ISSN: 1813-4890

Psychological Fluctuations During Hormone Therapy in Patients with Diabetes Mellitus and Neuropathy: Implications for Disease Management and Hospital Outcomes

Mengshuang Ding [1,2], Yuxin Zhang [1,2,*]

[1] School of Basic Medical Sciences, North China University of Science and Technology, Tangshan 063210, China.

[2] Hebei Key Laboratory for Chronic Diseases, Tangshan, 063210, China.

Abstract

Diabetic patients with neuropathy presented with admission anxiety and depression scores of 0.78 ± 0.58 and 0.94 ± 0.59, respectively; these scores increased to 1.43 ± 0.56 and 1.18 ± 0.65 following corticosteroid therapy, and slightly decreased to 0.79 ± 0.51 and 1.02 ± 0.56 prior to discharge. Steroid therapy in diabetes patients with neuropathic complications leads to increased anxiety and depressive symptoms. These psychological factors independently correlate with treatment outcomes (p=0.09; p=0.01) and healthcare expenditures (p=0.01), although their effect on blood glucose fluctuations and length of hospital stay is comparatively minor.

Keywords

Diabetic Neuropathies, Hormone Therapy, Anxiety, Depression, Treatment Outcome.

1. Introduction

In China, diabetes mellitus is highly prevalent among older adults and is more likely to be complicated by neuropathic damage. The variability and therapeutic challenges of the disease, coupled with the extensive and irreversible nature of neuropathic complications, profoundly impair patients' quality of life and psychological well-being. Neuropathy often necessitates hormone therapy, which can induce marked fluctuations in blood glucose levels, thereby exacerbating anxiety, depression, and other adverse psychological states in diabetic patients. Adverse psychological states can impair glycemic control, diminish the efficacy of hormone therapy, and negatively affect hospitalization outcomes. Therefore, conducting empirical research to assess the psychological status of diabetic patients with neuropathy during hormone therapy, and to examine the impact of adverse psychological states on neuropathy treatment outcomes, glycemic control, and hospitalization metrics, is of considerable importance for informing targeted psychological interventions and improving both therapeutic efficacy and hospital outcomes in this population.

Diabetes mellitus is a chronic, lifelong metabolic disorder characterized by hyperglycemia and caused by multiple etiological factors. In China, the prevalence of diabetes is 28.8% among individuals aged 60–69 years and rises to 31.8% among those aged 70 years and older[1]. Evidence indicates that patients with diabetes are prone to developing neuropathic damage[2–3]. The prevalence of diabetic neuropathy is reported to be 52.97% [4].

Diabetic neuropathy, a chronic complication of diabetes, is closely associated with persistent hyperglycemia, metabolic dysregulation, and multiple cardiovascular factors [5]. Its pathogenesis involves activation of the polyol pathway, oxidative stress, mitochondrial dysfunction, accumulation of advanced glycation end-products, alterations in neurotrophic support, and activation of the protein kinase C (PKC) pathway, among others[6]. Neuropathic lesions can involve various parts of the nervous system, including demyelinating disorders such

ISSN: 1813-4890

as facial neuritis, Bell's palsy, oculomotor nerve palsy, and optic neuropathy, with reported prevalence ranging from 0.4% to 24.3%[7–10]. The management of such neurological lesions relies on high-dose corticosteroid pulse therapy[8, 11–14]. However, glucocorticoid use can reduce glucose utilization and promote gluconeogenesis, leading to further hyperglycemia in diabetic patients[15], which may in turn trigger anxiety and depression. Adverse psychological states may further hinder glycemic control, prolong hospitalization, and escalate healthcare costs in diabetic patients.

However, these assertions are largely inferred from prior studies; direct evidence is lacking to confirm that diabetic patients with neuropathy develop anxiety or depression during hormone therapy, or that such adverse psychological states influence hormone therapy outcomes, glycemic control, hospitalization duration, and medical costs.

