EFFECT OF HEALTH RESORT TREATMENT ON THE PHYSICAL FITNESS OF WOMEN ASSESSED THROUGH THE SENIOR FITNESS TEST

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SUMMARY

Introduction. The aim of this study is to assess the effect of health resort treatment on physical fitness in adult women.

Material and methods: Study participants comprised 72 women living in cities, who underwent a three-week treatment program at a health resort in Kudowa Zdrój. They were divided into two age groups. The first group included 35 women aged 45–54 and the second group included 32 women aged 55–64. Two assessments using the Senior Fitness Test were performed at the beginning and at the end of the treatment program. During the first assessment, the participants were asked to fill in a questionnaire about their lifestyles. The following parameters were selected for the purposes of this study: body mass, body height, and relative body mass index (BMI).

Results: All trials of the Senior Fitness Test showed improvement in somatic parameters and physical fitness. The observed differences were statistically significant.

Conclusions: Study participants had high mean values of BMI compared to the general Polish population. BMI values were higher in the second age group than in the first age group. The first age performed better than the other group in five trials of the Senior Fitness Test and the second group performed better in one of the trials. Undergoing a treatment program in a health resort improved the participants’ physical fitness and somatic parameters. Therefore, we may conclude that rehabilitation and the health-benefitting climate of a health resort have a positive effect on physical fitness in women.
are much less physically active than men are. Studies emphasize that women's social roles, vocational duties, and family responsibilities leave little time for physical activity [21, 22]. Researchers from other countries have reached similar conclusions [23]. Women expend less energy per day and spend less time on recreation than men do.

Resort treatment gives patients a chance to improve their health and well-being as well as to improve the biological condition of their bodies [24]. One of the aims of health resort treatment is to change patients' health habits with respect to diet, physical activity, and the use of stimulants. Resort treatment is one of the few methods that enable combining commonly available factors such as kinesitherapy and physiotherapy with natural factors unique for each health resort. Despite clear differences in employed treatment and diagnostic methods, all aforementioned branches of medicine complement each other perfectly thanks to the common property of using natural or nearly natural treatment procedures. This allows comprehensive treatment and preventive actions to be organized in a unique manner, thus vastly increasing patients' health. Nonetheless, researchers rather rarely assess the tangible health effects of resort treatment [9, 10], perhaps due to, for instance, organizational difficulties in conducting such studies.

Aim of the study

The aim of this study is to assess the effect of health resort treatment on the level of physical fitness in women using the Senior Fitness Test.

Material and methods

Study participants comprised female patients who underwent a three-week health resort treatment at the Polonia, Koga, Zameczek, and Zacisze health resorts in the Kudowa Zdrój branch of the Kłodzko Health Resorts Association and at the Bristol Resort HMO in Kudowa Zdrój. The participants were divided into two age groups. The first group included 35 women aged 45–54 with a mean age of 50.57 years, and the second group included 37 women aged 55–64 with a mean age of 59.46 years. The sample was selected from patients who at the time lived in cities. The participants had been prescribed the same therapeutic program, and they all had locomotor disorders.

Out of numerous parameters measured in the participants, we selected body height, body mass, and BMI for the purposes of this study. We also applied the Senior Fitness Test, designed to assess physical fitness of older adults. The test is composed of six trials that enable indirect measurement of strength and flexibility of the upper and lower part of the body, aerobic capacity, motor coordination, and dynamic balance [25]. The test is safe, easy to conduct, and does not require specialized equipment. It employs simple models of movement to determine elementary parameters of physical fitness. The trials are conducted in a strict order [26, 27]:

1. Arm curl – assesses strength of arm muscles. Number of curls within 30 seconds was counted.
2. Back scratch – assesses flexibility of the upper part of the body. This parameter was measured using a tape measure to an accuracy of 0.5 cm.
3. 30-second chair stand – assesses strength of leg muscles. Number of cycles within 30 seconds was measured.
4. Chair sit-and-reach – assesses flexibility of the lower part of the body. The patient extended one leg forward, keeping the knee straight while attempting to reach the toes on the leg with her fingers. This parameter was measured using a tape measure to an accuracy of 0.5 cm.
5. 8-foot up-and-go – assesses motor coordination and dynamic balance. The patient stood up from a chair as fast as possible and walked 2.44 m (measured from the edge of the chair to a post) and returned to the sitting position on the chair. Time of execution was measured to an accuracy of 0.01 s.
6. 6-minute walk – assesses aerobic capacity. The patient walked for six minutes. Traveled distance was measured.

Each trial was demonstrated in advance. Preliminary assessment was conducted, which determined the possibility of performing each trial in order to acquaint the patients with the correct execution. Units of distance and mass in the test were adapted to Polish conditions to enable the use of common SI units [26].

