Decision Support System in diagnoses and prescription of physical activity

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Abstract and Objective

The physical activity as well as exercise, have become allies in the prevention of diseases, especially those of chronic degenerative character. While it is agreed that the practice of physical exercise has a beneficial role for the health of the population, especially for the elderly; the health professional, because of a lack of specific training, has great difficulty to steer and guide their patients to a physical education professional to prescribe exercises that produce real benefits. The aim of this study is to diagnose behavior regarding physical activity, determine the optimal dose of exercise to be prescribed based on evidence, and integrate prescription of physical activity to the patient and medical records. This application, its validation and the evaluation of a new protocol could contribute directly to the prevention of chronic degenerative diseases.

Keywords:

Medical informatics, Physical activity, Physical activity prescription, Decision support system.

Introduction

Epidemiologic studies from the last decade showed a distinct association between an active lifestyle and an improvement in life quality; which can be explained by the innumerous physiological and psychological benefits from the regular practice of physical activity (improvement of the circulatory system, delay at the muscular fatigue and an increase at its tonus, improved feeling of well being, memory and self-esteem). Therefore, physical activity as well as exercise have become important allies in the prevention of diseases, in particular the chronic degenerative ones. Nonetheless, the health professional, due to their lack of specific training, finds it difficult to guide their patients and refer them to a physical education professional in order to the most adequate exercise and activity be prescribed.

According to a literature review published at Am J Prev Med in 2007 there were 15 articles about web sites recommending physical activity, 7 of the articles presenting an individual but not automated prescription of exercise and all of them in English. In Brazil, few are the articles about individual and automated prescription of physical activity. The main purpose of this study is to develop a computerized decision support system to help the health professional to diagnose the level of physical activity of the individual and prescribe adequate and personalized physical activity. For the development and presentation of the knowledge in this system some concepts previously described in the literature were used such as: physical activity, exercise, sport and sedentary lifestyle.

During the last decade, cardiologists and physiologists developed a new energy consumption measurement unit, which is more specific that Kilocarie/ Kilojoule for other variables are used for its calculation such as weight and the physical activity performed by the individual. This new unit is name MET, meaning Metabolic Equivalence. One MET is equal to the metabolic consumption of a 40 years old individual, standing still in a sitting position and is 3,5mlO2/Kg/min.

Methods

In order to develop a decision support system to diagnose and prescribe the adequate and personalized level of physical activity, this study choose the tree decision knowledge representation and rules of the type IF premise THEN. Although this type of system only accepts future rule additions, it was chosen exactly for its compact and exact model for data grouping. The energy consumption unit used in the diagnoses and prescription of physical activity in this study is the METS unit. The cases used in this study will comprehend both genders healthy non-pregnant individuals, ranging from 18 to 65 years old.

Study Analysis and Expected Results

The hypotheses to be verified are: a) if the set of rules used in this system generates a physical activity prescription, b) if the physical prescription generated is equivalent to the ones made by specialists.

The system, as well as two health professionals are going to prescribe activity to five different cases. The data collected from the system and the two health professionals will be blindly compared by two specialists in order to determine the most accurate prescription for each case.

By mid April the system will be ready to undergo validation and by January 2011 the study will be concluded.