Therefore, this study aims to conduct an empirical investigation to elucidate the psychological status of diabetic patients with neuropathy during hormone therapy and to determine the impact of adverse psychological states on treatment efficacy, glycemic control, and hospitalization outcomes. The findings will be pivotal for informing targeted psychological interventions to improve therapeutic results and clinical prognosis in this patient group.

2. Participants and Methods

2.1. Participants

A convenience sampling method was employed to recruit patients with diabetic neuropathy who were undergoing treatment at a tertiary grade-A hospital in Shandong Province. Inclusion criteria: (1) age ≥18 years; (2) clinically diagnosed with diabetic neuropathy; (3) normal or corrected-to-normal vision; (4) adequate reading ability; and (5) deemed by a clinician to be capable of completing the study assessments and provided informed consent. Exclusion criteria: (1) history of other severe physical illnesses; (2) diagnosed with psychiatric disorders or a family history of psychiatric disorders; and (3) history of substance abuse.

2.2. Instruments

2.2.1. General Information Questionnaire

Demographic and clinical data were collected, including name, sex, age, religious belief, disease duration, sleep quality, smoking and alcohol consumption habits; disease-related and laboratory parameters, including coexisting neurological disorders, neurological symptoms, glycemic control regimen, other complications, blood pressure, diastolic blood pressure (DBP), triglycerides (TG), low-density lipoprotein cholesterol (LDL-C), glycated hemoglobin (HbA1c), and postprandial 2-hour blood glucose

2.2.2. Short Portable Mental Status Questionnaire (SPMSQ)

The SPMSQ, developed by Pfeiffer et al., was used to assess cognitive function in older adults. It consists of four domains—orientation, calculation, memory, and recall—comprising a total of 10 items. Each correct answer scores 0 points, and each incorrect answer scores 1 point, with higher scores indicating poorer cognitive function. Scoring standards proposed by Professor Guo Jinwu were adopted: <2 points = normal cognition, 3–4 points = mild cognitive impairment, 5–7 points = moderate impairment, and 8–10 points = severe impairment. As the SPMSQ served as a screening tool for older adults in this study, when a respondent was identified as having severe cognitive impairment (total score >7), certain subjective questions were omitted.

2.2.3. Hospital Anxiety and Depression Scale (HADS)

The HADS comprises 14 self-report items, divided into two subscales for anxiety and depression. Items A (1, 3, 5, 7, 9, 11, 13) assess anxiety, and items D (2, 4, 6, 8, 10, 12, 14) assess depression. Each item is scored from 0 to 3, with subscale scores ranging from 0 to 21. Scores

ISSN: 1813-4890

of 0–7 indicate normal levels, 8–10 mild anxiety/depression, 11–14 moderate, and 15–21 severe. In this study, a score ≥8 on either subscale was considered indicative of anxiety or depression.

2.3. Survey Procedure

Investigators provided standardized instructions before the survey, ensuring informed consent and explaining the study objectives, procedures, and confidentiality principles. The questionnaires were administered and collected on site. A total of 104 questionnaires were distributed, and 102 valid responses were obtained, yielding a valid response rate of 98.00%.

2.4. Statistical Analysis

(1) Psychological changes during corticosteroid therapy

Eligible patients were screened using the SPMSQ, excluding those with severe cognitive impairment. The Hospital Anxiety and Depression Scale (HADS), developed by Zigmond et al. and revised by Ye Weifei et al., was administered at three time points—upon admission, after corticosteroid initiation, and before discharge—to assess the relationship between psychological changes, corticosteroid use, and glycemic fluctuations.

