

Systematic review of the impact of physical activity on depression and anxiety symptoms

Revisión sistemática del impacto de la actividad física en los síntomas de depresión y ansiedad

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Abstract

According to estimates, depression will affect 340 million people globally by 2020, making it the major cause of disability and the second-largest contributor to the global burden of disease. It influences a person's thinking, actions, motivation, emotions, and well-being. Anhedonia is thought to be the primary symptom of depression, which refers to a loss of interest or pleasure in various activities that normally bring individuals happiness. Major depressive disorder and dysthymia are two mood disorders that can cause depression. This review aims to describe the scientific literature that has explored the influence and effect of physical activity on symptoms of depression. Using the electronic databases Scopus, Psycho-info, CINAHL, PubMed and ProQuest, Google Scholar and Research Gate, it was possible to locate publications on this topic using the following keywords: physical activity, physical effort, depression, depressive symptom and anxiety. We were able to identify 16,301 published articles, but of these we chose only 17 articles after applying their eligibility standards for our review. Physical activity has a significant role in reducing the symptoms of depression, anxiety, and stress, independent of the subject's age, gender, or medical condition, as demonstrated by the 17 studies included in this study. The majority of the interventions, which were performed on clinically healthy subjects, persons with medical issues, and pregnant women, involved aerobic and anaerobic exercise programs. Different ages, sexes, and living situations were present among the study individuals. In certain studies, exercise therapies have been used in addition to standard pharmaceutical depression treatment. The physical exercise programs ranged in length from 12 weeks to 6 months overall, with 2-3 sessions per week lasting between 30 and 90 minutes each.

Key words: sports, mental health, physical effort, physical activity, stress

Resumen

Según estimaciones, la depresión afectará a 340 millones de personas en todo el mundo para 2020, lo que la convierte en la principal causa de discapacidad y el segundo factor que más contribuye a la carga mundial de enfermedades. Influye en el pensamiento, las acciones, la motivación, las emociones y el bienestar de una persona. Se cree que la anhedonia es el síntoma principal de la depresión, que se refiere a la pérdida de interés o placer en diversas actividades que normalmente brindan felicidad a las personas. El trastorno depresivo mayor y la distimia son dos trastornos del estado de ánimo que pueden causar depresión. Esta revisión tiene como objetivo describir la literatura científica que ha explorado la influencia y el efecto de la actividad física sobre los síntomas de la depresión. Utilizando las bases de datos electrónicas Scopus, Psycho-info, CINAHL, PubMed y ProQuest, Google Scholar y Research Gate, fue posible localizar publicaciones sobre este tema utilizando las siguientes palabras clave: actividad física, esfuerzo físico, depresión, síntoma depresivo y ansiedad. Pudimos identificar 16.301 artículos publicados, pero de estos elegimos solo 17 artículos después de aplicar sus estándares de elegibilidad para nuestra revisión. La actividad física tiene un papel importante en la reducción de los síntomas de depresión, ansiedad y estrés, independientemente de la edad del sujeto, género o condición médica, como lo demuestran los 17 estudios incluidos en este estudio. La mayoría de las intervenciones, que se realizaron en sujetos clínicamente sanos, personas con problemas médicos y mujeres embarazadas, incluyeron programas de ejercicios aeróbicos y anaeróbicos. Diferentes edades, sexos y situaciones de vida estaban presentes entre los individuos del estudio. En ciertos estudios, las terapias de ejercicio se han utilizado además del tratamiento farmacéutico estándar para la depresión. Los programas de ejercicio físico variaron en duración de 12 semanas a 6 meses en general, con 2-3 sesiones por semana con una duración de entre 30 y 90 minutos cada una.

Palabras claves: deporte, salud mental, esfuerzo físico, actividad física, estrés

INTRODUCTION

Based on the notion that health reflects the physical, mental, and social integrity of the individual and the collectives, We chose to conduct this systematic review to determine the relationship between these components and the significance of their harmony.

Noticing that no studies have been conducted at the national level regarding the importance of correlating mental and physical health in approaches based on physical activity, I believed that such a review of the scientific literature could provide new insights into the mentality of future generations.

Since the beginning of the pandemic produced by the SARS-CoV-2 virus, depression and anxiety have left their imprint on the global population, regardless of age, the primary etiological element being a lack of structured or unorganized physical activity (Heitzman, 2020).

During pandemics and epidemics, there may be mental and social disorders that impair population activity. The anxiety of becoming ill exacerbates the disease. During pandemics, the population endures some worry and anxiety, and psychological illnesses become prevalent (Liu, 2020).

Prior research conducted during the initial phase of the coronavirus pandemic revealed that more than half of respondents assessed the psychological impact as moderate to severe, and around one-third expressed moderate to severe anxiety (Wang, 2020).

