Effects of a Recommended Training Program on some Psychobiological and Physical Variables in Women with Depression in Kuwait

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Abstract: The current research aims to identify the effects of a recommended training program on some psychobiological and physical variables in women with depression in Kuwait. The researcher used the experimental approach (one-group design) with pre- and post-measurements. 10) women with depression who regularly visit the psychological and mental health clinic, Ministry of Health – Kuwait, for counselling, (30-58 years) participated in this study10) women with depression who regularly visit the psychological and mental health clinic, Ministry of Health – Kuwait, for counselling, (30-58 years) participated in this study. The researcher used SPSS software to calculate mean, SD, Wilcoxson test and Spearman correlation coefficient. Results indicated that the recommended aerobic exercises program had positive effects as it increased endorphin levels in blood which in turn decreased depression significantly and improved the mood positively. In addition, it improved cardiorespiratory fitness through decreasing rest pulse and increasing aerobic power. Furthermore, it improved body shape through decreasing weight, improving BMI and decreasing body circumferences. There were no statistically significant differences in systolic/diastolic blood pressure.

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1. Introduction

Most diseases and behavioral and psychological disorders are related to stressful daily life events. Depression is a common disorder. Although the term depression describes bad mood of individuals in some moments of their lives, physicians consider it as a serious disorder because of changes in memory, cognition, perception, behavior, body, mood, sleep and other aspects of life related to it (Al-Mutairy 2005).

There are two types of depression. The first is stimulated by a painful life experience like losing a dear one or something important of failure of a relationship. This type is usually connected to the stimulating event. The other type is clinical where symptoms continue with increased severity for more than two weeks and prevent patient from his daily life activities. It is not necessary that clinical depression has clear reasons (Ibrahim 1998).

As a disorder, depression has three axes: emotional, cognitive and physical. Emotional disorder is clear in the inability to love and self-hatred that leads to suicidal thoughts. Cognitive disorder is clear in low self-esteem, maimed perceptions, memory disorder, expectation of failure, disappointment and lack of focus. Physical disorder is clear in appetite disorder, sleep disorder, parasympathetic disorder, headache, exhaustion, weeping, lack of energy and impotence.

Depression is not limited to a specific age group, gender, race, work category or income category. It can affect young children, teenagers or elderly in both genders. (Al-Mutairy 2005).

Research studies accumulated knowledge about psychological and physical consequences of depression in addition to introducing several interventions to help individuals with depression so that they can adapt through teaching them depression-management strategies individually or in groups. These strategies include several types of physical exercises that researcher studies proved its benefits for treating depression. During the last decade, physical exercises gained more attention as treatment. It is considered as a new field known as "exercise therapy". As a psycho-therapy, it is used as a main treatment or a link between several types of treatment (Babov 1985).

Depression is more common among females compared to males (A.P.A:IV 1994). Beck & Steer (1993) indicated that in a sample of (232) white adult Americans, 95.8% of them had major depression. Boyd & Weissman (1981) indicated that in a sample of (98) males and (150) females, 83.1% of males had depression while 61.9% of females had depression. Stuart et al (1984) indicated that depression affects females nearly twice as males (26% for females versus 11% for males).

Statistically speaking, there may be groups that are at risk of depression more than other groups like females. It is thought that, in addition to biological causes, there are other factors related to nurture,

economic status and social status of females. This may lead to decreased self-esteem and therefore depression (McKenzie 2004).

As a specialist in aerobics, with good knowledge about the benefits of regular participation in aerobics including physical, mental, psychological and social benefits, for women, the following questions raised in the researcher's mind: is there a clear effect for applying arecommended program with aerobics exercises with music on the psychobiological variable (depression and endorphin levels in blood) for women with depression? Is there a clear effect for applying a recommended program with aerobics exercises with music on the biological variables (pulse – blood pressure – aerobic power) for women with depression?

