MINI REVIEW ARTICLE

How is the Effect of Physical Activity on Non-Alcoholic Fatty Liver in Obese People? A Mini Review

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Abstract

Nonalcoholic fatty liver is known in the general public as an epidemic disease. The purpose of this mini-review was to determine a link between physical education (PA) and the risk of nonalcoholic fatty liver disease (NAFLD) determine the influence of an exercise method (volume and kind of exercise) on being health outcome.

Body mass index (BMI) was the good criteria for classifying obesity. It is ranges from underweight (<18.5 kg/m2) to severe or unhealthy obesity (≥40 kg/m2). Most time exercise was sufficient to reduce advanced fibrosis in almost 50% including moderated aerobic exercise for 2.5–5 hours a week, or 1–2.5 hours a week on vigorous intense exercise.

Different intensities of physical activity is affected on fatty liver factors and volume and exercise method stimulate improvements in related health outcome measures in obese people. Prolonged inactivity time was increased the prevalence of NAFLD. The final results were shown the influence of PA at different intensities and volume on NAFLD. Then a healthy lifestyle can improve the quality of life and physical health.

Keywords: Physical activity, Fatty liver, Central obesity, Physical education intensities

Introduction

Non-alcoholic fatty liver disease can also develop without alcohol abuse. Obesity, which can be caused by inactivity and poor nutrition, is one of the main risk factors for fatty liver. In this article, we will pay more attention to understanding fatty liver and the factors affecting it. Nonalcoholic fatty liver disease (NAFLD) is a term for a range of liver problems affecting people with too much fat stored in liver cells. NAFLD has become recognize as a widespread epidemic disorder (1). The diagnosis of NAFLD has been controversial, as most patients do not show symptoms until late in the disease. Liver biopsy is one of the main methods used to diagnose NAFLD and is the most accurate tool for grading fibrosis (2). Although investigations are ongoing, it is unclear what factors are likely to cause or reduce the fatty liver. Obesity and also more

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weight gain is an important factor in NAFLD incidence. These disorders together with NAFLD are depended with low activity as a protective factor of type 2 diabetes and central obesity (3,4). Several studies showed an inverse relationship between low physical activity and the prevalence of NAFLD (5,6). The most studies suggested correcting lifestyle methods using a healthy diet and daily physical activity as significant contributing factors for NAFLD management. Golabi et al in a study assessed participants with complete data in NAFLD and healthy groups. The patients were 18–20 % more likely that report their physical health was not good or were unable to perform daily activities (7). Therefore, the first aim of the present study was to conduct the association between PA and risk of NAFLD in obese people and the secondary aim was to establish if there is an exercise program (volume and exercise mode) more likely to elicit optimal improvements in related health outcome measure. In this study articles published at the google scholar, PubMed and science direct databases.

Epidemiology

The prevalence estimates of NAFLD ranging approximately from 22% to 29% in the general population (1). Data from the United States National Health and Nutrition show an increased spread of NAFLD concurrent with the prevalence of chronic disease including obesity and insulin resistance (8). NAFLD is reported in elderly people. A Chinese study examined the NAFLD prevalence in adults above 60 years of age (26.7%) and compared them to younger controls (22.8%) (9). another study showed similar results by a study of non-obese participants. The results of this study represented that prevalence of NAFLD was 7.27% (10).

Pathogenesis

Although the pathogenesis of NAFLD is not clear, probably the most important factor of the development of NAFLD is insulin resistance. It has been shown that insulin resistance already develops during weight gain within the normal range of body weight (11). It has been shown that insulin resistance already develops during weight gain within the normal range of body weight and because of insulin resistance, fat breakdown increased the circulating of free fatty acids and the lipids will be keep within the liver. (Steatosis)(12)

Obesity

Overweight and obesity are a major challenge in preventing chronic illness and health throughout the life span of the world. BMI is the most popular criteria used for classifying obesity (body weight in kilograms, divided by height in meters squared). It is ranges from underweight (<18.5 kg/m2) to severe or unhealthy obesity (≥40 kg/m2) (13). Physical activity and sedentary living have also been independently associated with weight change. These elements, along with diet, have additive effects on one's ability to maintain or gain a healthy body weight throughout the life span. Studies have shown that almost 4 hours of motor activity in every week is associated with weight loss and being healthy (14).

