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Senobi Versus Diaphragmatic Breathing Exercise to Ameliorate Depression in Obese Women

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Abstract

Purpose: The aim of the present study was to find out and compare the effect of different breathing techniques, [Senobi Breathing Exercise (SBE) and Diaphragmatic Breathing Exercise (DBE)] for amelioration of depression in obese women.

Subjects: Forty obese women aging from 40-50 years with body mass index 30-34.9kg/m ^{2} participated in this study, they were chosen from the clinic of comprehensive health insurance in Belbeis in Egypt.

Methods: Subjects were assigned randomly into two groups equally in number: Group (1) performed SBE for 3 times daily for one month and Group (2) performed DBE for 3 times daily for one month.

Results: Showed that both SBE and DBE were significantly ameliorating depression in obese women, the percentage of decrease in HAM-D scores was 27.4% in Group (1) and 14.8% in Group (2) also the urinary concentration of Estradiol and growth hormones showed percentage of improvement by 193% and 246% in Group (1) respectively and 96.9% and 100% in Group (2) respectively. Moreover, SBE was better than DBE.

Conclusion: Both SBE and DBE were effective physical therapy modalities to ameliorate depression in obese women, with SBE showing more significant improvement than DBE.

Key Words: *Obese women – Depression – Senobi breathing exercise – Diaphragmatic breathing exercise.*

Introduction

DIAPHRAGMATIC breathing exercise increases insulin, reduces glycemia, reduces reactive oxygen species production, reduces heart rates, and reduces free-radical production as indicated by the higher antioxidants levels **[1]**.

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Stretching-breathing exercise, which known as "Senobi" Breathing Exercise (SBE) which involves only one minute of stretching together with both abdominal breathing and thoracic respiration,was found to be effectieve exercise for asthmatic patients to achieve a desirable improvement in symptoms **[2]**, this was also found to be effectieve for weight loss in obesity possibly by regulating the automonic nervous system and hormone secretion **[3]**.

Numerous brown fat cells exist in the erector spinae group of the back and when this area is stimulated, the brown fat cells are activated and play an important role in fat combustion. It has been suggested that the brown fat cells contribute to the improvement of various diseases, including obesity and age-related conditions **[4]**. After performing the "Senobi" breathing for 1min, thermography shows an increase in skin temperature of the erector spinae group between scapulas. Moreover, it is well known that both abdominal breathing and thoracic respiration are effective weight-loss methods that can be done easily **[3]**.

Obesity has been described as a serious threat as climate change, and other sources assert that, world governments are focusing too much on fighting terrorism, while obesity and other life style diseases' are killing millions more people **[5]**.

Meta-analysis confirms a reciprocal link between depression and obesity. Obesity was found to increase the risk of depression and for clinically diagnosed depression. In addition, depression was found to be predictive of developing obesity **[6]**.

People with initially severe symptoms of depression or anxiety showed a subsequent decrease

in HDL cholesterol levels and an increase in abdominal obesity over time. Therefore, such people are at elongated and increasing risk for dyslipidemia and obesity, predisposing them to cardiovascular disease [7].

Among middle-aged women, both obesity and depression are independently associated with substantially higher health care costs. These cost increases are spread across the full range of outpatient and inpatient health services. Given the high prevalence of obesity, cost increases of this magnitude have major policy and public health importance [8].

Depression is a "whole-body" illness involves the body, mood, and thoughts. It affects the way a person eats and sleeps, the way one feels about himself, and the way one thinks about things. It is a state of intense sadness [9].

It has been reported that in pre-menopausal woman, age-related changes in ovarian estrogen production may alter the function of autonomic nervous system and thus predispose them to depression [10].

Therefore the approaches for the treatment or prevention of depression in obese individuals are urgently required.

The purpose of this study was to compare the effects of Senobi Breathing Exercise (SBE) versus Diaphragmatic Breathing Exercise (DBE) on Estradiol, growth hormones and hamilton depression rating scale, in ameliorating depression in obese women.

Material and Methods

The study was conducted at the comprehensive health insurance in Belbeis, Sharkia, Egypt, duration of the work from 3/2015 to 6/2015. After obtaining appropriate informed consent in writing, forty obese women aging from 40-50years with body mass index 30-34.9kg/m^2. Medically and clinically stable and non-smokers, with good mentality to follow the investigators instructions. The patients were examined by physician before the study and the following patients were excluded: Medically unstable, smokers, any known abdominal pathologies (for example, hiatus hernia), history of gastro esophageal reflux of any degree, history of serious injury to the spine or thorax, including costal or spinal fractures, history of diaphragm surgery and psychological disturbances who will not follow instructions or who has any other disease will affect the results.

