The Psychological Health of Women After 16 Weeks of Practicing Different Exercise Programs

Rosa Maria Soares Costa de Mendonça¹, Adenilson Targino de Araújo Júnior¹, ², Maria do Socorro Cirilo de Sousa², ³, Helder Miguel Fernandes¹, ⁴

¹University of Trás-os-Montes and Alto Douro, Vila Real, Portugal
²Federal Institute of Technology Education, Campina Grande, Paraíba, Brazil, ³Laboratory of Kinanthropometry and Human Performance, Federal University of Paraíba, Brazil, ⁴Research Centre for Sport, Health and Human Development, Vila Real, Portugal

ABSTRACT

Mendonça RMSC, Araújo Jr AT, Sousa MSC, Fernandes HM. The Psychological Health of Women After 16 Weeks of Practicing Different Exercise Programs. JEPonline 2015;18(2):32-44. The purpose of this study was to examine the effects of practicing different exercise programs for 16 wks on various psychological dimensions of women. A sample of 89 Brazilian women between 25 and 55 yrs of age (41.42 ± 9.23 yrs), was divided into the following experimental groups: strength training, dance, hydrogymnastics, and a sedentary control group. Women completed rating scales with the following dimensions: satisfaction with physical appearance (SPA), health perception (HP), body image perception, self-esteem (SE), and depression. For the analysis, estimated marginal averages for SPA, HP, and depression were used. The ANCOVA results showed significant effects favorable to all experimental groups on the group × time interaction factor for SPA, HP, and SE. It was concluded that 16 wks of practical exercise resulted in significant improvements in SPA, HP, and SE regardless of the program, with the greatest effect shown by the strength training group.

Keywords: Women, Health, Exercise
INTRODUCTION

Although the relationship between exercise and psychological well-being is not fully understood, evidence suggests that exercise increases the levels of serotonin, norepinephrine, and dopamine, all of which are important neurotransmitters of thoughts and emotions (39). Epidemiological studies show that women have higher prevalence rates of mental and behavior disorders than men, especially those related to anxiety and mood (3). Women are genetic carriers with greater vulnerability and also experience physiological changes attributable to the reproductive cycle. These considerations, together with environmental and psychosocial factors, neuroendocrine and neurotransmitter functioning, and individual levels of resilience, play an important role in the diagnosis of comorbidities (40,44). These conditions are generally accompanied by changes in behavior, feelings, and personality traits throughout life (39).

According to previous research, the effects of exercise are better identified in programs lasting more than 10 wks, both with regard to kinanthropometry (5,6,13,14,15,19,22) and psychologically (2,8,9,17,22,28,34,41). However, the dose-response relationship to physical exercise and the duration of the programs seem to be important factors in determining the effects. It is possible that a longer intervention time not only promotes clearer recognition of the intensity of the effects but also makes it more likely to distinguish the satisfactory dose-response relationship for each variable investigated. Therefore, in this study, the intervention period was set at 16 wks -- a condition also found in other studies (25,49,51). Gaining a better understanding of the relationship between exercise programs and their effects may enhance our ability to use specific interventions involving exercise to treat various psychological conditions.

However, much of this effectiveness is linked to the intervention processes of exercise combined with other therapies such as medication and psychotherapy (41). Thus, the scientific interest in investigating the behavior of different psychological dimensions such as satisfaction with physical appearance, perceived health, self-esteem, and depression, and their association with physical exercise is continuing (9).

Satisfaction with physical appearance, combined with the perception of body image, forms an essential part of the complex mechanism of personal identity. Body image is observed to exceed the characteristics of physical functional competencies and biological integrity (10). It is recognized as a feeling where one experiences fulfillment as a person, integrating components related to physical appearance in addition with the mental representation of size, shape, and facial features as well as attitudes, cognition, feelings, and behaviors (36).

