



## Physical exercise, issues and impacts in the *Academia da Cidade* Program: a systematic review

*Exercícios físicos, barreiras e influencias no Programa Academia da Cidade: uma revisão sistemática*

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### ABSTRACT

Chronic diseases and the lack of physical exercises affect the public health. Recife implemented the “Academia da Cidade” program as a health care strategy. However, Recife is among the five capitals which shows the highest percentage of lack of physical exercise. To systematically review, the issues and impact of physical exercise in the “Academia da Cidade” program and its influence on aspects of public health in Recife/PE. The articles were searched in the databases Pubmed, Scielo and Bireme (Medline) by two researchers and 28 studies were found. Six articles were selected after reliability analysis and inclusion and exclusion criteria. It was observed that the “Academia da Cidade” Program in Recife helps on aspects of public health providing positive impacts on the quality of life. However, some issues were observed, such as lack of security, promotion of the program and equipment.

Keywords: Physical activity. Exercise. Public health.

### RESUMO

As doenças crônicas e a prática insuficiente de exercícios físicos afetam a saúde pública. Recife implementou o programa academia da cidade como uma estratégia de promoção de saúde. Contudo, está entre as cinco capitais com maior percentual de inatividade física. Revisar sistematicamente as barreiras e as influências da prática de exercício físico no programa Academias da Cidade e o seu reflexo em aspectos da saúde pública em Recife/PE. As buscas dos artigos foram realizadas por dois pesquisadores, nas bases de dados Pubmed, Scielo e Bireme (Medline). Foram encontrados 28 estudos. Após critérios de inclusão e exclusão, e análise de confiabilidade, foram selecionados seis artigos. Verificou-se que o Programa Academia da Cidade de Recife auxilia em aspectos da saúde pública proporcionando impactos positivos na qualidade de vida dos participantes. Contudo, algumas barreiras foram observadas, como falta de segurança, divulgação do programa e de equipamentos.

Palavras-Chave: Atividade física. Exercício físico. Saúde pública.

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## INTRODUCTION

Chronic Non-Communicable Diseases (CNCDs) are one of the greatest problems in public health nowadays. They are responsible for 71% of 41 million deaths per year in the world (1). In Brazil, as well as in other countries, CNCDs represent a public health issue of great seriousness. They are responsible for 72,7% of death causes, and the ones that stand out are diseases of the circulatory system (30,4% of the deaths), neoplasia (16,4%), diabetes (5,3%) and respiratory illnesses (6,0%)<sup>2</sup>.

Physical exercising is strongly recommended in order to reduce a series of chronic degenerative problems. However, physical inactivity has been growing, and it is considered a public health aspect that has been negatively affecting different parts of the world<sup>3</sup>. In Brazil, around 46% of adults do not spend the minimum weekly time recommended by the World Health Organization (150 minutes)<sup>4</sup> on physical activities. In parallel, the unfavorable scenario of low or insufficient practice of physical exercises by the population has motivated international and national organizations to include physical activity into the public health world's agenda.

For that reason, in Brazil, the National Health Promotion Policy (NHPP) comprises the promotion of physical activities in the national agenda through the Decree No 2.608, of 28 December, 2005<sup>5</sup>. The resources were provided by the Financial Ceiling of Health Surveillance (FCHS) to all states as investments in local projects to motivate physical activity<sup>6</sup>.

In that context, a state capital that stands out is Recife, which, even before the aforementioned decree, created and implemented a program named PAC – *Programa Academia da Cidade* (Gym City Program), instituted by the City Decree No 19.808, of 3 April, 2003. It became a Municipal Health Promotion Policy through Decree No. 122/2006, of September 28, 2006. The program is a strategy to promote health with emphasis on stimulating citizens to do regular physical activities and have healthy eating habits, also focusing on the restoration or creation of public spa-

ces for interaction and leisure. The so-called centers offer structures that favor physical activities such as gymnastic, dance, walking, running, sports, games, besides lectures, workshops, meetings and nutritional counseling, exercise prescription and physical assessment services<sup>6</sup>.

