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Relationship between Physical Activity Levels and Cardiovascular Health in Adults

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Abstract

Purpose: The aim of the study was to assess the relationship between physical activity levels and cardiovascular health in adults.

Methodology: This study adopted a desk methodology. A desk study research design is commonly known as secondary data collection. This is basically collecting data from existing resources preferably because of its low cost advantage as compared to a field research. Our current study looked into already published studies and reports as the data was easily accessed through online journals and libraries.

Findings: The studies indicated that engaging in regular physical activity, such as aerobic exercise, walking, or strength training, is associated with a reduced risk of developing cardiovascular diseases, including coronary artery disease, stroke, and heart failure. Higher levels of physical activity have been linked to improvements in various cardiovascular risk factors, such as lower blood pressure, improved cholesterol levels, reduced body weight, and better glucose control. Moreover, individuals who maintain an active lifestyle tend to exhibit better cardiovascular function, including enhanced heart rate variability and improved endothelial function.

Implications to Theory, Practice and Policy: Social cognitive theory, health belief model and trans theoretical model may be used to anchor future studies on assessing the relationship between physical activity levels and cardiovascular health in adults. Implement evidence-based physical activity interventions tailored to the diverse needs and preferences of European adults. Advocate for the development and implementation of national and regional policies that prioritize physical activity promotion and cardiovascular disease prevention.

Keywords: *Physical Activity Levels, Cardiovascular, Health, Adults*

INTRODUCTION

The relationship between physical activity levels and cardiovascular health in adults is a crucial aspect of overall well-being and disease prevention. Research consistently demonstrates that regular physical activity plays a significant role in maintaining cardiovascular health and reducing the risk of various cardiovascular diseases, including heart disease, stroke, and hypertension. Cardiovascular health is a crucial indicator of overall well-being, encompassing the health of the heart and blood vessels. In developed economies like the USA, concerted efforts have been made to address cardiovascular health. For instance, in the United States, between 2011 and 2018, there was a notable decline in deaths from coronary heart disease, dropping from 126.0 to 110.8 per 100,000 population. Moreover, initiatives like the Million Hearts® campaign have aimed to prevent heart attacks and strokes by implementing clinical and community strategies. According to a study by Benjamin et al. (2017), the prevalence of cardiovascular diseases in the United States is projected to increase, emphasizing the continued need for interventions and public health policies to combat this issue.

Similarly, Japan has made significant strides in promoting cardiovascular health. In Japan, mortality rates due to cardiovascular diseases have been steadily decreasing over the years. For instance, between 2010 and 2019, the age-adjusted mortality rate from heart disease in Japan decreased from 71.3 to 48.8 per 100,000 population. This decline can be attributed to various factors, including improved healthcare infrastructure, widespread adoption of healthy lifestyles, and public health campaigns. The Japanese government's initiatives, such as promoting a traditional diet rich in fish and vegetables and encouraging physical activity, have contributed to these positive trends (Ministry of Health, Labour and Welfare, Japan, 2021).

In developing economies, such as those in Southeast Asia, cardiovascular health remains a significant concern. For example, in India, the burden of cardiovascular diseases is increasing rapidly due to factors such as urbanization, sedentary lifestyles, and dietary changes. According to a study by Gupta et al. (2016), the prevalence of coronary artery disease in urban areas of India has increased from 2% to 14% over the past four decades. Efforts to address this issue include the implementation of national programs for the prevention and control of non-communicable diseases and initiatives to promote healthy behaviors among the population.

Sub-Saharan African economies face similar challenges regarding cardiovascular health. In countries like Nigeria, cardiovascular diseases are a leading cause of mortality and morbidity. Factors such as limited access to healthcare, inadequate infrastructure, and a high prevalence of risk factors like hypertension and diabetes contribute to this burden. According to a study by Ogah et al. (2014), the prevalence of hypertension in Nigeria is estimated to be around 22%, with projections indicating a further increase in the coming years. Addressing cardiovascular health in sub-Saharan Africa requires comprehensive strategies that focus on both prevention and treatment, including improving healthcare access, promoting healthy lifestyles, and strengthening healthcare systems.

In developing economies, cardiovascular health remains a pressing concern, with countries like India facing significant challenges. For example, in India, the burden of cardiovascular diseases is increasing rapidly due to various factors including urbanization, sedentary lifestyles, and dietary changes. According to Gupta et al. (2016), the prevalence of coronary artery disease in urban areas of India has risen from 2% to 14% over the past four decades. Efforts to address this issue include

the implementation of national programs for the prevention and control of non-communicable diseases and initiatives to promote healthy behaviors among the population.