Although the concern for physical appearance is a common feature of behavior among women in Western cultures, special attention should be paid to the representation of the body in Brazilian culture, where this concept is closely tied to good physical appearance. This situation results in a fertile ground for vanity, because women in search of the ideal body become obsessed with beauty. The importance of physical appearance, particularly for women, is well known (2). Positive body image together with good physical appearance represent an important vehicle for social mobility and successful relationships (36), forming a significant portion of the aesthetic component of life, often to the detriment of physical health (26).

The perception of health is a dimension that relates to one’s subjective opinion of health, that is, how individuals view themselves when considering the daily stimuli of life (52). It is not only influenced by variations in the experiences of each person but also by the availability of social and health services.
Although women live longer than men, they report higher morbidity and psychological problems and use more health services (7). Demographic data on the Brazilian population show a higher prevalence of negative health perceptions in women with low education, higher age, elevated stress levels, reduced sleep periods, obesity, smoking habits, and little involvement in physical leisure activities (23).

Self-esteem is a psychological dimension that plays a key role in explaining human behavior, and it is an important indicator of emotional and social adjustment (20). It is defined as the quantitative evaluative dimension of self-knowledge related to how individuals express appreciation of themselves, their self-image, or their performance in a specific area of life (48). Women with higher levels of self-esteem seem to be more emotionally stable and resistant to stress. On the other hand, those with low self-esteem seem to be more susceptible to negative influences such as depression, anxiety, dissatisfaction with their body, eating disorders, and suicidal tendencies (18).

Among the dimensions considered in this study, depression is a persistent, prolonged form of negative mood that interferes with many aspects of life and should be understood as a multifactorial disease that needs to be diagnosed and treated appropriately (50). Studies show that women are more susceptible to depression than men. Biological factors are apparently the main reason for this high incidence because of the constant hormonal fluctuations suffered during different stages of reproductive life (4).

In general, it is understood that the female body has a greater vulnerability to changes in behavior that are likely to impact psychological health. This research is relevant to social, economic, and political concerns as well as public health, because psychological and physical dysfunctions lead to chronic diseases, resulting in greater damage to quality of life and higher spending on health (28,45). Finally, this study seeks to expand our knowledge of the effects of exercise on women’s psychological health based on the hypothesis that practicing different exercise programs for 16 wks can cause changes in the psychological dimensions of satisfaction with physical appearance, health perception, self-esteem, and depression.

METHODS
Study Design
This is a longitudinal, quasi-experimental study that was conducted using comparative analysis within and between groups on pre- and post-tests.

Subjects
The population consisted of a sample of 89 adult women aged between 25 and 55 (41.42 ± 9.23 yrs), chosen to be examined in specific locations such as strength training and hydrogymnastics gyms, and a public municipal institution. The probabilistic sample was randomly divided into four groups, of which one was designated as the sedentary control group (CG) (n = 25) and three were experimental groups: strength training (SG; n = 25), dance (DG; n = 18), and hydrogymnastics (HG; n = 21). Participation was strictly voluntary, considering that women could neither be suffering from infectious and/or chronic musculoskeletal diseases nor could they give any negative responses to questions on the readiness for Physical Activity Readiness Questionnaire (PAR-Q).

Procedures
This study complied with the guidelines for research involving humans (Brazil, 2012). It was approved by the Institutional Ethics Committee (number 124/2011). After signing the Statement of Individual Consent Form, the subjects were given a scheduled day and time during which they had to complete
the questionnaire. All subjects were evaluated before starting the exercise program and again after 16 wks, providing two measurements at different times following the same procedures.

**Dependent Variables: Psychological Dimensions and Instruments Used**

With regard to satisfaction with their physical appearance (SPA), the following question was used: “From 1 to 10, indicate how satisfied you feel with your body/appearance.” A response of 1 indicated “not satisfied” and 10 indicated “very satisfied” (21). Perception of health (PH) relied on the question: “From 1 to 10, indicate how healthy you consider yourself,” with 1 meaning “not healthy” and 10 “very healthy” (52).