Subjects were assigned randomly into two groups equally in number.

Group (1) performed SBE for 3 times daily for one month and Group (2) performed DBE for 3 times daily for one month.

Evaluative procedures:

All participants of both groups were underwent the following evaluation at the beginning and after one month of breathing training.

- VIDASE device was used to determine hormones level in urine (Growth hormone, estradiol). The urine samples were collected two times, in the morning; (at the beginning of the study and after 30min of one-minute session of breathing exercises of the last session).
- The Hamilton Depression Rating Scale (HAM-D) (17 items): All participants were answered the HAM-D questionnaire before starting the study and at the end of the study. Used as a way of determining a patient's level of depression [11].

Treatment procedures:

All participants in both groups in general were instructed to repeat the cycle of their breathing patterns for a total of 3 deep breaths per minute and try to breathe at a rate of one breathe every 20 seconds. Their respiration patterns were performed three times/day.

1- Training program for Group 1:

"Senobi" breathing exercise was performed from standing, woman stood still with the feet at shoulder width. The arms were extended firmly. The neck was extended to the back, and the upper body was extended so as to face the ceiling. The woman was intstructed to take care to avoid overexertion. woman took a slow deep breath in through her nose for 5 seconds and hold it for 7 seconds (or as long as she was able, not exceeding 7sec). Then, slowly exhale through her mouth for 8 seconds [3].

2- Training program for Group 2:

Diaphragmatic breathing exercises was performed while sitting position with back supported, placed one hand on here chest and the other on here abdomen. When woman took deep breath in, the hand on the abdomen should rise higher than the one on the chest. This ensured that the diaphragm was pulling air into the bases of the lungs. woman took a slow deep breath in through her nose 5 seconds imagining that she was sucking in

all the air in the room and hold it for 7 seconds (or as long as she was able, not exceeding 7sec). Then, slowly exhale through her mouth for 8 seconds **[12]**.

Results

Data obtained from both groups prior and following breathing exercise program were statistically analyzed and compared.

Measurement of hormone levels in the urine; at the baseline examined at the beginning of study, the urinary concentrations of estradiol and growth hormone were increased in both groups (Tables 1-3) & Figs. (1,2). HAM-D scale; the HAM-D score in both groups was significantly decreased as in (Tables 1-3) & Fig. (3).

Group (1) the results of the present study revealed that urinary growth hormone increased from 3.9±0.41 to 13.5±2.1 (246%), urinary estradiol increased from 3.1±0.31 to 9.1±1.5 (193%), and The HAM-D score decreased from 17.7±2.89 to 12.6± 1.49 (27.4%).

Group (2) the results of the present study revealed that urinary growth hormone increased from 4±0.4 to 8±0.63 (100%), urinary estradiol increased from 3.3±0.66 to 5.6±0.63 (69.6%), and the HAM-D score decreased from 16.8 ±2.77 to 14.3±3.5 (14.8%).

Table (1): Comparison between mean values of estradiol, growth hormone and Hamilton depression score, before and after breathing exercise of both groups.

Breathing type	Group 1 (Senobi breathing)	Group 2 (Diaphragmatic breathing)	MD	*t*-value	*p*-value	Sig.
Estradiol before ng/g creatinine	3.1±0.31	3.3±0.66	–0.2	–1.18	0.24	NS
Estradiol after ng/g creatinine	9.1±1.5	5.6±0.63	3.5	9.4	0.000	S
Growth hormone before ng/g creatinine	3.9±0.41	4±0.4	–0.1	–073	0.46	NS
Growth hormone after ng/g creatinine	13.5±2.1	8.1±1.4	5.4	9.3	0.000	S
Hamilton depression score before breathing exercise	17.7±2.89	16.8±2.77	0.9	0.66	0.5	NS
Hamilton depression score after breathing exercise	12.6±1.49	14.3±1.49	–1.7	–3.5	0.01	S

$\bar{x}$: Mean. MD : Mean Difference. *p*-value : Probability value.
SD : Standard Deviation. *t*-value : Paired *t*-test. S : Significant.

Table (2): Comparison between before and after mean values of urinary estradiol, growth hormone and Hamilton depression score and of Group 1.

