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Endocrinology & Metabolism International Journal

Research Article

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Psychological wellbeing and sleep quality parameters response to life style intervention in non-alcoholic steatohepatitis obese patients

Abstract

Background: Non-alcoholic steatohepatitis (NASH) is a common progressive chronic hepatic disorder that has no approved treatment. Obesity is usually associated with NASH. Life style intervention is the standard management of NASH. Objective: The purpose of current study was to detect psychological wellbeing and sleep quality parameters changes following Life style intervention in non-alcoholic steatohepatitis obese patients. Material and Methods: Fifty NASH patients of Internal Medicine Department at King Abdul Aziz University Hospital of both gender (27males & 23females). The mean of their age was 46.11±4.95year, the mean of their BMI was 33.76±3.12Kg/m^2. Exclusion criteria included smokers, cardiovascular disorders, alcohol intake and renal failure. Participants assigned into two groups; group (A) conducted a 3months of life intervention program of exercise and diet control, while group (B) considered the control group. Results: The mean values of BMI, depression (BDI), total mood disturbance (POMS), awake time after sleep onset and REM sleep latency were significantly decreased, where the mean value of self-esteem (RSES), total sleep duration, sleep efficiency and sleep onset latency were significantly increased as result of reduced body weight in group (A), while results of group (B) showed no significant changes. Conclusion: Weight reduction modulates psychological wellbeing and sleep quality parameters following Life style intervention in non-alcoholic steatohepatitis obese patients.

Keywords: anxiety, depression, psychological wellbeing, sleep parameters, nonalcoholic steatohepatitis, weight loss.

Volume 7 Issue 4 - 2019

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Received: June 05, 2019 | **Published:** July 23, 2019

Introduction

Non-alcoholic steatohepatitis (NASH) is a prevalent medical problem about 4% of adults worldwide;[1,2] which is parallel with the high risk of obesity.[3] The mortality rate among patients with NASH is great due to the associated cardiovascular and hepatic complications.[4] In addition, risk of psychiatric disorders are higher among obese subjects.[5,6]

Increased body mass index (BMI) is directly correlated with risk of sleep disorders, reduced sleep duration and poor quality of sleep.[7] However, there is a close link between obesity and nonalcoholic fatty liver disease (NAFLD) along with risk of sleep disturbance.[8–11] Other studies reported an association between risk of NAFLD and short sleep duration & poor quality of sleep.[12,13] In the other hand, sleep disruption was reported as a contributing factor in the pathogenesis and development of the NAFLD.[14,15]

Chronic hepatic disorders are usually associated with higher depression rate.[16] While, Russ and colleagues found an association between NAFLD/NASH and psychological distress as emotional symptoms are common among patients with chronic hepatic disorders.[17] Moreover, anxiety and depressive symptoms found to be associated with NAFLD and other liver diseases.[18–23]

Exercise and diet control cons,[24–28] Weight loss is usually associated with many health benefits as modulation of live enzymes,[29–32] reduction of liver fat,[33–36] improved activity score and severity of NAFLD,[37] in addition to resolution of depressive symptoms.[38]

The current study aimed to detect psychological wellbeing and sleep quality parameters changes following life style intervention in non-alcoholic steatohepatitis obese patients.

Material and methods

Subjects

Fifty NASH patients of Internal Medicine Department at King Abdul Aziz University Hospital of both gender (27males & 23females). The mean of their age was 46.11±4.95year, the mean of their BMI was 33.76±3.12Kg/m^2. Exclusion criteria included smokers, cardiovascular disorders, alcohol intake and renal failure. Participants assigned into two groups; group (A) conducted a 3months of life intervention program of exercise and diet control, while group (B) considered the control group.

Measurements

Psychological well-being: Self-esteem that include ten items was measured using the Rosenberg Self-Esteem Scale (RSES), while mood disturbances was measured by the Profile of Mood States (POMS) that include 65 items and depression was measured by Depression Inventory (BDI) that consists of 21 items.[39]

Sleep parameters: Polysomnographic (PSG) recording was conducted for all participants over 48 hours using the digital system (Philips-Respironics, USA). The sleep parameters measured included total sleep time, sleep latency, sleep efficiency, awake after sleep

onset, REM sleep latency.[40] The above parameters were measured at the beginning and after 90days at the end of the study.

Procedures

The training group: Twenty five NASH patients enrolled in the training group by doing aerobic exercise program in addition to diet control. Treadmill (Track master 400E, gas fitness system, England) was used to do aerobic training program with intensity about 70% to 80% of the maximum heart rate (HRmax), three training sessions every week for 12weeks, each session consisted of 5minutes warming up, 30minutes aerobic training and 5minutes cooling down. The diet control was conducted under close supervision of dietitian who designed each the total energy intake 1200Kilocalories/day with balanced diet (protein=15%, fat=30 to 35% and carbohydrate=50 to 55%) for three months.