According to review of literature, the researcher didn't find any studies in the Arab environment that dealt with the effects of aerobics exercises with music on women with depression. Therefore, the current study tried to design an aerobic training program using aerobics exercises with music on and applying it to women with depression in Kuwait to improve their physical and mental health.

Aims:

The current research aims to identify the effects of a recommended training program on some psychobiological and physical variables in women with depression in Kuwait through identifying its effects on:

1. Psychobiological variable: depression degree – endorphin concentrations in blood
2. Biological variables: pulse – systolic/diastolic blood pressure – aerobic power
3. Physical variables: weight – BMI – body circumferences

Hypotheses:

1. There are statistically significant differences between the pre- and post-measurements of women with depression (participants) on the level of psychobiological variable under investigation, in favor of post-measurements.
2. There are statistically significant differences between the pre- and post-measurements of women with depression (participants) on the level of biological variables under investigation, in favor of post-measurements.
3. There are statistically significant differences between the pre- and post-measurements of women with depression (participants) on the level of physical variables under investigation, in favor of post-measurements.

2. Methods:

Approach:

The researcher used the experimental approach (one-group design) with pre- and post-measurements.

Participants:

(10) women with depression who regularly visit the psychological and mental health clinic, Ministry of Health – Kuwait, forcounselling, (30-58 years) participated in this study.

Research Variables:

Independent Variable: a recommended training program using aerobics exercises with music

Dependent Variables:

A- Psychobiological variables: Depression – Beta Endorphin hormone

B- Physical variables: weight – MBI – circumference (brachium – chest – waist – abdomen – pelvic – thigh).

C- Biological variables: Rest heart rate – systolic/diastolic blood pressure – aerobic power.

Bik Depression Inventory:

The researcher used the Arabicized form of Bik depression inventory for collecting data (Hamdy et al 1988).

Study Design:

The researcher used the experimental approach (one-group design) with pre- and post-measurements after being approved by the post-graduate studies committee – School of Post-Graduate Studies – Kuwait University. The researcher chose participants and got their consent in writing. All administrative permissions were gained. Preliminary version of the program and research variables were identified through review of literature and experts' opinions (sports training – physiology – psychology). Two forms for demographic data and research measurements were prepared. Pilot study was performed for to validate the research tools, verify suitability of exercises to participants, distributing exercises inside the training unit, identifying any difficulties that may occur during application and to train assistants on taking measurements. Pre-measurements for all research variables and Bik Depression inventory were taken in "Total Fitness Center – Al-Suaifia". Height and weight were measured using a restameter while women were wearing swimsuit without shoes. A measuring tape was used for measuring circumference (brachium – chest – waist – abdomen – pelvic – thigh). Rest pulse rate was measured by assistants. A digital blood pressure monitor was used for measuring systolic/diastolic blood pressure. Endorphin levels were measured by blood samples. Cooper test for aerobic power was performed at Kuwait University track. The program was applied for (8) weeks (3 units per week. Each unit (45-60 minutes) was divided into three stages (warmup – main part – cool down). Post-measurements were taken at the end of the program following the same protocol of pre-measurements. Data was tabulated for statistical treatment.

Statistical treatment:

The researcher used SPSS software to calculate mean, SD, Wilcoxson test and Spearman correlation coefficient.

3. Results and Discussion:

Table (1) indicated statistically significant differences between pre- and post-measurements of both depression and endorphin as Z calculated values were 2.80 (P ≤0.05) and 2.09 (P ≤0.037). this indicates significant improvement in depression as it decreased for all participants while endorphin increased in post-measurements for (7) participants.

