RESEARCH ARTICLE

Examination of quality of life in patients using exenatide with different dimensions

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Abstract

Objective: To investigate the effects of exenatide treatment on type-2 diabetes mellitus patients' quality of life.

Methods: The cross-sectional study was conducted from March 1 to June 30, 2019, after approval from Suleyman Demirel University, Isparta, Turkey, and comprised type 2 diabetes mellitus patients of either gender under exenatide treatment. Data was collected using a questionnaire during face-to-face interview and included sociodemographic and clinical information along with the World Health Organisation-5 well-being index, the obesity awareness and insight scale, the obesity-specific quality of life scale and the coping orientation to problems experienced-brief inventory. Data was analysed using SPSS 22.

Results: Of the 146 patients, 82(56.2%) were female. The overall mean age was 50.6±11.5 years, mean duration of diabetes was 7.4±4.3 years, and mean exenatide use was 9.1±6.6 months. The most common reason cited in favour of exenatide was related to weight-loss 121(82.9%). The patients scored the highest score on the 'Awareness' subscale of the obesity awareness scale 29.54±5.42.

Conclusion: Exenatide use was effective in improving quality of life, and weight-loss was considered a secondary gain by the diabetics.

Keywords: Diabetes mellitus, Exenatide, Quality of life, Patients. (JPMA 72: 817; 2022)

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Introduction

Diabetes mellitus (DM) is one of the main causes of death and its frequency is increasing across the World. Since 2000, the estimated prevalence of DM has increased by 5.7% worldwide to 9.3%. There were 30 million diabetics globally in 1985, but by 2005 there were more than 230 million diabetics; an increase of almost seven times in 20 years. According to the International Diabetes Federation (IDF), if nothing is done to slow down this epidemic, it is expected that the number of diabetics will increase to 700 million by 2045 from 463 million in 2019, indicating an increase of 51%.[1,2] It is known that more than 80% of diabetics have weight problems and half of them are at obesity level. Studies showed that obesity in DM increases morbidity and mortality.[3]

According to the Turkish Epidemiology Survey of Diabetes, Hypertension, Obesity and Endocrine Diseases (TURDEP-II), the prevalence of diabetes in Turkey reached 13.7% and the prevalence of obesity reached 32% in the Turkish adult population, and obesity and diabetes were the most important public health problems.[4] According the preliminary TURDEP-II results, mean weight, waist circumference and hip circumference increased in both genders.[5]

Timely medical intervention and its continuity are necessary for DM management.[6] Further, failure to attain and maintain the target glycated haemoglobin (HbA1C) level despite long-term insulin and oral anti-diabetics (OADs) brought into play incretins which are hormones that stimulate insulin secretion in response to food intake.[7]

Glucagon-like peptide-1 receptor agonists (GLP-1A) mimic incretin hormones, and, therefore, GLP-1A exenatide was approved by the United States Food and Drug Administration (FDA) in 2005 and by the relevant authorities in Europe, Middle East and Africa (EMEA) in 2007.[8] It was put into use in Turkey in 2010. A study showed that GLP-1A was superior to other DM treatments in terms of diabetes and weight control.[9] The American Diabetes Association (ADA) and the American Association of Clinical Endocrinologists (AACE) indicated that treatment with GLP-1A, sodium-glucose co-transporter-2 (SGLT-2) inhibitor or non-insulin treatment should be intensified in patients who cannot achieve glycaemic control with basal insulin.[6,8,10,11] Thus, GLP-1 agonists became a second-line treatment option.

The quality of life (QOL) includes cognitive and emotional components of an individual, and is defined as subjective perception of social, emotional and physical well-being.[12]

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Studies found that the presence of complications, lack of adequate metabolic control, the presence of any other chronic disease, having previous psychiatric illness, and accompanying obesity result in insulin having negative effect on QOL.[12-14]

The current study was planned to investigate the effects of exenatide drug treatment on type 2 DM (t2DM) patients' QOL.

Subjects and methods

The cross-sectional study was conducted from March 1to June 30, 2019, at endocrinology and metabolic diseases polyclinics of universities and public hospitals in Turkey's western province. After approval from the ethics review committee of Suleyman Demirel University, Isparta, Turkey, T2DM patients of either gender under exenatide treatment were included without using any sampling technique. All T2DM patients presenting to the polyclinics during the study period constituted the study universe. Patients having spent <3 months under exenatide therapy and those not willing to participate were excluded.

