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The comparison between diet and physical activity on quality of life in obese nursing females

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Abstract : Maintaining quality of life are very important outcomes during postpartum period of women life. Aim of study was to compare between the effect of diet and physical activity on quality of life, body mass index and prolactin level in obese nursing females.Methods:50 primiparous obese nursing subjects were divided randomly into two equal groups, group A Diet group with a caloric restricted diet for 12 weeks. Group B Exercise group with exercise training for 12 weeks. All subjects in both groups were evaluated by quality of life questionnaire, Body mass index (BMI) was calculated, and prolactin level was determined by lab investigations to measure the serum prolactin level in blood before and after treatment period. Results:there were significant improvement($p<0.05$) in psychological domains of quality of life questionnaire in the post treatment condition compared with the pre treatment in group A. In the same context regarding within subject effect, the multiple pairwise comparison tests revealed that there were significant increase ($p <0.05$) in the 1st , 2nd, 3rd, and 4th domains in the post treatment condition compared with the pre treatment in group B. Between subject effects multiple pairwise comparisons revealed that there were significant increase of quality of life for all domains in favor to group B than group A ($p <0.05$), also, there were significant differences of BMI between groups in favor for group A, and there were significant increase in prolactin level in group A, while group B and between both groups there were no significant difference. Conclusion: Diet and exercise are effective methods for improvement quality of life and weight reduction in postpartum period among overweight and obese nursing mothers.
Keywords : Diet, Physical activity, Quality of life, Obese nursing females.

Introduction

The postpartum stage is a very special period in the woman's life and her new born child. Dramaticphysical and psychological changes occur in postpartum period. Decreased physical activity and increased caloric intake above mother demands of lactation may explain why some breastfeeding women fail to return to their weight before pregnancy. It is debated that recommended dietary allowance for breastfeeding women is too high, and the need for increased calories for milk production may be offset by the decrease in physical activity and basal metabolic rate forthe breastfeeding women[1].Retention of weight at postpartum period can be a serious cause of obesity. Inactivity and unhealthy eating habits are associated with weight gain, overweight and obesity which are the major underlying causes for a lot of diseases[2].Theoretically,women during lactation loss their weight duringpostpartum period, but in fact, weight loss during lactation is highly variable, and some females gain weight during lactation[3].

During pregnancy and the early weeks of postpartum period, the mothers have many changes in physical and psychological health. Most mothers have symptoms; affect mother's physical and emotional health[4].Postpartumdepression was related to breastfeeding experience[5].There are many factors affect mother's breastfeeding experience as psychological and physical health, sociodemographic characteristics and living condition[6].

Quality of life (QOL) is a broad ranging concept that includes physical, psychological and environmental aspects. Despite the potential role of maternal quality of life (QOL) in the breastfeeding experience, there is limited scientific evidence about the relationship between QOL and breastfeeding continuation [7].

Also obesity is related with increased depression and anxiety, and decreased quality of life. Many obese subjects have physical, psychosocial and social problems [8].One of the actions that could affect health and life quality of mothers is to encourage them to practice physical exercises during postpartum period[9].Exercise is a significant way to maintain physical wellbeing and so mental wellbeing will be improved. It decreases the emotional stresses and improves the self-confidence. Meanwhile, it improves the quality of nutrition and sleep, strengthens the muscles and bones and prevents osteoporosis[10].Also,exercise will improve cardiac activity and general fitness, improve energy levels, reduce stress levels, help in weight control, and help in the treatment of post-natal depression [11].

During lactation period there are high levels of plasma prolactin, this is due to different styles of child feeding and the number of breast feeding times. Also nutritional status of the mother has a major effect on plasma-prolactin levels[12].Exercise may also have an effect in prolactin level during postpartum period [13].

So the aim of our research was to compare between the effect of diet and physical activity on quality of lifeof nursing females complain from overweight and measuring the change of body mass index and prolactinlevel as many mothers fear of the efficacy of diet or exercise on lactation.

Materials and Methods

Study design: randomized clinical trial study. This study was carried out in Kafr El Sheikh University outpatient clinic. In the period from January 2016 to December 2016.

Ethical considerations

This study was approved by the Faculty of Physical Therapy Ethical Committee under unique identification number for the study is P.T.REC/012/001537. Before participating in this study, the aims were explained to all subjects and they signed a confirmed consent form before participation in the study.

Subjects

50 primiparous obese nursing subjects selected from kafr elshiekh outpatient clinic were included in this study, their age ranged from 20 - 35 years old and they were all after 6 weeks of normal vaginal delivery. Body mass indexes (BMI) ranged from 30 to 35 kg/m2. They had singleton healthy term baby. They were lactating their babies by normal breastfeeding.