In 2008, Recife had 20 centers of the program. Currently, the number is 33, 9 of them built in joint action by the city of Recife and the state government. It is an initiative that aims to restore green areas, thus potentializing the use of public spaces, promoting sports practice and contributing to a better quality of life of the population. The program counts on 100 Physical Education professionals working at the program centers, which are requalified public spaces distributed among the eight Sanitary Districts of the city<sup>7</sup>.

Yet, according to Vigitel<sup>8</sup>, Recife is among the five capitals with the highest percentage of physical inactivity in Brazil. Therefore, its population has more chances of developing and/or worsening morbidities and CNCDs, such as overweight, obesity, diabetes and hypertension.

It is known that public health practices aim to reduce the prevalence of chronic non-communicable degenerative diseases, precocious death and incapacities caused by illnesses, and physical exercising is an important aspect in terms of public health<sup>7</sup>. Thus, public programs that stimulate physical exercising and a healthier life style, specifically focused on the prevention and control of diseases and morbidities, besides the promotion of mental and physical health, appear to be of great value for society as a whole<sup>8</sup>. Additionally, there are no systematic reviews summarizing information about the program in the city of Recife.

Based on these assumptions, the aim of this study was verifying, through a systematic review, the barriers and the positive influences to physical exercising within the *Academia da Cidade* program, and its effects on public health aspects in Recife, state of Pernambuco, Brazil. The hypothesis is that, despite the barriers, the program has a positive influence on health aspects among the population that take part in it.

## METHODOLOGY

### DETERMINATION OF DATABASES AND KEYWORDS

The systematic literature review was carried out based on bibliographic research on studies that analyzed programs that offer physical activities at program centers taking into account the general factors of public health related to overweight, obesity, hypertension and diabetes. The searches for scientific articles were done simultaneously by two independent researchers in 2019 (May). In order to find recent studies, the period covered by the searches was 2009 to 2019, on the following electronic bases: Pubmed, Scielo and Bireme (Medline).

Regarding the clinical matter based on evidences, we have PICB: P – Participants in the physical exercises project; I – Interventions of the *Academia da Cidade* program; C – Comparisons of the results of the projects in Recife; B – Barriers and effects on health.

The selection of descriptors used in the review process was carried out based on previous studies. For articles search we used the following terms “Academia da Cidade” (City Gym), “Programa comunitário” (community program) in combination with Recife, using AND, all introduced in the aforementioned databased. As for references organization, they were tabulated in an Excel 2013 spreadsheet.

### SEARCH PLAN STAGES

The search plan was divided into three stages. At the first one, we identified 28 potentially electable publications for the review. When checking the Cronbach’s alpha intraclass correlation coefficient in the statistical program SPSS 10.0 to determine the internal consistency between the searches of the two independent researchers, the value of 0.951 (ICC 95% 0,918 – 0,999) with  $p \leq 0,05$  was presented. Therefore, there was great agreement between the researchers’ results. Still at this stage, the “available articles” and “human” year filters were used to converge into studies closer to the proposed theme, which resulted in 24 studies.

At the second stage, two researchers read the titles and abstracts in order to verify the papers’ ade-

quacy to the proposal of the review. When necessary, the results and conclusions of the studies were also read. In addition, the researchers applied the inclusion criteria established for selecting the articles. The studies were included taking into account the following criteria: a) the sample was a frequent population in the *Academia da Saúde* Program, in Recife; b) the articles were original; and c) they were related to aspects of the *Academia da Cidade* Program and its impact on the population > 18 years. After analyzing the studies, eight publications were selected, since they fit the inclusion criteria. Then, they started being analyzed at the following stage, and, again, agreement between the researchers was considered high (Cronbach’s alpha = 1,000;  $p \leq 0,05$ ).