After taking consent from the participants, data was collected through a questionnaire using face-to-face interview method. In the first part of the questionnaire, data related to socioeconomic status (SES), disease status, anthropometric measurements and lifestyle information was collected. In anthropometric measurements, height, weight and weight change of the preceding 1 year were asked about, and body mass index (BMI) was calculated. Open-ended questions about the use of exenatide were added to the questionnaire. The second part of the questionnaire comprised the World Health Organisation-5 well-being index (WHO-5), the obesity awareness and insight scale (OASIS), the obesity-specific quality of life scale (OSQOL) and the short form of coping orientation to problems experienced (Brief-COPE) inventory. WHO-5 collects data on the health status and QOL of individuals related to their physical and social environment.[15,16] The short form of WHO-5 was used to determine patients' QOL. This scale consists of 5 subscales, with overall score having a 0-25 range. Low scores indicate low QOL.[15,17]

OASIS has 23 items and three sub-dimensions.[18] The Turkish version of the scale19 was used which is scored on a 4-point Likert scale and has three subscales, and higher scores indicate high awareness level.[19] The Turkish version of OSQOL is a 17-item tool scored on a 6-point Likert scale.[20,21] A single QOL score is obtained by summing up all items of OSQOL, ranging 0-100, with higher score indicating higher QOL. The Turkish version of Brief-COPE[22] is a self-reporting scale having 15 subscales and 60 questions. Each subscale score ranges 4-16 points. The sum of the scores of the first five of these subscales is the problem-oriented coping score. The sum of the 6th to 10th subscale scores gives the emotional-oriented coping score, and the sum of the last five subscale scores gives the non-functional coping score.

Data was analysed using SPSS 22. Data was presented with 95% confidence interval (CI) as mean ± standard

Table-1: Socio-demographic characteristics of the study subjects (n=146).

Variables		n	%
Gender			
Female		82	56.2
Male		64	43,8
Age		50.6±11.6 (18-85)	
Educational status			
Literate		19	13.0
Primary School		27	18.5
High School		59	40.4
University		41	28.1
Economical Status			
Good		38	26.0
Moderate		76	52.1
Poor		32	21.9
Ones whose mother is overweight		60	41.1
Ones whose father is overweight		34	23.3
Ones who has another obese among first degree relatives		90	61.6
Weight change in the last year before starting Exenatidee			
>5 kg weight loss		29	19.9
No weight change		63	43.1
>5 kg weight gain		54	37.0
Latest Body Mass Index values		39.5±7.5 (25.2-62.4)	
Smoking			
Yes		35	24
No		111	76
Alcohol			
Yes		1	0.7
No		145	99.3
Physical Activity			
Yes		48	32.9
No		98	67.1
Duration of diabetes (years)	7.4±4.3	1	19
Obesity diagnosis period (years)	12.6±3.6	1	19
The age of being overweight	37.5±10.1	28	53
Exenatidee usage period (months)	9.1±6.6	3	36
Weight loss after Exenatide (kg)	10.1±5.6	0	38
FBS level			
FBS before Exenatidee	189.4±57.6	89	392
FBS after Exenatidee	162.3±45.1	94	299
t/p		6.076/0.000	
HbA1C level			
Level of HbA1C before Exenatidee	8,4±1,7	5.3	15
Level of HbA1C after Exenatidee	7,3±1,5	4.5	11
t/p		7.175/ 0.000	

DM: Diabetes mellitus, FBS: Fasting blood sugar, HbA1c: Glycated haemoglobin.

deviation and frequencies and percentages. Paired t test was used for intra-group comparisons and student's t test was used for inter-group comparisons. Pearson's correlation coefficient was used to determine the correlation of continuous data. P<0.05 was considered statistically significant.

Results

Of the 197 patients receiving exenatide therapy, 146(74.11%) formed the study sample. Among them, 82(56.2%) were female. The overall mean age was 50.6±11.5 years, mean duration of diabetes was 7.4±4.3 years, and mean exenatide use was 9.1±6.6 months. The majority of patients 98(67.1%) did not exercise actively and they lost an average 10.1±5.6kg after starting exenatide. Fasting glucose (FG) values and HbA1C ratios of the patients decreased significantly after exenatide use (p<0.001) (Table-1).

Table-3: The mean scale scores of the subjects.

Scales	Mean± SD
WHO-5	16.85±1.65
I have felt cheerful and in good spirits	3.72±1.65
I have felt calm and relaxed	2.93±1.42
I have felt active and vigorous?	4.37±0.91
I woke up feeling fresh and rested?	3.15±1.63
My daily life has been filled with things that interest me	2.68±1.49
OASIS	
Awareness	29.54±5.42
Risk information	18.63±3.54
Nutrition	17.69±3.46
OSQOL	76.39±12.23
COPE	
Problem-oriented coping	62.32±8.05
Emotional-oriented coping	59.84±10.23
Non-functional coping	37.23±7.59

SD: Standard deviation, WHO-5: World Health Organisation-5, OASIS: Obesity awareness and Insight scale, OSQOL: Obesity-specific quality of life scale, COPE: Coping Orientation to Problems Experienced.

