

INFORMATION MODEL OF INDIVIDUAL REHABILITATION PROGRAM EFFICACY IN DISABLED PERSONS WITH CARDIOVASCULAR DISEASES

Scientific Research Institute of Invalid Rehabilitation on the base of
Vinnitsa Pirogov National Medical University
Vinnitsa National Technical University

Анотація

На підставі математичного моделювання, віщуючий зважений ідентифікуються в індивідуальній реабілітаційній програмі (IRP), які впливають на ефективність відновлення обробляють і скорочують обмеження у блокованих індивідуумів з серцево-судинними хворобами. Згідно з багатовимірним покроковим аналізом дискримінанта, головне відновлення зважене, це підвищено ефективність відновлення у осіб з нездатністю із-за серцево-судинних хвороб аге: "тонізуюча терапія", "медичне спостереження", "радячись на фізичному відновленні", "терапевтичній фізкультурі", раціональне працевлаштування орієнтації професіонал "," здібності професіонал "," потенціал "огляд "і" адекватність професія і особливості порекомендувало в IRP ". Зважаючи на їх зважений і їх виконання значно збільшить ефективність відновлення особи з нездатністю з серцево-судинною патологією.

Ключові слова: модель прогнозування, індивідуальна реабілітаційна програма, відновлення, серцево-судинні хвороби нездатності.

Abstract

On the basis of mathematical modeling, prognostic measures are identified in the individual rehabilitation program (IRP), which influence on the effectiveness of the rehabilitation process and reduce the limitations in disabled individuals with cardiovascular diseases. According to a multivariate stepwise discriminant analysis, the main rehabilitation measures that increase the effectiveness of rehabilitation in persons with disabilities due to cardiovascular diseases are: "restorative therapy", "medical observation", "counseling on physical rehabilitation", "therapeutic physical education", "examination potential professional abilities "," professional orientation "," rational employment "and" adequacy of the profession and specialty recommended in IRP ". Taking into account these measures and their implementation will significantly increase the effectiveness of rehabilitation of a person with disabilities with cardiovascular pathology.

Keywords: prognostic model, individual rehabilitation program, rehabilitation, disabilities cardiovascular diseases.

Introduction

In recent decades cardiovascular diseases continue to keep the leading positions among the world population in causing disability. Thus, in Europe, more than 64 million people with cardiovascular pathology have sustained functional limitations, accounting for 23% of the total number of disabled individuals [1,2,3]. The reason of this trend is high prevalence of cardiovascular diseases on the one hand, and inadequate and ineffective rehabilitation measures, on the other [1]. Therefore, improvement of rehabilitation system in individuals with cardiovascular pathology has become one of the priority tasks both in Ukraine and worldwide. Rehabilitation service of disabled persons is regulated by unified individual rehabilitation program (IRP), its main function is the provision of comprehensive rehabilitation of a particular individual in order to eliminate the existing limitations in performance of daily life activities, or prevent their development and progression [4,5]. Most scientific papers deal with the study efficacy of separate rehabilitation methods, focusing on medical and physical aspects [6,7], although integrated approach is required to achieve target result in the process of life activity restoration [8,9,10].

IRP of 53412 disabled individuals from 22 regions of Ukraine with circulatory diseases were retrospectively studied (ICD-10 codes: I 00-99, except I60-I69, I71-I83). The ratio percentage of patients was the following: by age - 13.8% - young, 71.5% - middle-aged, 14.7% - elderly; by gender -38.0% - females, 62.0% - males. According to IRP data, 100.0% of disabled persons required medical rehabilitation measures, professional rehabilitation was required by

33.8%, vocational – by 53.8%, physical – by 73.4%, psychological and pedagogical adjustment – by 60.4%, social and personal – by 2.5%, rehabilitation equipment – by 15.4%, medical products – by 5.9% of disabled individuals.

The study was conducted by 61 parameters - types of rehabilitation services, formulated in the valid Form of Individual Rehabilitation Program (IRP) of a disabled person. Measures of medical, psychological and pedagogical, physical, professional, vocational, physical culture and sport, social and household rehabilitation, provision with rehabilitation equipment and medical products were analyzed [11,12,13].

Three-year monitoring of corresponding parameters (2012-2014) were performed. The parameters were evaluated by calculating Wilkes' Lambda variables, analyzing the received system of classification equations and the model validity. The variable "life activity restoration" of a disabled person within 1 year of compiling IRP was used as the endpoint. Grading of the variable "life activity restoration" was done according to the following classification: "complete restoration of life activity", "partial restoration of life activity", "no restoration of life activity", "increased limitation in performance of life activity".

Software package SCM Maple 15 was used in statistical processing of numerical data. In order to identify the priority parameters, having predictive value in achieving the endpoint and creation of predictive model, a multivariate Fisher's linear discriminant analysis was used.

CONCLUSIONS

- The structure of medical and social rehabilitation of disabled with cardiovascular pathology, available in Ukraine at present, predicts mostly "no restoration" or "increase" in life activity limitations emphasizing the need for improving IRP.
- Prognosis of the end point ("restoration of vital activity") in disabled individuals with cardiovascular pathology should be based on multivariate statistical model considering 61 major parameters in compiling IRP.
- According to multivariate stepwise discriminant analysis, major rehabilitation measures increasing rehabilitation efficacy in disabled individuals with cardiovascular diseases are the following: "restorative therapy", "medical screening"; "counseling in physical rehabilitation", "exercise therapy", "examination of potential professional abilities", "vocational education"; "rational employment" and "occupation or specialty recommended in IRP". Their integrated implementation will provide successful rehabilitation of disabled individuals with cardiovascular diseases.