At the third and last stage, the exclusion criteria established in accordance with the proposed aim were applied. Two independent researchers read the entire articles, and those excluded were: a) literature, bibliographic, systematic reviews or meta-analysis; b) duplicate articles; and c) studies about the program, but which did not establish its relation with public health, bad habits and chronic non-communicable diseases (physical inactivity, overweight, obesity, diabetes and hypertension). In addition, an analysis of the reliability of the studies was carried out with the critical review form<sup>9</sup>.

Such instrument aims to classify studies regarding their quality. It originally has 15 aspects. However, the fourth aspect results in no score, for it only distinguishes the type of study. For that reason, it was excluded from the analysis, and the fifth aspect became the fourth one, and so on. Thus, there is a total of 14 aspects in the table that follows. We defined a quality cutoff point of 10 points. That way, the article that did not score in at least 10 aspects would be excluded from the review. The aspects with a score were marked with an “x”, whereas the ones that did not score were left blank. At this stage, agreement between the researchers was also considered high (Cronbach’s alpha = 0,988 (ICC 95% 0,548 – 1,000;  $p \leq 0,05$ ).

For better understanding of the results in Figure 1, we present the stages and the number of studies during all the pre-established stages and, at last, a topic about the reliability analysis of the studies (Table 1).

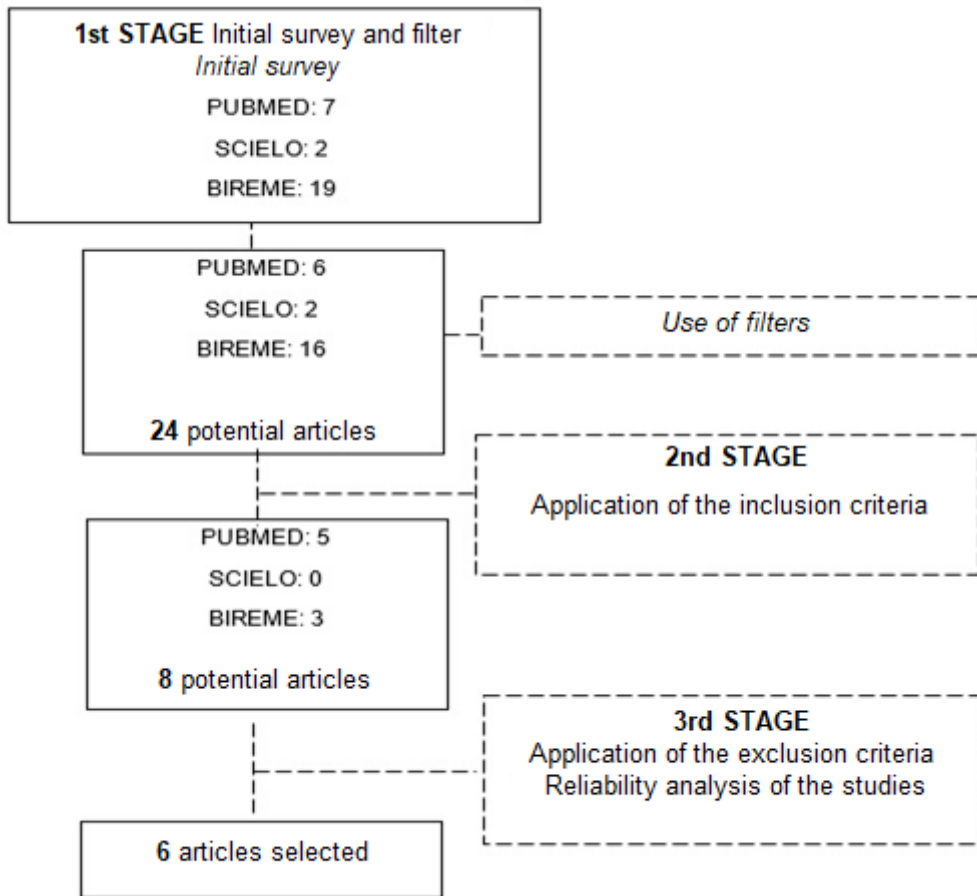


Figure 1. Flowchart of the systematic review stages.