Table-2: The Answers of the study subjects to questions about the use of exenatide.

	n	%
Have you used insulin before Exenatide		
Yes	84	57.5
No	62	42.5
Do doctors take into consideration that you are overweight when you use Exenatide		
Yes	121	82.9
No	25	17.1
Are you satisfied with the final form of your treatment compared to the previous version		
Yes	110	75.4
No	36	24.6
How do you think the convenience of Exenatide in addition to basal insulin use (n = 84)		
More Comfortable (group who had more previous injections)	16	19.1
Harder, less Comfortable	47	55.9
I am not questioning, I need to use	21	25.0
***How do you think the convenience of using Exenatide in addition to OAD (n = 62)**		
More Comfortable	4	6.5
Harder	35	56.4
I am not questioning, I need to use	23	37.1
***What are the advantages of Exenatide with Basal Insulin use compared to insulin use only (n = 84)**		
No need to adjust / change injection dose	79	94.0
There is no possibility of forgetting the amount of injection dose	73	86.9
I can carry more comfortably	21	25.0
Since I can provide better blood glucose control, "Will my insulin dose increase?" concern has diminished	36	42.9
Dose of insulin I use was reduced	37	44.0
It does not increase weight	84	100.0
Does not increase / decrease my appetite	82	97.6
I'm getting less of a dessert / eating crisis because of my satiety	58	69.0
I have less hypoglycaemia attacks since the addition of exenatide, which reduced my concerns	65	77.4
My effort capacity increased because I lost weight	61	72.6
I'm more confident because I lost weight	69	82.1
***What are the advantages of using Exenatide with OAD compared to OAD only (n = 62)**		
I feel confident that I can manage the disease because I can provide better blood glucose control	56	90.3
Although I am afraid of injections, I am not having trouble	43	69.4
My effort capacity increased because I lost weight	51	82.3
My self-confidence increased because I lost weight — it made me feel good	54	87.1

OAD: Oral anti-diabetics *Multiple options are marked.

Table-4: Relationship of WHO-5 scores with OASIS, COPE, OSQOL values of the subjects.

Item Content	Awareness	Risk information	Nutrition
I have felt cheerful and in good spirits	0.63*	0.09	0.44**
I have felt calm and relaxed	0.23**	0.25**	067**
I have felt active and vigorous	0.25**	0.71*	0.09
I woke up feeling fresh and rested	0.32*	0.53**	0.08
My daily life has been filled with things that interest me	0.68**	0.07	0.45**
WHO-5Total	0.45**	0.82*	0.09

The relationship between the WHO-5 subscale and the COPE subscale (Pearson r)

Item Content	Problem-oriented coping	Emotional-oriented coping	Non-functional coping
I have felt cheerful and in good spirits	0.20*	0.41**	0.58**
I have felt calm and relaxed	0.09	0.69**	0.57**
I have felt active and vigorous	0.45**	0.40**	0.30*
I woke up feeling fresh and rested	0.59**	0.34*	0.55**
My daily life has been filled with things that interest me	0.63**	0.07	0.35*
WHO-5 Total	0.65**	0.93*	0.06

The relationship between the WHO-5 total scale score and the OSQOL total score (Pearson r)

Scales	OSQOL
WHO-5	0.72**

WHO-5: World Health Organisation-5, OASIS: Obesity awareness and insight scale, OSQOL: Obesity-specific quality of life scale, COPE: Coping Orientation to Problems Experienced inventory.
*p<0.05,** p<0.01.

All the patients (100%) said they did not prefer exenatide as a first-line treatment option. The most common reason cited in favour of exenatide related to weight-loss 121(82.9%). Of the total patients, 84(57.5%) had used insulin before exenatide, and they were asked to compare the effect of the two on QOL. Majority of them described the use of exenatide as much more comfortable compared to insulin use (Table-2).

The scores for the various scales used in the study showed that the patients were feeling more vigorous and active, and that the levele of awareness had increased (Table-3).

Discussion

With DM cases rising rapidly, multi-directional evaluation is needed for good management and effective treatment of the disease.[3,23] Patient compliance in treatment is as important as the effectiveness of prescribed medications. In the current study, exenatide was not started as the first-line treatment option, which is in line with literature.[23] Patients described the use of exenatide as much more comfortable compared to insulin use in the current study, and it boosted their confidence as well.

Knowledge about risks and more awareness increased the QOL significantly (p<0.05) in the current study. Another study[24] reported that treatment satisfaction was better in exenatide users after the 30th week. Also, it reported that weight-related QOL scores were higher in exenatide users, and, the widespread side-effects of exenatide, like nausea and vomiting, did not affect treatment compliance, QOL and treatment satisfaction of patients both physically and psychologically.[24]

GLP-1A production is coordinated by caudal neurons in the brainstem and excitation in this region also extends to hypothalamic areas that control the surrounding stress and energy haemostasis.[25] Exenatide suppresses the appetite centre, arouses the feeling of satiety that leads to a serotonin-like effect chain.[24]

Conclusion

The use of exenatide was found to be a good treatment option for glycaemic control. Exenatide affected both physiological and psychological parameters, and contributed positively to the well-being of DM patients. Weight loss was found to be the secondary gain of the treatment.

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