To measure body image perception (BIP), we used the Stunkard scale of silhouettes for adults, validated in studies with the Brazilian population (1,16,42,46). The degree of body dissatisfaction is given by the difference between current silhouettes (CS) and ideal silhouettes (IS). Values range between −8 and 8, with a value of zero corresponding to satisfaction with the current body size, positive values expressing a desire to be slimmer, and negative values indicating a desire to be fatter.

For the self-esteem dimension, we used the validated version of the Rosenberg self-esteem scale in Portuguese (31,48). It consists of 10 items relating to one’s feelings of self-respect and self-acceptance. After the reversal of negative items, the sum of the 10 items provides a score with a total range between 10 and 40; a high score reflects high self-esteem.

Finally, to evaluate depression, we used the adapted Beck Depressive Inventory (BDI) (27,29), which consists of 21 items answered on a scale from 0 (“never”) to 3 (“always”), where the individual expresses the amount of symptomatology experienced during the past week.

**Independent Variables: Protocols of Physical Exercise (Experimental Groups)**

All exercise protocols prescribed for the experimental groups followed the recommendations of the American College of Sports Medicine (ACSM) (24).

**Strength Training (SG)**

To assess the initial condition of this group, the 8RM test was chosen with intervals of 2 to 5 min between attempts of each exercise (43). After obtaining the exercise load, intervals equal to or greater than 10 min were applied before moving on to the next exercise. When a fault signal was obtained in the execution, the test was stopped. Thus, we validated, as the maximum baseline load, the weight obtained in the last correct execution.

The training frequency was performed 3 times·wk⁻¹ with a maximum weight established between 60% and 70% of 8RM during a session of 50 to 60 min with 3 sets of 8 to 12 repetitions and intervals of 2 to 3 min. The major muscle groups were exercised by using weight machines, free weights, or resistance equipment. Each session included a 10-min cardiorespiratory warmup (treadmill, bike, or elliptical), followed by 40 min of strength training (muscular endurance) and 5 min of recovery. The sequence of exercises comprised two types of training performed on alternate days. Training day A consisted of 8 exercises and training day B had 9 exercises. A load increase of 5% to 10% was applied when observed a facility in execute the exercise series.

**Dance Group (DG)**

This group also had 3 sessions·wk⁻¹ with a maximum heart rate of 60% to 85% in a session of 50 to 60 min with the maximal heart rate calculated by the equation (220 – age). In the first week, the subjects were instructed to measure their heart rate by palpation of the radial artery, pressing lightly with the index and middle finger for 15 sec and then multiplying their count by 4. This group featured
aerobic training; the basic movements involved the major muscle groups in a continuous and progressive form, using a minimum of three rhythmic variations of Brazilian folk dance per session (samba, forró, axé, funk, xote, lambada) with a rhythmic cadence between 100 to 160 beats·min⁻¹. Each session included 10 min of warm-up, 45 min of main activity, and 5 min of recovery.

**Hydrogymnastics Group (HG)**

For the hydrogymnastic sessions, a pool 1.40 m deep was used so that water reached the subjects’ shoulder height. The water temperature was 25°C. Exercise took place 3 times·wk⁻¹ at a maximal heart rate frequency intensity of 60% to 85%. The heart rate measurement was performed following the pattern already described for the DG. The movement activities consisted of combined exercises (cardiorespiratory and muscular endurance) of the major muscle groups and were organized into 4 parts, beginning with a 10-min warm-up. The first main part included 20 min of cardiorespiratory exercises in the pool without equipment and with maximal heart rate frequency intensities of 50% to 65% and 60% to 85%. The second main part (15 min) involved resistance exercises using various hydrogymnastic equipment along the edges of the pool, each lasting 2 to 3 min at a maximal heart rate of 60% to 75% until the time was completed. Each session ended with 5 min of stretching and relaxation.

**Control Group (CG)**

Subjects who met the inclusion criteria but reported no regular physical exercise activity during the previous 6 months – the standard recommended by the ACSM (24) – were classified as sedentary. They were asked not to start any exercise program but maintain their regular activities of daily life and their normal eating habits during the study.