**RESULTS**

At the end of the final stage, six publications remained to compose the discussion of this review study. As an additional analysis to the last stage, all the references of the selected studies were thoroughly examined in order to verify the inclusion potential of such publications into the study. Yet, no other poten-

tial studies were found, as it can be seen in the flowchart presented in Figure 1.

**RELIABILITY ANALYSIS OF THE SELECTED STUDIES**

Table 1 shows the score of the studies selected through the *critical review form*.

**Table 1.** Eligibility of the selected studies

Author	1	2	3	4	5	6	7	8	9	10	11	12	13	14	Total
Hallal et al. (2009)	x	x	x	x		x	x	x		x	x	x		x	11
Simões et al. (2009)	x	x	x			x	x	x		x	x	x		x	10
Hallal et al. (2009)	x	x	x	x		x	x	x		x	x	x		x	11
Parra et al. (2010)	x	x	x			x	x	x		x	x	x		x	10
Soares et al. (2010)	x	x					x	x						x	05
Paes et al. (2011)	x	x	x			x	x	x		x	x	x		x	10
Paez et al. (2015)	x	x					x							x	04
Da Fonte et al. (2016)	x	x	x			x	x	x		x	x	x		x	10

1. Objective; 2. Literature Review 3. Sample description 4. Sample calculation 5. Outcome measures 6. Outcome measures validity 7. Description of the intervention 8. Contamination 9. Co-intervention 10. Statistical report 11. Appropriate analysis method 12. Highlighted importance 13. Withdrawals 14. Appropriate conclusions.

**Chart 1.** Publications selected for the study

(Continue)

Author/year	Objective	Population studied	Evaluation methods / instrument	General conclusions
Hallal et al., 2009.	To identify and analyze the vision of the teachers working in the program in Recife	Goers of four centers with high and low economic conditions (two of each) (n=12)	Quanti-qualitative field study  Questionnaire (close and open-ended questions and Interviews (face to face)	The teachers reported difficulties with the safety of the centers and the need to purchase and maintain equipment. There is good community participation in the festivities / outings and suggestions for physical activities. Yet, they report low involvement of people with "extra center" activities. In general, there is good satisfaction from the program's teachers and their professional activity. In addition, they believe in positive impacts on the health of the attendees.
Simões et al., 2009.	To analyze the effects of the program in Recife on the level of physical activity of the regulars	Goers of several centers were interviewed (n=2038)	Cross-sectional study  IPAQ Questionnaire	It was found that a community physical activity program, when professionally well supervised and evaluated, can improve the sedentary / physically inactive time of residents and regulars from various regions of Recife, thus, improving aspects related to quality of life
Hallal et al., 2010.	To describe the profile of attendees and non-attendees of the program in Recife	Users and non-users of the four centers (n=554)	Transversal study  Questionnaire (close and open-ended questions) and interviews (face-to-face)	A great part of the participants were females. 22% of the non-attendees who were interviewed stated they had never heard of the program.  Among those who had heard of it, 4,3% knew it because they had seen a center. Among attendees, the main reason for participating in the program was improving their health; the average time of participation in the program was 27,5 months, and 72,8% stated they were highly satisfied. The percentage of people whose perception of their health was regular or bad was significantly higher among non-attendees (45,4%) in comparison with attendees (28,5%), which demonstrates a higher level of awareness of their conditions.