Subjects were excluded from the study if they are athletes, had any medical problems such as diabetes mellitus, hypertension, musculoskeletal disorders, and who use any hormonal contraceptive method.

Subjects were divided randomly into two groups A or B by simple randomization; it was occurred by using the envelope method. After females agreed to participate in the study, by using cards with written words either, "Diet" or "Physical activity" in sealed envelopes, these envelopes were given to a staff physical therapist who did not share in this study; she/he picked one envelope. Depending on which card was selected, participants were allocated to their respective group.

Group A (n=25) Diet group with a caloric restricted diet for 12 weeks.
Group B (n = 25) Exercises group with exercise training for 12 weeks.

Methods

1-Diet for group (A):

Calculating total energy requirements:

Total energy requirements according to the activity level were determined by multiplying the woman's weight by a factor which was determined by the level of activity (25 in person with mild activity – 30 in person with moderate activity – 35 in person with hard activity – 40 in athletes). The lactating woman was considered as a moderate physical activity level, so multiply the woman's weight by 30**14**.

Calculating the basal metabolic rate:

BMR was calculated by multiplying the woman's ideal weight (in kilograms) by 0.9 by 24 hours.A dietary modification plan for 12 weeks was prescribed for the nursing mother. The calorie intake per day in diet should not be reduced than the basal metabolic rate per day. The reduction in energy intake was 500 calories per day from the active metabolic rate. The aim is reduction of the mother's weight by 0.5 kg/week. Daily diet records were kept and submitted weekly for analysis to ensure adherence to the dietary protocol.

2. Exercise for group (B)

Exercise interventions included in this study was aerobic exercise including walking and running on treadmill, pelvic rocking exercise and abdominal exercise in order to promote weight loss and improve physical fitness.

The treatment session was an hour. The patient spent forty minutes walking on a True ES900 treadmill and twenty minutes on pelvic rocking exercise and abdominal exercise in order to strengthen abdominal muscles which are the most affected muscles during pregnancy, as strong abdominal muscles burn more deep fats which help in reshaping the body.

Walking exercises: The exercise was performed on treadmill as following;

First stage (warming up): It consisted of walking on treadmill without resistance or inclination for five minutes. Second stage (active stage):It consisted of walking on treadmill with 15˚ inclination at training heart rate of each patient for thirty minutes. Third stage (Cooling down): It consisted of walking on treadmill without resistance or inclination for five minutes.

Pelvic rocking exercises: from crook lying position, prone kneeling position, and standing position Abdominal exercises: static and dynamic abdominal exercises.

Data collection

All subjects in both groups were evaluated by quality of life questionnaire by the World Health Organization Quality of Life brief version (WHOQOL-BREF).The WHOQOL-BREF is a 26-item, self-administered, generic questionnaire that is a short version of the WHOQOL-100 scale. The response options range from 1 (very poor) to 5 (very good).It consists of domains and facets (or sub-domains). It has four domains; physical health (seven items), psychological health (six items), social relations (three items) and environment (eight items). The WHOQOL-BREF provides a reliable, valid, and brief assessment of quality-of-life. Due to the length of the instrument and the domains covered[15]. Body mass index (BMI) was calculated, and prolactin level was determined by lab investigations to measure the serum prolactin level in blood before and after treatment period.

Data analysis

All statistical measures were performed using the Statistical Package for Social science (SPSS) program version 20 for windows. Prior to final analysis, data were screened for normality assumption, and presence of extreme scores. This exploration was done as a pre-requisite for parametric calculation of the analysis of difference and analysis of relationship measures. Descriptive analysis using histograms with the normal distribution curve showed that the data were normally distributed and not violates the parametric assumption for

the all measured dependent variables. Additionally, testing for the homogeneity of covariance using Box's test revealed that there was no significant difference with *p* values of > 0.05. The box and whiskers plots of the tested variables were done to detect the outliers. Normality test of data using Shapiro-Wilk test was used, that reflect the data was normally distributed for all dependent variables. All these findings allowed the researchers to conduct parametric analysis. So, 2×2 mixed design MANOVA was used to compare the tested variables of interest at different tested groups and measuring periods. The alpha level was set at 0.05.Parametric statistical tests in the form of (paired t test) was used to compare between "pre" and "post" treatment for each group and "unpaired t test" was conducted to compare BMI and prolactin level in blood at both groups in the "pre" and "post" treatment. .The alpha level was set at 0.05.