The COVID-19 pandemic has had terrible impacts on mental health. The virus resulted in social isolation, worry and suffering, the closure of schools put students, parents, and teachers under stress, the diagnosis took longer than expected, making it more challenging for affected

patients to continue receiving treatment, and health care staff burned out. In conclusion, unprecedented measures are being taken to assess the mental health of all citizens.

This review aims to describe the scientific literature that has explored the effect of physical activity on depressive, anxious, and stressful symptoms.

MATERIAL AND METHODS

Using the electronic databases Scopus, Psycho-info, CINAHL, PubMed and ProQuest, Google Scholar, and Research Gate, we identified publications on this issue using the following keywords: physical activity, physical exertion, depression, depressive symptom, anxiety, and stress. In the second phase, a combination of keywords was utilized to achieve the most accurate search results, and papers that examined the influence of physical exercise on the symptoms of depression, anxiety, and stress were selected.

Eligibility requirements

To be considered for inclusion in the review, scientific papers have to satisfy the following criteria:

- Articles that explored the effect of physical activity on depressive, anxious, and stressful symptoms.
- Articles accessible in a complete text.
- Only published/accessible abstracts for published articles.

Excluded articles from the review:

- Articles devoid of investigative specifics.
- Articles that are either systematic reviews or meta-analyses.
- Content older than 2009.

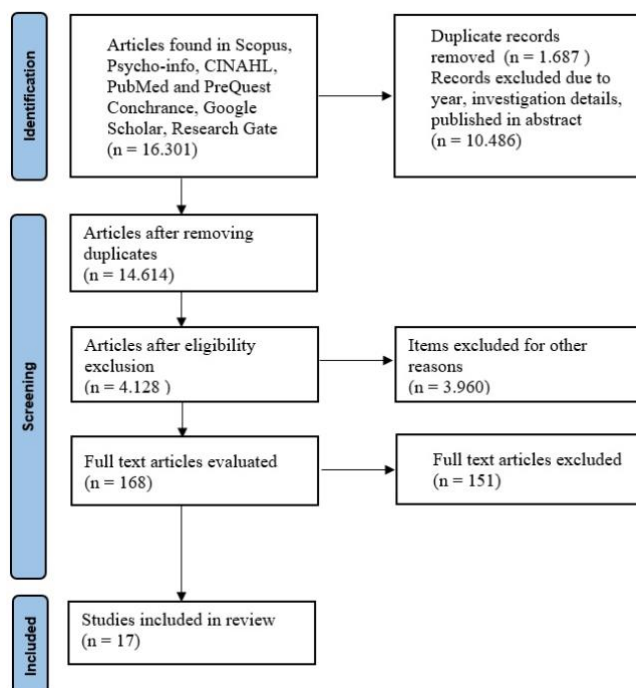


Figure 1. Prisma flow chart (www.prisma.org)

We used the Prisma protocol to be able to eliminate articles that could not be included in this systematic review. Since from all the databases used we were able to find 16,301 articles, after eliminating duplicate articles (1,687), articles that did not fit in terms of the year of publication, those published in abstract and excluded for other reasons, we remained and we evaluated 168 articles from which we excluded some, we was left with a number of 17 articles that we included in this study.

RESULTS

According to the diagram displayed above (Figure 1), a total of 16,301 items were recognized. It can be shown that, due to the pandemic situation in recent years, there are approximately 150 more papers published annually on this topic.

We chose 17 articles (Table 1) that satisfied the inclusion and exclusion requirements. The results indicate that physical activity is a significant influence in reducing the symptoms of depression, anxiety, and stress, regardless of the subject's age, sex, or medical condition.