	Group 1 (Senobi breathing)		MD	% of improvement	*t*-value	*p*-value	Sig.
	Before	After					
Estradiol hormone:							
X ± SD	3.1±0.31	9.1±1.5	–6	193 ↑	–16.6	0.000	S
Growth hormone:							
X ± SD	3.9±0.4	13.5.±2.1	–9.6	246 ↑	–18.1	0.000	S
Hamilton depression score:							
$\bar{x}$ ± SD	17.4±2.89	12.6± 1.49	4.8	27.4 ↓	6.5	0.000	S
Median	17.5	12					
Range	(13-22)	(11-16)					

$\bar{x}$: Mean. MD : Mean Difference. *p*-value : Probability value.
SD : Standard Deviation. *t*-value : Paired *t*-test. S : Significant.

Table (3): Comparison between before and after mean values of urinary estradiol, growth hormone and Hamilton depression score and of Group 2.

	Group 2 diaphragmatic breathing		MD	% of improvement	*t*-value	*p*-value	Sig.
	Before	After					
Estradiol hormone:							
X ± SD	3.3±0.66	5.6±.63	2.3	69.6 ↑	–13.3	0.000	S
Growth hormone:							
X ± SD	4±0.4	8±.63	4	100 ↑	–11.6	0.000	S
Hamilton depression score:							
$\bar{X}$ ± SD	16.8±2.77	14.3±3.5	2.5	14.8 ↓	3.8	0.000	S
Median	17.5	15					
Range	(13-21)	(11-16)					

$\bar{X}$: Mean. MD : Mean Difference. *p*-value : Probability value.
SD : Standard Deviation. *t*-value : Paired *t*-test. S : Significant.

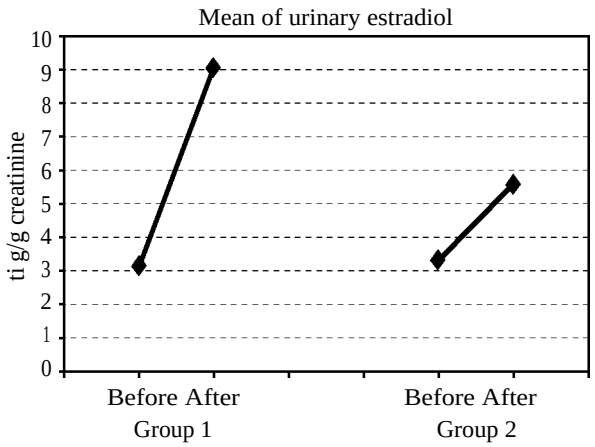

Fig. (1): Comparison between (Group 1) "Senobi" breathing exercise and (Group 2) diaphragmatic breathing as regard mean of urinary estradiol before and after.

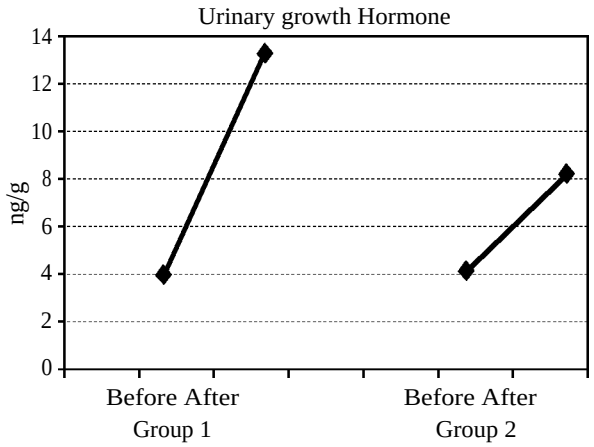

Fig. (2): Comparison between (Group 1) "Senobi" breathing exercise and (Group 2) diaphragmatic breathing as regard urinary growth hormone before and after.

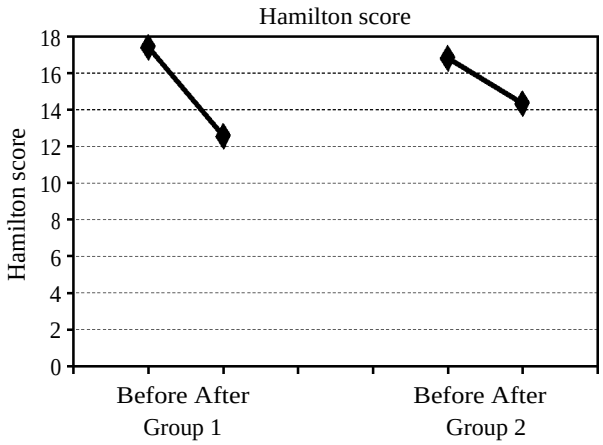

Fig. (3): Comparison between (Group 1) "Senobi" breathing exercise and (Group 2) diaphragmatic breathing as regard Hamilton depression score before and after.

Discussion

The results of the present study revealed that the urinary hormone concentrations of (estradiol and growth) showed a percentage of increasing in both groups as follow Group (1) 193% and 246% respectively Group (2) 96.6% and 100% respectively. So there is high significant difference between both groups. Although both groups have improved, the improvement was higher in Group (1) than in Group (2).