Results

Baseline and demographic data

There were no statistically significant differences (P>0.05) between subjects in both groups concerning age, height, and weight as presented in Table 1.

Table (1): Physical characteristics of subjects in both groups (A&B).

Items	Group A	Group B	Comparison	
	Mean ± SD	Mean ± SD	t-value	P-value
Age (yrs)	25.90±3.29	25.70±3.52	.161	.873
Body weight (Kg)	85.60±7.11	88.25±5.20	-1.166	.253
Height (cm)	161.33±4.15	164.33±3.89	-2.043	.051

*SD: standard deviation, P: probability, S: significance, NS: non-significant.

Table (2):Descriptive statistics of the all dependent variables in patients at both groups.

Dependent variables	**Group A**		**Group B**	
	Pre treatment	**Post treatment**	**Pre treatment**	**Post treatment**
Domain 1	35.2±18.54	31.76 ±15.75	34.08 ±20.15	45±16.05
Domain 2	34.16±16.69	43.04 ±8.87	32.64 ±18.77	53.84±14.96
Domain 3	36.76±20.5	32.72±16.79	32.8 ±18.69	46.16±21.35
Domain 4	45.12±21.7	42.56 ±20.16	45.32 ±21.74	56.16 ±22.02

***Significant level is set at alpha level <0.05**.

Table: 3. Multiple pairwise comparison tests (Post hoc tests) for the all dependent variables in patients at both groups.

Within groups (Pre Vs. Post)				
p-value	**Domain 1**	**Domain 2**	**Domain 3**	**Domain 4**
Group A	0.11	0.002*	0.126	0.309
Group B	0.0001*	0.0001*	0.0001*	0.0001*
Between groups (Group A Vs. Group B)				
p-value	**Domain 1**	**Domain 2**	**Domain 3**	**Domain 4**
Pre treatment	0.839	0.764	0.479	0.974
Post treatment	0.005*	0.003*	0.017*	0.027*

***Significant at the alpha level (p < 0.05).**

Table (4): Mean ±SD, t and P values of BMI pre and post treatment at both groups.

BMI	Means ± SD	Means ± SD	Mean difference	%of improvement	t-value	P- value
	Pre test	Post test				
Group A	32.83±1.46	30.38±1.38	2.45	7.46 %	10.023	.001**
Group B	32.66±1.25	31.80±1.09	0.86	2.63 %	5.039	.001**
Mean difference	0.17	-1.42				
t-value	.359	.723				
P- value	-3.129	.004*				

***Significant level is set at alpha level <0.05**.

Table (5): Mean ±SD, t and P values of prolactin level pre and post treatment at both groups.

Prolactin level	Means ± SD	Means ± SD	Mean difference	% of improvement	t-value	P- value
	Pre test	Post test				
Group A	98.42±47.26	114.37±46.86	-15.95	16.21 %	-3.728	.002*
Group B	90.01±47.98	91.89±44.23	-1.88	2.08%	-.784	.446
Mean difference	8.41	22.48				
t-value	.483	1.351				
P- value	.633	.187				

***Significant level is set at alpha level <0.05**.

Table (2) show changes in quality of life domains when comparing pre and post treatment in group A, there were significant improvement($p<0.05$) in psychological domains in the post treatment condition compared with the pretreatment in group A. In the same context regarding within subject effect, the multiple pairwise comparison tests revealed that there were significant increase ($p <0.05$) in the 1st, 2nd, 3rd, and 4th domains in the post treatment condition compared with the pretreatment in group B. Between groups effects multiple pairwise comparisons revealed that there were significant increase of quality of life for all domains in favor to group B than group A ($p <0.05$).Table (3).

As shown in Table (4) regarding changes in BMI when comparing pre and post treatment there were significant improvement $p<0.001$ in both groups when comparing between both groups there was significant differences ($p>0.05$) which favor in group A

The prolactin level in the "pre treatment" and the "post treatment" for both groups were presented in Table(5)there were significant improvement in group A as $p<0.002$ when comparing between both groups there were no significant difference ($p>0.05$).

Discussion

Living with this excess weight is associated with increased depression and anxiety, and decreased quality of life. Many obese individuals experience social stigmatization, and impaired psychosocial as well as physical functioning [8].

Mothers fear that restricting their food intake may negatively affect their milk supply. The secret for postpartum fitness and eating plan is to find balance between fat loss and maintaining milk supply[16].

The results of our research revealed that there was significant improvement in quality of life in group B (physical activity).While in group A (diet)there is improvement in psychological domains only in quality of life questionnaire.