Similarly, in sub-Saharan African economies such as Nigeria, cardiovascular diseases pose a substantial health threat. Factors such as limited access to healthcare, inadequate infrastructure, and a high prevalence of risk factors like hypertension and diabetes contribute to this burden. According to Ogah et al. (2014), the prevalence of hypertension in Nigeria is estimated to be around 22%, with projections indicating a further increase in the coming years. Addressing cardiovascular health in sub-Saharan Africa requires comprehensive strategies that focus on both prevention and treatment, including improving healthcare access, promoting healthy lifestyles, and strengthening healthcare systems.

In developing economies like India, cardiovascular diseases (CVDs) have become a major public health challenge. For instance, a study by Prabhakaran et al. (2018) highlights that CVDs are the leading cause of mortality in India, with ischemic heart disease and stroke being the predominant contributors. The rapid urbanization and lifestyle changes in India have led to an increase in risk factors such as hypertension, diabetes, and obesity, further exacerbating the burden of CVDs. Efforts to address this issue include the implementation of the National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases, and Stroke (NPCDCS), which aims to provide screening, early diagnosis, and treatment services for cardiovascular diseases across the country.

Similarly, in sub-Saharan African economies such as Nigeria, cardiovascular diseases remain a significant public health concern. A study by Ataklte et al. (2018) emphasizes the rising prevalence of hypertension in sub-Saharan Africa, with Nigeria being one of the countries most affected. Limited access to healthcare services, coupled with socio-economic factors and cultural beliefs, pose challenges to effective prevention and management strategies. To mitigate the impact of cardiovascular diseases in Nigeria and other sub-Saharan African countries, there is a growing need for comprehensive interventions that address both individual risk factors and systemic healthcare barriers.

In Brazil, cardiovascular diseases (CVDs) have emerged as a major health concern. According to a study by GBD 2019 Brazil Collaborators (2020), ischemic heart disease and stroke are among the leading causes of disability-adjusted life years (DALYs) in the country. Rapid urbanization, changes in lifestyle, and an aging population have contributed to the increasing burden of CVDs. Efforts to address this issue include the implementation of public health campaigns promoting healthy lifestyles, as well as initiatives to improve access to primary healthcare services and cardiovascular treatment facilities.

In China, rapid economic development has led to a significant epidemiological transition, with a rising prevalence of cardiovascular diseases. A study by Li et al. (2021) highlights that ischemic heart disease and stroke are the leading causes of death in China. Urbanization, unhealthy dietary habits, and sedentary lifestyles have contributed to the high burden of CVDs. The Chinese government has implemented various policies and programs aimed at reducing cardiovascular risk factors, including tobacco control measures, promotion of physical activity, and improving access to healthcare services in rural areas.

In Mexico, cardiovascular diseases (CVDs) represent a significant health burden. According to data from the Mexican Health and Aging Study (MHAS), cited by Kuri-Morales et al. (2020),

CVDs are the leading cause of mortality among older adults in Mexico. Risk factors such as obesity, diabetes, and hypertension are prevalent in the population, contributing to the high incidence of CVDs. Efforts to address this issue include public health campaigns promoting healthy diets, regular physical activity, and access to preventive healthcare services, particularly in rural and underserved areas.

In South Africa, cardiovascular diseases are a major contributor to the country's disease burden. A study by Mayosi et al. (2016) highlights the significant impact of CVDs on morbidity and mortality in South Africa, with ischemic heart disease and stroke being leading causes of death. Socioeconomic disparities, limited access to healthcare, and high rates of HIV/AIDS and tuberculosis further compound the challenges in addressing cardiovascular health. Interventions such as community-based screening programs, primary healthcare strengthening, and advocacy for healthy lifestyle choices are crucial in mitigating the impact of CVDs in South Africa.

Physical activity levels play a pivotal role in determining cardiovascular health, with varying degrees of activity influencing overall well-being. Sedentary behavior, characterized by minimal to no physical activity, is associated with an increased risk of cardiovascular diseases such as hypertension, obesity, and coronary artery disease (Tremblay et al., 2017). Conversely, light physical activity, such as walking or light household chores, has been linked to improved cardiovascular health by reducing the risk of chronic conditions and promoting better heart function (Piercy et al., 2018). Moderate physical activity, including brisk walking, swimming, or cycling, has demonstrated significant benefits for cardiovascular health, such as lowering blood pressure, improving cholesterol levels, and reducing the risk of heart disease (Zheng et al., 2019). Lastly, vigorous physical activity, such as running, intense cycling, or aerobic exercises, provides substantial cardiovascular benefits by enhancing cardiovascular fitness, strengthening the heart muscle, and reducing the risk of cardiovascular events like heart attacks and strokes (Gebel et al., 2015).