**Statistical Analyses**

Data were analyzed using the SPSS statistical software version 20 for the descriptive statistics of mean and standard deviation and for inferential correlation analysis with regard to each health factor (SPA, HP, BIP, SE, and depression). As for the differences between groups throughout the study (baseline T1 and final T2 measurements), an ANCOVA of repeated measurements was performed. The magnitude values of the differences (F value), significance (P value), and estimated effect size (value of η²) with values greater than 0.01, 0.06, and 0.14 (representing small, medium, and high effects, respectively) (12) were identified. In addition, the deltas of variation (Δ%) were determined by calculating (T2 – T1)/T1 × 100. The level of significance was set at 5%. Moreover, using Cronbach’s alpha coefficient, the internal consistency of the instruments to assess the levels of depression and SE were estimated; pre- and post-test values of 0.89 for depression and 0.73 – 0.86 for SE were obtained.

**RESULTS**

Good values were observed for the reliability of measurements, attesting to the internal consistency of the questionnaire (Table 1).

<table>
<thead>
<tr>
<th></th>
<th>Beginning (Baseline)</th>
<th>16 Weeks</th>
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<tbody>
<tr>
<td><strong>Self-Esteem (SE)</strong></td>
<td>0.73</td>
<td>0.86</td>
</tr>
<tr>
<td><strong>Depression (BDI)</strong></td>
<td>0.89</td>
<td>0.89</td>
</tr>
</tbody>
</table>

Regarding satisfaction with physical appearance (SPA), results demonstrated a significant interaction effects of the time × group factor (\(F_{(3, 84)} = 8.29, \ P<0.001, \ \eta^2 = 0.23\)), with Group (\(F_{(3, 84)} = 8.29, \))
P<0.001, η² = 0.23), having the most positive average change (Table 2). In addition, the significant effects of the time factor \( F_{(1, 84)} = 108.732, P<0.001, \eta^2 = 0.56 \) were reported with an elevated effect size, where an increase in the SPA during the study, especially for SG (24.7%), was observed. CG group (~5.1%) alone did not indicate an improvement on this variable.

Results for health perception (HP) were similar. A significant interactive effect of time \( \times \) group \( (F_{(3, 84)} = 13.76, P<0.001, \eta^2 = 0.33) \) and group \( (F_{(3, 84)} = 13.76, P<0.001, \eta^2 = 0.33) \) occurred, showing the highest amount of change for the SG (21.1%). The time factor likewise had a large effect on the change \( (F_{(1, 84)} = 140.114, P<0.001, \eta^2 = 0.62) \), and again only the CG (~9.0%) showed lower levels of HP at the end of the study (Table 2).

As for the BIP, which was established by the difference between the current (CS) and ideal (IS) silhouette, the ANCOVA results showed no interactive effect for the Time \( \times \) Group factor \( (F_{(3, 85)} = 0.899, P=0.445, \eta^2 = 0.03) \) or for the group effect on the measurements \( (F_{(3, 85)} = 1.520, P=0.215, \eta^2 = 0.05) \). The level of bodily dissatisfaction (CS-IS) was also unaffected by the time factor \( (F_{(1, 85)} = 3.079, P = 0.083, \eta^2 = 0.07) \). Although no significant interaction effect of the group and time factors were observed, the average variations (Table 2) show that the experimental groups SG, DG, and HG had less dissatisfaction than the CG.

### Table 2. Descriptive Analysis of the Psychological Variables: Satisfaction with Physical Appearance, Perception of Health and Body Image Perception \((n = 89)\).