REFERENCE

- [1] Timmis A, Townsend N, Gale C [et al.]. European Society of Cardiology: Cardiovascular Disease Statistics 2017. *European Heart Journal*. 39 (2018), 508–579. doi: 10.1093/eurheartj/ehx628.
- [2] The National Audit of Cardiac Rehabilitation (NACR). The National Audit of Cardiac Rehabilitation (NACR) annual statistical report. UK: University of York, 2016.
- [3] Röhrig B, Salzwedel A, Linck-Eleftheriadis S [et al.]. Outcome based center comparisons in inpatient cardiac rehabilitation – results from the EVA-Reha® Cardiology project. *Rehabilitation (Stuttg)*. 54(1) (2015), 45-52. doi: 10.1055/s-0034-1395556.
- [4] Soumagne D. Weber classification in cardiac rehabilitation. *Acta Cardiol*. 67(3) (2012), 285-290.
- [5] Anderson L, Thompson DR, Oldridge N [et al.]. Exercise-based cardiac rehabilitation for coronary heart disease. *Cochrane Database Syst Rev*. 5 (1)(2016).CD001800. doi: 10.1002/14651858.CD001800.pub3.
- [6] Widmer RJ, Allison TG, Lennon R [et al.]. Digital health intervention during cardiac rehabilitation: A randomized controlled trial. *Am Heart J*. 188 (2017), 65-72. doi: 10.1016/j.ahj.2017.02.016.
- [7] Bhasipol A, Sanjaroensuttikul N, Pornsuriyasak P [et al.]. Efficiency of the home cardiac rehabilitation program for adults with complex congenital heart disease. *Congenit Heart Dis*. (2018) Sep 14. doi: 10.1111/chd.12659.
- [8] Olena V. Vysotska , Kostiantyn Nosov, Natalia B. Savina, and etc. An approach to determination of the criteria of harmony of biological objects", *Proc. SPIE 10808, Photonics Applications in Astronomy, Communications, Industry, and High-Energy Physics Experiments 2018*, 108083B (1 October 2018); doi: 10.1117/12.2501539.
- [9] Sergii V. Pavlov, Aleksandr T. Kozhukhar, et al. Electro-optical system for the automated selection of dental implants according to their colour matching // PRZEGLĄD ELEKTROTECHNICZNY, ISSN 0033-2097, R. 93 NR 3/2017. – P. 121-124. - doi:10.15199/48.2017.03.28
- [10] Vladimir V. Kholin, Oksana M. Chepurna, Sergii Pavlov et al. Methods and fiber optics spectrometry system for control of photosensitizer in tissue during photodynamic therapy, *Proc. SPIE 10031, Photonics Applications in Astronomy, Communications, Industry, and High-Energy Physics Experiments 2016*, 1003138 (September 28, 2016); doi:10.1117/12.2249259
- [11] Ronald H. Rovira; Stanislav Ye. Tuzhansky; Sergii V. Pavlov; Sergii N. Savenkov; Ivan S. Kolomiets, et al. Polarimetric characterisation of histological section of skin with pathological changes, *Proc. SPIE 10031, Photonics Applications in Astronomy, Communications, Industry, and High-Energy Physics Experiments 2016*, 100313E (September 28, 2016); doi:10.1117/12.2249373
- [12] S. V. Pavlov; V. B. Vassilenko; I. R. Saldan; D. V. Vovkotrub; A. A. Poplavskaya, et al. Methods of processing biomedical image of retinal macular region of the eye, *Proc. SPIE 9961, Reflection, Scattering, and Diffraction from Surfaces V*, 99610X (September 26, 2016); doi:10.1117/12.2237154

- [13] Ronald Rovira; Marcia M. Bayas; Sergey V. Pavlov; Tatiana I. Kozlovskaya; Piotr Kisała, et al. Application of a modified evolutionary algorithm for the optimization of data acquisition to improve the accuracy of a video-polarimetric system, *Proc. SPIE* 9816, Optical Fibers and Their Applications 2015, 981619 (December 18, 2015); doi:10.1117/12.2229087

Зленко Сергій Макарович – д-р тех. наук, професор, Вінницький національний технічний університет, м.Вінниця.

Безсмертний Юрій Олексійович - д-р мед. наук, професор Вінницький національний медичний університет, м.Вінниця.

Шевчук Віктор Іванович - д-р мед. наук, професор Вінницький національний медичний університет, м.Вінниця.

Куриленко Ірина Володимирівна - кандидат медичних наук, доцент, Вінницький національний медичний університет, м.Вінниця.

Безсмертна Галина Вікторівна - кандидат медичних наук, доцент, Вінницький національний медичний університет, м.Вінниця.

Sergii M. Zlepko - Candidate of Technical Sciences, Professor Vinnytsia National Technical University, Vinnytsia.

Yurii O. Bezsmertnyi - Doctor of Medical Sciences, Professor, Vinnytsia National Medical University, Vinnytsia.

Viktor I. Shevchuk - Doctor of Medical Sciences, Professor, Vinnytsia National Medical University, Vinnytsia.

Iryna V. Kurylenko - Candidate of Medical Sciences, associate professor, Vinnytsia National Medical University, Vinnytsia.

Halyna V. Bezsmertna - Candidate of Technical Sciences, associate professor, Vinnytsia National Medical University, Vinnytsia.