The test was conducted twice, that is, at the beginning (Assessment I) and at the end (Assessment II) of the three-week treatment program. During the first assessment, the participants were asked to complete a questionnaire about selected elements of their lifestyles and signed a written agreement to participate in the study. The research aim was approved by the Scientific Research Committee of the Senate of the University School of Physical Education in Wroclaw.
Obtained results were subjected to statistical analysis. The following statistical methods were used to analyze the results:
1. Descriptive statistical methods: mean value ($\bar{x}$), standard deviation ($s$), and coefficient of variation ($v$).
2. Student’s $t$-test for independent groups to determine the significance of differences between mean values in the two age groups; the test was used only in Assessment I.
3. Two-way ANOVA (age group × number of repetitions) to determine differences between mean values in Assessments I and II. Significance of differences was accepted at $p \leq 0.05$.

**Results:**

### Assessment I

The two researched age groups differ in somatic traits. In the first age group (45–54 years), mean body height equaled 159.9 cm, which was 1.4 cm more than in the second age group (55–64 years) (Table 1). The difference was not statistically significant. Mean body mass equaled 74.2 kg in the first group and was lower by 2.6 kg than in the second group (Table 1). The difference was not statistically significant.

In both studied groups, mean value of BMI exceeded the norm (Table 1). Mean BMI in the first group

### Table 1. Statistical description of somatic parameters and physical fitness of tested women divided into age groups as well as significance of differences between the first (IB) and second examination (IIB)

<table>
<thead>
<tr>
<th>Quality</th>
<th>Test</th>
<th>Age range: 45–54 years (N = 35)</th>
<th>Age range: 55–64 years (N = 37)</th>
<th>Student $t$-test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$\bar{x}$</td>
<td>$s$</td>
<td>$v$</td>
<td>$\bar{x}$</td>
</tr>
<tr>
<td>height [cm]</td>
<td>159.93</td>
<td>5.23</td>
<td>3.27</td>
<td>158.54</td>
</tr>
<tr>
<td>body mass [kg]</td>
<td>I</td>
<td>74.21</td>
<td>7.60</td>
<td>10.25</td>
</tr>
<tr>
<td></td>
<td>II</td>
<td>73.72</td>
<td>7.35</td>
<td>9.97</td>
</tr>
<tr>
<td>BMI [kg/m2]</td>
<td>I</td>
<td>29.03</td>
<td>2.94</td>
<td>10.13</td>
</tr>
<tr>
<td></td>
<td>II</td>
<td>28.84</td>
<td>2.87</td>
<td>9.94</td>
</tr>
<tr>
<td>Arm Curl [n]</td>
<td>I</td>
<td>17.89</td>
<td>4.42</td>
<td>24.74</td>
</tr>
<tr>
<td></td>
<td>II</td>
<td>18.97</td>
<td>4.08</td>
<td>21.53</td>
</tr>
<tr>
<td>Back Scratch [cm]</td>
<td>I</td>
<td>-0.23</td>
<td>3.13</td>
<td>-1367.32</td>
</tr>
<tr>
<td></td>
<td>II</td>
<td>0.24</td>
<td>2.97</td>
<td>1223.30</td>
</tr>
<tr>
<td>30-second Chair Stand [n]</td>
<td>I</td>
<td>15.54</td>
<td>3.23</td>
<td>20.78</td>
</tr>
<tr>
<td></td>
<td>II</td>
<td>17.23</td>
<td>2.73</td>
<td>15.87</td>
</tr>
<tr>
<td>Chair Sit-and-Reach [cm]</td>
<td>I</td>
<td>-0.43</td>
<td>2.49</td>
<td>-581.33</td>
</tr>
<tr>
<td></td>
<td>II</td>
<td>0.00</td>
<td>2.28</td>
<td>-</td>
</tr>
<tr>
<td>8-Foot Up-and-Go [s]</td>
<td>I</td>
<td>6.53</td>
<td>1.39</td>
<td>21.33</td>
</tr>
<tr>
<td></td>
<td>II</td>
<td>6.19</td>
<td>1.17</td>
<td>18.89</td>
</tr>
<tr>
<td>6-minute Walk [m]</td>
<td>I</td>
<td>525.09</td>
<td>105.91</td>
<td>20.17</td>
</tr>
<tr>
<td></td>
<td>II</td>
<td>545.97</td>
<td>96.59</td>
<td>17.69</td>
</tr>
</tbody>
</table>
amounted to 29.03, which corresponded to the overweight category. In the second age group, mean BMI was slightly higher (30.58), which meant the value was marginally higher than the lower threshold of obesity. The difference between the age groups was not statistically significant.

