THE QUALITY OF LIFE OF PATIENTS WITH SARCOIDOSIS AND THE CLINICAL FEATURES OF THE DISEASE AND PHYSICAL PERFORMANCE

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Summary

Quality of life measurement has become a significant element of assessment of patients with chronic respiratory diseases. Long-lasting symptoms of shortness of breath or a feeling of constant fatigue negatively affect the quality of life and everyday functioning of these patients (Judson 2017, 2015). A common problem in patients with chronic respiratory diseases is a sense of powerlessness caused by disease-induced restrictions (Jassem 2005). Therefore, psychosocial assessment and especially the assessment of individual perception of quality of life is crucial (Piotrowski and Górski 2011). Identification of problems arising from the disease and its treatment, as well as those relating to physical, mental, and social activity and evaluation of the patients' mental health have recently become the standard of medical management of sarcoidosis (James and Judson 2020, Moor et. al. 2020, Gudim et al. 2019, Tavee and Culver 2019, van Helmondt et al. 2019).

Sarcoidosis is a multi-organ granulomatous disease of an unclear etiology. Infectious, autoimmune and genetic factors have been implicated in its etiopathogenesis (Dubaniewicz 2009). Sarcoidosis is a chronic disease with the symptoms increasing the feeling of fatigue, shortness of dyspnea and poor exercise tolerance. Shortness of breath and fatigue associated with physical activity lead to limitations in both physical and mental aspects, and consequently lower quality of life (Marcellis et al. 2014, Drent et al. 2012, De Vries and Drent 2007).

Physical activity is one of the important determinants of health-related quality of life, as it leads to improvement and maintenance of functional fitness, affecting the perception of quality of life (Tudor-Locke et al. 2013, Pruitt et al. 2008). Research to date has confirmed the beneficial effect of physical activity on quality of life assessment. It has been shown that people who meet the recommendations for health promoting physical activity, achieve better

results in the overall assessment of health and quality of life compared to those who are physically inactive (Päivärinne i wsp. 2018, Vagetti et al. 2014, Gunnell et al. 2016, Cohen et al. 2016, Gill et al. 2013, 2011).

In the light of the above studies, determining an effective method of reducting fatigue and improving exerice tolerance in patients with sarcoidosis is becoming an important clinical problem.

This dissertation is concerned with the aspect of self-assessment of the quality of life in persons suffering from sarcoidosis. The study objective was to confront their quality of life with healthy people of a similar age.

The verification of whether and to what extent people diagnosed with the disease that limits the functional efficiency of the respiratory system, meet the recommendations for physical activity is an innovative element of the research study. In addition, it seems important to examine whether the restrictions resulting from the disease influence physical work capacity and quality of life. The main goal of this study was to assess the quality of life, feelings of fatigue and shortness of breath in patients with sarcoidosis. Significantly important in this study was also the demonstration of the correlations between the quality of life and subjective assessment of fatigue and shortness of breath, the lung function test results and physical fitness and activity.

The study was conducted in a group of twenty-five people suffering from sarcoidosis (GrS, n = 25, aged 51.3 ± 11.6 years) who were patients of the Clinic of Lung Diseases and Tuberculosis in Zabrze. The enrolled patients were at the initial stage of the disease (0-1), in a stable period of its development, which did not exceed four years, and with no indications for treatment. All patients were non-smokers. Patients were not treated with glucocorticoids and did not take immunosuppressants. They did not report any symptoms that prevented testing and the functional status of their respiratory system met all the criteria for qualification for exercise tests. The control group consisted of 16 healthy people of a similar age (49.8 ± 13.3 years) who did not report symptoms that would prevent the performance of the tests. The subjects from the group of patients and the group of healthy people did not differ in terms of age, sex and body composition. The tests were conducted at the Respiratory Rehabilitation Subdivision of the Clinic of Lung Diseases and Tuberculosis of the Medical University of Silesia in Zabrze and at the Functional Research Laboratory of the Jerzy Kukuczka Academy of Physical Education in Katowice. The research was approved by the Bioethics Committee

