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Efficacy of lifestyle modification approaches for management of non alcoholic fatty liver disease in obese diabetic patients

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Abstract

There has been a strong connection between fatty liver disease with obesity even in persons with very little or no intake of alcoholic beverages. The situation becomes more critical when a person is suffering from diabesity. It has been scientifically noted that weight reduction improves liver function but whether lifestyle modification counselling is one of the methods to obtain the desired results is debatable. This study primarily focuses on the management of fatty liver disease in non-alcoholic diabesity individuals with lifestyle counselling. The study selected 50 obese male adults suffering from type-2 diabetes with very little or no intake of alcoholic beverages. Out of these 50 subjects, 23 were found to be obese with type-2 diabetes and thereby selected for this experimental research. Standard techniques were used to get the data on the height and weight of the patient. A formula was employed for BMI assessment. A standard liver profile of the patients was created by routine pathological tests. A three-month program based on the Fantastic Lifestyle Assessment Checklist was meticulously planned for counselling. The anthropometric parameters, liver profile and lifestyle changes were assessed twice (pre-post). Results reveal a significant weight loss in male subjects with fatty liver disease and diabesity in the post-test assessment. It was also found that SGOT and SGPT values in the liver profile were also decreased and came within acceptable limits. It was concluded that lifestyle modification is a good method to manage weight in male patients suffering from diabesity and fatty liver disease and thereby reducing liver inflammation also.

Keywords: Diabesity, fatty liver, lifestyle.

Introduction

The evidence-based studies suggest diabesity poses a major threat as far as fatty liver disease is concerned. Hence diabesity is considered a major risk factor towards the development of fatty liver disease even in person with very low or no consumption of alcohol. Research in this regard indicates that NAFLD or fatty liver disease in non-alcoholic lifestyles is very common in type-2 diabetes obese subjects. It means that diabesity may induce fatty liver disease even in subjects without a history of alcohol consumption. The main function of the liver is to adjust blood sugar. When too much fat is accumulated in the liver, it becomes less responsive to insulin. Liver fat is responsible for triggering inflammation and the result of the inflammation is seen as scar tissue in the liver. This stage can further progress into cirrhosis and ultimately liver failure. A major percentage of type-2 diabetic patients have excess fat in their liver which causes inflammation and resultant scarring but they are oblivious to it. The symptoms of fatty liver disease in people with very little or no alcohol consumption are far and few so makes it is very tough to diagnose it. It has also been advocated by medical consultants that losing 10% of body weight is enough to stop the accumulation of too much fat in the liver. After extensive research and deliberations de Marco et al. concluded that around 4.4% of mortality in diabetes is due to cirrhosis[1]. The management of fatty liver disease in patients with diabesity but non-alcoholics include medication as well as lifestyle changes. It is been opined that weight loss, proper exercise, and food choices can be beneficial in obese male type-2 diabetics suffering from a fatty liver disease not induced by alcohol consumption. So a thorough experimental study is required to determine whether counselling to improve the lifestyle of these patients affects their body mass index, lifestyle changes and SGOT and SGPT levels.

Review of Literature: Amarapurkar et al. reported that the risk factors for fatty liver disease in patients not induced by alcohol consumption were high fasting blood sugar, BMR of more than 25 and obesity[2].

Mohan et al. in their study found that the prevalence of NAFLD was 32% with a proven correlation with diabetes. The prevalence was lower in pre-diabetics as compared to diabetes mellitus[3].

Breitling et al. found that obesity alters enzyme actions[4]. Lim et al. reported that lifestyle modification may reduce the rate of mortality in hepatic patients[5]. Kalra et al. reported that 56.5% of patients diagnosed with type-2 DM (diabetic Mellitus) but a non-alcoholic fatty liver disease with prevalence being higher in females as compared to males between 25-74 years of age group.

The prevalence of fatty liver disease in patients classified as non-alcoholics increased with advancing age. The other contributing factors were obesity and hypertension[6].

Vendhan et al. calculated the prevalence of fatty liver disease to be 8.9% in non-alcoholic patients[7].

Williams et al. in their study studied to establish the link between fatty liver disease in non-alcoholic diabetics[8].

Tomah et al. reported that type-2 diabetes aids in developing a first-grade fatty liver to more severe steatohepatitis in non-alcoholic patients[9].

Bhatt et al. reported that fatty liver disease in India among subjects without a history of alcohol consumption is more common in urban people and the risk factors are excess fat (abdominal), sedentary lifestyle and other lifestyle factors such as poor eating habits and food choices. Fatty liver disease was also found to be correlated with insulin resistance even in non-alcoholics[10].

