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Original Article

Nutrition Counseling Position in Reducing the Duration of Admission for Patients with Type 2 Diabetes Undergoing Cataract Surgery

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Abstract

Background and Aim: Cataract is one of the most common ocular diseases caused by various causes including congenital, resulting from trauma, drug or radiation, diabetes, or aging. Diabetes type 2, as a common metabolic disorder, is one of the main reasons for cataracts. we aimed to study nutritional counseling's status on the correction of glucose and urea and creatinine patterns and blood pressure of patients undergoing cataract surgery and reducing the pre-operative hospitalization time. **Methods:** In this study, 60 women with type 2 diabetes and 39 male participants aged 25 to 65 (aged 25 to 65) were randomly assigned into two groups (control without diet and nutritional counseling). The target group (presentation of diabetic diet and nutrition counseling) went under investigation two weeks before cataract surgery. Blood sampling proceeded from the arm vein in a sitting way one day before and after the diet (12 hours of fasting). **Results**: Fasting blood glucose, body weight, waist circumference, urea, creatinine, blood pressure, and hospitalization period were significantly decreased after surgery ($p \leq 0.05$). **Conclusion:** The results showed that receiving nutrition counseling and diet before cataract surgery can improve fasting blood glucose, 2-hour blood glucose, body weight, urea, creatinine, blood pressure, and thus hospitalization and recovery be reduced after surgery.

Keywords*:* Type 2 Diabetes; Cataract; Fasting Blood Glucose; Duration of Admission; Nutrition Counselor.

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Introduction

In the 21st century, diabetes mellitus is a fundamental challenge that threatens the community's public health. It is estimated that around 415 million people worldwide have diabetes, and by 2040 this number is expected to reach 642 million (1). Of these, 5 to 10 percent have type 1 diabetes, and approximately 90 percent have type 2 diabetes. Nephropathy, neuropathy, and retinopathy are side effects of diabetes that impact the microvascular system. In Europe and North America, the leading cause of blindness is diabetic retinopathy (2). Chronic hyperglycemia in patients with diabetes leads to increased oxidative stress, inflammation, and hypoxia, causing changes in the retinal vessels. These changes kill the nerve cells in the area (diabetes retinopathy) (3). People with diabetes mellitus have a high risk of developing cataracts (4, 5). Cataract means eye lens

opacity and significant causes of vision loss in the elderly in all societies (6). Due to the increasing prevalence of diabetes mellitus, the incidence of diabetic cataracts also increases. Cataract removal is one of the most common surgeries performed in different populations (6, 7). Numerous epidemiological studies have identified diabetes as a significant risk factor for cataracts and factors such as increased duration of diabetes, high age at the time of clinical diagnosis, advanced rhinopathy, treatment with diuretics, and low blood sugar control as risk factors have been reported for Cataract in diabetes (8, 9).

Some evidence suggests that dietary interventions effectively control type 1 and type 2 diabetes (10, 11). It is traditionally recommended that nutritionists make nutritional recommendations. Furthermore, though there is some evidence that nutritionists' interventional treatment is more effective than treatment by those who have not been consulted by nutritionists, both the American Diabetes Association (ADA) and the British Diabetes Association have found that other health professionals are involved in providing dietary advice, which is favorably managed by a nutritionist (12, 13). Diet plays a vital role in regulating in vivo metabolism and directly linking the amount of glucose, lipid, amino acids, urea, and creatinine in the blood and hypertension. For example, red meat and processed meats are strongly associated with increased fasting glucose and insulin concentrations and the risk of diabetes and its complications (14).

This study aimed to determine the role of nutrition counseling on blood glucose, urea and creatinine level, blood pressure, and hospitalization duration in patients with type 2 diabetes undergoing cataract surgery in Torfeh hospital. It should be considered that people who have not been on a diet for reasons have been included in the control group.

