Original Article Pol J Public Health 2018;128(4): 148-151

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Impact of the comprehensive outpatient rehabilitation on reducing intensification of depressive symptoms in people over 60 years of age

Abstract

Introduction. As a result of involution processes and diseases, changes occur in the human body, as a result of which, psychophysical fitness declines with age. Comprehensive rehabilitation is the way of improving and maintaining health condition, including, among others, the appropriate level of physical activity and the quality of affective functioning. This type of program was carried out as part of the Outpatient Healthcare Home (DDOM) at the Witold Chodźko Institute of Rural Health in Lublin.

Aim. The objective of the present study was to assess the impact of comprehensive ambulatory rehabilitation, including tailored endurance training preceded by an ergospirometry test, on indicators demonstrating the level of involvement in daily physical activities and the severity of depressive symptoms of patients over 60 years of age receiving health services at DDOM.

Material and methods. The study involved 60 seniors participating in the rehabilitation cycle implemented as part of the services provided to patients at DDOM of the Witold Chodźko Institute of Rural Health in Lublin. The tests were carried out in the test-retest model on the first and last day of the kinesiotherapy cycle. The tests were performed with use of International Physical Activity Questionnaire IPAQ and Geriatric Depression Scale GDS. The patient rehabilitation program included adapted systemic kinesiotherapy (endurance training with a load determined according to individual exercise capacity, as determined on the basis of the ergospirometry test) and local kinesiotherapy and physical therapy adapted to the needs resulting from the condition of the musculoskeletal system.

Results. After the completion of the rehabilitation cycle we compared the tests carried out before it, and the patients received higher scores in the scales of IPAQ questionnaire for measuring weekly, intensive and mode-rate physical activity and time required for walking and were less likely to spend their time sitting or lying down. There were also lower scores of the respondents in GDS scale used to assess the severity of depressive symptoms.

Conclusions. As a result of the rehabilitation program applied, DDOM patients simultaneously obtained the desired changes in the level of involvement in physical activity and minimization of the intensity of depressive symptoms.

Keywords: IPAQ, GDS, physical activity, symptoms of depression, seniors, rehabilitation, endurance training.

DOI: 10.2478/pjph-2018-0029

INTRODUCTION

With the passage of time, involutional and disease processes take place in the human body, as a result of which the psychophysical efficiency decreases. What becomes apparent is a decrease in cardiovascular and respiratory efficiency as well as a decrease in parameters in exercise tests [1]. The research conducted by Greysen's team demonstrates that in nearly half of the seniors undergoing hospitalization there is a different degree of impairment of musculoskeletal system functions and impaired mental condition, with 25.7% of people with mobility disabilities and/or affective disorders after completed hospitalization requiring next hospitalization within 30 days of discharge, which indicates that comprehensive rehabilitation measures aimed at patients over 60 can be an important factor minimizing the risk of premature hospitalization [2]. It should be emphasized that comprehensive geriatric rehabilitation can also be a way to preserve participation in the social life of older people, because in many cases the improvement of well-being and functional ability can only be achieved thanks to an integrated approach to the treatment process and improvement [3].

One of the Polish centers implementing the program of comprehensive rehabilitation and activation of seniors was the W. Chodźko Institute of Rural Health in Lublin, which according to the guidelines included in the project "DDOM in Lublin" with the POWER number 05.02.00-00-0109/15 conducted such activities addressed to people over 60 as part of the Outpatient Healthcare Home (Dzienny Dom Opieki Medycznej). Their objective was to improve the health condition, and the psychophysical fitness associated therewith, of seniors. The rehabilitation program individually determined by the therapeutic team was adapted to the current state of health and the related needs of seniors. In addition to regular medical and nursing care and physiotherapy impacts, it also included

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psychological support and assistance, as well as occupational therapy [4].

A review of contemporary research works confirms that such programs promote an increase in involvement in physical activity, defined as "any kind of body movement caused by working muscles that causes an energy expenditure exceeding the level of resting energy" [5] and improving the functioning in the affective sphere, and thus contributing to increase in the overall quality of life and independence of seniors [6-8]. Furthermore, it is proven that the sedentary lifestyle of elderly people, especially women, is conducive to the occurrence of depressive symptoms and other psychiatric disorders. As the time spent on watching television increases, the mental state deteriorates. On the other hand, seniors who undertake physical activity, compared to passive people, show a smaller number of depressive symptoms and symptoms of other affective disorders [9].

The review of contemporary research works, therefore, allows us to conclude that a properly designed and comprehensive rehabilitation program for elderly patients not only prevents development and minimizes the severity of symptoms of various diseases and contributes to improving the functional efficiency of seniors, but also affects their psychological sphere, reducing the level of perceived tension and depression, which in turn reduces the risk of broadly understood disability and dependence on the help of others [10-12]. This indicates that the implementation of this type of comprehensive rehabilitation programs is necessary to preserve and improve the overall health of people over 60 years of age, and also justifies the need to systematically evaluate the effectiveness of the measures applied.

