HEALTH LITERACY EDUCATION IN SEDENTARY STUDENTS

EDUCAÇÃO DE ALFABETIZAÇÃO EM SAÚDE EM ALUNOS SEDENTÁRIOS

EDUCACIÓN EN ALFABETIZACIÓN SANITARIA EN ESTUDIANTES SEDENTARIOS

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ABSTRACT: The purpose of this study is to examine the health literacy education in sedentary students. This quasi-experimental study was a pretest-posttest with a control group. 22 sedentary students with a liver grade higher than 1 were purposefully selected and randomly divided into intervention (n = 11) and control (n = 11) groups. The subjects in the intervention group participated in the exercise training protocol for 8 weeks along with the health literacy training program, the control group did not have any intervention. Data were collected through liver ultrasound, blood sampling and body mass index measurement before and after the intervention and analyzed using ANCOVA test and SPSS 20 software. This study shows that performing two interventions of exercise and health literacy simultaneously is effective in improving the fat content of the liver and body mass index of sedentary students and prevents the development of advanced fatty liver.

KEYWORDS: Education. Exercise. Health literacy. Sedentary.

RESUMO: *O objetivo deste estudo é examinar a educação para a alfabetização em saúde em alunos sedentários. Este estudo quase experimental foi um pré-teste e pós-teste com um grupo de controle. 22 estudantes sedentários com grau hepático superior a 1 foram selecionados propositalmente e divididos aleatoriamente em grupos de intervenção (n = 11) e controle (n = 11). Os sujeitos do grupo de intervenção participaram do protocolo de treinamento físico por 8 semanas, juntamente com o programa de treinamento de alfabetização em saúde, o grupo controle não teve nenhuma intervenção. Os dados foram coletados por meio de ultrassonografia hepática, coleta de sangue e mensuração do índice de massa corporal antes e após a intervenção e analisados por meio do teste ANCOVA e do software SPSS 20. Este estudo mostra que a realização de duas intervenções de exercícios e alfabetização em saúde simultaneamente é eficaz para melhorar o conteúdo de gordura do fígado e o índice de massa corporal de alunos sedentários e previne o desenvolvimento de fígado gorduroso avançado.*

PALAVRAS-CHAVE: *Educação. Exercício. Alfabetização em saúde. Sedentário.*

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RESUMEN: *El propósito de este estudio es examinar la alfabetización en salud en estudiantes sedentarios. Este estudio cuasiexperimental fue un pretest-postest con un grupo de control. Se seleccionaron a propósito 22 estudiantes sedentarios con una calificación hepática superior a 1 y se dividieron al azar en grupos de intervención (n = 11) y de control (n = 11). Los sujetos del grupo de intervención participaron en el protocolo de entrenamiento con ejercicios durante 8 semanas junto con el programa de capacitación en alfabetización en salud, el grupo de control no tuvo ninguna intervención. Los datos se recogieron mediante ecografía hepática, muestras de sangre y medición del índice de masa corporal antes y después de la intervención y se analizaron mediante la prueba ANCOVA y el software SPSS 20. Este estudio muestra que realizar dos intervenciones de ejercicio y alfabetización en salud simultáneamente es eficaz para mejorar el contenido de grasa del hígado y el índice de masa corporal de los estudiantes sedentarios y previene el desarrollo de hígado graso avanzado.*

PALABRAS CLAVE: *Educación. Ejercicio. Literatura saludable. Sedentario.*

Introduction

Fatty liver is a common disease in the entire global community and threatens most people. This disease has no specific symptoms in the early stages and results from many diseases, including metabolic syndrome, obesity and overweight, inactive lifestyle and poor eating habits that exist around the world (AL-JIFFRI *et al*., 2013). Accumulation of fat in liver cells can lead to inflammation of liver cells and eventually to cirrhosis of the liver (DIETRICH; HELLERBRAND, 2014). Fatty liver has 4 degrees (grades), which include: Grade 1 fatty liver or hepatic osteosis: Spot-like and excess fats in the liver have no symptoms or harm.

Grade 2 fatty liver or nonalcoholic osteohepatitis is a simple fatty liver that also has signs of liver cell damage. Grade 3 fatty liver, in which case liver fibrosis is a resistant inflammation and fibrous tissue replaces part of the liver, but there is another part of healthy liver tissue, and it continues to function normally. Grade 4 fatty liver or cirrhosis of the liver, in which the scar tissue and cell masses of the liver expand and the liver becomes small and full of mass, this damage is not reversible (SAADEH *et al*., 2002).