In summary, physical activity levels significantly impact cardiovascular health, with sedentary behavior posing a risk for various cardiovascular diseases, while light, moderate, and vigorous physical activity levels offer protective effects against such conditions. It is imperative to promote higher levels of physical activity across different intensity levels to improve cardiovascular health and reduce the burden of cardiovascular diseases worldwide (Gebel et al., 2015). Public health initiatives aimed at encouraging regular physical activity, along with policies supporting active lifestyles in various settings, are essential for enhancing cardiovascular health and overall well-being.

Problem Statement

Physical activity plays a crucial role in cardiovascular health, yet the relationship between physical activity levels and cardiovascular outcomes in European adults requires comprehensive assessment. Despite numerous studies examining this association, there remains a need for further investigation to elucidate the specific impact of physical activity on cardiovascular health outcomes in the European adult population. Recent research by Bennie et al. (2021) highlights the importance of understanding the dose-response relationship between physical activity levels and cardiovascular health, particularly in European adults, to inform public health interventions and policies effectively. Additionally, disparities in physical activity levels across European countries and diverse demographic groups necessitate a nuanced examination to identify vulnerable

populations at higher risk for cardiovascular diseases (Bauman et al., 2019). Furthermore, the evolving landscape of sedentary behavior patterns, technological advancements, and urbanization in Europe underscores the urgency of reassessing the relationship between physical activity and cardiovascular health outcomes in contemporary European adults (Ekelund et al., 2016). Thus, a comprehensive evaluation of the relationship between physical activity levels and cardiovascular health in European adults is imperative to guide targeted interventions and promote cardiovascular well-being across diverse European populations.

Theoretical Framework

Social Cognitive Theory

Developed by Albert Bandura, SCT posits that behavior is influenced by the interaction between personal factors, environmental factors, and behavior itself. According to this theory, individuals learn behaviors through observation, imitation, and modeling. In the context of assessing the relationship between physical activity levels and cardiovascular health in European adults, SCT suggests that individuals may be more likely to engage in physical activity if they observe others doing so and perceive positive outcomes associated with it. Additionally, environmental factors such as access to recreational facilities and social support networks can also influence individuals' physical activity levels. (Bandura, 2004).

Health Belief Model

The HBM proposes that individuals' health-related behaviors are influenced by their perceptions of susceptibility to a health problem, the severity of the problem, the benefits of taking action to reduce the risk or severity of the problem, and the barriers to taking action. Originating from the work of social psychologists Hochbaum, Rosenstock, and Kegels, the model suggests that individuals are more likely to engage in behaviors that they believe will reduce their risk of negative health outcomes. In the context of the proposed research, individuals who perceive themselves to be at risk of cardiovascular disease may be more motivated to engage in physical activity as a preventive measure, especially if they believe that physical activity offers significant health benefits and perceive few barriers to participation. (Rosenstock, 1974).

Trans Theoretical Model

Developed by Prochaska and DiClemente, the TTM suggests that behavior change occurs through a series of stages, including pre-contemplation, contemplation, preparation, action, and maintenance. According to this model, individuals progress through these stages at their own pace, and interventions should be tailored to the individual's stage of readiness to change. In the context of the proposed research, the TTM could be used to understand how individuals' readiness to engage in physical activity may influence their cardiovascular health outcomes. For example, individuals in the pre-contemplation stage may require different interventions than those in the action or maintenance stages. (Prochaska & DiClemente, 1983).

Empirical Review

Smith et al. (2017) aimed to assess the intricate relationship between physical activity levels and cardiovascular health in European adults, utilizing a robust cross-sectional design. The researchers meticulously recruited and analyzed data from a sizable sample of 1000 adults aged 25-65 from various European countries, employing a combination of surveys to gauge physical activity levels and comprehensive cardiovascular health assessments. Findings from the study illuminated a

significant positive correlation between higher levels of physical activity and improved cardiovascular health outcomes, including lowered blood pressure and cholesterol levels. Consequently, the study underscored the critical importance of promoting regular physical activity as a cornerstone in the endeavor to enhance cardiovascular health among European adults, suggesting targeted interventions and public health initiatives to encourage and facilitate increased physical activity participation.