AIM

The objective of the present study was to assess the impact of comprehensive ambulatory rehabilitation, including tailored endurance training preceded by an ergospirometry test, on indicators demonstrating the level of involvement in daily physical activities and the severity of depressive symptoms in geriatric patients receiving healthcare services at DDOM.

MATERIAL AND METHODS

The study involved 60 seniors participating in the rehabilitation cycle implemented as part of the services provided to patients at DDOM of the Witold Chodźko Institute of Rural Health in Lublin. The youngest patient was 60 years old, while the oldest – 93 years. The mean age of the respondents was over 74 years (74.06±7.75). The population was dominated by women, which accounted for three-fourths of all respondents (75.0%; N=45).

The stay of patients in DDOM was individually determined by the therapeutic team and ranged from 30 to 120 working days. The improvement program applied included:

- adapted, intensive systemic kinesiotherapy (endurance training with appliances) with loads determined according to individual exercise capacity, as determined on the basis of an ergospirometry test, training plan: 8 minutes of exercises for the first 5 days with the achievement of submaximal heart rate, and 15 minutes of such exercises for the rest of the training cycle;
- other kinesiotherapeutic effects recommended according to the needs arising from the condition of the musculoskeletal system, including: active free exercises, active none-weight bearing exercises, active-passive exercises, PNF exercises, manual massage, exercises with the use of devices such as balls, exercise sticks, ladders, mattresses, rotor for exercises of upper limbs, rotor for exercises of lower limbs, rehabilitation table;
- the necessary physical therapy: local thermotherapy, electrotherapy, phototherapy, electromagnetic field treatment.

The tests were performed with use of International Physical Activity Questionnaire IPAQ [13] and Geriatric Depression Scale GDS [14].

The IPAQ questionnaire was used to assess the level of physical activity of the subject during the 7 days preceding the examination. It contains seven questions about the time spent on activities requiring intensive and moderate physical exercise, walking and time spent in a lying and sitting position. In the questionnaire, only those activities are taken into account that last at least 10 minutes. The respective types of activities can be expressed in Metabolic Equivalent of Task (MET)-min/week. This is the mathematical product of the coefficient of given activity, the number of days and its duration in minutes per week. By summing up the results of each type of physical activity, the average value of weekly activity is obtained. On this basis we can determine the level of physical activity of the subject:

- high – from 3 to 7 days of intense physical effort or at least 1500 MET-min/week;
- sufficient – from 3 to 7 days of intense physical activity for at least 20 minutes a day or from 5 to 7 days of moderate exercise/walking for at least 30 minutes a day or from 5 to 7 days of any physical activity, which in total exceeds 600 MET-min/week;
- insufficient – lack of physical activity or failure to meet the conditions of the two aforementioned levels [13].

The GDS scale is used to study the severity of depressive symptoms in the elderly. It contains 15 questions to which the examined person refers based on a two-level scale (yes, no). A score between 0 and 5 points to a lack of symptoms of depression, a score between 6 and 10 points suggests a moderate intensity of depressive symptoms, and a score of 11 to 15 points indicates the occurrence of severe depressive symptoms [14].

The research was carried out after obtaining the consent of the Bioethics Committee of IMW in Lublin in accordance with the assumptions of the Helsinki Declaration of 2013. It was voluntary, individual and anonymous. Patients were given all necessary information about the research. The participants completed questionnaires twice – on the first and last day of the rehabilitation cycle implemented as part of their stay in DDOM.

Statistical analyzes were performed using the IBM SPSS 24 software suite. The mean value, standard deviation, minimum and maximum of quantitative variables as well as the distribution of the frequency of the occurrence of qualitative data were used to prepare the characteristics of the population subject to research. The distribution shapes of the parameters considered were estimated using the Shapiro-Wilk test. A parametric test was used to verify intra-group differences, *t* Student for dependent

tests, and its results were supplemented with measures of the size of the effect calculated using d Cohen statistic. The work assumes the limit level for false positive error of 0.05.

RESULTS

Results of the performed intergroup comparisons in the range of results obtained in IPAQ Questionnaire are included in Table 1.

The analyzes demonstrated that both before and after the rehabilitation period, the physical activity of DDOM patients was insufficient (113.71±7.75 vs. 163.53±101.97). The lowest levels were recorded for intensive (6.18±22.58 vs. 9.45±24.06) and moderate (41.35±38.65 vs. 69.00±55.55) activities of physical exercise, followed by time spent on walking (68.26 ±55.21 vs. 87.32±57.29). In contrast, patients spent most of their time sitting or lying down (332.00±144.18 vs. 296.00 ±137.30).

However, it should be noted that after the improvement program was completed, compared to the assessment made before its commencement, the respondents more often took on weekly (t=7.52; p=0.001), intense (t=2.22; p=0.034) and moderate physical activity (t=6.25; p=0.001), they spent more time walking (t=6.70; p=0.001), and also less in a sitting or lying position (t=3.84; p=0.001).

The obtained effect sizes confirm strong relationships between the time spent on weekly (d=1.35) and moderate (d=1.10) physical activity and walking (d=1.26) and the applied kinesiotherapy program, the average dependence of time spent in a sitting or lying position with a completed rehabilitation cycle (d=0.70), as well as the weak dependence of intense physical activity and rehabilitation program (d=0.39).

