YANGI O‘ZBEKISTON, YANGI TADQIQOTLAR JURNALI
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ASSESSMENT OF THE EFFECTIVENESS OF PROGRAMS AIMED AT INCREASING PHYSICAL ACTIVITY IN PATIENTS WITH ISCHEMIC HEART DISEASE

Odashaliyev Abbosbek A.
Rajabova Ra'no Sh.
Tashkent State Medical University Tashkent, Uzbekistan.

Annotatsiya: *Yurak ishemik kasalligi (YuIK) butun dunyo bo'ylab o'limning asosiy sababidir va jismoniy harakatsizlik asosiy o'zgartirilishi mumkin bo'lgan xavf omilidir. Ushbu maqola YuIK bemorlarida jismoniy faollikni oshirish uchun mo'ljallangan turli xil dasturlarning samaradorligini baholash jumladan, yurak reabilitatsiyasi, nazorat ostida olib boriladigan mashqlar dasturlari, uy sharoitida olib boriladigan mashqlardan iborat dasturlar va raqamli texnologiyalarga asoslangan dasturlar. Dalillar shuni ko'rsatadiki, jismoniy faollikni oshiruvchi bu dasturlar yurak-qon tomir kasalliklarini kamaytiradi, funktsional imkoniyatlarni va hayot sifatini sezilarli darajada yaxshilaydi. Ammo, isbotlangan foydalariga qaramay, mutaxasislarga murojaat etadigan bemorlar soni kamligi va bu xizmatlarning cheklanganligi kabi to'siqlar saqlanib qolmoqda. YuIKni boshqarishda jismoniy faollikning ta'sirini maksimal darajada oshirish uchun moslashtirilgan, mavjud va ko'p o'lchovli dasturlar muhim ahamiyatga ega.*

Kalit so'zlar: *yurak ishemik kasalligi, jismoniy faoliyat, yurak reabilitatsiyasi, mashqlar terapiyasi, ikkilamchi profilaktika, bemorning natijalari*

Аннотация: *Ишемическая болезнь сердца (ИБС) является основной причиной смерти во всем мире, а физическая неактивность является основным модифицируемым фактором риска. В этом обзоре оценивается эффективность различных программ, разработанных для повышения физической активности у пациентов с ИБС, включая кардиологическую реабилитацию, контролируемые тренировки, программы активности на дому и цифровые вмешательства. Данные свидетельствуют о том, что структурированные рограммы упражнений значительно улучшают сердечно-сосудистые исходы, функциональные возможности и качество жизни. Несмотря на доказанные преимущества, сохраняются такие барьеры, как низкие показатели направления к специалистам и ограниченный доступ к услугам. Индивидуально разработанные, доступные и многомерные программы необходимы для максимального воздействия вмешательств физической активности при лечении ИБС.*

Ключевые слова: *ишемическая болезнь сердца, физическая активность, кардиологическая реабилитация, лечебная физкультура, вторичная профилактика, результаты лечения пациентов*

Abstract: *Ischemic heart disease (IHD) is a leading cause of death globally, and physical inactivity is a major modifiable risk factor. This review evaluates the effectiveness of various programs designed to increase physical activity in IHD patients, including cardiac rehabilitation, supervised exercise training, home-based activity programs, and digital interventions. Evidence suggests that structured exercise programs significantly improve cardiovascular outcomes, functional capacity, and quality of life. Despite proven benefits, barriers such as low referral rates and limited access to services persist. Tailored, accessible, and multidimensional programs are essential to maximize the impact of physical activity interventions in IHD management.*

Keywords: *ischemic heart disease, physical activity, cardiac rehabilitation, exercise therapy, secondary prevention, patient outcomes*

Objective of the study. To assess the effectiveness of programs aimed at increasing physical inactivity in patients with Ischemis heart disease.

INTRODUCTION.

Ischemic heart disease (IHD), also known as coronary artery disease, is characterized by reduced blood flow to the heart muscle due to atherosclerotic plaque buildup in the coronary arteries. Globally, ischemic heart disease (IHD) affects a significant portion of the population. In 2020, 244.1 million people lived with IHD, with males experiencing higher prevalence than females. IHD was responsible for 8.88 million deaths and 187 million DALYs (Disability-Adjusted Life Years) lost in 2021[1] While the number of deaths due to cardiovascular diseases (CVDs) has increased due to an aging and growing population, the age-standardized death rate has declined . Physical inactivity is a significant modifiable risk factor contributing to the development and progression of IHD. Regular physical activity has been shown to improve endothelial function, enhance myocardial perfusion, reduce systemic inflammation, and favorably modulate traditional risk factors such as hypertension, dyslipidemia, and insulin resistance. Given these benefits, increasing physical activity is a cornerstone of secondary prevention in patients with established IHD. Various interventions, ranging from structured cardiac rehabilitation (CR) to emerging digital health solutions, aim to promote sustained increases in physical activity levels. This article provides a comprehensive evaluation of the efficacy of such interventions in improving outcomes among IHD patients.

