Effects of a Recommended Sports Nutrition Program for Weight Lose in Elderly Men with Non-Alcoholic Fatty Liver Disease

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Abstract:

The current research aims to identify the effects of the recommended program on reducing weight and liver fats in patients with non-alcoholic fatty liver disease and the relationship between decreasing liver fats and body weight. The researcher used the experimental approach (one-group design) with pre- and post-measurements. Participants (n=20) were purposefully chosen (age between 40-50 years). Results indicated that:

1. The recommended program had positive effects on weight loss and liver size.
2. There are statistically significant differences between pre- and post-measurements of the research in favor of post-measurements.
3. The recommended program had positive effects on decreasing body fats and body water in addition to increasing health level and changing body style from obese (1) to overweight.

Key words: Non-Alcoholic Fatty Liver – Obesity – Therapeutic Nutrition – Aerobic Exercises

INTRODUCTION:

Sports scientists are in continuous pursuit for new scientific methods that induced many changes in the life style through practicing sports activities. Well-balanced nutrition is the first defense line for preserving health and preventing and curing diseases. Recently, therapeutic nutrition and using food for healing and early prevention of diseases gained considerable interest. Therefore, it became not less than medical and surgical treatment. Thus, therapeutic nutrition aims to rest some body parts like liver, kidneys and gastrointestinal system. (Owaida 2015).

Lack of physical activity is a major risk factor in many diseases including non-alcoholic fatty liver (NAFLD) as physical exercises provide minimum level of prevention. In addition, high levels of cardiorespiratory fitness decrease costs of treatment in non-alcoholic fatty liver (Pfirrmann et al. 2019).

Fatty residuals accumulate in obese persons, alcoholics, cases of diabetic urine and prolonged chronic cardiac diseases with side effects. Toxins also may cause this disease. It can be treated through identifying and eliminating the causes and this eliminates fatty residuals in the liver. This is true for all cases but not in case of alcohol and high toxication as it may cause death of some cells (Al-Sadik 2005).

Fatty liver disease is the accumulation of fats inside liver cells with a higher-than-usual rate to constitute 5-10% of liver weight. Fats accumulate in the form of large vesicles of triglyceride during fat accumulation and metabolism process (abnormal fat accumulation in the cell) (Al-Harthy 2009).

Non-alcoholic fatty liver is a common disease all over the world, especially in western countries as statistic indicated that 20-33% of population suffer from it (Younossi et al. 2018).

Sports exercises using different types of aerobic and resistance training have positive effects on patients with NAFLD as it proved effective in reducing liver fatty content through improving insulin resistance and fatty acids metabolism. It is recommended to use a training program suitable for each individual patient's abilities to achieve the desired goal and induce a more active lifestyle (Van Der Windt et al. 2018).

Through review of statistics and related literature (Willis et al. 2012; Cava et al. 2017; McCarthy & Berg 2021), the researcher noticed that diseases related to obesity and lack of movement are responsible

for 53% of deaths all over the world, countries of the middle east are no exception. Obesity and lack of movement are related to many diseases including NAFLD which causes serious inflammations and many continue to seize most tissues of the liver. Some studies indicated three types of weight lose exercises including resistance and weight exercises, cardio exercises and a mix between weight and cardio exercises while maintaining calories fixed. Aerobic and resistance exercises can decrease liver fatty content. This can be used to design individually-tailored therapeutic programs for each case.

Through review of literature and the researcher's experience in physiotherapy, he noticed that liver disorders are not taken care of unless there is a clear complain. This may lead to halting weight lose programs due to the decrease of physical efficiency of individual as they become unable to fulfill the demands of their daily life. The researcher performed this study to identify the effects of NAFLD in men using sonar scanning for the liver in addition to BMI index and blood analysis as predictors of body fat percentage in elderly men.

Aim:

The current research aims to:

1. Identify the effects of the recommended program on reducing weight and liver fats in patients with non-alcoholic fatty liver disease.
2. The relationship between decreasing liver fats and body weight.