Patel and Verma in their study reported that fatty liver disease in subjects without a history of alcoholism is associated with diabetes, flabbiness, age, duration of diabetes and hypertension[11].

Paul et al. in their study that after lifestyle modification, the fibroscan values improved significantly in fatty liver patients without a history of alcohol consumption[12].

Kuchay et al. in their study reported a prevalence of steatosis in 84.2% with an additional risk factor being diabesity. Mellitus patients were 84.2% with elevated BMI being an independent risk factor associated with it[13].

Apart from the above studies Ueno et al., Pukhala et al., Piepoli and Villani and Ali et al. throw value information towards various causes of fatty liver diseases[14-17].

Objectives: i. The first objective was to determine the effectiveness of lifestyle modification counselling on weight management in obese male type-2 diabetics fatty liver disease patients without a history of alcohol consumption. ii. The second objective was to determine the effectiveness of lifestyle modification counselling on body mass index in obese male type-2 diabetics fatty liver disease patients without a history of alcohol consumption. iii. The third objective was to determine the effectiveness of lifestyle modification counselling on SGPT and SGOT values in obese male type-2 diabetics fatty liver disease patients without a history of alcohol consumption. iv. The third objective was to determine the effectiveness of counselling on lifestyle parameters in obese male type-2 diabetics fatty liver disease patients without a history of alcohol consumption.

Methodology

Hypothesis: i. Three months of individual lifestyle modification counselling will reduce the weight in male obese type-2 diabetic fatty liver disease patients without a history of alcohol consumption. ii. Three months of individual lifestyle modification counselling will reduce the body mass index in male obese type-2 diabetic fatty liver disease patients without a history of alcohol consumption. iii. Three months of individual lifestyle modification counselling will bring down the biochemical markers namely SGOT and SGPT in male obese type-2 diabetic fatty liver disease patients without a history of alcohol consumption. iv. Three months of individual lifestyle modification counselling will enhance the lifestyle choices in male obese type-2 diabetic fatty liver disease patients without a history of alcohol consumption.

Sample: The researchers selected 50 obese male adults suffering from type-2 diabetes with very little or no intake of alcoholic beverages from Raipur. The subjects were chosen from tertiary hospitals. Out of these 50 subjects, 23 were found to be obese with type-2 diabetes and thereby selected for this experimental research. The final sample was between 25 to 50 years of age.

Anthropometric Measures: Standard equipment was used to measure the height and weight of the selected subjects. A BMI of more than 30 is considered obese according to the WHO classification.

Biochemical Markers: Spectrometry was used to evaluate SGOT and SGPT in the pathology lab.

Assessment of Lifestyle: A fantastic lifestyle assessment checklist was used to assess the lifestyle of selected subjects. The checklist enquires about various factors including sleep pattern, actual intake of alcohol and tobacco, temperament, career-related choices, physical activities, peer and family. With an increase in scores on the checklist it is assumed that lifestyle choices are getting better.

Individual Counselling: An individual counselling program was prepared with its base on a fantastic lifestyle checklist with a duration of three months.

Design: This study uses a pre-post design with experiments being done on a single group.

Procedure: The researchers selected 50 obese male adults suffering from type-2 diabetes with very little or no intake of alcoholic beverages from Raipur. The subjects were chosen from tertiary hospitals. Out of these 50 subjects, 23 were found to be obese with type-2 diabetes and thereby selected for this experimental research. All the ethical considerations were strictly followed in this research.

The data on anthropometric measures, biochemical markers and lifestyle were taken twice as per the requirement of pre-post research design. Data analysis are shown in Table-1, 2, 3 and 4 respectively.

The mean weight of the obese male type-2 male diabetic fatty liver disease patients without a history of alcohol consumption before the counselling sessions was 77.47 with a standard deviation of 10.74. The mean weight of the obese male type-2 male diabetic fatty liver disease patients without a history of alcohol consumption after the counselling session of three months was 76.21 with a standard deviation of 10.18. It shows that the weight of the entire sample has an overall decrease of 1.26 kg during three months of individual lifestyle modification counselling. (t= 5.45p<.01).

The mean BMI of the obese male type-2 male diabetic fatty liver disease patients without a history of alcohol consumption before the counselling sessions was 33.37 kg/m^2 with a standard deviation of 4.80. The post-test mean of body mass index of obese male type-2 male diabetic fatty liver disease patients without a history of alcohol consumption after the counselling sessions was 32.86 kg/m^2 with a standard deviation of 4.87. It shows a significant decrease of 0.50 kg/m^2 in body mass index due to three months of individual lifestyle modification counselling which is statistically significant (t=5.57, p<.01).