<table>
<thead>
<tr>
<th></th>
<th>Beginning (T1)</th>
<th>16 Weeks (T2)</th>
<th>Δ%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Satisfaction with Physical Appearance</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Strength Group-SG ((n = 25))</td>
<td>6.53 ± 0.00</td>
<td>8.14 ± 0.26</td>
<td>24.7</td>
</tr>
<tr>
<td>Dance Group-DG ((n = 18))</td>
<td>6.53 ± 0.00</td>
<td>7.42 ± 0.30</td>
<td>13.6</td>
</tr>
<tr>
<td>Hydrogymnastic Group-HG ((n =21))</td>
<td>6.53 ± 0.00</td>
<td>7.44 ± 0.29</td>
<td>13.9</td>
</tr>
<tr>
<td>Control Group-CG ((n = 25))</td>
<td>6.53 ± 0.00</td>
<td>6.20 ± 0.27</td>
<td>−5.1</td>
</tr>
<tr>
<td><strong>Perception of Health</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SG</td>
<td>7.15 ± 0.00</td>
<td>8.66 ± 0.23</td>
<td>21.1</td>
</tr>
<tr>
<td>DG</td>
<td>7.15 ± 0.00</td>
<td>7.72 ± 0.26</td>
<td>8.0</td>
</tr>
<tr>
<td>HG</td>
<td>7.15 ± 0.00</td>
<td>8.14 ± 0.24</td>
<td>13.8</td>
</tr>
<tr>
<td>CG</td>
<td>7.15 ± 0.00</td>
<td>6.51 ± 0.24</td>
<td>−9.0</td>
</tr>
<tr>
<td><strong>Body Image Perception</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SG</td>
<td>1.00 ± 081</td>
<td>0.92 ± 0.86</td>
<td>−8.0</td>
</tr>
<tr>
<td>DG</td>
<td>1.44 ± 0.98</td>
<td>1.11 ± 1.23</td>
<td>−23.1</td>
</tr>
<tr>
<td>HG</td>
<td>1.52 ± 0.81</td>
<td>1.14 ± 0.65</td>
<td>−25.0</td>
</tr>
<tr>
<td>CG</td>
<td>1.44 ± 1.26</td>
<td>1.48 ± 1.15</td>
<td>2.8</td>
</tr>
</tbody>
</table>

SE = Standard error  †Variable described as average

Regarding self-esteem (SE), a moderate interaction effect of the two measurements occurred during the 16 wks \( (F_{(3, 85)} = 2.740, P=0.048, \eta^2 = 0.09) \) along with an effect of the group factor \( (F_{(3, 85)} = 5.060, P=0.003, \eta^2 = 0.15) \), where only SG, DG, and HG had positive average variations. Moreover, the effect of the time factor on SE level was high \( (F_{(1, 85)} = 10.364, P=0.002, \eta^2 = 0.11) \). The CG was
the only group to have a negative change in score (−1.3%), apparently reflecting a lower level of SE in the sedentary group when compared with the initial assessment (Table 3).

With regard to depression, all average variations were negative (Table 3, n = 89). However, the ANCOVA demonstrated that the interaction effects of time × group ($F_{(3, 84)} = 1.417, P=0.244, \eta^2 = 0.05$) and group ($F_{(3, 84)} = 1.417, P=0.244, \eta^2 = 0.05$) were not relevant. The same effect occurred for the Time factor ($F_{(1, 84)} = 2.811, P=0.097, \eta^2 = 0.03$).

**Table 3. Descriptive Analysis of the Psychological Variables: Self-Esteem and Depression.**

<table>
<thead>
<tr>
<th></th>
<th>Beginning (T1)</th>
<th>16 Weeks (T2)</th>
<th>Λ%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Self-esteem</strong></td>
<td>M ± SE</td>
<td>M ± SE</td>
<td>(T2−T1)</td>
</tr>
<tr>
<td>Strength Group-SG (n = 25)</td>
<td>33.32 ± 4.46</td>
<td>36.12 ± 4.19</td>
<td>8.4</td>
</tr>
<tr>
<td>Dance Group-DG (n =18)</td>
<td>33.22 ± 2.57</td>
<td>34.33 ± 3.86</td>
<td>3.3</td>
</tr>
<tr>
<td>Hydrogymnastic Group-HG (n =21)</td>
<td>33.67 ± 3.02</td>
<td>36.14 ± 2.88</td>
<td>7.4</td>
</tr>
<tr>
<td>Control Group-CG (n =25)</td>
<td>31.68 ± 4.79</td>
<td>31.28 ± 5.17</td>
<td>−1.3</td>
</tr>
<tr>
<td><strong>Depression</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SG</td>
<td>10.91 ± 0.00</td>
<td>7.38 ± 1.04</td>
<td>−32.4</td>
</tr>
<tr>
<td>DG</td>
<td>10.91 ± 0.00</td>
<td>7.18 ± 1.21</td>
<td>−34.2</td>
</tr>
<tr>
<td>HG</td>
<td>10.91 ± 0.00</td>
<td>6.29 ± 1.13</td>
<td>−42.3</td>
</tr>
<tr>
<td>CG</td>
<td>10.91 ± 0.00</td>
<td>9.50 ± 1.09</td>
<td>−12.9</td>
</tr>
</tbody>
</table>