(2) Impact of negative psychological states on glycemic control, therapeutic outcomes, and hospitalization results

At each of the three time points (before corticosteroid initiation, after initiation, and before discharge), psychological status, blood glucose levels, and corticosteroid treatment efficacy were measured. Hospitalization duration, medical expenses, and discharge outcomes were obtained from medical records. Paired t-tests were used to compare psychological states before and after corticosteroid therapy. Linear or logistic regression analyses were conducted, with hospitalization duration, medical expenses, blood glucose variability, and treatment efficacy as dependent variables, controlling for baseline psychological status, to evaluate the predictive value of psychological status three days after corticosteroid initiation. This analysis aimed to determine the effects of negative psychological states on glycemic control, neuropathy treatment efficacy, and hospitalization outcomes in patients with diabetic neuropathy undergoing corticosteroid therapy.

3. Results

3.1. General Characteristics of the Study Participants

A total of 102 eligible patients were enrolled in this study, comprising 55% males and 45% females.

The majority of participants were married, had no religious affiliation, were engaged in farming, and had been diagnosed within the past 0–10 years.

Table 1. General Characteristics of the Study Participants

Item	(Number of cases) Percentage / Mean (SD)
Marital Status	
Married	86.00%
Other (Unmarried, Widowed, Divorced)	14%
Education Level	
0–6 years	32.30%
7–10 years	35.5%

ISSN: 1813-4890

10–15 years	32.2%
Occupation	
Worker	21.3%
Farmer	54.00%
Self-employed	12.00%
Unemployed	7.4%
Other	5.3%
Duration of Diagnosis	
0–10 years	80%
11–20 years	15%
21–30 years	5%
Religious Belief	
None	98%
Yes	2%

3.2. Psychological Changes in Patients with Diabetic Neuropathy During Glucocorticoid Therapy

Analysis revealed that the mean anxiety score upon admission was 0.78 ± 0.58, and the mean depression score was 0.94 ± 0.59. Following glucocorticoid therapy, the mean anxiety and depression scores increased to 1.43 ± 0.56 and 1.18 ± 0.65, respectively. Prior to discharge, anxiety and depression scores were 0.79 ± 0.51 and 1.02 ± 0.56, respectively (Table 2).

Table 2. Anxiety and Depression Scores of Patients at Admission, Post-Glucocorticoid Treatment, and Discharge

Variable	Mean	SD
Anxiety at admission	0.78	0.58
Depression at admission	0.94	0.59
Anxiety after glucocorticoid treatment	1.43	0.56
Depression after glucocorticoid treatment	1.18	0.65
Anxiety at discharge	0.79	0.51
Depression at discharge	1.02	0.56

A paired t-test comparing pre- and post-treatment anxiety scores in patients with diabetic neuropathy yielded statistically significant results ($p < 0.01$), indicating that glucocorticoid therapy significantly influences anxiety levels in this population. Similarly, a paired t-test of pre- and post-treatment depression scores demonstrated statistical significance ($p < 0.01$), suggesting that glucocorticoid therapy has a significant impact on depression levels in these patients (Table 3).

Table 3. Changes in Anxiety and Depression Scores Before and After Glucocorticoid Administration

Pairwise Comparison	Mean ± SD	95% CI	t	p
Anxiety before vs. after glucocorticoid	-0.26 ± 0.49	(-0.36, -0.16)	-5.33	<0.01

ISSN: 1813-4890

Depression before vs. after glucocorticoid	-0.24 ± 0.43	(-0.33, -0.16)	-5.58	<0.01

3.3. Impact of Adverse Psychological States on Glycemic Control, Therapeutic Outcomes, and Hospitalization in Patients with Diabetic Neuropathy

Hospital stay duration, medical costs, and clinical outcomes were extracted from medical records. Using length of hospitalization, healthcare expenditure, glycemic variability, and therapeutic efficacy as dependent variables, linear regression analyses were conducted to assess the predictive validity of psychological status measured three days after glucocorticoid initiation. The results indicated that post-treatment anxiety and depression were independent risk factors for poorer therapeutic outcomes ($p = 0.09$; $p = 0.01$), and that post-treatment depression was an independent predictor of increased medical expenses ($p = 0.01$) (Table 4).

