
Maintaining functional capacity through physical activity over time despite chronic disease: the interest of a global approach based on health and environment.

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Résumé

Introduction

Sedentary lifestyle and physical inactivity are recognized as major risk factors for the onset of chronic disease, recurrence, complication and/or the development of comorbidities (1). Physical activity (PA) plays a main role in the secondary and tertiary prevention of chronic diseases. However, to be effective in maintaining of bio-psycho-social abilities in the long term, it must be adapted to the needs and limitations of individuals living with chronic conditions (3). Encouraging long-term engagement to healthy behaviours that include regular Physical Activity (PA) and reduced sedentary lifestyle within care pathways is now a necessity. Nonetheless, numerous barriers, both individual and environmental, often hinder sustainable engagement (4). The characterization of patient's profiles will contribute to develop more targeted and therefore more effective prevention strategies for chronic patients which promote an active and non-sedentary lifestyle, facilitate access to local PA practice locations, while offering a specific adapted PA offer. This project aims (1) to model typical profiles of individuals with chronic illnesses based on their PA level (MET-minutes per week), and their sedentary behaviour (hours per day); and (2) to identify individual and environmental factors associated with PA, inactivity, and sedentarity.

Method

To explore these questions, we analyzed a dataset of 408 individuals, gathered by professionals in Adapted Physical Activity (APA) working in Health-Sport Centers in the Pyrénées Orientales region (France). For our analysis, we selected a subset of 240 adults with chronic diseases residing in this territory. We applied a Principal Component Analysis (PCA) to process several variables, including PA levels (assessed via the Global Physical Activity Questionnaire – GPAQ), physical fitness indicators (handgrip, seat-to-stand test, and the

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six-minute walk test), age, body mass index, functional limitations, and environmental descriptors from geospatial data. Following this, we conducted a K-means clustering analysis to identify distinct patient profiles based on these variables. We also used spatial analysis technics in QGIS (a specific software *in exploring and designing cartographic features*) to describe the relationship between the patients and the environmental conditions they live in to assess how this environment can affect their behaviour.

Results

The results revealed a negative correlation between age and physical fitness, as expected. However, these variables were *not* significantly correlated with PA scores from the GPAQ, suggesting that individuals with reduced physical capacities, whatever their age, are still capable of engaging in PA. Our clustering analysis identified three distinct profiles, which primarily differed in terms of high-intensity PA levels and sedentary time. We estimated the accessibility of PA infrastructure for each patient to assess the role of the environment on behaviours. These preliminary results showed that the profiles in each cluster were associated with different sets of environmental condition.

Conclusion

The additional environmental data points enable a deeper understanding of the role that environmental factors play in sustaining PA in population with chronic disease. Key environmental features under study include residential altitude, distance to healthcare and PA facilities, exposure to water and air pollution, presence of natural environments and infrastructure conducive to PA. By integrating these environmental dimensions, the project aims to refine its profile models and improve the targeting of interventions to encourage long-term, sustainable PA habits. This differentiation emphasizes the diversity of PA behaviours among individuals with chronic diseases and underlines the importance of personalized support strategies within health-sport systems.

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