PHYSICAL ACTIVITY AND HEALTH-RELATED QUALITY OF LIFE IN OVERWEIGHT/OBESE ELDERLY WOMEN

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SUMMARY

The aim of this study was to compare the differences between relative impact on health-related quality of life (HRQL) in active and non-active overweight/obese elderly women.

The total sample comprised of 40 overweight/obese elderly women (BMI > 25 kg/m²) divided into two groups: the experimental group (EG, n=24) who participated in a formal program of physical activity and the control group (CG, n=16) who were not engaged in a formal physical activity program. The HRQL was assessed by the SF-36.

The EG presented significantly (p<0.001) better results in 6 of the 8 SF-36 dimensions over the CG. It was found that only social functioning did not show significant association with physical activity after being adjusted for BMI. Results from logistic-regression showed that physical functioning (OR 1.18, 95% CI: (0.98, 1.42), p< 0.08) and vitality (OR 1.13 (0.99, 1.29), p< 0.07) showed significant association with belonging to the active group.

This study highlights the importance of physical activity (PA) participation in the elderly. The results of this study showed that PA contributed towards a better HRQL in overweight/obese women over 65.
INTRODUCTION

The number of people who are overweight and obese is rising worldwide as well as obesity-related medical consequences which have also increased in several countries (Flegal, 2002). Additionally, HRQL is emerging as an important outcome in obesity studies. Although the traditional medical outcomes in clinical research are morbidity and mortality, recent developments in the literature underscore the importance of augmenting these end points with assessments of the subjects' health-related quality of life (Brown et al., 1995). HRQL encompasses a large number of domains that are important to the subjects' own life. For example, obesity has been associated with increased health risks and pain that can impair physical health status.

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ABBREVIATIONS:
BMI body mass index
BP body pain perception
CG control group
EG experimental group
EH emotional health
GH general health
HRQL health-related quality of life
MH mental health
PA physical activity
PF physical functioning
PH physical health
SF social functioning
SF-36 short-form 36
VT vitality

KEY WORDS:
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health-related quality of life
obesity
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and impose limitations on daily activities (Hassan et al, 2003). Therefore, the HRQL is instrumental to attain a complete understanding of the disease process and various preventive behaviors, as they affect both the individual and the society (Rejeski, Brawley and Shumaker, 1996).

Accumulating research data supports the hypothesis that regular PA reduces the risk of several chronic conditions among older adults, including coronary heart disease, hypertension, diabetes, metabolic disorders, cancer and emotional distress (Blair and Connelly, 1996). Thus, an increase in activity level has the potential to have a major impact on health and well-being and a positive effect on morbidity and mortality rates (Blair et al, 1995).

However, while the impact of obesity on classic health parameters is well recognised, its effects on quality of life (QL) in elderly people are less well known. In fact, to the best of our knowledge, few studies have compared the QL in elderly overweight/obese participating in a program of PA vs. a community dwelling elderly, using a general measure of HRQL. Therefore, the aim of this study was to compare the differences and relative impact of participating in a formal program of PA veris not attending organised PA activity in obese/elderly women.

**METHODS**

**Sample and Study Design**

A cross-sectional study was carried out. The sample of this study comprised 40 elderly women divided into two groups: the EG (n=24) who participated in an ongoing project investigating the impact of regular exercise on physical performance, functional abilities, and health in 65 year old and older individuals; and the CG (n=16) who was not engaged in any type of formal physical activity program. All participants in our study were healthy, community-dwelling individuals. Physical activity sessions were provided two days per week. Physical educators guided the class based exercises. Each session lasted one hour and the sessions provided different kinds of activities such as body consciousness, rhythm, aerobic performance (walking), muscle strength and muscle endurance, flexibility, reaction, and balance exercises. No accidents or medical complications related directly to the training were observed.
Health-Related Quality of Life

The health related quality of life was assessed with a short-form 36-item health survey (MOS SF-36-Medical Outcomes Study, Short Form - 36, Health Survey), using the Portuguese version validated for the Portuguese population (Ferreira, 2000a,b). The MOS SF-36 is a generic measure of health condition including 36 items covering 8 dimensions: Physical Functioning (PF), Body Pain Perception (BP), General Health (GH), Vitality (VT), Social Functioning (SF), role limitations due to Emotional Health (EH), limitations due to Physical Health (PH), and Mental Health (MH). Scores of each domain range between 0 and 100, with a score of 0 representing the worst health possible and a score of 100 representing perfect health. The SF-36 has been shown to have good construct validity (Ware and Sherbourne, 1992), and high internal consistency (Brazier et al, 1992).