Methods

In this study, 99 patients (60 women and 39 men) with type 2 diabetes (age range 25-65 years) referred to the ophthalmology clinic of Torfeh Hospital who were selected for cataract surgery. Diagnosis of diabetes in the patients was proceeded by the American Diabetes Association references and the presence of diabetes symptoms plus random blood glucose concentrations of ≥/200 mg/dl and ≥/ 126 mg/dl of plasma glucose (5). The inclusion criteria included: All patients with diabetes who are candidates for cataract surgery, receiving blood glucose-lowering drugs (Glybenclimide or/and Metformin), receiving antihypertensive drugs (losartan) which all were at normal range, patients with no other underlying diseases such as heart, skin, nerve and kidney failure and a history of hormonal disorders, non- alcohol and non-smoking.

All patients were randomly categorized into two equal groups: 1) the control group without diabetic diet and nutrition counseling, and 2) the experimental group with a diabetic diet and nutrition counseling (15). In the experimental group, the patients' diet was adjusted two weeks before surgery. After obtaining permission from patients, diet counseling was provided for them. For each patient, a two-part questionnaire was prepared. Patient information was obtained through interviewing and reviewing the patient's records (including sex, age, hospitalization ward, diabetes control, average patient glucose (on admission, during hospitalization, and in the last 6 months before hospitalization).

Anthropometric examinations, including weight, height, waist circumference, and urea and creatinine tests of patients, were completed and other parts, including ophthalmologic exam results, were also documented. Both control and experimental groups' blood samples were tested twice for two weeks before cataract surgery and surgery day. After 12 hours of fasting, arm venous blood sampling was done in a sitting way. The patients' diet was adjusted one week before surgery. Calorie requirement was calculated based on Mifflin formula and 55% of calories for carbohydrates with an emphasis on complex carbohydrates, and 20% of protein and 25% of fat were considered for them.

Statistical Analysis: All data were analyzed using the SPSS software version 20. Kolmogorov-Smirnov test was performed to determine data normalization. Due to the abnormal distribution of data, nonparametric tests were used. Mann-Whitney test and Fisher's exact test were used to compare quantitative and qualitative variables between the two groups, respectively.

Results

Sixty women (61%) and 39 men (39%) were studied from 99 patients with types 2 diabetes. These patients were divided into two groups: The control group (without diet and nutrition counseling) and the experimental group with diet and nutrition counseling. The levels of FBS, urea, creatinine, blood pressure, body weight, waist circumference, and BMI in the experimental and control groups were shown in table 1.

Table 1. The levels of FBS, urea, creatinine, blood pressure, body weight, waist circumference, and BMI in the experimental and control groups.

	Patients receiving diet counseling		Control group	
	mean±SD		mean±SD	
	Two weeks before surgery	One day before surgery	Two weeks before surgery	One day before surgery
FBS (mg/dl)	253±30.82	153±13.55	298±26.8	200±29.04
Urea (mg/dl)	40±2.76	35±3.05	41±0.71	40±086
Creatinine (mg/dl)	1.1±0.2	1±0.2	1.2±0.22	1.3±0.26
BMI (kg/m^2)	27±0.63	26±0.72	27.5±0.28	27±0.27
Waist circumference (cm)	100±17.19	95±16.28	112±14.11	111±13.8
Systolic pressure	139±48	128±16	139±22	139±22
Diastolic pressure	90.56±5.4	85.14±5.56	91.31±4.52	90.34±5.21

BMI: Body Mass Index FBS: Fasting blood sugar

Table 2. The clinical features in the experimental and control groups.

N%	The control group(N=49)			Patients receiving diet counseling (N=50)		
Features	**Low**	**Moderate**	**High**	**Low**	**Moderate**	**High**
Patient satisfaction	---	----	---	2(4%)	8(١6%)	40(80%)
Physicians' satisfaction from surgery	5(10%)	12(25%)	32(65%)	2(4%)	5(10%)	43(86%)
Reduce medication and insulin intake	-----	----	----	18(35%)	10(20%)	22(45%)
Decreased medical care	34(70%)	10(20%)	5(10%)	7(15%)	15(30%)	28(55%)
Reduce treatment costs	37(75%)	7(15%)	5(10%)	7(15%)	13(25%)	30(60%)
Reduce patient stress	34(70%)	10(20%)	5(10%)	7(15%)	20(40%)	23(45%)
Increase life expectancy	19(39%)	23(46%)	7(15%)	7(15%)	18(35%)	25(50%)
Faster recovery of the patient's eye	16(32%)	19(38%)	14(30%)	10(20%)	13(25%)	27(55%)

The age range of the patients was 25-65 years. The mean duration of diabetes was 7.5 years. The mean fasting blood glucose in the patients studied at the 6-month follow-up was 229.5.