Table (1): Wilcoxon test for rank signs between the pre- and post-measurements of the psychobiological variable (depression degree and endorphin levels in blood) (n=10)

Variable	Rank sign	Rank sum	Rank number	Rank mean	Z	P
Depression	Negative	55.00	10	5.50	- 2.80	*0.005
	Positive	0.00	0	0.00		
	Sum	55	10			
Endorphin	Negative	7	3	2.3	- 2.09	*0.037
	Positive	48	7	6.9		
	Sum	55	10			

Z table value on P ≤0.05 = 1.96

These statistically significant differences in favor of post-measurements of the psychobiological variable resulted from the application of the recommended training program using aerobic exercises with music. The program was designed according to scientific principles and included major standards recommended by the American Association of Sports Medicine (2000) including continuity of performance during the training session (45-60 minutes) with three parts (warmup – main part – cool down). Effort exerted during exercises was 60-85% of max pulse rate for each participant. All participants were punctual in attending sessions (3 sessions per week for 8 weeks). The program considered variation in exercises to avoid boredom and maintain motivation.

It is well documented that aerobic exercises had positive effects on anti-depression hormones. Abd El-Fattah (2003) indicated that when neurotransmitters cycle decreases in the brain, several brain functions suffer disorder including low appetite, sleep disorders, low sexual desire, memory disorders and hormonal disorders of gland, these side effects may lead to depression. Sports exercises increase dopamine, serotonin and beta endorphin in the brain. Beta endorphin is formed from beta-lipotropin, secreted by the frontal lobe of the pituitary gland while secreting Adrenocorticotrophic hormone (ACTH) (Vander et al 1985). It is called the body-secreted morphine to react to drug receptors in the brain that transmit pain signals in addition to improving mode and increasing the feelings of happiness and joy (Al-Bataina et al 2002). Sports training to exertion increases this hormone level in the brain. This is how anti-depressive drugs work. And this is confirmed by Eric Newsholme (1987) who indicated that sports participants rarely suffer from depression. Fraioli et al (1980) indicated that sports training induces changes in plasma ACTH and Bet Endorphin. Farrell (1985) indicated that sports training for men induces increases in Beta Lipotropin and Beta Endorphin while Mac Arthur (1985) concluded the same results for women. These results of previous studies are consistent with the results of this research as increases in Bet Endorphin levels were noticed.

This is also consistent with Nabkasorn et al (2005) who indicated statistically significant decreases in cortisol and epinephrine levels induced by a training program as this decreased vulnerability to depression as these two hormones are responsible for sadness and bad mood. Results of the current study indicate an increase of endorphin that is responsible for happiness and good mood.

This is also consistent with the results of Dritsa et al (2008), Craft et al (2007), Knubben et al (2006) and Dimeo et al (2000) although these studies differed in training intensity, program duration, frequency and type of activities used with depressive patients.

Table (2) indicated that correlations between endorphin and depression were -0.681 for pre-measurement and -0.745 for post-measurement. These values are higher than the table value with a negative relation between endorphin and depression. This clearly indicates that the recommended program led to significant improvements in the psychobiological variable as depression was significantly decreased while endorphin levels increased in blood and this in turn improves mood. This proves the first hypothesis.

Table (3) indicated that Z values for rest pules and aerobic power were 2.35 (P ≤0.02) and 2.26 (P ≤0.024) respectively. This means that there are

statistically significant differences between the pre- and post-measurements of these two variables in favor of post-measurements. No statistically significant difference appeared between pre- and post-measurements of systolic/diastolic blood pressure.

Table (2): Spearman correlation coefficient for Endorphin and depression

Variable	Depression (pre-)	Depression (post-)
Endorphin (pre-)	- 0.681	-
Endorphin (post-)	-	- 0.745

R table value on P ≤0.05 = 0.631

Table (3): Wilcoxon test for rank signs between the pre- and post-measurements of the biological variables (n=10)

Variable	Rank sign	Rank sum	Rank number	Rank mean	Z	P
Rest pulse	Negative	50.50	8	6.13	- 2.35	*0.020
	Positive	4.50	2	2.25		
	Sum	55	10			
Systolic blood pressure	Negative	4.00	2	2.00	- 0.96	0.334
	Positive	11.00	3	3.67		
	Sum	15	5			
Diastolic blood pressure	Negative	20.00	5	4.00	- 1.13	0.257
	Positive	8.00	2	4.00		
	Sum	28	7			
Aerobic power	Negative	0.00	0	0.00	- 2.26	*0.024
	Positive	21.00	6	3.50		
	Sum	21	6			