Table 4. Effects of Adverse Psychological States on Glucocorticoid Treatment Outcomes and Hospitalization

Post-Treatment Psychological State	Outcome	β	t	p
Anxiety	Treatment efficacy	-0.23	-1.67	0.09
Depression	Treatment efficacy	-0.244	-2.431	0.01
Depression	Medical costs	7056.3	3.010	0.01

4. Discussion

4.1. Psychological changes in patients with diabetic neuropathy during glucocorticoid therapy

Whether glucocorticoid therapy induces psychological fluctuations in patients with diabetes remains insufficiently substantiated by empirical evidence. However, existing studies indicate that glucocorticoid therapy in diabetic patients can provoke more pronounced glycemic fluctuations. The underlying mechanism may involve glucocorticoids exacerbating insulin resistance, impairing pancreatic β-cell function, restricting glucose utilization, and promoting gluconeogenesis[16]. Studies have demonstrated[17] that administration of moderate-to-high doses of glucocorticoids leads to significant hyperglycemia in diabetic patients. Research by Burt et al.[18] and Yan Yuxin et al.[19] in patients with chronic obstructive pulmonary disease revealed that those with coexisting diabetes had daily mean blood glucose concentrations 32% and 38% higher, respectively, than their non-diabetic counterparts following glucocorticoid therapy. In a study of nine patients with multiple myeloma, Véber et al.[20] found that those with coexisting diabetes experienced an almost twofold increase in mean blood glucose after glucocorticoid treatment. Postprandial glucose after lunch and dinner increased by 63% and 70%, respectively, compared with patients not receiving glucocorticoids[17]. In diabetic patients receiving methylprednisolone, postprandial blood glucose levels follow the order of dinner > lunch > breakfast, with the glycemic peak delayed to 1.5 hours after dinner, exhibiting a stepwise elevation pattern [19]. Glycemic variability is closely associated with anxiety and depressive symptoms in individuals with diabetes. Epidemiological data indicate that the prevalence of anxiety and depression among adults with type 2 diabetes mellitus (T2DM) in China is 61.74% and 34.78%, respectively [21]. Higher blood glucose levels are correlated with greater severity of depressive and anxiety symptoms in diabetic patients [22–24].

ISSN: 1813-4890

In summary, current evidence suggests that corticosteroid therapy can induce greater glycemic variability in patients with diabetes, and such fluctuations have been shown to be associated with the development of adverse emotional states. However, whether these glucose fluctuations during corticosteroid therapy contribute to psychological distress in diabetic patients remains unexplored.

The present analysis demonstrated that, in patients with diabetes and neuropathy, paired t-tests revealed a statistically significant change in anxiety scores before and after corticosteroid therapy ($p < 0.01$), indicating that steroid treatment significantly affects anxiety levels.

Similarly, depression scores before and after corticosteroid therapy showed a statistically significant difference ($p < 0.01$), suggesting that such treatment also influences depressive symptoms in this population. This effect may be attributable to steroid-induced hyperglycemia, which impairs glycemic control and exacerbates negative emotions such as depression.

4.2. Impact of Adverse Psychological States on Glycemic Control, Hormone Therapy Outcomes, and Hospitalization in Patients with Diabetes

Effect of Adverse Psychological States on Hormone Therapy Outcomes in Patients with Diabetes and Neurological Complications

Evidence indicates that adverse psychological states, such as anxiety and depression, can impair the therapeutic efficacy of hormone treatment in patients with neurological complications. These conditions may precipitate or exacerbate neurological disorders, thereby increasing the complexity of diagnosis and treatment [27]. The underlying mechanisms, however, remain to be fully elucidated.

In the present study, data on length of hospitalization, medical costs, and clinical outcomes were extracted from medical records. Using length of stay, healthcare expenditure, glycemic variability, and therapeutic efficacy as dependent variables, linear regression analyses were performed to assess the predictive value of patients' psychological status three days after initiation of hormone therapy. The results demonstrated that post-treatment anxiety and depressive symptoms were independent risk factors for suboptimal treatment outcomes ($p = 0.09$; $p = 0.01$, respectively). By contrast, the impact of these psychological factors on glycemic variability was relatively modest.

