ROLE OF EXERCISE IN PHYSIOTHERAPY FOR CHRONIC CONDITIONS: REVIEW ARTICLE

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Abstract:

Background: Chronic diseases are a growing concern worldwide, particularly among the elderly population, leading to significant healthcare costs and medical consultations. Strategies such as self-management and promoting healthy behaviors, including physical activity, are crucial in addressing these health challenges. However, there are barriers to implementing exercise interventions in clinical practice, including a lack of awareness, inadequate descriptions of interventions in published studies, and limited training opportunities for medical practitioners.

Aim: This study aims to investigate the effectiveness of exercise interventions in managing chronic conditions such as arthritis, diabetes, and heart disease. It seeks to evaluate the impact of exercise on improving functional abilities, quality of life, reducing pain and inflammation, and assessing the socio-economic impact of chronic diseases. Additionally, the study aims to identify barriers and facilitators to incorporating exercise into physiotherapy treatment plans for chronic condition. So, we concluded that regular physical activity and exercise play a crucial role in preventing and managing chronic diseases such as diabetes and osteoarthritis. Exercise interventions have shown positive effects on glucose metabolism, insulin sensitivity, muscle strength, and pain management in individuals with chronic conditions. However, challenges exist in prescribing and implementing exercise regimens in clinical settings. Addressing these challenges and promoting physical activity as a form of medicine can lead to improved health outcomes, reduced healthcare costs, and enhanced quality of life for individuals with chronic diseases. Further research and efforts are needed to overcome barriers and integrate physical activity promotion effectively into the treatment of chronic conditions.

Keywords: chronic disease, exercise, Noncommunicable diseases, Obesity, Diabetes, Cardiovascular disease, Cancer.

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Introduction:

The occurrence of chronic diseases is on the rise, surpassing 80% among individuals aged 65 and above, constituting a significant portion of medical consultations and healthcare expenses in the Basque Country [1]. Notably, conditions such as cardiovascular and respiratory diseases, cancer, diabetes, and mental illnesses contribute substantially to the global disease burden [2]. This burden is exacerbated by improved survival rates, necessitating a greater focus on addressing the health challenges stemming from these ailments, their treatment, and any accompanying comorbidities [3,4]. Proposed strategies to tackle this threat to healthcare system sustainability include empowering patients through self-management, promoting well-being, and fostering independence.

Evidence suggests that promoting healthy behaviors within healthcare environments can effectively prevent and manage a wide array of chronic conditions [5]. Specifically, physical activity plays a crucial role in the care of patients with cancer, schizophrenia, or chronic obstructive pulmonary disease (COPD), as these individuals often face limitations due to their health conditions [6,7].

The advantages of engaging in physical exercise are manifold, including enhancements in cardiorespiratory function, muscle mass quality and quantity. Exercise-induced disruption of the body's equilibrium triggers anti-inflammatory responses and bolsters the immune system, aiding in combating tumor development in cancer patients, mitigating the chronic inflammatory state associated with metabolic syndrome in individuals on antipsychotic medications for schizophrenia, and boosting functional capacity in COPD patients [8,9].

Various factors contribute to the underprescription of exercise interventions in clinical practice. Some clinicians and patients may lack awareness of the effectiveness of exercise interventions, while others may have limited knowledge about what constitutes an effective exercise program. Additionally, there is a shortage of training and educational opportunities for medical practitioners in this area [10]. Moreover, the descriptions of exercise interventions in published trials and reviews are often inadequate, which hinders the replication of these interventions in practice. For instance, a study analyzing 137 nonpharmacologic interventions from 133 trials revealed that 61% lacked sufficient information, such as procedural and intensity details, necessary for replication [11]. This lack of information makes it challenging for clinicians to prescribe these interventions effectively. Similarly, an examination of the exercise component in cardiac rehabilitation trials showed that 58% of interventions did not have adequate descriptions of the exercise schedule [12]. These findings underscore the need for clearer reporting and better dissemination of information regarding exercise interventions to improve their uptake in clinical settings.

Objectives:

The objectives of this review include:

1. To investigate the effectiveness of exercise interventions in managing chronic conditions such as arthritis, diabetes, and heart disease.
2. To assess the impact of exercise on improving functional abilities and quality of life in individuals with chronic conditions.
3. To explore the role of exercise in reducing pain and inflammation associated with chronic conditions.
4. To evaluate the socio-economic impact of chronic disease
5. To identify barriers and facilitators to incorporating exercise into physiotherapy treatment plans for chronic conditions.