The control group: Twenty five NASH patients shared in this study as a control group by keeping their usual life style and received no treatment intervention.

Statistical analysis

Comparison of the significance for the mean values of the measured parameters at the start and at the end of the study in two groups were compared using student paired "t" test. While, student unpaired "t" test was used in comparison between the two groups ($P<0.05$).

Results

The baseline and biochemical parameters of the study are presented in Table 1 which proved that there was no significant differences between the intervention group(A) and the control group (B) that means we have two homogenous groups. Regarding the values of BMI, Depression (BDI), Total mood disturbance (POMS), Awake time after sleep onset and REM sleep latency they obtained significant reduction in group (A), where the values of Self-esteem (RSES), Total sleep duration, Sleep efficiency and Sleep onset latency they obtained significant increase (Table 2), while results of group (B) showed no significant changes (Table 3). In addition; no significant difference recoded between both groups at the end of the study (Table 4).

Table 1 Baseline and biochemical parameters of participants

	Mean±SD		Significance
	Group(A)	Group(B)	
Age(year)	44.95±5.28	42.51±4.93	P>0.05
Gender(male/female)	14/11	13/12	P>0.05
BMI(kg/m^2)	34.73±4.64	33.41±4.59	P>0.05
SBP(mm Hg)	146.14±11.13	144.75±10.78	P>0.05
DBP(mm Hg)	89.26±5.37	87.94±5.42	P>0.05
Total cholesterol(mg/dl)	197.38±16.69	195.22±14.84	P>0.05
HDL-C(mg/dl)	35.65±4.21	36.51±3.93	P>0.05
LDL-C(mg/dl)	121.18±10.54	118.96±9.25	P>0.05
Triglycerides(mg/dl)	154.37±9.16	153.15±8.73	P>0.05
AST(IU)	65.44±5.72	63.83 ±4.94	P>0.05
ALT(IU)	53.52±4.45	52.21±4.32	P>0.05

BMI, body mass index; SBP, systolic blood pressure; DBP, diastolic blood pressure; HOMA-IR, homeostasis model assessment-insulin resistance index; HDL-c, high density lipoprotein cholesterol; LDL-c, Low density lipoprotein cholesterol; AST, aspartate aminotransferase; ALT, alanine aminotransferase.

Table 2 Mean value and significance of measured variables of group(A) before and at the end of the study

	Mean±SD		T-value	Significance
	Before	After		
BMI(kg/m^2)	34.73±4.64	27.56±3.21*	7.32	P<0.05
Self-esteem(RSES)	23.41±4.32	26.38±4.24*	7.27	P<0.05
Depression(BDI)	8.26±1.98	6.11±1.76*	6.76	P<0.05

Citation: Neamatallah ZA, AlKhateeb AM, Alabasi UM, et al. Psychological wellbeing and sleep quality parameters response to life style intervention in non-alcoholic steatohepatitis obese patients. *Endocrinol Metab Int J.* 2019;7(4):107–111. DOI: 10.15406/emij.2019.07.00253

Table Continued....

	Mean±SD		T-value	Significance
	Before	After		
Total mood disturbance(POMS)	25.17±2.76	21.25±2.85*	7.19	P<0.05
Total sleep duration(min)	316.16±25.31	335.34±27.12*	9.21	P<0.05
Sleep efficiency(%)	73.25±11.37	80.19±10.13*	8.24	P<0.05
Sleep onset latency(min)	12.34±2.28	16.15±2.61*	6.82	P<0.05
Awake time after sleep onset(min)	79.23±9.34	66.52±8.37*	8.32	P<0.05
REM sleep latency(min)	80.62±10.48	68.38±9.22*	6.95	P<0.05

BMI, body mass index; RSES, rosenberg self-esteem scale; BDI, beck depression inventory; POMS, profile of mood states; REM, rapid eye movements;(*) indicates a significant difference between the two groups; P<0.05.