Physical activity and nonalcoholic fatty liver

Lifestyle changes is an influential treatment for NAFLD. Self-reported exercise method testing in a large subject with NAFLD was shown more time of physical activity decreased BMI. Although, the moderate and light time spending PA were reduced risks of NAFLD but vigorous exercise was sufficient to effect on 50% of fibrosis (15). The European guidelines recommend moderate aerobic exercise for 2.5–5 hours a week, or 1–2.5 hours a week on more sever exercise (16). But there is not a determined recommendation for a special kind of training including aerobic and resistance or the combination of both training due to limited data (17). Similar results were determined in another study with less reported leisure time physical activity including both of aerobic and resistance training (18) but there was no decrease in liver

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fat by aerobic exercise dose or intensity in a different 8-week exercise training (19). However, having an activity life is better than being nonnative, since prolonged inactivity time was increased the prevalence of NAFLD (20).

Regarding the effect of physical activity on cardiovascular fitness and its effect on NAFLD risk factors, another study examined the association between PA and a fatty liver factor (alanine aminotransferase- ALT) in obese children. Measurements included anthropometric assessments, biological measurements, treadmill test, PA (accelerometer), and maturity stage using tanner criteria. The results showed the effect of different intensities of exercise (volume and type of exercise program) on a fatty liver factor in obese children independent of central adiposity or cardiorespiratory fitness (21).

Obese people with NAFLD and Lifestyle

A study by Promrat et al (22) found that a combination of diet and physical activity caused a 7% -10% weight gain loss in obese patients and resulted in positive changes in liver histology. In a similar study, NAFLD patients with high liver enzymes and central obesity were used to evaluate the effectiveness of lifestyle interventions. Patients were randomly divided into two groups of low intensity (3- 4 min) and moderate (6 -10 min) physical activity and compared with the control group. The results showed that liver changes were more in the middle-aged group compared to the control group (23). In addition, a study by Thoma et al (24). Analyzed participants using diet modification, physical activity, or a combination of both. They also found that lifestyle modifications that lead to weight loss or increased physical activity reduce liver fat and improve insulin sensitivity.

Conclusions

NAFLD is one of the most important causes of liver disease in the world. Educating people as well as initiating appropriate interventions are ways to prevent the spread of the disease. Weight loss and exercise have in some cases been proven to reduce static inflammation and reversal of fibrosis. Combination of diet, physical activity lead to weight gain loss in obese patients and resulted in positive changes in liver histology. In addition evidence supports that PA at different intensities and volume influence to a NAFLD. Therefore, a healthy lifestyle can lead to improved quality of life and physical health.

References

1. Younossi ZM, Koenig AB, Abdelatif D, Fazel Y, Henry L, Wymer M. Global epidemiology of nonalcoholic fatty liver disease-meta-analytic assessment of prevalence, incidence, and outcomes. Hepatology. 2016;64(1):73-84.
2. Loria P, Lonardo A, Carulli L, Verrone AM, Ricchi M, Lombardini S, et al. the metabolic syndrome and non-alcoholic fatty liver disease. Alimentary pharmacology & therapeutics. 2005;22:31-6.
3. Zhao G, Ford ES, Li C, Balluz LS. Physical activity in US older adults with diabetes mellitus: prevalence and correlates of meeting physical activity recommendations. Journal of the American Geriatrics Society. 2011;59(1):132-7.
4. Gerber L, Otgonsuren M, Mishra A, Escheik C, Birerdinc A, Stepanova M, et al. Non-alcoholic fatty liver disease (NAFLD) is associated with low level of physical activity: a population-based study. Alimentary pharmacology & therapeutics. 2012;36(8):772-81.
5. Maersk M, Belza A, Stodkilde-Jorgensen H, Ringgaard S, Chabanova E, Thomsen H, et al. Sucrose-sweetened beverages increase fat storage in the liver, muscle, and visceral fat depot: a 6-mo randomized intervention study. The American journal of clinical nutrition. 2012;95(2):283-9.
6. Sansone A, Sansone M, Vaamonde D, Sgro P, Salzano C, Romanelli F, et al. Sport, doping and male fertility. Reproductive Biology and Endocrinology. 2018;16(1):1-2.
7. Perseghin G, Lattuada G, De Cobelli F, Ragogna F, Ntali G, Esposito A, et al. Habitual physical activity is associated with intrahepatic fat content in humans. Diabetes care. 2007;30(3):683-8.

