

PHYSICAL ACTIVITY LEVEL IN PEOPLE WITH DOWN SYNDROME: A SYSTEMATIC REVIEW

Nível de atividade física em pessoas com síndrome de down: uma revisão sistemática

El nivel de la actividad física en personas con Síndrome de Down: una revisión sistemática

Review Article

ABSTRACT

Objective: To investigate the physical activity levels in individuals with Down Syndrome, through a systematic review. **Methods:** The search was performed in MEDLINE/PubMed, LILACS, and SciELO databases, following the adopted inclusion and exclusion criteria. **Results:** Five studies were selected for the study, with a sample of 344 participants aged 8-70 years. Among the findings, the studies presented varied physical activity practice and levels, according to each age group. In general, individuals with Down Syndrome present particularly low levels of physical activity and sharp decline with age. **Conclusion:** The individuals with Down Syndrome perform low level of physical activity, with lower rates than the recommendations for an active life. Moreover, it was found that, as age advances, the physical activity level decreases. There was a small number of researches addressing this issue. Thus, further studies should be conducted with the aim of assessing the level of physical activity in this population.

Descriptors: Down Syndrome; Intellectual Disability; Physical Activity.

RESUMO

Objetivo: Investigar os níveis de atividade física em indivíduos com Síndrome de Down por meio de uma revisão sistemática. **Métodos:** A busca foi realizada nas bases de dados MEDLINE/PubMed, LILACS e SciELO, seguindo os critérios de elegibilidade e exclusão adotados. **Resultados:** Cinco estudos foram selecionados para a pesquisa, apresentando uma amostragem de 344 participantes de 3 a 70 anos de idade. Dentre os resultados encontrados, os estudos apresentaram uma variação dos níveis e prática de atividade física de acordo com cada faixa etária. De forma geral, os indivíduos com Síndrome de Down apresentam níveis particularmente baixos de atividade física e declínio acentuado com a idade. **Conclusão:** Os indivíduos com Síndrome de Down possuem baixo nível de atividade física, com índices inferiores às recomendações para uma vida ativa. Além disso, constatou-se que à medida que a idade avança, o nível de atividade física diminui. Verificou-se um baixo número de pesquisas com essa temática; dessa forma, recomenda-se que novos estudos sejam conduzidos, com o intuito de avaliar o nível de atividade física nesta população específica.

Descritores: Síndrome de Down; Deficiência Intelectual; Atividade Física.

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RESUMEN

Objetivo: Investigar los niveles de la actividad física en individuos con Síndrome de Down a través de una revisión sistemática. **Métodos:** La búsqueda fue realizada en las bases de datos Medline/PubMed, Lilacs y Scielo según los criterios de elegibilidad y exclusión aprobados. **Resultados:** Cinco estudios fueron elegidos para la investigación con una muestra de 344 participantes entre 3 y 70 años de edad. De los resultados encontrados los estudios presentaron variación en los niveles y la práctica de actividad física según la franja de edad. En general, los individuos con el Síndrome de Down presentan niveles bajos de actividad física y disminución acentuada con la edad. **Conclusión:** Los individuos con el Síndrome de Down tienen bajo nivel de actividad física con índices abajo de las recomendaciones para una vida activa. Además, se constató que al paso que la edad avanza disminuye el nivel de actividad física. Se verificó un bajo número de investigaciones sobre este tema; por lo tanto, recomendase nuevos estudios con el objetivo de evaluar el nivel de actividad física de esta población específica.

Descriptor: Síndrome de Down; Discapacidad Intelectual; Actividad Motora.

INTRODUCTION

Down syndrome, or trisomy 21, is a genetic disorder caused by an error in cell division during embryonic stage. Individuals with this syndrome have three copies of chromosome 21 rather than two, resulting in overexpression of the gene. It is a congenital anomaly and is the most common genetic cause of intellectual disability⁽¹⁻³⁾.

The health status of adults with intellectual disabilities is alarming, with high rates of morbidity and mortality⁽⁴⁾. In the case of individuals with Down Syndrome, the risk of developing health problems is higher when compared to other groups with intellectual disabilities⁽⁵⁾; therefore, they are an important group in need of health-related research⁽⁶⁾.