SE = Standard error  *Variable described as average ± SD

**DISCUSSION**

The comparative analysis was favorable to all three experimental groups over the control group. Regardless of the exercise program selected, physically active women had better results than the CG in the psychological dimensions studied, most significantly in their SPA, HP, and SE, after 16 wks of training.

The scores for SPA and BIP, two somewhat related variables, showed a higher difference for the SG. Similarly, this condition was present in other studies (2,8,16,17,28,33,37), suggesting that resistance training may provide the most visible changes in body appearance with more toned and defined muscles when compared with the practitioners of dance and hydrogymnastics. Another fact to consider is the slightly younger average age of the SG (38.84 ± 9.97 yrs), as studies on body image in Brazil have repeatedly demonstrated that younger women show more concern with physical appearance (36).

A longitudinal study (22) of the effects of exercise on psychological variables (perception of health, body and life satisfaction, and depression) in middle-aged and elderly women showed that 24 wks of resistance training promoted beneficial changes in health perception and depressive symptoms. Moreover, significant changes in these measurements were found only in the second phase (13 to 24 wks) of intervention, corroborating the findings of this study at 16 wks. The authors comment that muscle strengthening can provide the stimulus needed to improve the performance of daily life activities and feelings about one’s general welfare. Thus, the perceived improvements in functional capacity would also provide an experience of being in charge, increasing one’s physical self-efficacy, experiencing positive mood changes, and reflecting better psychological health. These results are
consistent with the present study, in which the experimental groups showed significant improvement in HP and depression. However, it is noteworthy that the hydrogymnastics group, consisting of somewhat older women (45.50 ± 8.81 yrs), showed minor fluctuations between the scores of the dimensions analyzed. They stand out among other groups as less depressed after 16 wks. This result may be explained by the different attitude toward health aspects adopted by older people. It is likely that, as people grow older, their body’s functioning and basic health may become more important to them than SPA and BIP (9).

Research conducted on Brazilian adults’ satisfaction with their bodies has found disparities in terms of sex, age, and other evaluated dimensions (36). Simultaneously, most studies focus on female adolescents and college-age samples and dissatisfaction with appearances is undeniably the most analyzed component of the problematic relationship of a woman with her body (26,30). A neglect of the perceptual dimension and cognitive, behavioral, and emotional components of body image has been noticed (32). Therefore, the observations mentioned are also attributable to female samples in other studies.

In literature reviews (2,28) and a meta-analysis (8) as well as other studies (17,33,37), changes in body image and satisfaction with the body have been shown to occur through exercise. Some authors have argued that resistance training produces the best results by promoting the most visible changes in body appearance compared with other methods, leaving the muscles more toned and defined. It is possible that strength training causes practitioners to feel stronger for this reason. Changes in body weight, muscularity, and physical competence are considered to be possible influences in understanding the effects of exercise on body image. In each individual, these perceptions can produce positive changes in general attitude, whether or not any changes in body image have actually occurred (11). This can be a positive feedback mechanism that enhances self-esteem and increases satisfaction with the body. Likewise, it is reported that changes in body image are related to subjective (perception) and objective (increased strength) physical changes. Thus, despite the methodological differences between these studies, they appear to agree that strength training induces more positive self-assessment of satisfaction with the body, BIP, and self-esteem among women. This view is corroborated by the present study, which found through comparative analysis that the practitioners of strength training had higher scores in SPA and SE. Similarly, scores related to BIP reflected less dissatisfaction with the body among this group after 16 wks of training.