(Conclusão)

Author/year	Objective	Population studied	Evaluation methods / instrument	General conclusions
Parra et al., 2010.	To observe the intensity levels of physical exercise in areas with and without the program	Attendees and non-attendees of the program (10 places: 5 program centers and 5 random parks)  (n= 32974)	Observational  SOPARC Systematic protocol	In this study with 5589 visits to areas with and without the program, 32,974 people were observed. When comparing attendees and non-attendees, the program attendees were less frequently sedentary (36% vs 51%). Besides, they were more likely to be involved in vigorous efforts (25% vs 10%). Women were more present (45 vs 42%), as well as elderly people (15 vs 6%). Finally, areas with the program were supervised in 88% of the observations vs 46%.
Paes, Fontbonne & Cesse 2011.	To identify the lifestyle of hypertensive patients who attend the program of the Sanitary District VI, in the city of Recife	Attendees of the four centers who declared they had arterial hypertension  (n=78)	Descriptive, observational, cross-sectional study.	Women corresponded to 91% of the sample. The most popular activity among the program participants was walking (59%). Intense exercises, such as running and weight training were done by 41% of the sample. 44,9% were overweight and 20,5% obese. Smokers were 6,4%.  89,7% declared to drink alcohol 1 to 3 days a week. The main bad eating habits identified were: eating greasy food (31,3%), fried food (25,0%) excessive meat ingestion (16,7%). The results point to the need to expand educational measures that influence improvement in relation to some aspects of lifestyle.
Da Fonte et al, 2016.	To evaluate the quality of life of the elderly who attend the program in the city of Recife	Program participants with a weekly frequency of at least two days and over 60 years old were included (N= 181)	Cross-sectional study	In Recife, 15% of the 32,000 people attending the program are elderly, and the program appears to be an important strategy to increase the quality of life of elderly people in the city. In addition, the longer the time participating in the program, the greater the tendency to improve quality of life.

N= Number of participants; M= Male F= Female; \*= Non-informed; IPAQ – International Physical Activity Questionnaire.

## DISCUSSION

Considering our hypothesis, even though there are barriers, such as lack of safety, maintenance supervision and dissemination to the population, the program has positive influences on health aspects among the population of Recife, reducing sedentary/inactive time and increasing the level of daily physical activity, which helps control chronic diseases such as hypertension, besides improving the quality of life of the elderly. That reduces the deleterious effects of degenerative chronic diseases that come with physical inactivity and a sedentary lifestyle.

It is known that Brazil's population has been increasingly affected by morbidities, and that Recife is among the five capitals with the greatest percentage of physical inactivity. Therefore, people from Recife have greater chances of developing and / or worsening

chronic morbidities and non-communicable diseases such as overweight, obesity, diabetes and hypertension. The aim of this study was verifying, through a systematic review, the barriers and positive aspects of the *Academia da Cidade* program when it comes to physical exercising, and its influences on public health in Recife.

In the first study, by Hallal et al<sup>10</sup>, through a questionnaire and interviews, the teachers reported some barriers. They stated that there were difficulties regarding safety at the centers, and mentioned the need for equipment purchase and maintenance. These data are enough to alert the Municipal Health Promotion Policy (decree No 122/2006), or even strengthen a partnership with other areas of surveillance and health care in the National Health Service (SUS), aiming to make the program even stronger<sup>5,6</sup>.

For instance, there could be an interaction among programs in the areas of health, education, culture, social assistance, sports and leisure, increasingly broadening individuals' autonomy in their choice for a healthier life style and, consequently, increasing the frequency of physical activity of the population.

In this sense, another study by Hallal et al<sup>11</sup> shows a low engagement of people with extra-center activities, even though teachers are satisfied with the program and they believe in positive impacts on attendees' health.

These data corroborate the study by Simões et al<sup>12</sup>, which showed that when a program of physical activity like Academia da Cidade is well supervised, it can make residents of various parts of Recife less sedentary and more physical active, thus improving quality of life and reducing costs with public health regarding the deleterious factors of chronic diseases and physical inactivity.

Considering that, it is necessary to have greater effectiveness of the authorities regarding the difficulties found at the program centers in Recife. For instance, if a place is not completely safe, how can attendees feel safe to do their physical activities?