Our results agree with Nunen et al., [17] who stated that lifestyle interventions report an important factor in change physical, mental, and obesity-specific quality of life problems. Practicing physical exercise regularly

is very useful in the postpartum period. As it can help in loss of weight ,improved ability to perform activities of mothering through increasing aerobic fitness and strength, enhancing bone health by increasing bone mineral density and preventing bone loss associated with lactation also, improving psychological status, mood, and increasing self-confidence[18].

Improvements in Psychological domain associated with physical activity might be considered to be 'process benefits' that result from engagement in physical activity. These might occur dueto the process of sharing which improve social interactions resulting from group participation or time spent outdoors, increased self-confidence, and also exercises enhance endorphin levels[19]. In addition, regular physical exercise is an effective method for treatment of depression, as well as its vital role in improvement of mental and social status in healthy people [20].Also improvement in psychological domains in diet group can explained by Blaine et al.,[21] who suggested that weight reduction by diet has psychological benefits as weight loss was associated with lowered depression and increased self-esteem.

Our results agreed with Migtgaard et al., [22] who concluded that Physical exercise is an efficient method to improve all health aspects and promotes good mood and improves quality of life by increasing overall health through socialization, goal setting, participation, decreased body weight, or decreased fatigue. Also, **Ankoye et al.,**[19]results suggested that increased physical activity are related with good quality of life. And thisis appropriate with different programs of physical activity.

Results of**Randy et al.,**[23] suggest that lifestyle changes program for obese subjects should focus less on weight loss as the primary outcome and pay more attention to another benefits of physical activity such as reduction of health problems related to obesity, and improvements of life quality.

Our results revealed that there were significant reduction of BMI at both groups, and there were significant differences of BMI between groups in favor for group A. These results were consistent with **Bertz et al.,**[24]who found that dietary treatment, with or without exercise treatment, lead to significant and clinically relevant weight loss among overweight and obese lactating women.

Colleran and Lovelady [25]investigatethe effects of diet restriction and exercise on body weight in overweight and obese lactating women in a 16-week intervention, and concluded that both diet and exercises decrease weight and BMI. **O'Toole et al.,**[26]suggests that healthcare professionals should strongly encourage postpartum women to be included in a structured diet and exercise program.

Amorim et al., [27]found that physical activity alone not affect weight reduction but diet restriction or both physical activity and diet together may be beneficial forloss of weight during the postpartum period. **Hankinson et al.,**[28]found a negative relation between physical activity and weight gain after several years of follow-up.

The results of our study not agree with **Lovelady et al.,**[29] who concluded that there were no significant changes in the weight or in body composition in exercises group.

Many mothers Fear to follow program of weight reduction with diet or exercise due to fear of its effect on lactation, in this study these results revealed that there were significant increase in prolactin levelin group A, while group B and between both groups there were no significant difference.

This result is in line with previous study that showed that short-term maternal weight reduction did not negatively affect infant growth or the quantity or quality of the mother milk[30].

Dewey,[31]who concluded that gradual weight loss seems to be appropriate with lactation. As the concentration of maternal plasma prolactin levels increases during loss of weight, as lactation enhance using of the mother's energy reserves.

Vega et al.,[32]investigated the effect of acute exercise on pregnant women during late pregnancy and women at postpartum stage, on the concentration of serum prolactin, and they found that there was no significant change in prolactin level during pregnancy and lactation after exercise program.

Zourladani et al.,[33] evaluated the prolactin hormone level after an exercise training program in lactating women, and found no statistical effect in prolactin level. **Change et al.,** [34]revealed that serum prolactin level not increase significantly even in response to acute maximal exercise.

Also another study show that long-term participation in an exercise program was found to have no effect on volume, energy composition of breast milk in non-overweight women, or in overweight women randomly assigned to an exercise and calorie-restriction intervention, they found no differences in body weight or growth among infants whose mothers were in either the exercise or control groups[35].

The limitations for our study may be small sample size, type and intensity of exercises, type of diet restriction, and short time of study. Recommendations for future research are conducting the same study on a large sample size, use different techniques of exercises, combine diet restriction and physical activity, and conduct the study for long time assessment.

Conclusion

Physical activity is effective methods for improvement quality of life and weight reduction in postpartum period among overweight and obese nursing mothers. However dieting was associated with more reduction in BMI and increase in serum prolactin level leading to better milk production and secretion while exercising has no effect on prolactin level. So, it is recommended to encourage overweight and obese nursing mothers to be enrolled in combined program of dieting and exercise for better results in weight reduction in addition to better milk production and improve their quality of life.

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