People with Down Syndrome are more likely to present respiratory disorders, osteoporosis, musculoskeletal problems, some types of cancer, cardiovascular diseases, diabetes, obesity, and sedentary lifestyle, contributing independently to the development of these diseases⁽⁷⁻⁹⁾. Noteworthy is that obesity is quite evident, since the prevalence of overweight or obese people in this population is 32% higher than in individuals without disabilities. This prevalence is also identified in individuals with intellectual disability, with rates that can reach 59% of obese individuals^(10,11).

The protective effect of physical activity on disease process is well established in the literature^(12,13) and

includes improved general health status, chronic disease prevention, increased self-esteem, and promotion of social interaction^(14,15). In this context, although some health problems are more evident in people with Down Syndrome and intellectual disabilities, it is believed that many of these problems could be prevented through education and promotion of a healthy lifestyle^(14,6). For these reasons, there is a need to establish specific patterns of physical activity for people with Down Syndrome and intellectual disability due to the positive effects on the physical and mental well-being and the improvement in the quality of life of this population.

Within this context, a study⁽¹⁶⁾ showed that the participation in physical activity or exercise training programs was related to significant improvements in cardiovascular system, muscular strength, balance, reduction of insulin resistance and abdominal obesity in people with Down Syndrome. However, it is important to highlight that the lack of such programs, restrictions on sports facilities, and difficulties in transportation and accessibility have been cited as barriers to physical activity⁽¹⁶⁾. It is noteworthy that in this particular group there is a loss of functional capacity due to a low level of physical fitness, which can affect performance in a variety of everyday tasks, including the performance at work^(17,18).

Studies show that the literature is limited and there is a lack of research on physical activity, people with Down Syndrome and other disabilities^(19,20). Given the benefits of an active lifestyle in this population, this study aimed to investigate the levels of physical activity in individuals with Down Syndrome through a systematic review.

METHODS

A systematic literature review was conducted covering the period from 1969 to 2013. We chose this period due to lack of studies found in a shorter period of time that was previously stipulated. Thus, we decided to search all articles found in the databases used. The following online databases were searched using the same descriptors: MEDLINE/PubMed (Medical Literature Analysis and Retrieval System), SciELO (Scientific Electronic Library Online), and LILACS (Latin American and Caribbean Health Sciences).

We used the MeSH (Medical Subject Heading Terms) dictionary to define the English descriptors to be used in the search. Down Syndrome (MeSH), Mongolism (Entry Term) and Trisomy 21 (Entry Term) were chosen for combination with the terms Motor Activity (MeSH), Physical Activity (Entry Term) Locomotor Activity (Entry Term) and Sedentary Lifestyle (MeSH), resulting in a total

of twelve two-term combinations by using the operator “and” to combine the descriptors. In Portuguese, we used the structured vocabulary *DeCS – Descritores em Ciências da Saúde* (Health Sciences Descriptors) to increase the scope of the search in addition to the descriptors Trisomy of chromosome 21, Sedentary Lifestyle and Health of Down Syndrome, both in Portuguese and English. We used the operator “and” for the combination of descriptors, resulting in 24 two-term combinations.

The main researcher of the study carried out the search in electronic databases, the selection of studies, the reading of articles and the compilation of information. The whole procedure was replicated by a second researcher blindly and independently, and no differences regarding the final selection of articles were identified.

The following eligibility criteria were adopted in this review: (1) the sample should be comprised of individuals diagnosed with Down Syndrome, with or without intellectual disabilities; (2) the study should have as one of its objectives the measurement of the level of physical activity; and (3) be original research conducted with human beings. We chose not to include review articles, monographs, dissertations, theses, abstracts, chapters or books, and point of view/opinion of experts due to the difficulty in conducting a systematic search for these types of work.

Based on the search and selection criteria, we identified 657 articles. Of these, 592 were excluded after the analysis of the title. A total of 65 articles were selected for reading of abstracts; and then 29 were selected for full-text reading. After the reading of the full texts, five articles met the inclusion criteria and were selected for this review. The whole selection process is described in Figure 1.

RESULTS

We identified 657 studies, 29 of which were selected for full-text reading; of these, only five met the eligibility criteria. The main reasons for the exclusion of articles were as follows: they did not present physical activity interventions; were systematic or literature review; included only individuals with intellectual disabilities or autism; investigated only barriers to physical activity; addressed strength and performance in everyday tasks; or did not specifically address physical activity, but aspects of health conditions.