of the Medical University of Silesia (Resolution No. KNW/0022/kb1/32a/12 of 20.03.2012). During the study, the participants were under continuous medical supervision. The research was carried out in three stages. The study participants had their somatic indicators measurements taken during the first morning visit to the laboratory. Body height was measured with a BSM 170 height meter (MEDFitness, Maniac Gym A.B.H. Leszczyńscy, Poland) and body composition analysis was performed using an InBody 570 electrical bioimpedance analyzer (Tanita, Poland). Then spirometry tests were performed in accordance with the recommendations for performing spirometry tests (Quajneretal.1993) using a Jaeger-Masterlab spirometer (Erich Jaeger GmbH, Warzburg, Germany) To assess pulmonary function, the following indicators were measured: forced vital capacity (FVC), forced expiratory volume in one second of forced vital capacity (FEV_1) and carbon monoxide diffusion capacity *(DL_{CO}-diffusing capacity of the lungs for carbon monoxide).* The FEV_1/VC ratio (ratio of intense one-second capacity to vital capacity of the lungs) was calculated. Afterwards the subjects' quality of life, fatigue and shortness of breath were assessed by means of the questionnaire method Quality of life was assessed using the SF-36 v.2 questionnaire (*The Short Form – 36 Health Survey Questionnaire)* (Żołnierczyk-Zreda et al. 2009). Self-assessment of the quality of life included a reference to the physical health component (SF-36-ZF), to the mental health component (SF-36-ZP) and to eight domains: physical functioning (F), role restrictions - physical problems (R), pain (P), general health (H), vitality (V), social functioning (S), role restrictions - social problems (E), well-being (W). The level of fatigue was assessed using the FAS *(Fatigue Assessment Scale)* questionnaire (De Vries et al. 2004b). The level of dyspnea was assessed using a modified Borg dyspnoea scale (Poloński and Hudzik 2013) and a modified mMRC scale *(Modified Medical Research Council)* (Kozielski 2013).

The following morning, in the second stage of the study, a six-minute walk test 6MWT (six minute walking test) was carried out in accordance with the guidelines of Polish Society of Lung Diseases (Przybyłowski et al. 2015) to assess exercise tolerance. After a few minutes of rest, resting blood pressure (BP) and heart rate (HR) were measured, followed by an ergospirometric test (Metalyzer 3B-2R Ergospirometer, Cortex, Leipzig, Germany) on a treadmill (H/P Cosmos, Pulsar, Poland) according to the Bruce's protocol. The measurements included: maximum oxygen consumption (VO_{2max}), oxygen consumption at anaerobic threshold (VO_2AT), maximum minute ventilation (VE_{max}), maximum tidal volume (VT_{max}) and maximum breathing frequency (BF_{max}).

In the third stage of the study, physical activity level was assessed. The assessment of physical activity was based on monitoring the number of steps and energy expended during daily activities recorded with Triaxial accelerometers (Actigraph GT3X+, USA). Physical activity was assessed on the basis of the average number of steps taken (steps/day), energy expenditure of physical activity (kcal/day) and metabolic energy equivalent (MET) recorded over the next seven days of period.

The most significant finding of the study is the reduction in the quality of life of patients with sarcoidosis compared to healthy subjects. Noteworthy is the fact that the quality of life is worse in the area of physical and mental health. The highest rated domain is social functioning, while the lowest rated domains are pain, general health and vitality. Valuable results include the FAS fatigue scale. Patients with sarcoidosis experienced physical and mental fatigue more often compared to healthy people. In addition, strong correlations between quality of life and fatigue were confirmed in patients with sarcoidosis. There were significant relationships between the cumulative number of quality of life points (SF-36 sum) and the cumulative number of points on the fatigue scale (FAS sum). Moreover, statistically significant correlations concerned the quality of life in the component of physical (SF-36-ZF) and mental health (SF-36-ZP) and all eight domains of quality of life. In this paper, subjective assessment of dyspnea expressed according to the Borg scale confirmed the occurrence of moderate dyspnea more often in patients compared to healthy people. Significant relationships between quality of life and dyspnoea assessed on the Borg scale and mMRC were found.

The study found that the patients quality of life depends on the feeling of fatigue and shortness of breath and on exercise tolerance, as assessed in the 6 MWT gait test. It was shown that the quality of life does not depend on spirometry indicators and physical activity. There was no significant relationship between the quality of life of patients and the ergospirometric test results. People suffering from sarcoidosis obtained a lower level of physical activity compared to healthy individuals. The assessment of physical activity based on monitoring expenditure during daily activities indicates lower than recommended for this age group values. Demonstrating that patients with sarcoidosis were characterized by lower exercise tolerance, aerobic fitness, and cardiopulmonary adaptation to exercise compared to healthy people were interesting study findings. It was found that the patients physical capacity assessed by the 6 MWT test depends on fatigue and spirometric indicators. There was no relationship between the feeling of shortness of breath and walking distance in 6MWT. Patients' exercise tolerance assessed during an ergospirometry test does not depend on

shortness of breath and fatigue, but on spirometric indicators. Fatigue is strongly conditioned by feelings of breathlessness.

In conclusion, it is worth highlighting the significant role that psychosocial support plays in activating and motivating patients with sarcoidosis to undertake regular physical activity and lead a health-promoting lifestyle. Physical activity permanently introduced into patients' life is crucial for maintaining good physical and mental health.

Therefore, it seems to be crucial to continue research into effects of a rehabilitation program combined with physical activity on perception of quality of life of patients suffering from sarcoidosis. Multidimensional benefits in the area of physical and mental health as well as psychosocial support for patients may be inevitable results of such program.