Regarding the HAM-D score, the percentage of decreasing was 27.4% in Group (1) and 14.8% in Group (2). So there is high significant difference between both groups. The reduction in score indicated that Group (1) improved more than Group (2).

The present study came in agree with SATO, 2011 who found out that "Senobi" breathing exercise was approved to be effective for amelioration of depression in obese women possibly through up-regulation of sympathetic nerve activity and hormone secretion **[13]**.

The present study also came in agree with Irving, 2009 who found out that sixteen weeks of supervised exercise training in adults with the metabolic syndrome increases spontaneous nocturnal growth hormone secretion independent of exercise training intensity **[14]**.

Estrogen signaling is implicated in both central (by regulation of food intake) and peripheral pathways (by protecting against adiposity). Low estrogen levels following menopause are associated with loss of subcutaneous and gain of visceral fat **[15]**. Estrogen improves the steatolysis action of noradrenaline, and it is considered that the reduced secretion of estrogen together with a decrease of ovarian function, which occurs before menopause in women, leads to obesity and depression **[16]**. When we examined urinary E2 before and after the study a surprising increase was revealed.

Adults with growth hormone deficiency "tend to have a relative increase in fat mass and a relative decrease in muscle mass and, in many instances, decreased energy and quality of life" **[17]**. Although administration of GH decreases visceral fat and LDL cholesterol, especially in obese women, it is not a widely performed treatment because of its adverse effects and high cost. When safety and effectiveness are expected, considerable time and exercise are required for the production of GH **[18]**. A surprising increase of GH was revealed after performing those breathing techniques for one month according to our study.

Consequently, an increase of these hormones would likely be responsible for recovery of the HAM-D score **[13]**.

In conclusion, both SBE and DBE are effective physical therapy modalities to Ameliorate depression in obese women, with SBE showing more significant improvement than DBE.

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References

1- MARTARELLI D., COCCHIONI M., SCURI S. and POMPEI P.: Diaphragmatic breathing reduces postprandial oxidative stress. Journal of alternative and Complementary Medicine, 17 (7): 623-8, 2011.

2- SATO K., ABO T. and KAWAMURA T.: “Senobi” stretch ameliorates asthma symptom by restoring autonomic nervous system balance. J. Invest. Med., 58: 968-70, 2010.

3- SATO K., KAWAMURA T. and YAMAGIWA S.: The “Senobi” breathing exercise is recommended as first line treatment for obesity. Biomed. Res., 31: 259-62, 2010.

4- MATTSON M.P.: "Perspective: Does brown fat protect against diseases of aging?" Ageing. Res. Rev., 9: 69-76, 2010.

5- KEMPER H.C., et al.: The prevention and treatment of overweight and obesity. Summary of the advisory report by the Health Council of the Netherlands. Neth. J. Med., 62: 10-71, 2004.

6- LUPPINO F.S., De WIT L.M., BOUVY P.F., STIJNEN T., CUIJPERS P., PENNINX B.W. and ZITMAN: Overweight, obesity, and depression: A systematic review and meta-analysis of longitudinal studies. Archives of General Psychiatry, 67: 220-9, 2010.

7- VAN A.K.B., GILTAY E.J., VAN VEEN T., et al.: Longitudinal relationship of depressive and anxiety symptoms with dyslipidemia and abdominal obesity. Psychosomatic Medicine, 75 (1): 83-9, 2013.

8- GREGORY E. SIMON, DAVID ARTERBURN, PAUL ROHDE, EVETTE J. LUDMAN, JENNIFER A. LINDE, BELINDA H. OPERSKALSKI and ROBERT W. JEFFERY: Obesity, Depression, and Health Services Costs Among Middle-Aged Women. Journal of General Internal Medicine, 26 (11): 1284-90, 2011.

9- SHARP L.K. and LIPSKY M.: "Screeing for depression across the lifespan: A review of measures for use in primary care settings". American Family Physician, 66 (6): 1001-8, 2006.

10- SCHMIDT P.J. and RUBINOW D.R.: Sex hormones and mood in the perimenopause. Ann. N. Y. Acad. Sci., 1179: 70-85, 2009.

11- HAMILTON M.: A rating scale for depression, Journal of Neurology, Neurosurgery, and Psychiatry, 23: 56-62, 1960.

12- GILIOTTIL F., ROMAGNOIL L. and SCAMO G.: Breathing retraining and exercise conditioning in post-operative patients: A physiological approach. Respiratory Medicine, 97: 197-204, 2009.