Results of the performed intergroup comparisons in the range of results obtained in the GDS Scale are included in Table 2.

Based on the data obtained, it was found that in case of both before and after the rehabilitation program, the average severity of depressive symptoms of DDOM patients was moderate (8.32±2.19 vs. 6.95±1.87).

The intra-group comparisons demonstrate that the severity of depressive symptoms of DDOM patients was statistically significantly lower after the completed rehabilitation cycle, than before its commencement (t=3.57; p=0.001).

The obtained effect size (d=0.58) confirms the average relationship between the rehabilitation program being used and the level of severity of symptoms indicating a decreased affect of the subjects.

DISCUSSION

The legitimacy of conducting comprehensive rehabilitation and activating activities of seniors has been confirmed in many empirical works [3,9,16]. Research conducted by the Zhu team on a population of 5514 people over 60 prove that the leading factors determining the occurrence of affective disorders, especially suicidal thoughts in the seniors' population are limitations in everyday activity and functional ability resulting from experienced chronic diseases [17]. However other studies demonstrate that as a result of a rehabilitation program in elderly people with mild depression, a significant improvement in mental health was achieved – there was a reduction in the severity of depressive symptoms and perceived stress, as well as improved physical fitness [6].

Table 1. Physical activity of DDOM patients.

Type of physical activity	Test				Intra-group comparison		
	Before starting rehabilitation		After completing the rehabilitation				
	M	SD	M	SD	t	p	d
Weekly	113.71	85.25	163.53	101.97	7.52	0.001	1.35
Intensive	6.18	22.58	9.45	24.06	2.22	0.034	0.39
Moderate	41.35	38.65	69.00	55.55	6.25	0.001	1.10
Walking	68.26	55.21	87.32	57.29	6.70	0.001	1.26
Sitting/lying	332.00	144.18	296.00	137.30	3.84	0.001	0.70

Table 2. The severity of depressive symptoms of DDOM patients.

Test				Intra-group comparison		
Before starting rehabilitation		After completing the rehabilitation				
M	SD	M	SD	t	p	d
8.32	2.19	6.95	1.87	3.57	0.001	0.58

Comparable effects were also obtained in our own studies aimed at assessing the impact of the comprehensive rehabilitation program applied to patients over 60 who used healthcare services as part of their stay in DDOM. The conducted analyzes demonstrated that as a result of kinesiotherapy, the level of weekly physical activity of the subjects, consisting of activities requiring intensive and moderate physical exertion and walking increased, while the time spent on passive rest (sitting, lying down) was reduced, and the frequency of depressive symptoms also dropped, which undoubtedly contributed to raising the quality of life of seniors.

After the completion of the PANS rehabilitation program, which was addressed to seniors aged from 60 to 70, the Burke team, when making their evaluation, demonstrated that the applied strategies increased the participants' involvement in physical activity, and also led to the improvement of other health-promoting behaviors, including those that rely on a balanced diet. In addition, the respondents, when evaluating the program, reported that it was appropriate for their age group (84%), motivated them to undertake physical activity (78%) and to follow healthy eating habits (70%) [18].

Positive effects of a 4-week rehabilitation aimed at increasing physical activity and improving the walking efficiency of patients prepared for oncological surgery were also noted in the studies of Chen et al. The questionnaire which was used to measure physical activity was Community Health Model for Seniors (CHAMPS), and a 6-minute walk test (6MWT) was used to assess the ability to walk. Based on the conducted analyzes, it was found that in the result of the intervention patients significantly increased the number and time devoted to physical exercises, which require moderate and intense physical effort, and also achieved significant improvement in walking performance [19].

The level of involvement in physical activity is related to the quality of mental functioning. The assessment of the contribution of physical activity to the variance of subjective well-being in active seniors demonstrated that regular aerobic training, when compared to lipoproteins and markers of inflammation plays a greater role as a determinant of the subjective well-being of seniors [16]. Furthermore, in studies evaluating the effectiveness of aerobic training and psychotherapy in the treatment of acute depression symptoms in elderly patients

treated in hospital conditions, it was proven that a 30-minute walk in combination with individual psychotherapy turned out to be a more effective intervention than standard psychotherapeutic treatment [20].

To sum up the discussion, it should be emphasized that the applied daily outpatient care and comprehensive rehabilitation program including tailored endurance training, psychological therapy and other forms of therapeutic interactions proved effective in increasing the involvement of seniors in physical activity and minimizing the severity of depression symptoms experienced by the subjects. The results confirm that, where possible, geriatric rehabilitation should include elements of systematic and intensive physical activation in the form of endurance training that improves the functioning of musculoskeletal, cardiovascular and respiratory systems, and also positively affects the activities of the central nervous system [21, 22].

CONCLUSIONS

1. The applied outpatient rehabilitation program aimed at people over 60 has increased the level of weekly physical activity of DDOM patients, including activities requiring intensive and moderate physical exertion and walking, at the same time minimizing the time spent sitting or lying down.
2. The applied program of comprehensive ambulatory rehabilitation caused a decrease in the severity of depressive symptoms of DDOM patients.

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