The study by Paes et al<sup>13</sup> "type": "article-journal", "volume": "24"}, "uris": [{"http://www.mendeley.com/documents/?uuid=9f94202d-d6f4-4bb8-923b-6317ae7b5ae0"}], "mendeley": {"formattedCitation": "(13, which aimed to identify the life style of the program attendees, showed that the greatest part of the population were females. This is in fact because women tend to be more concerned with health than men<sup>14,15</sup>. That being said, if there is not a guarantee of safety, it is likely that a great part of the program users will leave it.

Still referring to the study by Paes et al<sup>13</sup>, among the non-users volunteers of the program, 22% stated they had never heard of the program. Considering those who had, 4,3% knew it because they had seen a center. Therefore, the lack of dissemination can be considered a barrier factor to the access of the population to the program. Regarding the attendees evaluated, they mostly participate in the program for health-related needs and, despite the negative as-

pects, 72,8% were highly satisfied with the activities offered by the teachers at the centers.

Beyond exercises, it is important to mention the importance of educative guidelines offered by the professionals, which contribute with the participants' understanding of healthy life habits, since a considerable percentage of the attendees demonstrated to have a regular or bad perception of their health. This percentage, though, was significantly higher among non-users of the program (45,4%) in comparison with users, which demonstrates that the program attendees were more aware of their real health conditions.

A great deal of this information on the program was reinforced in the study by Parra et al<sup>16</sup>, which pointed that this is a program with a strategy to increase/keep the levels of physical activity of the population, and it can assist public health aspects. On the other hand, the same study<sup>16</sup> found that, in general, only 40% of the public leisure areas were used for activities related to the program in different parts of the day (morning, afternoon and evening). That way, it is possible to notice the need of a better dissemination of the program and its strategy of adopting regular physical exercises, so that some aspects of public health can be controlled. These data corroborated those found by Paes et al<sup>13</sup>.

With more places conducive to exercising, the program could reach even more residents, helping participants with morbidities, such as overweight. That reality is pointed by several studies, as verified by a research called VGITEL<sup>8</sup>, taking as an example the population of João Pessoa, from the neighboring state of Paraíba, which has one of the worst physical activities rates in the country<sup>6,17</sup>. Nearly 50% of the population of João Pessoa over 18 years are physically inactive, with high risks and a family history for developing degenerative chronic diseases<sup>6</sup>.

Another population group assisted by the program are the elderly, a population with great rates of physical inactivity highly associated with chronic diseases that are common with senescence, and can affect quality of life<sup>16</sup>. The study by de Da Fonte et al<sup>17</sup> with such population found an association between longer participation in the program and a greater tendency to a better quality of life, according to the WOQOL-BREF and WOQOL-OLD questionnaires. Be-



sides, another finding that deserves to be highlighted is that among the elderly who take part in the program, most of them are widows. The authors justify such findings based on the fact that, in the region of Recife, life expectancy for women is 10 years higher than it is for men

Other states are also an example of large public programs to encourage physical exercise. São Paulo, the capital with the largest number of inhabitants in Brazil, created a program called *Agita São Paulo*, which focus on workers, students and the elderly. Its main aim is promoting an active life style among these population groups through activities, courses and huge events<sup>18</sup>.

The program has not only government support, but also partnerships with the private sector, which allows reaching more citizens<sup>19</sup>. According to data by the World Bank<sup>20</sup>, an analysis of the program's effectiveness in 2005 showed that it saved 310 million dollars. Thus, its implementation is recommended, and it has been developed in other countries of Latin America<sup>18,19</sup>.

Another reference program was created in Rio de Janeiro in 2009. It is called *Academia Carioca*, and it has three physical education professional units. In 2016, the program had more 200 units and 120 physical education professionals<sup>21</sup>. Its target are people with hypertension, diabetes and those who

are overweight, and it aims not only to encourage physical exercising among these people, but also disseminate knowledge on a healthy life style<sup>22</sup>. Moreover, the program also counts on a technical area called physical activity advisory, in which the physical education professional is responsible for implementing physical activity-related actions at the units of health and primary attention, and monitor educational actions for the population<sup>21</sup>.