Z table value on P ≤0.05 = 1.96

According to Hazza (1999) and Abd El-Fattah (2003), regular training decreases heart rate at rest compared with pre-training. This is due to physiological adaptations that lead to greater heart output in each beat for covering the whole body with minimal number of beats. Salama (2000) indicated a weekly decrease of 1 beat per minute after aerobic exercises for 12 weeks. This is due to improvements in the sympathetic and parasympathetic systems. In the current study, the recommended aerobic exercises program induced a decrease in physiological stimulation pf the sympathetic system and an increase in the parasympathetic response, which is responsible for decreasing heart rate at rest. This is an indicator for improving the training conditions of participants.

This is also consistent with the results of Dritsa et al (2008), Craft et al (2007), Knubben et al (2006), Nabkasorn et al (2005) and Dimeo et al (2000).

Improvement in aerobic power are due to activating body internal systems, especially the respiratory system as this leads to increased gas exchange because of metabolism. Breathing air increases per minute and this improves breathing efficiency as the individual require few number of breathes for inhaling sufficient oxygen and exhaling CO2 (Salama 2004). Aerobic exercises improve $VO2_{max}$ through improving metabolic capacity of muscles with decreased amount of glycogen and increased amount of fats (Heshmat et al 2002).

Al-Ramly & Mohamed (1991) indicated that running, walking and other temporal exercises with continuous pattern directly improve the cardiorespiratory system through improving lung efficiency and increasing RBC and hemoglobin levels in blood. Bastawisy (1999) indicated that training intensities between 60% and 80% of max intensity improve general and specific endurance. It improves endurance through increasing oxygen consumption. In the recommended program, the researcher carefully kept intensity within limits through monitoring pulse. In addition, the researcher considered duration and frequency of exercises to improve cardiorespiratory endurance as the training unit included a main part of (35-45) minutes to assure continuity. This is sufficient for improving cardiorespiratory endurance. Unites were repeated for 3 days per week to maintain health benefits of exercises. The program lasted for two months (24 training units). The researcher worked on involving more muscle groups to increase $VO2_{max}$ that affects cardiorespiratory system positively.

This is also consistent with the results of Dritsa et al (2008), Craft et al (2007), Knubben et al (2006), Nabkasorn et al (2005) and Dimeo et al (2000).

Blood pressure didn't show any statistically significant differences between pre- and post-

measurements. It was within normal values for all participants although slight increase in systolic and slight decrease in diastolic blood pressures. These values are normal for the age group of participants (30-58 years) as increased age may lead to increased blood pressure (Galal El-Din 2004). Values of diastolic blood pressure didn't change as cardiovascular system was dilated. Four out of ten participants refer to their doctors for hypertension drugs regularly. The recommended program only controlled blood pressure and maintained it within normal limits without any statistically significant positive improvements. This is contradicted with Kubitz et al (1993) who indicated statistically significant positive changes between pre- and post-measurements of the experimental group, compared to the control group, as participants had significant hypertension. Accordingly, the researcher can say that the recommended aerobic exercises program had positive effects on the biological variables as it improved the cardiorespiratory system efficiency, rest hart rate and aerobic power. This partially proves the second hypothesis as there were no statistically significant changes in blood pressure.

Table (4) indicated statistically significant differences between pre- and post-measurements of the physical variables in favor of post-measurements as Z calculated values were higher than its table value for weight, MBI and circumference (brachium – chest – waist – abdomen – pelvic – thigh). The researcher thinks that these improvements are because of the recommended aerobic exercises program. The program followed scientific principles as training intensity was between 60-85% of max heart rate for each participant and exercises were continuous for 45-60 minutes. Sessions were repeated (3) times per week with each session divided into three parts (warmup – main part – cool down). The main part included aerobic and floor exercises for 35-45 minutes to decrease body fats and improve body shape. Helmy (1989) indicated that aerobic exercises with moderate intensity and long to moderate duration burn more calories and this decreases body fats and improves BMI. This is consistent with energy balance equation when expended energy is higher than available energy. Body weight remains unchanged when expended and available energy are equal. To lose weight, the individual should use more energy than the available to burn deposited fats (Al-Kot 2002).