Socio-Economic Impact of Chronic Disease:

Chronic diseases pose a growing global concern with significant social ramifications. According to a study conducted in 2013, the healthcare costs associated with cardiovascular diseases (CVD), stroke, type 2 diabetes, breast cancer, and colon cancer amounted to approximately $54 billion in international currency (INT) [13]. Moreover, the global economic impact of physical inactivity and chronic diseases is substantial, with productivity losses estimated at around $21 billion INT. Specifically, the cost of physical inactivity, which is linked to chronic diseases and premature mortality, is estimated at $145 billion INT. The rise in chronic disease prevalence has also had a notable effect on the workforce, as individuals with chronic conditions are either unemployed or exhibit reduced work hours and productivity compared to their healthy counterparts [14]. As the incidence rates of chronic diseases continue to climb, the likelihood of productivity losses and increased welfare expenditures rises accordingly [15].

The impact of chronic diseases extends to global military forces, with militaries worldwide facing challenges in recruitment due to a significant rise in obesity rates. In regions such as North America, Asia, Europe, and Australia, approximately 50% of individuals in the military age bracket (18-29 years) are classified as overweight or obese. This demographic also displays poor aerobic fitness

levels, which are closely linked to obesity. Consequently, young adults aspiring to join the military encounter difficulties in meeting the requisite physical fitness standards. Furthermore, a sedentary lifestyle has led to decreased interest among young adults in enlisting in the military [16].

A decrease in academic performance has been linked to the increasing prevalence of chronic diseases among children, adolescents, and young adults. Research has shown that regular classroom attendance is positively correlated with higher course grades and academic achievement [17]. However, recent studies have found a negative relationship between school attendance and standardized test scores in individuals who are overweight or obese. It remains unclear whether this association is due to social and behavioral factors related to obesity or the physiological effects of the condition. Additionally, diabetes has been associated with lower academic test scores and decreased ability to concentrate [18].

Furthermore, lower test scores in grade school, high school, and college have been shown to be predictive of lower college degree attainment. In higher education settings, there is evidence suggesting that lower graduation rates are linked to overweight, obesity, and other chronic diseases [19]. The impact of chronic diseases on academic success extends beyond the individual level and has broader societal implications. For instance, college graduates are less likely to rely on welfare programs, more likely to participate in voting at various levels of government, and more inclined to engage in volunteer work and charitable donations. As the global burden of chronic diseases continues to escalate, healthcare costs are expected to rise, productivity losses will become more prevalent, national defense efforts may face challenges in recruitment, academic achievement may decline, and overall societal well-being may suffer [20]. Further research is needed to fully understand the complex interplay between chronic diseases and academic performance, as well as to develop effective interventions to mitigate these negative effects.

Health benefits of physical activity and exercise for chronic disease:

The continual exploration of the health benefits of regular physical activity (PA) and exercise encompasses chronic disease prevention, rehabilitation, and treatment, with ongoing research yielding new insights [21]. A common inquiry pertains to the mechanisms through which PA and exercise contribute to chronic disease prevention and management. The impact of PA and exercise on various health issues is multifaceted, with the effectiveness contingent upon the specific condition and its severity. A comparative analysis of the effects of PA and medication on heart rate, both at rest and during physical exertion, offers valuable insights. For instance, while beta-blockers are commonly prescribed for various cardiovascular diseases and are known to reduce resting, submaximal, and maximal exercise heart rates, daily PA and exercise also lead to decreased resting and submaximal heart rates, albeit not affecting maximal heart rate [22].

In contrast to conventional medications that primarily address symptoms or modify physiological processes in an artificial manner, the benefits of PA and exercise lie in optimizing the body's physiological systems. Consequently, daily PA and exercise serve as a natural remedy for numerous ailments. Notably, engaging in PA and exercise enhances myocardial function by bolstering myocardial strength and enhancing oxygen delivery while reducing myocardial oxygen demand [23]. Furthermore, regular PA and exercise are associated with improvements in cardiovascular health, such as decreased systolic blood pressure and lower blood catecholamine levels at rest and during submaximal exercise, thereby mitigating cardiovascular disease risk factors. These adaptations foster enhanced systemic function and overall well-being without the potential adverse effects often linked with conventional medications. Therefore, PA and exercise play a dual role in preventing and managing chronic diseases.

Beyond cardiovascular benefits, the positive impact of PA and exercise extends to various physiological systems, as supported by scientific literature. This evidence underscores the holistic benefits of exercise, positioning it as a form of medicine [24].