Effect of Adverse Psychological States on Hospitalization Duration and Healthcare Costs in Patients with Diabetes and Neurological Complications

To date, no study has specifically examined the influence of adverse psychological states on hospitalization duration and healthcare costs in patients with diabetes complicated by neurological disorders. Nevertheless, prior research has consistently shown that depressive symptoms are associated with prolonged hospitalization across various disease populations [28]. Patients with coexisting diabetes and depression experience a significantly higher number of hospital admissions and longer lengths of stay compared with those without depression. Fleur E. P. van Dooren et al. reported that depression increases the risk of mortality in patients with diabetes by 46% [29]. Similarly, Sajini Kuruppu et al. found that patients with cardiovascular disease and depression have extended hospital stays, higher 30-day readmission rates, and increased in-hospital mortality [30]. In another study, Angelo de la Rosa et al. demonstrated that depression in heart transplant recipients is linked to a higher incidence of acute rejection, longer stays in both intensive care units and general wards, and a significantly elevated five-year mortality rate [31].

Summary, collectively, these findings suggest that adverse psychological states can negatively affect glycemic control in patients with diabetes and may also influence hospitalization duration and healthcare expenditures. However, existing evidence is largely derived from studies of patients with diabetes alone or with other comorbidities, and no prior research has

ISSN: 1813-4890

investigated whether these effects extend to patients with both diabetes and neurological complications. Similarly, there is a paucity of evidence on the influence of adverse psychological states on hormone therapy outcomes in this patient population.

In the present study, post-treatment depressive symptoms emerged as an independent risk factor for increased medical costs ($p = 0.01$), whereas anxiety and depression had relatively limited effects on hospitalization duration.

5. Conclusion

In summary, among patients with diabetes mellitus complicated by neuropathy, the mean anxiety score upon admission was 0.78 ± 0.58, and the mean depression score was 0.94 ± 0.59. Following corticosteroid therapy, the mean anxiety score increased to 1.43 ± 0.56, and the mean depression score rose to 1.18 ± 0.65. Prior to discharge, the mean anxiety score decreased to 0.79 ± 0.51, while the mean depression score was 1.02 ± 0.56. Corticosteroid therapy in this patient population was associated with the onset or exacerbation of adverse psychological states such as anxiety and depression. Post-treatment anxiety and depressive symptoms were identified as independent risk factors for poorer therapeutic outcomes ($p = 0.09$; $p = 0.01$, respectively), whereas their impact on glycemic variability was minimal. Moreover, post-treatment depression emerged as an independent risk factor for increased medical costs ($p = 0.01$), while both anxiety and depression had a negligible effect on length of hospital stay.

Acknowledgements

The authors extend their sincere gratitude to all patients who generously participated in this study and to the clinical staff for their invaluable assistance in data collection and patient care. We also acknowledge the contributions of our colleagues in the Department of Medical Psychology for their insightful discussions and constructive feedback during the research process. The authors are particularly grateful to Professor Zhang for their guidance and encouragement, which greatly enhanced the quality of this study.

References

[1] Y.X. Li, Y.Y. Zuo, W.M. Li et al.: Interpretation on the Guideline for the Management of Diabetes Mellitus in the Elderly in China (2024 Edition) and Its Implications for Nursing Practice, Journal of Nurses Training, Vol. 1 (2025) No.1, p.1-10.

[2] B.F. Yang, Y.B. Wen, J. Li et al.: Diabetic Chronic Inflammatory Demyelinating Neuropathy – 4 Cases of Clinical Analysis and Literature Review, Journal of Apoplexy and Nervous Diseases, Vol. 31 (2014) No.12, p.1115-1117.