Table (4): Wilcoxon test for rank signs between the pre- and post-measurements of the physical variables (n=10)

Variable	Rank sign	Rank sum	Rank number	Rank mean	Z	P
Weight	Negative	48.00	9	5.33	- 2.09	*0.037
	Positive	7.00	1	7.00		
	Sum	55	10			
BMI	Negative	49.00	9	5.44	- 2.20	*0.028
	Positive	6.00	1	6.00		
	Sum	55	10			
Brachiumcircumference	Negative	54.00	9	6.00	- 2.70	*0.007
	Positive	1.00	1	1.00		
	Sum	55	10			
chest brachium brachium	Negative	34.50	7	4.93	- 2.31	*0.021
	Positive	1.50	1	1.50		
	Sum	36	8			
waist circumference	Negative	49.50	8	6.19	- 2.24	*0.025
	Positive	5.50	2	2.75		
	Sum	55	10			
Pelviccircumference	Negative	51.00	8	6.38	- 2.40	*0.016
	Positive	4.00	2	2.00		
	Sum	55	10			
Abdomencircumference	Negative	41.50	8	5.19	- 2.25	*0.024
	Positive	3.50	1	3.50		
	Sum	45	9			
Thighcircumference	Negative	43.00	8	5.38	- 2.43	*0.015
	Positive	2.00	1	2.00		
	Sum	45	9			

Z table value on P ≤0.05 = 1.96

Positive effects on circumferences (brachium – chest – waist – abdomen – pelvic – thigh) are induced by punctuality in participation as regular exercises maintain physical fitness and increase energy expenditure. Goldberg & Dian (2002) indicated that most body fats are located in the abdomen and pelvic. Usually these fats decrease when individuals follow a stable program of walking, running or aerobics. In addition, combining aerobics with strength and endurance exercises burn more fats. Furthermore, increased muscular mass increases metabolism in rest. The researcher chose to combine aerobics with endurance and strength exercises as some exercises were performed using 1.5 kg dumbbells. Through dividing the main part between aerobic and floor exercises, the researcher worked on involving many muscle groups to increase fat burning and $VO2_{max}$. all body parts were trained during this part.

This is consistent with Craft et al (2007) who indicated that a 12-week program induced positive effects on BMI with statistically significant direct relation between BMI and fat percentage.

On the contrary, this is contradicted with Nabkasorn et al (2005) who indicated no statistically significant differences in BMI. But this result may appear because participants used anti-depression drugs that increase appetite.

These results prove the third hypothesis of the current research as the recommended aerobic exercises program improved BMI through decreasing weight and body circumferences.

Conclusions and recommendations:

According to these results, the researcher concluded that the recommended aerobic exercises program had positive effects as it increased endorphin levels in blood which in turn decreased depression significantly and improved the mood positively. In addition, it improved cardiorespiratory fitness through decreasing rest pulse and increasing aerobic power. Furthermore, it improved body shape through decreasing weight, improving BMI and decreasing body circumferences. There were no statistically significant differences in systolic/diastolic blood pressure.

The researcher recommended that the recommended program should be applied because of its positive effects on psychological status of participants. Duration of the program should be increased for more than (8) weeks to induce more positive psychological and physical effects. Similar studies for the same variables with different age groups of both genders are required. Psychiatrists should be encouraged to urge their patients to participate in aerobics as a treatment and not depending solely on anti-depression drugs, especially in minor to moderate cases. Types of exercises and music should be varied weekly to avoid boredom and to increase patients' motivation as they usually suffer from exhaustion, lack of energy and psychomotor weakness.

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