The prevalence of fatty liver disease is in line with the increase in body mass index and obesity and is increasing rapidly, it is estimated to be about 20-30% in normal weight people and about 70 to 90% in obese people. Studies have shown that there is a positive and significant relationship between the levels of liver enzymes, liver fat grade and weight and body mass index (CLEMENTE *et al*., 2016; KUGELMAS *et al*., 2003). One of the factors that play an essential role in the prevention and treatment of liver fat content is exercise. Some studies have shown the effects of exercise along with proper nutrition and weight control in the prevention and treatment of fatty liver disease (KEATING *et al*., 2015). Gelli *et al.* (2017) reported that an

active lifestyle combined with a proper diet is a safe treatment to reduce the risk and severity of non-alcoholic fatty liver. Hickman *et al.* (2020), stated that moderate intensity aerobic exercise is effective in reducing body mass index and improving liver function (Hickman *et al*., 2004).

Another effective factor in the prevention and control of fatty liver is having knowledge and literacy about the disease, which is presented in the form of health literacy. Health literacy is the ability of individuals to make the right decisions about their health and to obtain, understand and evaluate the health information they need to improve and maintain their health throughout life. Having a high level of health literacy allows people to better cooperate with health centers and listen to and follow health instructions well, thus controlling the disease and preventing it from turning into advanced fatty liver (SHUM *et al*., 2018).

Berkman *et al.* (2011), in their study reported that patients with lower health literacy have less physical and mental health and are more likely to be hospitalized. The study of Ramezani *et al.* (2016), showed that health literacy training is effective in preventing complications and improving disease control indicators. Due to the importance of the subject, the present study was conducted to evaluate the effectiveness of exercise along with health literacy training on liver fat content and body mass index in sedentary middle-aged men.

Research Method

The method of the present study was quasi-experimental with pre and posttest and control group which was performed in the field. The independent variable in the present study was exercise along with health literacy training program, and the dependent variable was liver fat grade and body mass index. The statistical population included all sedentary middle-aged women with non-alcoholic fatty liver who referred to Islamshahr health center in Tehran province and had a medical record.

The sample size was selected using FELIS formula (CHEN *et al*., 2020) and 22 people were randomly divided into control and experimental groups.

Criteria for inclusion in the study were: Steatosis level 1 and above (hepatic triglyceride content above 5%), no cardiovascular disease, hypertension, osteoarthritis, respiratory problems and also no movement problems or any clinical condition that could limit sports performance and the exclusion criteria included absence of more than two sessions in training sessions and dissatisfaction with continued cooperation. Height and weight of the subjects using a scale equipped with a standard height gauge, body mass index using the weight

formula in kilograms divided by height squared in meters, and determination of liver fat grade using WS80A ultrasound device made by Samsung Korea it was performed in Islamshar city of Tehran province by a specialist doctor. Aerobic exercise intervention was performed for eight weeks, 3 sessions per week, and each session for 70 minutes including (warm-up, main exercises and cooling).

The physical activity was taking into account the progress of the subjects and the principle of overload. The program consisted of a 15-minute warm-up session with a variety of light walking and jogging, flexion and jumping exercises, 50 minutes of basic exercise with a variety of running and circular exercises and cooling down with a 5-minute stretching exercise. The content of the health literacy training package to increase awareness of fatty liver disease is approved by a specialist doctor And included a lecture using PowerPoint, along with showing an educational video on defining the liver organ and the vital role of this organ in the body, fatty liver disease, causes and grading of non-alcoholic fatty liver to familiarize patients with the concept of fatty liver, the importance of health And liver disease, reversibility of the liver in grades 1 and 2 and the importance of addressing sports activities and the beneficial benefits of exercise, replacing the consumption of healthy foods with fatty and sweet foods and fast foods, questions and answers, installing educational posters about the benefits physical activity, Forming a telegram group and using phone text messages to motivate and strengthen educational messages and solve possible problems was done for 20 minutes before the start of each session. At the end of the intervention, the post-test was performed exactly like the pre-test.

Data analysis was performed in two sections: descriptive statistics and inferential statistics. The normality of data distribution was assessed by Wilk Shapiro test, homogeneity of variances by Levin test and comparison of differences between groups was performed using analysis of ANCOVA. All statistical calculations were analyzed using SPSS 20 software.

Results

Table 1 provides information related to the demographic characteristics of the two groups participating in the study.