During the five trials of the Senior Fitness Test, the first group achieved slightly better results than the second group, except in Trial 4, in which the older group performed marginally better. All trials measured with the Senior Fitness Test showed high variability in both age groups (Table 1).

Assessment II

Statistically significant changes in physical fitness and somatic parameters were observed following the resort treatment program. The participants’ mass and BMI decreased after the program in both age groups (Table 1). The differences were statistically significant. However, BMI remained within the same category in both groups compared to the value prior to the program—that is, the overweight category in the first age group and near the lower threshold of the obesity category in the second age group.

Trial 1 of the Senior Fitness Test, which assessed muscle strength in the arms, showed improved results compared to Assessment 1 (Table 1). The second group displayed greater changes than the first group. The differences between Assessments I and II were statistically significant.

Trial 2, which assessed flexibility of the upper part of the body, also showed improvement in comparison to Assessment I, with the second age group achieving greater improvement than the first age group (Table 1). These differences were statistically significant.

Performance in the 30-second chair stand trial, which assessed muscle strength in the legs, also improved between the first and second assessment in both age groups (Table 1). The changes were statistically significant.

Similarly, both age groups achieved a statistically significant improvement of results in Trial 4 of the Senior Fitness Test, which assessed flexibility of the lower part of the body, compared to Assessment I (Table 1).

Both age groups covered the appropriate distance in Trial 5 (motor coordination and dynamic balance) in a shorter time than during Assessment I (Table 1). The difference between the assessments was statistically significant.

During the final trial, which assessed aerobic capacity, both age groups performed statistically better compared to Assessment I. The improvement was more prominent in the second group than in the first group (Table 1).

Discussion

The progress of civilization brings considerable benefits to humanity, such as improved living conditions. However, scientific and technological achievements more and more often turn against us. Changing living conditions induce stress, limit physical activity, and weakened body functions [28, 29].

Many researchers consider body height a somatic trait that provides information on biological development and regional, environmental, and social variation [30, 31]. Body height is subject to secular variation, i.e., to changes between generations [30, 32]. Participants of this study showed symptoms of secular variation. Women in the first age group (45–54 years) were taller than women in the second age group (55–64 years), albeit the difference was not statistically significant.

Body mass is a trait that depends to a considerable degree on lifestyle and dietary habits. The most popular indicator used to assess body mass is BMI. Many authors indicate that obesity and excessive fat tissue constitute the dominant diseases of affluence. Being overweight is a serious risk factor in cardiovascular diseases, leads to locomotor pathologies, and limits physical fitness [33, 31]. Women in the first age group belonged to the overweight category, while BMI values in the second age group were marginally higher than the lower threshold of Class I obesity. We should assume, therefore, that study participants had an increased risk of diseases that mainly stem from excessive fat tissue.

A comparison of the level of somatic development in study participants with results observed by other authors shows certain tendencies: younger women are taller, lighter, and have lower BMI values than older women [34, 35, 10].

Loss of physical fitness and aerobic capacity with age is physiological and inevitable even in healthy persons. Nevertheless, the loss may take place at a different rate and intensity [16]. Individual and group differences take effect here, as do differences in living conditions, working conditions, and lifestyle.

As expected, we observed lower functional physical fitness in the second age group than in the first age
Effect of health resort treatment on the physical fitness of women assessed through the Senior Fitness Test

Studies by other authors confirm the beneficial effect of systematic, daily rehabilitation on physical fitness [9]. Appropriately selected systematic exercise, relaxing treatments, and freedom from everyday duties improve women's physical fitness and biological condition. A stay at a health resort not only involves a change of environment and a rest from one's duties, but also learning correct dietary habits and lifestyle as well as an improvement in general well-being.

Conclusions

1. A three-week resort treatment program improved the patients' somatic parameters and physical fitness. A significant decrease in body mass and BMI as well as a definite improvement in functional physical fitness was observed in study participants following the program. Therefore, we may assume that health-promoting values of a resort and the applied treatment benefited the bodies of study participants.

2. Study participants had high mean body mass compared to their peers. BMI values were higher in the second age group (55–64 years) than in the first age group (45–54 years) and were marginally higher than the lower threshold of Class I obesity. The first age group belonged to the overweight category.

3. The first group performed slightly better in fitness trials than the second group due to involution. Significant differences were found in motor coordination, dynamic balance, and aerobic capacity and were higher among the first age group.
LITERATURE


[34] Nowak P, Ignasiak Z: The state of health of women aged 20–59 at different levels of physical activity. Human Movement, 2008; 9, 1 (17): 27–33.