Table 3 Mean value and significance of Mean value and significance of measured variables of group(B) before and at the end of the study

	Mean±SD		T-value	Significance
	Before	After		
BMI(kg/m^2)	33.41±4.59	34.22±4.64	0.87	P>0.05
Self-esteem(RSES)	21.82±3.97	20.91±4.11	0.92	P>0.05
Depression(BDI)	7.99±1.76	8.33±1.79	0.79	P>0.05
Total mood disturbance(POMS)	23.79±3.92	24.11± 3.97	0.88	P>0.05
Total sleep duration(min)	321.41±26.18	317.75±25.41	1.76	P>0.05
Sleep efficiency(%)	74.58±10.64	73.23±10.71	1.54	P>0.05
Sleep onset latency(min)	13.62±2.81	13.79±2.82	0.95	P>0.05
Awake time after sleep onset(min)	78.76±8.16	81.12±9.34	0.83	P>0.05
REM sleep latency(min)	80.85±10.98	79.41±11.19	0.85	P>0.05

BMI, body mass index; RSES, rosenberg self-esteem scale; BDI, beck depression inventory; POMS, profile of mood states ; REM, rapid eye movements;(*) indicates a significant difference between the two groups; P<0.05.

Table 4 Mean value and significance of Mean value and significance of measured variables of group(A) and group(B) after treatment

	Mean±SD		T-value	Significance
	Group(A)	Group(B)		
BMI(kg/m^2)	27.56±3.21*	34.22±4.64	7.21	P<0.05
Self-esteem(RSES)	26.38±4.24*	20.91±4.11	6.48	P<0.05
Depression(BDI)	6.11±1.76*	8.33±1.79	5.12	P<0.05
Total mood disturbance(POMS)	21.25±2.85*	24.11± 3.97	4.97	P<0.05
Total sleep duration(min)	335.34±27.12*	317.75±25.41	8.92	P<0.05
Sleep efficiency(%)	80.19±10.13*	73.23±10.71	6.57	P<0.05
Sleep onset latency(min)	16.15±2.61*	13.79±2.82	4.93	P<0.05
Awake time after sleep onset(min)	66.52±8.37*	81.12±9.34	6.38	P<0.05
REM sleep latency(min)	68.38±9.22*	79.41±11.19	7.23	P<0.05

BMI, body mass index; RSES, rosenberg self-esteem scale; BDI, beck depression inventory; POMS, profile of mood states ; REM, rapid eye movements; (*) indicates a significant difference between the two groups; P<0.05.

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Discussion

For the best of our knowledge, the present study is the first one to measure the psychological wellbeing sleep quality parameters response to life style intervention in non-alcoholic steatohepatitis obese patients, as there is limited researches in this area even NASH and obesity are growing medical problems. The novelty of the present study is that weight reduction is considered as a cornerstone and only the standard treatment for the NASH and psychological distress and abnormal sleep parameters are common complains among obese patients with NASH.[41] Therefore, the purpose of current study was to detect psychological wellbeing and sleep quality parameters changes following life style intervention in non-alcoholic steatohepatitis obese patients.

Our results regrading influence of weight loss on psychological wellbeing, showed reduced BDI & POMS and increased RSES, which agreed with many researches.[42–46] Grave and colleagues and Imayama and coworkers stated that good results of psychological wellbeing and quality of life (QOL) obtained following 12months of weight reducing program.[42,43] However, Wycherley and colleagues proved that 4months of weight reduction program resulted in resolution of psychological distress and good QOL in obese diabetic subjects.[44] Similarly, Faulconbridge et al.[45] reported that loss of weight positively changed the depressed mode in obese subjects.[45]

Regarding results sleep parameter, our results proved that sleep duration and quality positively improved with weight reducing program among NASH patients, these results approved with similar researches in other different disorders.[46–51] Tan and colleagues stated that sleep onset latency shortened in obese men with insomnia after of six months of diet control.[46] While, Tan et al.[46] reported that six months of weight reducing program of diet control and exercise improved sleep quality parameters in obese men with sleep disorders.[47] However, Passos and coworkers proved that polysomnographic (PSG) recording of sleep quality improved after four months of aerobic exercise training in patients with chronic primary insomnia.[48] Moreover, the possible mechanism of improving sleep quality following life style intervention may include: modulation of body temperature, weight loss, reduced secretion of inflammatory cytokines, increased secretion of endorphin and anti-inflammatory cytokines.[49–51]

Conclusion

Weight loss modulates psychological wellbeing and sleep quality parameters following life style intervention in non-alcoholic steatohepatitis obese patients.

Acknowledgments

None.

Conflicts of interest

The authors declare that there are no conflicts of interest.

Funding

None.

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Citation: Neamatallah ZA, AlKhateeb AM, Alabasi UM, et al. Psychological wellbeing and sleep quality parameters response to life style intervention in non-alcoholic steatohepatitis obese patients. *Endocrinol Metab Int J.* 2019;7(4):107–111. DOI: 10.15406/emij.2019.07.00253