 75– 82.

26.Joukamaa M, Saarijärvi S, Lehtinen V. Alexithymia in primary health care patients. J Psychosom Res 1995; 39: 833–842.

27.Lane RD, Sechrest L, Riedel R. Sociodemographic correlates of alexithymia. Compr Psych 1998; 39: 377–385.

28.Franz M, Olbrich R, Croissant B, et al. Gefühl ohne Sprache oder Sprache ohne Gefühl. Weitere Hinweise auf die Validtät der Erkopplungshypothese der Alexithymie (Feelings without speech or speech without feelings? Further evidence for the decoupling hypothesis of alexithymia.) Nervenarzt 1999; 70: 216–224.

29.Parker JD, Taylor JG, Bagby RM. The alexithymia construct: relationship with sociodemographic variables and intelligence. Compr Psychiatry 1989; 30: 434–441.

30.Todarello O, Taylor GJ, Parker JDA, et al. Alexithymia in essential hypertension and psychiatric outpatients: a comparative study. J Psychosom Res 1995; 39: 987–994.

31.Taylor GJ. Recent developments in alexithymia theory and research. Can J Psychiatry 2000; 45(2): 134–142.

32.Filiz TM, Topsever P, Topalli R, et al. Aleksitimi ve hipertansiyon: yüksek egitim düzeyi ile Iliskili mi? (Alexithymia and hypertension: is there a relation with high educational level?). Diabet Bilimi (Diabetes Science) 2004; 2(5):221–225.