Table 1. Included Studies in the Review

Article (first author name, year)	Hypothesis / purpose	Material and method	Results
Karmel W Choi, 2019	Assessing bidirectional relationships between physical activity and depression in adults: a 2-sample Mendelian randomization study	This 2-sample Mendelian randomization (MR) used top independent genetic variants associated with 2 self-reported and objective accelerometer-based physical activity phenotypes and with major depressive disorder as genetic instruments from the largest genome-wide association studies available .	Mendelian randomization evidence suggested a protective relationship between accelerometer-based activity and MDD. In contrast, there was no statistically significant relationship between MDD and accelerometer-based activity. Furthermore, there was no significant relationship between self-reported activity and MDD, or between MDD activity and self-reported activity (Katmel, 2019).
Paul WM Marshall, 2017	Physical activity and the mediating effect of fear, depression, anxiety, and catastrophizing on pain-related disability in people with chronic low back pain.	Cross-sectional study on 218 people with chronic low back pain. Multiple mediation analyzes were conducted to determine the role of depression and anxiety in the relationship between pain and disability. Separate analyzes were conducted with physical activity as moderator.	Fear, catastrophizing, and depression significantly mediated the relationship between pain and disability (Marshall, 2017).
Lucineide da Silva Santos Castelo Branco de Oliveira, 2019	Effects of physical activity on anxiety, depression, and quality of life in community-dwelling older adults.	Cross-sectional study of 200 elderly people of both sexes. Subjects divided into two groups. Instruments used: Baecke questionnaire, SF-36, HADS.	The active group showed higher physical activity and quality of life scores. In contrast, the sedentary group revealed higher anxiety and depression scores (de Oliveira, 2019).
Haewon Byeon, 2019	The relationship between physical activity level and depression in elderly people living alone.	Research subjects 256 elderly people living alone. Method for determining depression questionnaire PHQ-9.	Flexibility exercise was significantly related to depression, and on the other hand, average hours in a sitting position per day, aerobic physical activity, walking, and muscle strength exercises were not significantly related to geriatric depression (Byeon, 2019).
Haritz Arrieta, 2018	Physical activity and fitness are associated with verbal memory, quality of life and depression among nursing home residents: preliminary data from a randomized controlled trial.	The study participants were 114 patients with an average age of 85 years from 10 nursing homes. Assessment methods: Rey Auditory-Verbal Learning Test, Quality of Life Scale-Alzheimer's Disease (QoL-AD) and Goldberg Depression Scale.	The need to implement interventions aimed at increasing the strength and physical activity of people living in asylums to promote physical, cognitive and emotional benefits (Arrieta, 2018).
Sun-Young Kim, 2019	This study aims to identify the optimal amount and appropriate state of physical activity for reducing incident depressive symptoms.	Data from 107,901 Korean adults who underwent at least two annual health examinations from 2012 to 2015 were analyzed. Assessment methods: MET Questionnaire, Center for Epidemiological Studies Depression Rating Scale.	Lower risk of incident depressive symptoms. A better outcome in the occurrence of depressive symptoms was greater in men than women (Kim, 2019).
Aaron P Turner, 2019	Behavioral activation as a mechanism mediating the effects of physical activity intervention on the improvement of depressive symptoms in people with MS.	Analysis of mediational pathways using data from a randomized controlled trial comparing physical activity telephone counseling with education.	Improvements in behavioral activation were associated with fewer adjusted depressive symptoms at baseline. Behavioral activation may represent a mechanism by which physical activity improves depression in MS (Turner, 2019).