Finally, some research studies have associated positive changes in depression with physical activity (50), while others state that the frequency of exercise influences the amount of impact on the severity of the disorder (38). Alternatively, the type of physical activity may be an important factor. For instance, some studies have found that aerobic exercise has a greater influence on mood disorders (22), which has been a major research focus in psychiatry. Researchers still do not know exactly what causes depression, but they recognize that changes in brain function, particularly those caused by physical exercise, advance one’s ability to combat depression at almost all levels (44). Aerobic exercise performed over a significant time (at least 10 wks) has shown favorable results (34,35,38,41,47). This condition was also confirmed by the present study, as women who engaged in predominantly aerobic activities (dance and hydrogymnastics) experienced greater reduction of their level of depression. Thus, at a superficial level of analysis, it is possible that improvement in certain psychological constructs, represented here by SPA, HP, and SE, may not necessarily be associated with positive changes in another construct (in this case, depression).

This study, along with evidence presented in previous studies, suggests some possibilities for future research as well as guidance for professional practice. First, we should recognize the importance of
encouraging physical exercise among the sedentary population, given that the sedentary condition is consistently associated with a less satisfactory state of health, physiologically and psychologically.

Another recommended measure would be to prescribe exercise programs lasting more than 12 wks within a well-defined frequency, intensity, type, and time (FITT) model with an established empirical basis. This study showed that time factor had significant influence on the effects of exercise on the psychological dimensions studied, reinforcing the fact that interventions lasting fewer than 10 wks are unlikely to have much impact.

The results also suggest the inclusion of strength training programs aimed at adult women as an important activity for improving their SPA, HP, and SE. In this situation, although the SG consisted of relatively younger women who tend to have the greatest level of concern about physical attractiveness, the mean changes in these variables were largest among this group.

Discovering positive changes in the body, such as weight reduction or muscularity, may also lead to the increased sense of self-efficacy and perception of personal skills, confirming that the complexity of body image construction is related to the characteristics of physical appearance and encompasses physical skills and biological integrity. In this study, the HG, consisting of older women who tend to pay more attention to aspects of health, displayed greater change on these dimensions than the DG, comprising younger women. The DG was the only group to experience a predominantly aerobic exercise program, and it displayed less improvement on the three psychological variables tested.

This study has some limitations such as the sample size and length of intervention. It would be helpful to reproduce this study with a larger number of subjects and a longer duration of exercise programs. Still, delimiting the age and length of tighter physical practice complements the systematic control of the daily habits of the control group with sedentary women. Similarly, there was no attempt to maintain a record of subjects' food intake, an important intervening variable in changes in body composition, which could greatly influence the responses given to questions on psychological dimensions.

**CONCLUSIONS**

The results indicate that 16 wks of practice of different exercise programs promoted significant improvements in satisfaction with physical appearance, health perception, and self-esteem in adult women. Furthermore, the effect was greatest among the practitioners of strength training, suggesting that this type of exercise may be more effective and beneficial in certain psychological dimensions. These results point to the need for deeper knowledge about the effects of exercise on the psychological health of women. The results also provide insight to healthcare professionals, particularly exercise physiologists, with regard to the suitability of various programs, the selection of programs, and the dose-response relationship of exercise in promoting a more satisfactory level of psychological health. They can also offer a direction for multidisciplinary teams such as the possibility of including the practice of exercise in women’s health care.

**Address for correspondence:** Rosa Maria Soares Costa de Mendonça, PhD, University of Trás-os-Montes and Alto Douro, Research Centre for Sport, Health and Human Development. Governador Silvio Pedroza Avenue 310/400 – Areia Preta – Natal/RN – Brazil. Zip-code 59014-100. Phone 55 84 99530313, Email: rosamendo@hotmail.com
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