The mean SGOT of the obese male type-2 male diabetic fatty liver disease patients without a history of alcohol consumption before the counselling sessions was 331.76 units/litre of serum while after the counselling session; it was 38.46 units/litre of serum. It indicates a significant decrease of 293.21 units/litre of serum in type-2 male diabetic fatty liver disease obese patients without a history of alcohol consumption during the three months individual lifestyle counselling program and supported by t=7.79 at p<.01.

The mean SGPT of the obese male type-2 male diabetic fatty liver disease patients without a history of alcohol consumption before the counselling sessions was 287.10 units/litre of serum while after the counselling session, it was 45.05 units/litre of serum. It indicates a significant decrease of 242.05 units/litre of serum in type-2 male diabetic fatty liver disease obese patients without a history of alcohol consumption during the three months individual lifestyle counselling program and supported by t=7.16 at p<.01.

Table-1: Pre-Post Weight of Fatty Liver Disease patients with Diabesity.

N	Weight (kg)				Mean Difference	't'
	Pre Test (Before)		Post Test (After)			
	Mean	S.D.	Mean	S.D.		
23	77.47	10.74	76.21	10.18	- 1.26	5.45, p<.01

t(df=23) 2.07, p<.05 t(df=23) 2.81, p<.01.

Table-2: Pre-Post BMI in Fatty Liver Disease patients with Diabesity.

N	Body Mass Index (kg/m^2)				Mean Difference	't'
	Pre Test		Post Test			
	Mean	S.D.	Mean	S.D.		
23	33.37	4.80	32.86	4.87	- 0.50	5.57 (p<.01

t(df=23) 2.07, p<.05 t(df=23) 2.81, p<.01.

Table-3: Pre-Post Scores on SGOT, SGPT Biochemical Measures in Fatty Liver Disease patients with Diabesity.

Biochemical Markers (Liver Profile Test)	N	Pre Test		Post Test		Mean Difference	't'
		Mean	S.D.	Mean	S.D.		
SGOT (Units/litre of serum)	23	331.76	178.66	38.46	22.22	- 293.21	7.79 (p<.01)
SGPT (Units/litre of serum)	23	287.10	150.90	45.05	34.48	- 242.05	7.16 (p<.01)

t(df=23) 2.07, p<.05 t(df=23) 2.81, p<.01.

Table-4: Pre-Post Scores on Lifestyle Checklist in Fatty Liver Disease patients with Diabesity.

N	Lifestyle				Mean Difference	't'
	Pre Test		Post Test			
	Mean	S.D.	Mean	S.D.		
23	51.58	4.52	70.75	6.41	19.16	16.72 (p<.01)

t(df=23) at 0.05 = 2.07, t(df=23) at 0.01 = 2.81.

The mean score on the fantastic lifestyle assessment checklist for selected type-2 male diabetic NAFLD obese patients was 51.58 and the post-test mean score was 70.75. It indicates a mean increase of 19.16 which is statistically significant (t=16.72, t<.01)

Results and discussion

The weight of the male obese non-alcoholic fatty liver disease patients with type-2 diabetes was decreased significantly after three months of individual lifestyle counselling compared to the baseline mean.

The mean serum glutamic-oxaloacetic transaminase (SGOT) enzyme was decreased to a statistically significant extent after 03 months of counselling sessions as compared to the baseline mean score for type-2 male diabetic non-alcoholic fatty liver disease obese patients.

The mean Serum glutamic pyruvic transaminase (SGPT) enzyme was decreased to a statistically significant extent after 03 months of counselling session as compared to the baseline mean SGPT score in male diabetic fatty liver disease obese patients without a history of alcoholism.

Positive lifestyle changes were observed in fatty liver disease obese patients with type-2 diabetes due to individual lifestyle counselling for three months.

Discussion: In the present study, the beneficial effect of three months of individual lifestyle counselling was observed on weight management and a decrease in SGOT and SGPT enzymes in non-alcoholic fatty liver disease obese subjects having diabetes. Vilar-Gomez et al.[18] in this regard conducted a landmark study in which they found that even slight weight loss due to positive lifestyle changes improves the condition of NAFLD patients and the same is applicable in type-2 male diabetic non-alcoholic fatty liver disease obese patients as can be observed by the results of the present study.

Conclusion

Results, associated discussion and theories lead to a conclusion those three months of individual lifestyle counselling given to fatty liver disease obese patients who had diabetes is beneficial in reducing their weight thereby biochemical markers also came down to within normal range.

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