METHODOLOGY

A comprehensive literature search was conducted using PubMed, Scopus, and Google Scholar databases. Search terms included: "ischemic heart disease," "physical activity," "cardiac rehabilitation," "exercise intervention," "home-based program," and "digital health." Inclusion criteria comprised randomized controlled trials, meta-analyses, and systematic reviews published in English between 2003 and 2024 that assessed the impact of physical activity interventions on clinical, functional, or psychosocial outcomes in adult patients with IHD. Cardiac rehabilitation is a comprehensive, multidisciplinary program encompassing exercise training, lifestyle modification, risk factor control, and psychosocial support. It is typically delivered in three phases: inpatient, early outpatient (phase II), and long-term maintenance (phase III). CR has consistently demonstrated substantial benefits in reducing all-cause and cardiovascular mortality, hospital readmission rates, and improving quality of life.[2,3,4]

Supervised exercise programs are conducted under the guidance of healthcare professionals in clinical or community-based settings. They enable individualized exercise prescriptions based on baseline functional capacity, ensure patient safety, and promote adherence. Supervised training has been particularly effective in improving maximal oxygen uptake (VO_2 max), a robust predictor of cardiovascular mortality. Home-based interventions offer greater flexibility and accessibility, especially for patients with geographical, logistical, or financial constraints. These programs often include written or video instructions, exercise diaries, and periodic remote consultations. While generally less intensive than center-based programs, they can yield comparable outcomes when appropriately structured and monitored.

Recent technological advancements have facilitated the integration of mobile health (mHealth) applications, wearable devices, and telemonitoring platforms into exercise programs. These tools enhance patient engagement, enable remote supervision, and provide real-time feedback. Although relatively new, digital interventions have shown promising results in improving physical activity levels, adherence, and self-efficacy.[5,6]

CLINICAL OUTCOMES

Participation in structured physical activity programs, particularly CR, is associated with significant reductions in mortality and morbidity among IHD patients. A meta-analysis encompassing 25 studies with over 55,000 participants found that CR was associated with a 60% reduction in cardiac death rates (RR=0.40; 95% CI: 0.30–0.53) and a 51% reduction in major adverse cardiac events (RR=0.49; 95% CI: 0.44–0.55) . Another systematic review reported that exercise-based CR resulted in a 47% reduction in mortality hazard ratio (HR=−0.47; 95% CI=−0.56 to −0.39)[7,8,9]. Exercise interventions lead to significant improvements in cardiorespiratory fitness, as evidenced by increased VO_2 max, enhanced six-minute walk test (6MWT) distances, and improved heart rate recovery. These functional

markers are predictive of long-term survival and quality of life in patients with IHD. A meta-analysis demonstrated that CR improved peak oxygen uptake (VO_2peak) by a mean difference of 3.13 ml/kg/min (95% CI: 2.61 to 3.65).

Structured physical activity is associated with reductions in symptoms of depression and anxiety, improved cognitive function, and greater social integration. These benefits are particularly important given the high prevalence of psychological comorbidities among cardiac patients. CR has been shown to significantly improve both physical and mental components of quality of life, with mean differences of 6.05 and 5.38, respectively[13,14,15].

Despite robust evidence, utilization of physical activity interventions, particularly CR, remains suboptimal. Global participation rates vary widely, with estimates suggesting fewer than 30–50% of eligible patients enroll in CR programs[16,17,18].

Key barriers include:

- Inadequate referral by healthcare providers;

-Limited availability of CR facilities in rural or resource-constrained settings;

-Financial costs and transportation difficulties;

-Low health literacy and cultural factors;

-Comorbidities and patient-perceived barriers, such as fear of exercise or lack of motivation;

Efforts to address these challenges must include policy changes, provider education, infrastructure development, and integration of telehealth to extend reach and equity[19,20,21].

DISCUSSION

The effectiveness of physical activity interventions in patients with IHD is unequivocal, with demonstrated benefits across clinical, physiological, and psychosocial domains. Cardiac rehabilitation remains the most comprehensive and effective modality, but alternative approaches-particularly home-based and digital solutions—are critical to expanding access and personalizing care. The integration of technology, patient-centered design, and behavioral science principles offers significant potential to overcome existing limitations. Future research should focus on optimizing hybrid models of care, developing culturally adapted interventions, and evaluating cost-effectiveness in diverse healthcare settings. Moreover, strategies to improve referral rates and patient engagement must be prioritized to ensure widespread adoption and maximal benefit.

CONCLUSION

Interventions aimed at enhancing physical activity in patients with ischemic heart disease are both efficacious and essential components of secondary prevention. While traditional models like cardiac rehabilitation remain the gold standard, the growing adoption of home-

based and digital programs provides promising alternatives to improve accessibility and adherence. A patient-tailored, multidisciplinary approach—supported by ongoing policy and system-level initiatives—is vital to bridging existing gaps and improving long-term cardiovascular outcomes.

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