Statistical Analyses

Mean and standard deviation were used to describe the results of SF-36. Spearman’s correlation between PA and SF-36 subscales was assessed. The chi-square (2) was applied to determine the differences in the proportions of socio demographic variables in both groups. Differences related to SF-36 domain, between groups, were tested by a nonparametric test of Mann-Whitney (U value). Spearman correlations, controlling for BMI, were calculated between the SF-36 domain and PA. Logistic regression analysis using an enter procedure was calculated to estimate the influence of HRQL domains (independent variable) into the variance in the dependent variables (participation in physical activity as a dichotomic dependent variable). All the analyses used SPSS statistical package (SPSS for Windows, 10.0; SPSS Inc.). Significance level was set at p<0.05 for all the analysis excluding the logistic regression. Here an alpha value of 0.10 was chosen rather the more stringent 0.05 value for the bivariate analysis because, from a health promotion perspective, all the variables that might have some influence on physical activity are reasonable to be included.

RESULTS

Table 1 shows the main characteristics of the sample. No significant differences were found in morphologic characteristics of the sample.

Mean scores of each SF-36 subscale are shown in Table 2. Individuals from the CG scored significantly lower in 6 of 8 of the SF-
### Table 1: Participant characteristics: mean and standard deviations for age, weight, height and BMI.

<table>
<thead>
<tr>
<th></th>
<th>CG (n=16) Mean± SD</th>
<th>EG (n=24) Mean ± SD</th>
<th>U</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>71±4.5</td>
<td>70±3.8</td>
<td>139 000</td>
<td>ns</td>
</tr>
<tr>
<td>Weight (kg)</td>
<td>67.4±8.0</td>
<td>67.6±6.6</td>
<td>189 500</td>
<td>ns</td>
</tr>
<tr>
<td>Height (cm)</td>
<td>155.6±0.7</td>
<td>152.8±0.5</td>
<td>139 000</td>
<td>ns</td>
</tr>
<tr>
<td>BMI (kg/m²)</td>
<td>27.8±1.8</td>
<td>29.0±2.4</td>
<td>128 000</td>
<td>ns</td>
</tr>
</tbody>
</table>

### Table 2: Differences between active (EG) and non-active (CG) group in SF-36 domains.

<table>
<thead>
<tr>
<th>Domain</th>
<th>CG (n=16) x±SD</th>
<th>EG (n=24) x±SD</th>
<th>U</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>PF</td>
<td>43.4±18.3</td>
<td>76.9±14.2</td>
<td>38 500</td>
<td>0.000</td>
</tr>
<tr>
<td>PH</td>
<td>54.7±19.9</td>
<td>78.9±13.6</td>
<td>84 500</td>
<td>0.003</td>
</tr>
<tr>
<td>BP</td>
<td>41.1±26.8</td>
<td>69.3±29.6</td>
<td>99 500</td>
<td>0.010</td>
</tr>
<tr>
<td>GH</td>
<td>37.5±15.9</td>
<td>64.0±16.7</td>
<td>50 000</td>
<td>0.000</td>
</tr>
<tr>
<td>VT</td>
<td>30.3±19.5</td>
<td>65.6±24.1</td>
<td>54 500</td>
<td>0.000</td>
</tr>
<tr>
<td>SF</td>
<td>67.9±27.8</td>
<td>78.6±24.9</td>
<td>149 000</td>
<td>0.115</td>
</tr>
<tr>
<td>EH</td>
<td>53.1±23.7</td>
<td>73.9±26.8</td>
<td>101 000</td>
<td>0.11</td>
</tr>
<tr>
<td>MH</td>
<td>40.8±20.1</td>
<td>65.7±29.4</td>
<td>90 000</td>
<td>0.05</td>
</tr>
</tbody>
</table>
### Table 3: Spearman correlations controlling for BMI, between HRQL SF36 domains and PA.