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[DOI: 10.18502/ijdo.v13i2.6480]

8. Younossi ZM, Stepanova M, Afendy M, Fang Y, Younossi Y, Mir H, et al. Changes in the prevalence of the most common causes of chronic liver diseases in the United States from 1988 to 2008. Clinical gastroenterology and hepatology. 2011;9(6):524-30.
9. Wang Z, Xu M, Peng J, Jiang L, Hu Z, Wang H, et al. Prevalence and associated metabolic factors of fatty liver disease in the elderly. Experimental Gerontology. 2013;48(8):705-9.
10. Xu C, Yu C, Ma H, Xu L, Miao M, Li Y. Prevalence and risk factors for the development of nonalcoholic fatty liver disease in a nonobese Chinese population: the Zhejiang Zhenhai Study. American Journal of Gastroenterology. 2013;108(8):1299-304.
11. Erdmann J, Kallabis B, Oppel U, Sypchenko O, Wagenpfeil S, Schusdziarra V. Development of hyperinsulinemia and insulin resistance during the early stage of weight gain. American Journal of Physiology-Endocrinology and Metabolism. 2008;294(3):E568-75.
12. Hruby A, Hu FB. The epidemiology of obesity: a big picture. Pharmacoeconomics. 2015;33(7):673-89.
13. Donnelly JE, Blair SN, Jakicic JM, Manore MM, Rankin JW, Smith BK. Appropriate physical activity intervention strategies for weight loss and prevention of weight regain for adults. Medicine & Science in Sports & Exercise. 2009;41(2):459-71.
14. Hu FB. Obesity and mortality: watch your waist, not just your weight. Archives of internal medicine. 2007;167(9):875-6.
15. Kistler KD, Brunt EM, Clark JM, Diehl AM, Sallis JF, Schwimmer JB. NASH CRN Research Group. Physical activity recommendations, exercise intensity, and histological severity of nonalcoholic fatty liver disease. The American journal of gastroenterology. 2011;106(3):460.
16. Perk J, De Backer G, Gohlke H, Graham I, Reiner Z, Verschuren M, et al. European Guidelines on cardiovascular disease prevention in clinical practice (version 2012) The Fifth Joint Task Force of the European Society of Cardiology and Other Societies on Cardiovascular Disease Prevention in Clinical Practice (constituted by representatives of nine societies and by invited experts) Developed with the special contribution of the European Association for Cardiovascular Prevention & Rehabilitation (EACPR). European heart journal. 2012;33(13):1635-701.
17. Eckel RH, Jakicic JM, Ard JD, de Jesus JM, Houston Miller N, Hubbard VS, et al. 2013 AHA/ACC guideline on lifestyle management to reduce cardiovascular risk: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines. Journal of the American College of Cardiology. 2014;63(25 Part B):2960-84.
18. Zelber-Sagi S, Nitzan-Kaluski D, Goldsmith R, Webb M, Zvibel I, Goldiner I, et al. Role of leisure-time physical activity in nonalcoholic fatty liver disease: a population-based study. Hepatology. 2008;48(6):1791-8.
19. Keating SE, Hackett DA, Parker HM, O'Connor HT, Gerofi JA, Sainsbury A, et al. Effect of aerobic exercise training dose on liver fat and visceral adiposity. Journal of hepatology. 2015;63(1):174-82.
20. Ryu S, Chang Y, Jung HS, Yun KE, Kwon MJ, Choi Y, et al. Relationship of sitting time and physical activity with non-alcoholic fatty liver disease. Journal of hepatology. 2015;63(5):1229-37.
21. Martins C, Aires L, Junior IF, Silva G, Silva A, Lemos L, et al. Physical activity is related to fatty liver marker in obese youth, independently of central obesity or cardiorespiratory fitness. Journal of sports science & medicine. 2015;14(1):103.
22. Promrat K, Kleiner DE, Niemeier HM, Jackvony E, Kearns M, Wands JR, et al. Randomized controlled trial testing the effects of weight loss on nonalcoholic steatohepatitis. Hepatology. 2010;51(1):121-9.
23. Zelber-Sagi S, Ratziu V, Oren R. Nutrition and physical activity in NAFLD: an overview of the epidemiological evidence. World journal of gastroenterology: WJG. 2011;17(29):3377.
24. Thoma C, Day CP, Trenell MI. Lifestyle interventions for the treatment of non-alcoholic fatty liver disease in adults: a systematic review. Journal of hepatology. 2012;56(1):255-66.

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