Something in common among many studies in the literature that analyze public physical exercise programs such as *Academia da Cidade* is the majority of information from descriptive data, focusing on quality of life or physical exercise. The scarcity of experimental designs prevents further analysis of the impact of the programs on its participants<sup>23</sup>.

This review has limitations, such as the number of databases verified, which must have contributed to the non-inclusion of a relevant article on the theme. Yet, since it is a specific theme, such databases may have been more adequate to find studies on the *Academia da Cidade* program, in Recife – Pernambuco. Another limitation was que quantity/quality of studies. Some of them were not electable due to their poor quality, which left us with only six studies. More methodologically robust studies are suggested to verify the barriers and other health benefits promoted to the *Academia da Cidade* participants.

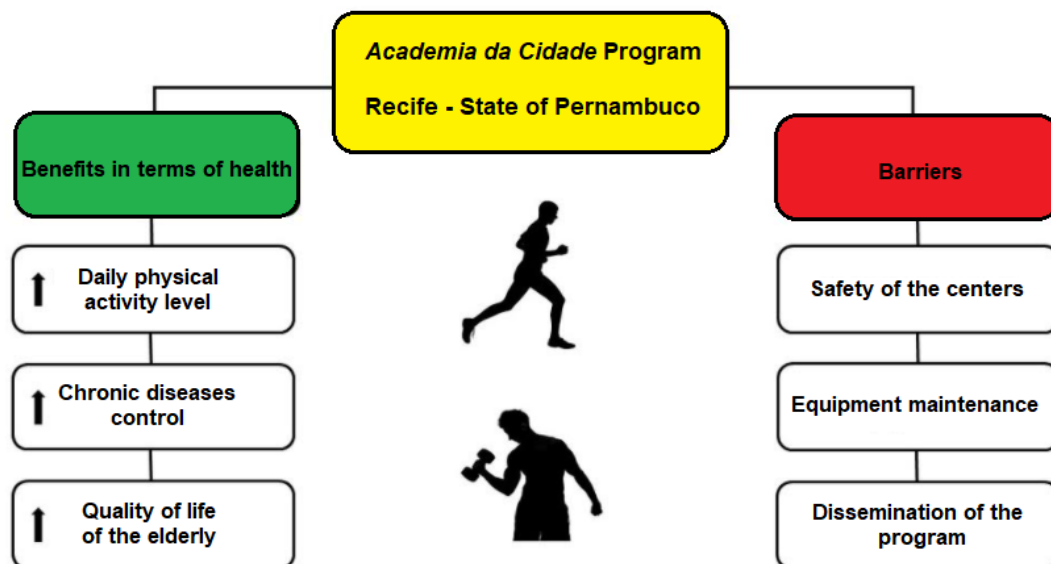


Figure 1. Summary of the main benefits and barriers of the program



## CONCLUSION

Considering our findings, it was possible to observe that the physical activities of the *Academia da Cidade* Program, in Recife, are helpful in health public aspects, reducing inactive/sedentary time, and increasing the level of daily physical activity, thus helping controlling chronic diseases such as hypertension, besides improving the quality of life of the elderly. Therefore, it reduces the deleterious effects of chronic degenerative diseases, physical inactivity and a sedentary lifestyle, which can, in the future, decrease Brazil's investments in public health and medical intervention.

However, it is important to highlight that the centers of the program require more attention, since safety, maintenance, supervision and dissemination among the population were mentioned as weaknesses and barriers to citizens who wish to engage in regular physical exercising.

Finally, in terms of applicability, we emphasize that the data collected in this review through a study of quality/reliability can be used by public authorities to improve the program, aiming to maximize its benefits.

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