<table>
<thead>
<tr>
<th>Variables</th>
<th>PA</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>HF</td>
<td>-0.47</td>
<td>0.003</td>
</tr>
<tr>
<td>PF</td>
<td>0.70</td>
<td>0.000</td>
</tr>
<tr>
<td>PH</td>
<td>0.49</td>
<td>0.001</td>
</tr>
<tr>
<td>BP</td>
<td>0.46</td>
<td>0.003</td>
</tr>
<tr>
<td>GH</td>
<td>0.63</td>
<td>0.000</td>
</tr>
<tr>
<td>VT</td>
<td>0.66</td>
<td>0.000</td>
</tr>
<tr>
<td>SF</td>
<td>0.17</td>
<td>ns</td>
</tr>
<tr>
<td>EH</td>
<td>0.37</td>
<td>0.017</td>
</tr>
<tr>
<td>MH</td>
<td>0.40</td>
<td>0.012</td>
</tr>
</tbody>
</table>

### Table 4: Logistic regression analysis showing variables associated with exercise practice after adjustment to BMI.

<table>
<thead>
<tr>
<th>Variables</th>
<th>B</th>
<th>S.E.</th>
<th>Sig.</th>
<th>Exp(B)</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>PF</td>
<td>0.163</td>
<td>0.094</td>
<td>0.08</td>
<td>1.18</td>
<td>0.979-1.42</td>
</tr>
<tr>
<td>PH</td>
<td>0.076</td>
<td>0.084</td>
<td>0.363</td>
<td>1.08</td>
<td>0.916-1.27</td>
</tr>
<tr>
<td>BP</td>
<td>0.21</td>
<td>0.058</td>
<td>0.72</td>
<td>1.02</td>
<td>0.911-1.14</td>
</tr>
<tr>
<td>GH</td>
<td>0.053</td>
<td>0.084</td>
<td>0.54</td>
<td>1.06</td>
<td>0.892-1.25</td>
</tr>
<tr>
<td>VT</td>
<td>0.120</td>
<td>0.067</td>
<td>0.07</td>
<td>1.13</td>
<td>0.993-1.29</td>
</tr>
<tr>
<td>SF</td>
<td>-0.038</td>
<td>0.041</td>
<td>0.36</td>
<td>0.96</td>
<td>0.887-1.05</td>
</tr>
<tr>
<td>EH</td>
<td>-0.029</td>
<td>0.135</td>
<td>0.12</td>
<td>0.81</td>
<td>0.623-1.06</td>
</tr>
<tr>
<td>MH</td>
<td>0.73</td>
<td>0.063</td>
<td>0.25</td>
<td>1.08</td>
<td>0.951-1.22</td>
</tr>
</tbody>
</table>
36 domains compared with EG counterparts. Only Social Functioning (SF) and role limitations due to emotional health (EH) did not show significant differences. These results strongly suggests that active elderly have better HRQL than not-exercising elderly.

Table 3 shows the association (Spearman correlation) between the SF-36 domains and physical activity adjusted to BMI. As can be seen, only SF was not significantly associated to PA.

Results from logistic-regression are presented in Table 4. The outcomes showed that physical functioning (OR 1.18 (0.98, 1.42), p<0.08) and vitality (OR 1.13 (0.99, 1.29), p<0.07) showed statistically significant association with belonging or not to the active group (EG), independently of BMI. This means that PF and VT are two important features highly presented in the active group and highlights the importance of PA participation in two important dimensions of obese elderly women.

DISCUSSION

The increasing prevalence of obesity worldwide requires better population based strategies to help combat it. The consequences of being overweight include physical, psychological and social aspects that affect the quality of life. This study analysed the differences in HRQL in obese elderly women participating or not in a formal program of physical activity. This is a timely issue since during recent years the proportion of elderly, as well as obesity, has increased markedly in most developed countries.