Kaisa Kaseva, 2019	The contribution of physical activity in depressive symptoms.	The eligible population consisted of adults. Depressive symptoms were measured using the modified Beck Depression Inventory.	Physical activity was associated with lower levels of sleep problems and depressive symptoms. The association between physical activity and depressive symptoms was partially mediated by sleep problems (Kaseva, 2019).
Karmel W Choi, 2020	Physical activity offsets genetic risk for depression.	Individuals with incident episodes of depression based on two or more diagnostic billing codes for a depressive disorder within 2 years were included in the study.	Polygenic risk was associated with increased odds of incident depression, and physical activity showed a protective effect of similar magnitude (Choi, 2020).
Samuel L Battalio, 2020	Assessing longitudinal associations between self-reported physical activity and anxiety and depression symptom severity in adults with long-term physical disabilities.	Community-dwelling US adults with 1 in 4 long-term physical disabilities (multiple sclerosis, muscular dystrophy, spinal cord injury, post-polio syndrome). Research methods, the Godin Questionnaire and short forms assessing the severity of depression and anxiety.	Physical activity is longitudinally associated with anxious and depressive symptoms in adults with long-term physical disabilities (Battalio, 2020).
Kathrin Haßdenteufel, 2020	Physical activity can reduce pregnancy-related complications and contribute substantially to improving the mother's mental health.	Longitudinal study conducted in two maternity hospitals in Germany, on 597 women. Depression and anxiety symptoms measured with the EPDS, PRAQ and STAI, and physical activity with the PPAQ.	Women who reported a greater decline in physical activity during pregnancy had significantly higher depression and anxiety scores (Haßdenteufel, 2020).
Charlotte M McKercher, 2009	Research suggests that physical activity is associated with a lower prevalence of depression.	Analyzes included data from young adults since 1995. Physical activity was measured by self-report (International Physical Activity Questionnaire). Depression was assessed using the International Composite Diagnostic Interview.	The context in which physical activity is assessed and the measurement methods used are important considerations when investigating associations between physical activity and depression (McKercher, 2009).
Marisa Touns, 2017	Exercise is an effective treatment for positive valence symptoms in major depression.	Subjects completed the self-reported SHAPE and MEI during 12 weeks. Global severity of MDD measured with the Quick Inventory of Depression Symptom (QIDS).	SHAPE and MEI scores improved significantly with exercise. MEI also showed significant moderator and mediator effects of exercise in MDD (Touns, 2017).
Charlotte McKercher, 2013	This study explored whether young adults with major depression who are physically active differ in their depression symptom profile from those who are physically inactive.	The analyzes included data from 950 men and 1045 women who participated in a national study. Participants reported recreational physical activity and ambulatory activity. Diagnosis was assessed using the International Composite Diagnostic Interview.	Interactions between physical activity and gender were observed for depressed mood. Among those with major depression, physically active men were significantly less likely to endorse the presence of insomnia, fatigue, and suicidality compared to inactive men. Physically active women were significantly less likely to endorse hypersomnia, excessive/irrational guilt, wandering thoughts, and suicidality compared to inactive women (McKercher, 2013).
Li Ma, 2020	The aim of this study was to explore how leisure-time physical activity was associated with depressive symptoms among adolescents in Sweden.	The full sample used for analysis consisted of 3787 adolescents (including 1855 boys and 1932 girls).	Adolescents who participated in physical activities in their free time daily, weekly, or monthly were substantially less likely to feel frequently depressed than those who were physically inactive (Ma, 2020).
Jesús López-Torres Hidalgo, 2021	Efficacy of exercise versus treatment with commonly used antidepressants in clinical practice in reducing depressive symptomatology in patients aged ≥65 years who meet clinical criteria for a depressive episode.	A total of 347 patients aged ≥65 years with a clinically significant depressive episode were randomized to participate in a supervised exercise program or to receive antidepressant treatment by their general practitioners.	Improvement was initially similar in both treatment groups, AT was superior in the medium term, despite giving rise to a greater number of adverse effects (Hidalgo, 2021).
Wioletta Dziubek, 2016	Evaluation of the effects of a six-month physical training exercise undertaken by hemodialysis patients on depression and anxiety.	Patients with end-stage renal disease. Physical training three times a week for 6 months. BDI and STAI questionnaire for assessment.	Physical training during dialysis by ESRD patients is beneficial in reducing their anxiety and depression levels (Dziubek, 2016).

The majority of the interventions, which were performed on clinically healthy subjects, persons with medical issues, and pregnant women, involved aerobic and anaerobic exercise programs.

Different ages, sexes, and living situations were present among the study individuals. In certain studies, exercise therapies have been used in addition to standard pharmaceutical depression treatment.

The physical exercise programs ranged in overall length from 12 weeks to 6 months. The physical exercise programs ranged in length from 12 weeks to 6 months overall, with 2-3 sessions per week lasting between 30 and 90 minutes each.

Both active and passive control conditions—including placebos, relaxation training, stretches, routine treatment (drug therapy), cooperative group activities with other participants, and occupational therapy—were recorded.

None of the studies that were reviewed evaluated or provided information on the negative effects of exercise programs (eg, pain, soreness, fatigue, or injury).

DISCUSSION

These studies demonstrate that there is a close relationship between physical activity and the reduction of symptoms of depression, anxiety, and stress. They also demonstrate that endorphins, also known as the "happiness hormone," are produced through physical activity and give the subject, regardless of age, gender, or social status, a sense of well-being.

Studies are conducted on samples ranging from hundreds to millions of people, thus the intimate relationship between the physical and mental is essential for a calm and healthy life on all levels.

The results of the investigations indicated that the group sessions reduced the depression symptoms of the participants.

People who consistently engage in physical activity engage in more positive leisure activities and receive more social support, resulting in improved psychological well-being, which in turn decreases depression. Continued physical activity promotes social support, including the development of friendships, the sharing of emotional support, and the discussion of personal issues. Physical activity can ultimately alleviate depression in daily life and have a favorable effect on mental health.

Physical activity enhances social integration in the setting of society. Moreover, it increases life satisfaction and decreases loneliness.

According to the findings of the studies, physical activity was connected with fewer sleep issues and depressive symptoms.

Finally, we recommend that family members encourage individuals of all ages to engage in physical activity and to participate in activities given by social centers, schools, associations, and sports clubs. These straightforward procedures may contribute to the emotional wellness of loved ones.

CONCLUSIONS

The study demonstrates that physical activity has a significant effect on depressive symptoms. Consistently producing endorphins through physical activity is a crucial component in postponing the development of symptoms.

On the subjects of the studies, intervention with a well-established physical exercise program reduces the incidence of symptoms of depression, anxiety, and stress.

It also demonstrates that physical activity has an effect regardless of the reason for the symptoms, whether they were from failure, the loss of a loved one, or the diagnosis of a medical problem or disease.

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