Among the studies included, the most commonly used method to assess physical activity was the accelerometer, followed by the pedometer and questionnaire. The studies included children, adolescents, adults and older adults with Down Syndrome, regardless of gender, and a study with a diagnosis of Down Syndrome with intellectual disabilities.

Among the studies, two were conducted in Brazil, two in the United States, and one in England.

In two studies^(8,21) the authors stated that the physical activity levels, according to the age of the sample studied, are below those recommended by the World Health Organization (WHO)⁽²²⁾. However, two other studies found satisfactory levels of physical activity^(2,23).

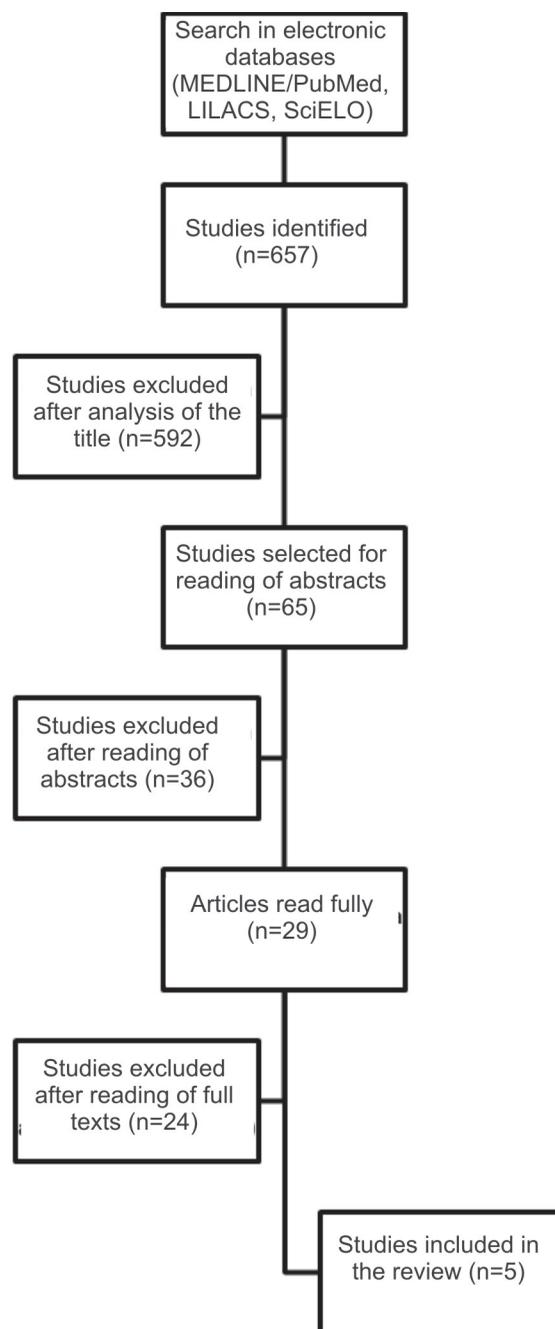


Figure 1 - Study selection and review process. Florianópolis, SC, 2014.

Chart I – Synthesis of the studies selected in the review. Florianópolis-SC, 2014.

Authors (year)	Age group	Diagnosis	n	Instruments	Language	Investigated variables	Main results
Marques; Nahas ⁽²⁴⁾ (2003)	>40	Down Syndrome Intellectual Disability	30	Interview and Pedometer	Portuguese	Physical Activity Anthropometry Sociodemographics Lifestyle Activities of daily living	56% of the participants do oriented physical activity in the institutions (nearly all are linked to APAE) Participants with Down Syndrome presented lower levels of physical activity than participants with intellectual disability without Down Syndrome
Whitt-Glover <i>et al.</i> ⁽²⁾ (2006)	3 a 10	Down Syndrome	28	Speedometer	English	Physical activity Weight Status	Participants with Down Syndrome presented an average of 5,541 steps/day. This rate is low when compared to individuals with intellectual disability (7,301 steps/day)
Phillips; Holland ⁽⁸⁾ (2011)	12 a 70	Down Syndrome Intellectual Disability	152	Speedometer	English	Physical activity Sociodemographics	Only 20.6% of the sample met the recommendations for physical activity
Esposito <i>et al.</i> ⁽²¹⁾ (2012)	8 a 16	Down Syndrome	104	Speedometer	English	Physical activity	86% of men and 90.9% of women did some physical activity. As to the regular practice of any sports, the rate decreases to 76.5% among men and 72.8% among women
Kalinoski <i>et al.</i> ⁽²³⁾ (2012)	>18	Down Syndrome	30	Questionnaire	Portuguese	Physical activity Lifestyle Anthropometry	

The high frequency of participation in physical activity referred to the physical activity performed in special institutions – nearly all of them are linked to the Association of Parents and Friends of the Exceptional Children (*Associação de Pais e Amigos dos Excepcionais – APAE*) – through physical education classes. However, when the level of physical activity was assessed in the leisure time, the sample studied was classified as presenting low levels of physical activity⁽²⁴⁾. Other characteristics of the selected studies are shown in Chart I.