13- SATO K., KAWAMURA T. and YAMAGIWA S.: The “Senobi” breathing exercise ameliorates depression in obese women through up-regulation of nerve activity and hormone sectretion. Biomed. Res., 32: 175-80, 2011.

14- IRVING B.A., WELTMAN J.Y., PATRIE J.T., DAVIS C.K., BROCK D.W., SWIFT D., BARRETT E.J., GAESSER G.A. and WELTMAN A.: Effects of exercise training intensity on nocturnal growth hormone secretion in obese adults with the metabolic syndrome. Clin. Endocrinol. Metab., 94: 1979-86, 2009.

15- DAHLMAN-WRIGHT K., CAVAILLES V., FUQUA S.A., JORDAN V.C., KATZENELLENBOGEN J.A., KORACH K.S., MAGGI A., MURAMATSU M., PARKER M.G. and GUSTAFSSON J.A.: International Union of Pharmacology. LXIV. Estrogen receptors. Pharmacol. Rev., 58: 773-81. 10.1124/pr.58.4.8, 2006.

16- NILSSON M., DAHLMAN I., JIAO H., GUSTAFSSON J.A., ARNER P. and DAHLMAN-WRIGHT K.: Impact of estrogen receptor gene polymorphisms and mRNA levels on obesity and lipolysis-a cohort study. B.M.C. Med. Genet., 8: 73, 2007.

17- MOLITCH M.E., CLEMMONS D.R., MALOZOWSKI S., MERRIAM G.R., SHALET S.M., VANCE M.L., Endocrine Society's Clinical Guidelines Subcommittee and STEPHENS P.A.: "Evaluation and treatment of adult growth hormone deficiency: An Endocrine Society Clinical Practice Guideline". J. Clin. Endocrino. Metab., 91 (5): 1621-34, 2006.

18- FRANCO C., ANDERSSON B., LONN L., BENGTSSON B.A., SVENSSON J. and JOHANNSSON G.: Growth hormone reduces inflammation in postmenopausal women with abdominal obesity: A 12-month, randomized, placebo-controlled trial. J. Clin. Endocrinol. Metab., 92: 2644-7, 2007.

الملخص العربى

الهدف من الدراسة: الغرض من هذه الدراسة معرفة ومقارنة تأثير تمارين سنوبى التنفسية مقابل تمارين الحجاب الحاجز فى تخفيف الإكتئاب لدى النساء البدينات.

مواد البحث وأساليبة: أجريت الدراسة فى العيادة الشاملة بالتأمين الصحى ببلبيس شرقية مصر. خلال الفتره بين ٢٠١٥/٣/١٧ الى ٢٠١٥/٦/٢٣ وقد تم أخذ إقرار مكتوب من كل منهن وشارك فى هذه الدراسة أربعون مريضة معامل كتلة اجسامهم ما بين ٣٠ الى ٣٤.٩كجم/م^{٢} وقد تراوحت أعمارهن بين أربعين وخمسين عاما، وقد تم تقسيم المرضى عشوائيا إلى مجموعتين متساويتين فى العدد.

- المجموعة (١) أدت تمارين سنوبى التنفسية ثلاثة مرات يوميا لمدة ثلاثون يوما.
- المجموعة (٢) أدت تمارين الحجاب الحاجز التنفسية ثلاثه مرات يوميا لمدة ثلاثون يوما.

القياسات: تم قياس هرمون الإستروجين والنمو ومعدل الإكتئاب لكل مريضة قبل بدء الدراسة وبعدها مباشرة.

النتائج: أظهرت نتائج هذه الدراسة أن كلا من تمارين سنوبى والحجاب الحاجز التنفسية فعال فى تخفيف الإكتئاب لدي النساء البدينات (بنسبة إنخفاض فى معدل الإكتئاب لكل من المجموعة (١) ٢٧.٤٪ والمجموعة ١٤.٨٪ (٢) وبنسبة ارتفاع فى مستوى هورمونات الاستروجين والنمو فى البول لكل من المجموعة ١٩٣٪ (١) و٢٤٦٪ والمجموعة (٢) ٩٦.٦٪ و١٠٠٪ على التوالى، وبذلك فان تمارين سنوبى كان أكثر فاعلية فى اظهار التحسن لدى المريضات.

الخلاصة: من النتائج التى تم الحصول عليها من هذه الدراسة، ثبت أن تمارين سنوبى والحجاب الحاجز التنفسية تساعد فى تخفيف الإكتئاب لدى النساء البدينات وتم إثبات أن تمارين سنوبى أفضل من تمارين الحجاب الحاجز.