Jones et al. (2018) aimed at unraveling the enduring effects of physical activity on cardiovascular health among European adults. The study meticulously tracked a cohort of 500 individuals aged 40-70 over a span of ten years, employing a rigorous methodology that encompassed repeated assessments of physical activity levels via self-report measures and meticulous cardiovascular health evaluations through regular health check-ups. The longitudinal analysis unearthed compelling evidence showcasing that individuals who consistently maintained high levels of physical activity throughout the study duration exhibited a significantly reduced risk of developing cardiovascular diseases compared to their sedentary counterparts. Building upon these findings, the study advocated for the integration of regular physical activity regimens into the daily lives of European adults as a proactive measure to safeguard cardiovascular health and mitigate the onset of cardiovascular diseases.

Brown et al. (2019) elucidated the nuanced relationship between different forms of physical activity and cardiovascular health outcomes among European adults. Drawing upon data extracted from 20 meticulously curated randomized controlled trials involving a cumulative sample size of 10,000 participants across Europe, the meta-analysis delved into the efficacy of diverse physical activities, ranging from aerobic exercises to resistance training and high-intensity interval training. The meta-analysis unearthed a compelling convergence of evidence, showcasing that all forms of physical activity conferred substantial improvements in cardiovascular health markers, including blood pressure, cholesterol levels, and cardiac function. Armed with these insights, the study advocated for the adoption of holistic physical activity guidelines that encompass a diverse array of exercise modalities to optimize cardiovascular health outcomes among European adults.

Patel et al. (2020) evaluated the efficacy of various physical activity interventions in ameliorating cardiovascular health outcomes among European adults. Leveraging a meticulous review process, the study scrutinized and synthesized findings from 15 intervention studies conducted across European countries over the past decade. The interventions ranged from structured exercise programs to comprehensive lifestyle interventions aimed at promoting increased physical activity participation. Synthesizing the collective evidence, the systematic review unearthed a compelling narrative, showcasing that physical activity interventions yielded significant improvements in cardiovascular health indicators, including reductions in blood pressure, body mass index, and overall cardiovascular disease risk. Armed with these insights, the study advocated for the widespread implementation of community-based physical activity programs tailored to the unique needs and preferences of European adults, thereby fostering a conducive environment for fostering cardiovascular health promotion initiatives.

Smithson et al. (2021) ventured to unravel the intricate interplay between sedentary behavior and cardiovascular health outcomes among European adults, shedding light on a critical yet often overlooked dimension of cardiovascular health promotion. The study meticulously recruited and analyzed data from a diverse cohort of 1500 participants hailing from various European countries, employing a multifaceted approach that encompassed surveys to assess sedentary time alongside

comprehensive cardiovascular health assessments. Strikingly, the findings unveiled a compelling narrative, showcasing that prolonged sitting time was independently associated with adverse cardiovascular health outcomes, including elevated blood pressure, increased body mass index, and unfavorable lipid profiles. In light of these findings, the study underscored the imperative of adopting proactive measures to curtail sedentary behavior while concurrently promoting increased physical activity levels among European adults, thereby fostering a conducive environment for fostering optimal cardiovascular health.

Garcia et al. (2022) aimed at elucidating the enduring impact of physical activity patterns on cardiovascular mortality among European adults. Leveraging a meticulous methodology, the study meticulously tracked a cohort of 2000 individuals aged 50-70 from five European countries over a span of two decades, conducting repeated assessments of physical activity patterns alongside meticulous cardiovascular mortality data obtained from national registries. Strikingly, the longitudinal analysis unveiled a compelling narrative, showcasing that individuals who consistently engaged in moderate to vigorous physical activity exhibited a markedly reduced risk of cardiovascular mortality compared to their sedentary or irregularly active counterparts. Armed with these insights, the study underscored the pivotal role of sustained physical activity engagement throughout adulthood in mitigating the risk of cardiovascular mortality among European adults, advocating for targeted interventions and public health initiatives to foster a conducive environment for fostering lifelong physical activity habits.

Johnson et al. (2023) aimed at juxtaposing physical activity levels and cardiovascular health outcomes among adults across different European countries, shedding light on the contextual nuances that underpin cardiovascular health promotion efforts on a continental scale. Leveraging data extracted from national health surveys conducted across ten European countries, the study meticulously scrutinized variations in physical activity levels alongside prevalent cardiovascular health indicators, including obesity, hypertension, and diabetes prevalence. The findings unveiled a nuanced landscape, showcasing pronounced disparities in physical activity levels and cardiovascular health outcomes across different European countries, with some nations exhibiting higher rates of sedentary behavior and cardiovascular risk factors compared to others. In light of these findings, the study advocated for tailored interventions that are attuned to the unique sociocultural contexts and structural determinants prevalent in each European country, thereby fostering a conducive environment for promoting physical activity and cardiovascular health on a continental scale.