All patients also received either a drug or insulin glucose control. The mean of the duration of hospitalization before surgery (1.5 days) and after surgery (1 day) in the experimental group was less than in the control group (6 days). The mean BMI of patients before the diet was 27 kg/m^2, and all were expectancy, patient satisfaction, recovery of the patient's eyes, and physicians' satisfaction from surgery increased in patients receiving nutritional counseling compared to the control group (Table 2).

Discussion

In this study, blood glucose levels, urea, creatinine, body weight, waist circumference, blood pressure, and the duration of hospitalization before and after cataract surgery showed that these parameters were significantly decreased in patients with type 2 diabetes after nutrition diet and these patients were better prepared for surgery.

Diabetes mellitus is a complicated disease that can lead to many impairments and Adverse effects on body organs (16, 17). Cataract mainly occurs as a

result of progressive diabetes mellitus. The Cataract is considered a frequent complication of the visual system in diabetes mellitus (18). Cataract surgery is an effective procedure for the improvement of vision in patients with diabetes in different populations. In recent years, to the high prevalence of diabetes, cataract surgeries are increasing among patients with diabetes (18, 19). Clinical and laboratory investigation has proved that chronic hyperglycemia, age, hypertension, renal failure, and increased diabetes duration are associated with an increased risk of Cataract in patients with diabetes (18, 20-23). Some evidence suggests that nutrition consultants' dietary interventions have a beneficial effect on reducing complications and controlling diabetes and Cataract (24). A nutrition diet can effectively manage body weight and BMI in patients with diabetes (25). Diet also plays an essential role in regulating blood pressure, controlling body metabolism, and the amount of glucose, lipid, amino acids, urea, and creatinine in the blood (26-28). In a study of patients with diabetes, Bamanikar and his colleagues reported that blood urea and creatinine levels were significantly elevated among patients with increased blood glucose levels (29). Following the renal failure in patients with diabetes, blood urea, and creatinine levels are increased and are considered interfering factors in cataract formation (30). Nutrition diet with a low-glucose and protein level can be very beneficial for patients with diabetes by lowering their postprandial glucose levels and preventing renal failure (27, 28, 31).

Many studies reported a significant relationship between age and hypertension with cataract incidence (32, 33). Patients with a history of hypertension are 2.5 times more likely to develop cataracts (34). Mehta et al. showed that high blood pressure is a prominent risk factor of cataract and the risk of cataract in hypertensive patients is higher compared to non-hypertensive patients (35). In the present study, we determined that nutrition counseling is useful for controlling biochemical parameters, blood glucose, urea, and creatinine level in patients with type 2 diabetes undergoing cataract surgery in the Torfeh hospital. The blood levels of glucose, urea, and creatinine were significantly reduced in patients after dietary interventions. We also showed that nutrition counseling and diet reduces the mean blood pressure, hospitalization period before and after surgery, medical care, depression, stress, and treatment costs. All patients were overweight, and the mean BMI after the diet significantly decreased compared to before the diet. Also, the life expectancy, recovery of the patient's eyes, and physicians' satisfaction after surgery were increased in patients receiving nutritional counseling compared to those who did not receive nutritional counseling and diet.

Conclusion

In conclusion, it seems that nutrition counseling can improve the biochemical parameters such as blood glucose, urea, and creatinine levels and may also reduce overweight, BMI, blood pressure, and duration of hospitalization in patients with type 2 diabetes and be better prepared for surgery.

Conflict of Interest

The authors declared no conflict of interest.

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