[3] H.H. Li, M.L. Guo, Y.Q. Yin, S. Wu and X.H. Jiang et al.: Analysis of the Risk of Diabetic Ophthalmoplegia, International Eye Science, Vol. 19 (2019) No.3, p.494-498.

[4] Clinical Guidelines for the Prevention and Treatment of Type 2 Diabetes in the Elderly in China (2022 Edition), Chinese Journal of Diabetes, Vol. 30 (2022) No.1, p.2-51.

[5] L. Li: Clinical Study of Chronic Complications of Type 2 Diabetes in the Elderly, Chinese Journal of Gerontology, Vol. 39 (2019) No.18, p.4619-4622.

[6] E.L. Feldman, K.A. Nave, T.S. Jensen and D.L.H. Bennett: New Horizons in Diabetic Neuropathy: Mechanisms, Bioenergetics, and Pain, Neuron, Vol. 93 (2017) No.6, p.1296-1313.

[7] F. Liu, C.R. Li and S.G. Sun: Current Status of Treatment of Diabetic Optic Neuropathy, Chinese Journal of Practical Ophthalmology, Vol. 33 (2015) No.9, p.960-962.

[8] Y. Zhou and L.Z. Liao: Clinical Application of Glucocorticoid in Type 2 Diabetic Patients Complicated with Oculomotor Paralysis, China Tropical Medicine, Vol. 10 (2010) No.11, p.1405-1406.

[9] X.X. Liu, L.J. Ji, W. Gong et al.: Diabetic Radioculoplexus Neuropathy: Two Case Reports and Literature Review, Chinese Journal of Diabetes, Vol. 12 (2020) No.12, p.1037-1040.

[10] X.J. Ye, H.B. Jiang, S.F. Chen et al.: Alprostadil Treated 20 Cases of Diabetes Mellitus Complicated by Bell's Palsy, The Journal of Practical Medicine, Vol. 24 (2008) No.24, p.4274-4275.

[11] Y.L. Feng and C.X. Wei: Discussion on the Use of Acute Facial Neuritis Hormones in Patients with Diabetes, Psychological Doctor, Vol. 25 (2019) No.5, p.150-151.

[12] J. Hu: Clinical Efficacy of Hormones in the Treatment of Inflammatory Demyelinating Diseases of the Central Nervous System, Chinese Journal of Gerontology, Vol. 33 (2013) No.24, p.6262-6263.

[13] Z. Jiang, H.B. Wang, J.F. Li et al.: Changes of Glucocorticoid Receptor Expression in the Facial Nucleus of Mice with Facial Nerve Palsy Induced by Herpes Simplex Virus Type 1, Journal of Shandong University (Health Sciences), Vol. 49 (2011) No.5, p.43-47.

[14] H. Ouyang, X.C. He, Z.P. Lin et al.: Retrospective Analysis of 1170 Cases of Bell's Palsy, Chinese Journal of Physical Medicine and Rehabilitation, Vol. 39 (2017) No.5, p.351-354.

[15] H.Y. Ye and Y.M. Li: Glucose Metabolism Abnormalities Induced by Glucocorticoids, Chinese Journal of Diabetes, Vol. 13 (2021) No.1, p.1-4.

[16] N. Li and Y. Wang: Research Progress on Glucocorticoid-related Blood Glucose Management in Patients with Type 2 Diabetes, Journal of Clinical and Pathological Research, Vol. 40 (2020) No.3, p.760-767.

[17] J.P. Li, N.S. Li and W.G. Zhao: The Impact of Exogenous Glucocorticoids on Glucose Metabolism as Evaluated by Continuous Glucose Monitoring, Chinese Journal of Clinical Nutrition, Vol. 26 (2018) No.1, p.61-64.

[18] M.G. Burt, G.W. Roberts, N.R. Aguilar-Loza, P. Frith and S.N. Stranks: Continuous Monitoring of Circadian Glycemic Patterns in Patients Receiving Prednisolone for COPD, The Journal of Clinical Endocrinology & Metabolism, Vol. 96 (2011) No.6, p.1789-1796.