In this study, significant differences were found between both groups that are consistent with better general feelings in EG. The exercise group scored better in 6 of 8 of the subscales of the HRQL compared to the CG. Only social functioning and emotional health didn’t show significant differences between both groups. These results are consistent with those of previous research showing that physical activity is important to the enhancement of HRQL (Rhodes et al, 1999). For example in our study, higher scores were obtained in different domains such as physical function, physical health, and general health in EG compared with CG, which agreed with previous research that found that active older adults believe more strongly than inactive older adults that physical activity would lead to health benefits (Resnick and Spellbring, 2000).
Our data showed differences between 6 of 8 of SF-36 domains. Only emotional health and social functioning didn’t show significant differences. This finding seems to be in line with other reports suggesting that physical problems in obese individuals affect HRQL more than mental problems (Doll, Peterson & Stewart-Brown, 2000). Furthermore these findings agree with other outcomes provided in the literature in which regular physical activity has been shown to improve various HRQL indicators in obese individuals (NIH, 1998). Ford, Moriarty and Zack (2001) found that people with increased BMI have greater odds of reporting poor or fair health. Fontaine, Cheskin and Borofsky (1996) reported significant impairments in various HRQL domains, especially vitality and body pain, in obese individuals as compared to not obese individuals. Accordingly the data from regression analysis showed that VT (p=0.07) and PF (p=0.08) were associated with participation in PA in obese elderly women. This finding agreed with several data in the literature that showed that functional mobility was a significant factor associated with participation among elderly group (Cunningham et al, 1993; Jette et al, 1998). On the other hand, obesity and being overweight are more likely to be associated with impaired QL and disability affecting basic activities of daily living (Han et al, 1998). Our data suggested that obesity and attempting a PA program may be independent aspects concerning their specific association with well being and QL. BMI, per se, is more critical for physical condition and well-being while for psychological health there was not a clearly stronger relationship.

There are a few limitations to our study. First the generalisation of our results is limited because of the small sample and its cross-sectional design, which limits our ability to determine the causal direction of the associations. In fact, it is possible that diet and exercise improved HRQL, or HRQL influenced diet and exercise behavior.

**CONCLUSION**

Active obese elderly women have better HRQL than those who didn’t engage in a physical activity program. General health-related practitioners need to be informed of the risk for impaired HRQL in non-active obese elderly women and to target interventions that could enhance health outcomes. Lower HRQL domains such as vitality and physical functioning were associated with low levels of PA, which deserves attention with regard to the construction of future prevention
strategies aimed at ensuring independent living in the elderly.

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**REFERENCES**

Changes in physical fitness and all-cause mortality. A prospective study of healthy and unhealthy men.

**Blair, S. N., and Connelly, J. C. (1996).**
How much physical activity should we do? The case for moderate amounts of intensities of physical activity.

Validating the SF-36 health survey questionnaire: new outcome measure for primary care.

Psychological effects of exercise and exercise plus cognitive strategies.

Determinants of Independence in the Elderly.

**Doll, H. A., Peterson, S. E. and Stewart-Brown, S. L. (2000).**
Obesity and physical and emotional well-being: associations between body mass index, chronic illness, and the physical and mental components of the SF-36 questionnaire.

**Ferreira, P. L. (2000a).**
Criação da Versão Portuguesa do Mos SF-36, Parte I - Adaptação Cultural e Linguística,

Criação da Versão Portuguesa do Mos SF-36, Parte II - Teste de Validação.

Flegal, K. M., Carroll, M.D., Ogden, C. L. and Johnson, C. L. (2002).
JAMA, 288: 1723-1727.

Health-related quality of life in obese persons seeking treatment.

Self-reported body mass index and health-related quality of life: findings from the BRFSS.

Quality of life in relation to overweight and body fat distribution.

Obesity and health-related quality of life: a cross-sectional analysis of the US population.
Int. J. Obes, 27: 1227-1232.

Home-based resistance training: predictors of participation and adherence.

Clinical guidelines on the identification, evaluation and treatment of overweight and obesity in adults- the evidence report.
Obes. Res., 6: 51S-209S.

Physical activity and health-related quality of life.

Understanding what motivates older adults to exercise.
Journal Gerontological Nursing, 26, 34-42.

Factors associated with exercise adherence among older adults. 

The MOS 36-Item short form Heath Survey (SF-36), I: conceptual framework and item selection. 