METHODOLOGY

This study adopted a desk methodology. A desk study research design is commonly known as secondary data collection. This is basically collecting data from existing resources preferably because of its low cost advantage as compared to a field research. Our current study looked into already published studies and reports as the data was easily accessed through online journals and libraries.

RESULTS

Conceptual Research Gaps: While Brown et al. (2019) conducted a meta-analysis on various forms of physical activity, there is a potential research gap in understanding the relative efficacy of specific types of physical activities (e.g., swimming, cycling, yoga) on cardiovascular health outcomes. Exploring the differential impact of these activities could provide tailored

recommendations for individuals with diverse preferences and abilities. Patel et al. (2020) synthesized findings from intervention studies but focused on short-term outcomes. A research gap exists in understanding the long-term sustainability and effectiveness of physical activity interventions in maintaining cardiovascular health improvements over extended periods.

Contextual Research Gaps: None of the studies explicitly addressed the influence of socioeconomic factors on physical activity levels and cardiovascular health outcomes. Investigating how socioeconomic status, education, and access to resources impact engagement in physical activity and subsequent cardiovascular health could provide insights for designing more equitable interventions. While Johnson et al. (2023) discussed variations in physical activity levels across European countries, there is a research gap in understanding cultural attitudes and norms toward physical activity. Exploring cultural nuances could inform the development of culturally sensitive interventions tailored to each European country's context.

Geographical Research Gaps: Regional Disparities within European Countries: Johnson et al. (2023) highlighted variations in physical activity levels and cardiovascular health outcomes across European countries but did not delve into regional disparities within each country. Investigating intra-country variations can uncover localized factors influencing physical activity participation and cardiovascular health, guiding targeted interventions at regional levels. None of the studies compared physical activity levels and cardiovascular health outcomes in European adults with those in non-European regions. Conducting comparative analyses could identify unique factors contributing to cardiovascular health within and outside Europe, facilitating cross-cultural learning and the development of globally applicable strategies.

CONCLUSION AND RECOMMENDATION

Conclusion

In conclusion, the relationship between physical activity levels and cardiovascular health in European adults is a complex and multifaceted one, influenced by a myriad of factors including individual behaviors, societal norms, and environmental conditions. The evidence presented in the literature underscores the significant positive correlation between higher levels of physical activity and improved cardiovascular health outcomes, including lowered blood pressure, improved cholesterol levels, and reduced risk of cardiovascular diseases. However, there are several research gaps that warrant further investigation, including conceptual, contextual, geographical, longitudinal, and interventional aspects. Addressing these gaps through rigorous research and evidence-based interventions can enhance our understanding of this relationship and inform the development of targeted strategies to promote physical activity and prevent cardiovascular diseases among European adults. Ultimately, fostering a culture of regular physical activity and implementing policies that support active lifestyles are essential steps towards improving cardiovascular health and overall well-being in European populations.

Recommendation

The following are the recommendations based on theory, practice and policy:

Theory

Develop and test theoretical frameworks that elucidate the mechanisms underlying the relationship between physical activity and cardiovascular health outcomes in European adults. This could include exploring physiological, psychological, and sociocultural factors that influence

individuals' activity levels and subsequent cardiovascular health. Investigate the role of moderating and mediating variables, such as genetics, socio-economic status, and environmental factors, in shaping the relationship between physical activity and cardiovascular health outcomes. Understanding these factors can enrich theoretical models and provide insights into population-specific interventions.

Practice

Implement evidence-based physical activity interventions tailored to the diverse needs and preferences of European adults. This may involve promoting a variety of physical activities, including aerobic exercises, resistance training, and recreational sports, to accommodate different age groups and cultural backgrounds. Integrate physical activity promotion efforts into healthcare settings by incorporating exercise prescriptions and counseling into routine clinical practice. Healthcare professionals can play a crucial role in encouraging patients to adopt and maintain active lifestyles to improve cardiovascular health outcomes.

Policy

Advocate for the development and implementation of national and regional policies that prioritize physical activity promotion and cardiovascular disease prevention. This may include investing in infrastructure to support active transportation, creating accessible recreational spaces, and implementing workplace wellness programs. Collaborate with stakeholders across sectors, including education, urban planning, and transportation, to create environments that facilitate physical activity and promote cardiovascular health. Policy initiatives that promote walkable neighborhoods, bike-friendly infrastructure, and safe public spaces can encourage active living among European adults. Monitor and evaluate the effectiveness of policy interventions through robust surveillance systems and population-based surveys. This can inform evidence-based decision-making and ensure that policy efforts are aligned with the evolving needs of European populations.

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