[19] Y.X. Xian, L. Li, R.X. Sun et al.: Characteristics of Daily Blood Glucose Profiles of Diabetes Mellitus Receiving Methylprednisolone and Adjustment of Insulin, Chinese Journal of Endocrinology and Metabolism, Vol. 30 (2014) No.6, p.468-472.

[20] O. Véber, A. Wilde, J. Demeter, G. Tamás, I. Mucsi and A.G. Tabák: The Effect of Steroid Pulse Therapy on Carbohydrate Metabolism in Multiple Myeloma Patients: A Randomized Crossover Observational Clinical Study, Journal of Endocrinological Investigation, Vol. 37 (2014) No.4, p. 345–351.

[21] T.Y. Qiu and J. Huang: Systematic Review of Mental Health of Patients with Type 1 Diabetes Mellitus and the Interventions, Journal of Nursing Science, Vol. 27 (2012) No.15, p.90-92.

[22] K.J. Smith, M. Béland, M. Clyde, G. Gariépy, V. Pagé, G. Badawi, R. Rabasa-Lhoret and N. Schmitz: Association of Diabetes with Anxiety: A Systematic Review and Meta-analysis, Journal of Psychosomatic Research, Vol. 74 (2013) No.2, p.89–99

[23] Q.L. Zhuang, F.M. Chen, T. Wang et al.: Current Situation and Influencing Factors of Anxiety and Depression in the Elderly with Hypertension and Prediabetes, Chinese Journal of Gerontology, Vol. 38 (2018) No.24, p.6093-6095.

[24] J.P. Liu, R.P. Wang and Y. Wang: Research of Influencing Factors on Senile Type 2 Diabetes Mellitus with Anxiety and Depression, Chinese Journal of Geriatrics, Vol. 34 (2015) No.10, p.1121-1123.

[25]S.X. LI. Investigation on Anxiety and Depression in Patients with Type 2 Diabetes(M.Med., Henan University, China 2019) , p.7

[26] T. Babazono, J. Nakajima, K. Ishizawa et al.: The Relationship between Depressive Symptoms and Diabetic Complications in Elderly Patients with Diabetes: Analysis Using the Diabetes Study from the Center of Tokyo Women's Medical University (DIACET), Journal of Diabetes and Its Complications, Vol. 30 (2016) No.4, p.597-602.

[27] Expert Consensus Group on the Diagnosis and Treatment of Neurological Diseases with Depression and Anxiety Disorders: Expert Consensus on the Diagnosis and Treatment of Neurological Disorders with Depression and Anxiety Disorders (Updated), Chinese Journal of Internal Medicine

[28] E.P. Vamos, I. Mucsi, A. Keszei, M.S. Kopp and M. Novak: Comorbid Depression is Associated with Increased Healthcare Utilization and Lost Productivity in Persons with Diabetes: A Large Nationally Representative Hungarian Population Survey, Psychosomatic Medicine, Vol. 71 (2009) No.5, p. 501–507.

[29] F.E.P. van Dooren, G. Nefs, M.T. Schram et al.: Depression and Risk of Mortality in People with Diabetes Mellitus: A Systematic Review and Meta-analysis, PLoS ONE, Vol. 8 (2017) No.3, p.e57058.

[30] S. Kuruppu, M. Ghani, M. Pritchard et al.: A Prospective Investigation of Depression and Adverse Outcomes in Patients Undergoing Vascular Surgical Interventions: A Retrospective Cohort Study Using a Large Mental Health Database in South London, European Psychiatry, Vol. 64 (2021) No.1, p.e13.

[31] A. de la Rosa, T. Singer-Englar, M.A. Hamilton, W.W. IsHak, J.A. Kobashigawa and M.M. Kittleson: The Impact of Depression on Heart Transplant Outcomes: A Retrospective Single-center Cohort Study, Clinical Transplantation, Vol. 35 (2021) No.3, p.e14204.