DISCUSSION

The main findings indicated that, in general, individuals with Down Syndrome have low levels of physical activity. It is known that an active lifestyle is beneficial for everyone, including this population. Benefits include improved health, prevention of chronic diseases, increased self-esteem, and promotion of social interaction^(14-16,25).

Two studies^(2,23) in this review found a satisfactory participation in physical activity. The first study⁽²⁾ compared the level of physical activity in children with Down Syndrome and their siblings without this genetic disorder. Children with Down Syndrome were younger and their body mass index (BMI) was higher than their siblings'. It also found adequate mild and moderate levels of physical activity in both groups; however, children with Down Syndrome participated less in vigorous-intensity activities. The study found that participation in vigorous-intensity activities in childhood may be appropriate for obesity prevention and promotion of health throughout life.

In the second study⁽²³⁾, the pattern of physical activity in the population studied presented satisfactory levels (81.6% of men and 90.9% of women practiced some physical activity). Another study⁽²⁴⁾ found that 56.3% of the individuals did oriented physical activity in the institution and 26.6% did not do any physical activity. However, both studies^(23,24) highlighted – as a justification and limitation – the fact that the study sample participated in extension projects and was enrolled in school, which increases the opportunities for physical activity.

Noteworthy is a research⁽²⁴⁾ to analyze the level of physical activity by directly recording the number of steps using a pedometer, which found a total average of 4,018 steps/day – individuals were classified as less active (less than 5,000 steps/day). The low participation in regular physical activity is a concern in this population. Being physically active can lead to several health benefits; additionally, most activities also bring social benefits, such as meeting with friends and having fun^(26,30).

A study published in 2012⁽²¹⁾ showed that individuals with Down Syndrome spent most of the day in sedentary activities, and only 20.6% of the sample met the physical activity recommendations. Another study carried out in 2011⁽⁸⁾ also found that the individuals did not meet health recommendations. According to WHO⁽²²⁾, children and young individuals should accumulate at least 60 minutes of moderate to vigorous physical activity every day of the week. For adults aged 18-64 years, the recommendation is to accumulate at least 150 minutes of physical activity of moderate-intensity or 75 minutes of vigorous-intensity physical activity during the week.

These results are consistent with the literature, which shows low levels of physical fitness in individuals with Down Syndrome and a high prevalence of obesity in children, adolescents and adults, which may be related to sedentary lifestyle⁽²⁶⁻³⁰⁾.

Regarding physical activity patterns, three studies found a decrease in physical activity with increasing age, suggesting that the older the age, the lower the level of physical activity^(8,21,24). One possible explanation for this decrease may be related to intermittent activities during childhood. As children get older, these informal activities diminish and are replaced by more structured activities⁽²¹⁾. For individuals with Down Syndrome, the lack of structured activities has been a reason for the non-participation in physical activity⁽¹⁶⁾.

Among the articles included in this study, most of them used direct measurements to establish the level of physical activity. No research using a longitudinal design was selected. The difficulty in conducting research using this methodology – particularly in special populations – is well known.

These data are consolidated by the lack of parental incentives to understand the benefits and keep these individuals in physical activity programs. Therefore, it is known that the attitudes of parents influence the behavior and lifestyle development of their children.

In order to increase participation in more active activities, the development of public policies to promote the health and well-being of this population in all age groups is suggested. Health care professionals, educators, families and individuals who work directly with this population are crucial in this process and should encourage maximum participation in physical activity programs

CONCLUSION

Individuals with Down Syndrome have low levels of physical activity, which stand below the levels recommended for an active life. In addition, it was found that the level of

physical activity decreases with advancing age. There was a small number of studies on this issue. Therefore, there is a need for further studies to be conducted in order to assess the level of physical activity in this specific population.

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