Benefits for selected populations with chronic disease:

Diabetes mellitus:

Engaging in physical activity plays a crucial role in both preventing and managing the condition. Physical exercise yields beneficial effects on glucose metabolism and aids in reducing insulin resistance, a key characteristic of type 2 diabetes. By influencing muscle physiology, exercise enhances insulin sensitivity, primarily through mechanisms such as increasing the presence of glucose transporter 4 (GLUT-4) and facilitating glucose transport. Furthermore, exercise helps lower circulating levels of free fatty acids by combatting obesity and boosts insulin-stimulated

blood flow in the limbs. Resistance training, by promoting muscle mass development, contributes to improved glucose uptake. Additionally, exercise has been observed to mitigate the progression of peripheral neuropathy, possibly by enhancing endoneurial blood flow and increasing oxygen delivery to nerves [25].

Osteoarthritis:

Therapeutic exercise emerges as a promising avenue for alleviating pain and enhancing muscle strength, balance, and range of motion in individuals grappling with this condition. Specifically, resistance training and endurance exercises prove particularly effective in addressing pain and balance issues in the context of osteoarthritis affecting major joints like the knee. Among the various exercise modalities, isokinetic exercise stands out as the most validated approach for knee osteoarthritis [26].

Clinical prescription of exercise:

Healthcare professionals tasked with recommending exercise regimens must possess a solid understanding of exercise physiology and training principles. Tailoring an exercise program involves considerations such as the specific disease and its stage, the individual's baseline fitness level, and the collaborative establishment of program goals with the patient. Unlike preventive measures aimed at healthy young individuals, the scope of physical activity prescribed for patients with chronic diseases may be more restricted. Ensuring long-term adherence to exercise regimens poses a common challenge in therapeutic settings. Strategies such as in-person or telephone-based exercise consultations can aid in sustaining high levels of physical activity. However, translating existing knowledge into routine clinical practice faces numerous obstacles, particularly in healthcare systems that prioritize treating the pathological aspects of illnesses rather than bolstering the overall health of individuals affected by these conditions [27]. There is a growing emphasis across all sectors on integrating physical activity promotion into the treatment of individuals with chronic ailments [28], although the most effective, widespread, and sustainable methods for achieving this integration remain unclear.

Impact of lack of physical activity and exercise on patients with chronic diseases:

Physical inactivity has been linked to a higher risk of chronic diseases [29]. Studies in the literature have consistently shown that maintaining moderate levels of physical activity (PA) and physical fitness is associated with lower morbidity and mortality rates. Epidemiologic and longitudinal studies have provided evidence supporting the notion that adopting a lifestyle that includes daily PA and higher cardiorespiratory fitness can lead to a reduced risk of disease [30].

Various countries and organizations, such as the American College of Sports Medicine and the World Health Organization (WHO), have developed guidelines on PA to offer evidence-based recommendations for individuals of all ages and health conditions. These guidelines cover different dimensions of PA, including mode, frequency, duration, and intensity, as well as various domains such as leisure time, transportation, occupation, and domestic activity, allowing for personalized recommendations [31]. It is important to recognize that different PA domains have distinct impacts on health and should be considered separately. For example, an increase in occupational activity may lead to a decrease in leisure time activity, potentially resulting in an overall rise in sedentary behavior. Increased sedentary time and inadequate sleep have been associated with adverse health outcomes and premature mortality [32].

Insufficient PA levels can have serious and even harmful effects. For instance, individuals with type 2 diabetes who increase their sedentary time by just 60 minutes per day may face a 13% higher risk of mortality [33]. Moreover, a sedentary lifestyle can lead to issues such as impaired circulation, osteoporosis, arthritis, diminished self-esteem, increased reliance on others for daily activities, limited social interactions, and an overall decline in quality of life [34].

Complications related to physical exercise:

The complications of therapeutic exercise are mainly related to poor technique that contributes to acute injury or decline in function. However, when performed correctly, it is extremely rare to experience any ill side-effects from physical exercise [35].

Conclusion:

In conclusion, the findings of this review have highlighted the positive impact of exercise on improving overall health outcomes, reducing symptoms, and enhancing quality of life for individuals living with chronic conditions. Specifically, regular exercise has been shown to help regulate blood sugar levels in diabetes patients, improve cardiovascular function in individuals with heart disease, reduce pain and stiffness in arthritis patients, and enhance physical and mental well-being in cancer survivors. Furthermore, the review has emphasized the

importance of personalized exercise programs tailored to the specific needs and limitations of each patient, as well as the need for ongoing support and guidance from physiotherapists to ensure safe and effective implementation of exercise interventions. Overall, the review underscores the crucial role of exercise in physiotherapy as a key component of holistic care for individuals with chronic conditions, and highlights the potential for further research and innovation in this area to continue improving outcomes for patients in the future.

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