Hypotheses:

1. There are statistically significant differences between pre- and post-measurements of weight lose and liver fats in favor of post-measurements.
2. There is a statistically significant correlation between liver fats decrease and body weight lose.

Methods:

Approach:

The researcher used the experimental approach (one-group design) with pre- and post-measurements.

Participants:

Research community included workers a health preservation and weight control association in 2021. Participants (n=20) were purposefully chosen (age between 40-50 years). The researcher homogenized participants for age, height, weight, body fat percentage and waist fat percentage.

Table (1): Mean, SD, Squewness and Kurtosis on Basic Variables for participants (n=20)

Variable	Measurement	Mean	SD	Median	Kurtosis	Squewness
Weight	CM	179,95	6,84	180	-0,264	0,135
Weight	KG	100,21	14,19	98,55	-0,059	0,784
Muscles	KG	68,26	7,31	66,15	-0,793	0,393
Fats	KG	28,03	4,91	27,25	-0,921	0,223
Water	KG	53,11	4,13	52,50	-0,064	0,394
BMI	KG/m	30,77	2,76	30	1,59	1,53
Liver	CM	16,67	1,11	16,75	-1,54	-0,042

Table (1) indicated that Squewness values were between (±3). This indicates normality of data distribution. In addition, kurtosis values ranged from (-0.042) to (-1.53) which indicates that normal curve fluctuation is acceptable. This clearly shows homogeneity of sample.

Criteria of Choosing Participants:

1. They were all men between 40-50 years.
2. They all practice exercises 33 times a week (60 minutes per unit) for 3 months in aerobic activities (walking – running – aerobics – swimming – gym).
3. They were all volunteers.

4. All individuals under medication (hypertension – cholesterol – diuretics) were excluded. In addition, individuals with heavy history of diseases were excluded.

Tools and equipment:

A nutritionist clinic for interviews – fool blood analysis – liver sonar – pulse rate – stopwatch – medicine balls – boxes – training matt – cones with different heights – jump robes – rubber cords – weights – kettle bells – gym – open court – cross fit court – swimming pool – swimming board with tools – life jacket – health club (in body device) – lecture room – projector.

The Recommended Program:

Through review of literature related to non-alcoholic fatty liver disease, weight and resistance exercises an nutrition programs, the researcher managed to design the recommended program.

Program Content:

The researcher consulted a specialized nutritionist and reviewed previous literature related to weight lose of NAFLD patients using diet and physical exercises with different loads and resistances. The program was divided into two parts: the first one used therapeutic nutrition (70%) while the second part used physical exercises (30%).

Statistical Treatment:

The researcher used SPSS software to calculate the following: Mean – SD – Median – Kurtosis – Squewness – (t) test – improvement percentage (%) – correlation (r) – effect size.

Results:

Table (2): Difference Significance between Pre- and Post-measurements and Effect Size for Research Variables (n=20)

Variables	Pre-		Post-		(t)	Improvement (%)	Significance	Effect size	Effect size significance
	Mean	SD±	Mean	SD±					
Weight	100,21	14,19	91,19	11,03	8,65	9,001	0,00	1,93	High
Muscles	68,26	7,31	66,79	7,26	1,91	2,153	0,071	0,437	Weak
Fats	28,03	4,91	23,82	4,64	11,67	15,019	0,00	2,61	High
Water	53,11	4,13	51,62	4,76	3,27	3,998	0,004	0,731	Moderate
BMI	30,77	2,76	28,16	2,26	7,47	8,482	0,000	1,67	High
Liver	16,67	1,11	15,17	0,613	9,12	8,998	0,000	2,04	High

(t) table value on P≤0.05 = 2.093.
Effect Size: 0.2= Low – 0.5= Medium – 0.8= High

Table (2) indicated catechistically significant differences on P≤0.05 between pre- and post-measurements of participants on basic research variables (weight – fats – water – BMI – liver) but not on muscles. Improvement percentages ranged from 2.153% to 9.001% in favor of post-measurements. Effect size ranged from 0.437 to 2.61 which varied from weak and medium to high.