Table 1 – Demographic characteristics of research group

Variable	**Combined Exercise group**	**Control group**
	M±SD	M±SD
Height(cm)	**1/0±62/71**	**1/0±51/32**
Weight(kg)	**81/15±65/37**	**81/6±17/51**
Age(year)	**43/6±63/67**	**41/7±90/13**

Source: Devised by the authors

Table 2 presents the mean and standard deviation of the values related to the degree of liver fat in the two study groups in the pre and post-test stages.

Table 2 – Mean and standard deviation of pre and post-test of research variables

Variable	**Groups**	**Pre test**		**Post test**
		n	M±SD	**M±SD**
Fatty Liver Grade	Exercise	11	1/72 ± 0/64	**1 ± 5/0**
	Control	11	31/9 ± 0/7	**1/ 0±86/ 76**
BMI(kg/m2)	Exercise	11	430/ ±17 5/1	**±20/29 3/51**
	Control	**11**	**71 ± 2/4829/**	**/92 ± 2/2303**

Source: Devised by the authors

Table 3 – Results of ANCOVA analysis the effectiveness of exercise along with health literacy training on liver fat

Variable		**Sum of Square**	**df**	**Mean of Square**	**F**	**P**	**Effect Size**	**Power Statistical**
Fatty Liver Grade	Group	3/843	1	1/281	8/836	0/001	0/40	**0/99**
	Error	5/654	22	0/145	-	-	-	**-**
BMI (kg/m2)	Group	8/130	1	2/710	6/591	**0/001	% 36	**% 95**
	Error	**14/393**	**22**	**0/411**				

Source: Devised by the authors

Table 3 shows the results of ANCOVA test to evaluate the effectiveness of exercise along with health literacy training on liver fat and body mass index, as can be seen, after removing the effect of synchronous variables on the dependent variable and according to the calculated F coefficient, it is observed that between the means of body mass index and liver fat of the subjects (experimental and control group). There is a significant difference in the post-test stage (P <0.05). The coefficient of effect shows that the effect of the intervention on the variable of liver fat grade is 0.40%. That is, 40% of the variance of post-test scores was related to the effect of the intervention. The test power of one and the level of significance close to zero indicated the adequacy of the sample size. And in body mass index, the effect of intervention is 36%.

Discussion

The aim of this study was to evaluate the effectiveness of exercise along with health literacy training on improving liver fat content and body mass index in patients with fatty liver. Findings showed that eight weeks of aerobic exercise along with health literacy training significantly reduced body mass index and liver fat grade in the experimental group compared to the control group. Improve body mass index and liver fat grade (reduction of liver steatosis) in the experimental group in the present study is a reason for the effectiveness of sports intervention and health literacy training. The reduction in liver fat was about 40% in the experimental group and 36% in the body mass index variable. These results, with the findings of Shojaei *et al.* (2016), Behzadi Moghadam *et al.* (1396), Hallsworth *et al.* (2015), China Youngping *et al.* (2019), Kimasi *et al.* (1398) and Houghton *et al.* (2017) is consistent. Shojaei *et al.* (2016) stated that regular exercise has positive effects on the complications of fatty liver (15). Behzadi Moghadam *et al.* (2017), investigated the effect of resistance training with stretching and low-calorie diet. The results showed that both resistance training methods and low-calorie diet are effective in improving liver fat content and plasma level of liver enzymes (SHOJAEE-MORADIE *et al*., 2016).

Research results

Hallsworth *et al.* (2015) showed a relative reduction in liver fat in patients with fatty liver after eight weeks of resistance training. Kimasi *et al.* (2017), investigated the effect of Pilates exercises on liver fat content of middle-aged men with non-alcoholic fatty liver showed the results of improving liver fat content. Aerobic exercise can stimulate the oxidation of lipids and inhibit their synthesis in the liver, resulting in reduced triglyceride accumulation and improved fatty liver status (LAVOIE; GAUTHIER, 2006; NIKROO *et al*., 2013; PERSEGHIN *et al*., 2007).

Evidence suggests that low health literacy may lead to adverse health behaviors and as a result of disease control and excessive consumption of fatty and sweet foods, increase the severity of the disease and its mortality (COSKUN; BAGCIVAN, 2020). In this study, in addition to exercise training intervention, theoretical training based on health literacy in relation to fatty liver disease was also performed. The results showed, upgrade health literacy increases people's understanding of self-care, exercise, calorie restriction, and thus the prevention and treatment of fatty liver disease. One of the limitations of this study is the lack of precise control and maintenance of the subjects' diet.

Conclusion

In general, the findings showed that simultaneous exercise and health literacy training interventions were effective in improving liver fat content and body mass in sedentary middle-aged women and could be another non-pharmacological solution for patients with liver disease Non-alcoholic fats should be considered.

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