Table (3): Correlations Among Research Variables

Variables	Weight	Muscles	Fats	Water	BMI	Liver
Weight		0,856**	0,707**	0,443	0,738**	0,788**
Muscles			0,361	0,587**	0,418	0,796**
Fats				-0,096	0,752**	0,446*
Water					0,108	0,580**
BMI						0,492*
Liver						

(r) table value on P≤0.05 = 0.433 and on P≤0.01 = 0.549

Table (3) indicated statistically significant correlation between weight and all other research variables except water. There are statistically significant correlation between muscles and all other research variables except BMI. There is statistically significant correlation between water and BMI. Correlations ranged from 0.096 to 0.796.

Discussion:

Table (2) indicated statistically significant difference and relative improvements in research variables in addition to high effect size of the program on weight, fats, water, BMI and liver but not on muscles. This can be explained as obese people have larger muscle mass with weak muscle quality. In addition, weight lose due to diet may decrease muscle mass without affecting muscle strength negatively (Cava et al. 2017).

Fat lose is accompanied by lose in skeletal muscles due to some population habits among elderly and persons with metabolic diseases. In addition, athlete are at more risk of losing skeletal muscles when following weight lose programs (Vignesh et al. 2017 ;Owaida 2015).

Results also indicated and increase in effect size for body weight, fat percentage, BMI and liver size. This is due to punctuality on the program and its effectiveness in achieving its goals. The high effect size of liver size can be explained as weight lose decreased liver size and eliminated accumulated fats (Abd El-Kader 2001;Hasanain 2004).

Results also indicated statistically significant differences in BMI. This explains body changes as effect size increased and participants transformed from obesity (1) to over weight with reduced body weight. This indicates the effectiveness of of the program and the increase in physical fitness (Willis et al. 2012;Mascaro et al. 2022;Scragg et al. 2021).

Applying therapeutic nutrition through a specialist and performing necessary medical analyses had a better effect on inducing statistically significant differences on weight, fats, muscles, water and liver size in addition to high effect size (Pfirrmann et al. 2019;Owaida 2015).

This clearly indicates the punctuality of participants on the program as weight lose motivated them. This proves the first hypothesis.

Table (3) indicated positive correlations between liver and (weight – muscles – water – BMI) while correlations were not found for: weight and water – muscles and body fats – BMI – fats and water. According to INBODY analysis, most participants had high percentage of water and this necessitates doctor intervention (Abd El-Kader 2012).

These results are consistent with recommendations of decreasing weight and most patients consider it a great challenge. On the other side, the key to program success is sports activity as diet contributes with (70%) of weight lose while sport contributes with (30%). Therefore, it is better to follow both to maximize the effect (Scragg et al. 2021).

In addition, aerobic exercises and resistance exercises are recommended for treating NAFLD. Accelerated Training (AT) is a new training modality that induces positive effects on skeletal muscles for obese people (Ibrahim & Abd El-Basset 2020) (Van Der Windt et al. 2018; Oh, S. et al. 2014 ;Willis et al. 2012).

These results indicated the positive effects of the program on decreasing weight. It also clearly shows the relationship between weight lose and liver fats decrease. This proves the second hypothesis.

Conclusions:

According to this research aims, methods and results, the researcher concluded the following:

4. The recommended program had positive effects on weight loss and liver size.
5. There are statistically significant differences between pre- and post-measurements of the research in favor of post-measurements.
6. The recommended program had positive effects on decreasing body fats and body water in addition to increasing health level and changing body style from obese (1) to overweight.

Recommendations:

According to these conclusions, the researcher recommends the following:

1. The recommended program should be the base for weight loss in elderly men.
2. A therapeutic nutritionist should be recruited for weight loss programs to monitor application and to consider NAFLD as a problem in weight loss.
3. Using INBODY device as the most accurate measurement for body evaluation.
4. Notifying individuals to follow science-based therapeutic nutrition rules with specialists.
5. Using resistance and endurance exercises in weight loss programs.
6. Performing similar studies on weight loss.

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