

# BODY PRACTICES IN ELDERLY PEOPLE IN MATO GROSSO, BRAZILIAN AMAZON: SPATIAL-TEMPORAL ANALYSIS (2013-2023)

## PRÁTICAS CORPORAIS EM IDOSOS EM MATO GROSSO, AMAZÔNIA BRASILEIRA: ANÁLISE ESPAÇO-TEMPORAL (2013-2023)

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**Abstract: Introduction:** Body Practices represent a therapeutic intervention in health, contributing to an increase in quality of life, and should be encouraged as public policy, understood as a right to health. This scenario is even more relevant with regard to the elderly, a portion of the population that naturally needs greater care, notably those related to increased autonomy. This work aimed to analyze Body Practices in elderly people living in the state of Mato Grosso, a Federative Unit that makes up the Brazilian Amazon Region, during the period from 2013 to 2023. **Methodology:** Ecological study using secondary data from DataSUS. Annual PC rates were calculated by dividing the number of procedures by the population per year and by municipalities, multiplied by 100,000. Spatial autocorrelation was calculated from the Local Moran Index, classified into High-High, Low-Low, High-Low and Low-High strata. Spatio-temporal clusters were calculated to identify PC clusters from the municipalities of Mato Grosso. A significance level of 5% was used throughout the study. All maps in this work were created using the QGIS program, version 2.18.20. **Results:** 6,309 records of PC procedures were observed during the years of study, 3,173 of which referred to men. The largest number of records in women aged 80 or over stands out. There was no pattern of spatial distribution of its values, with records observed in municipalities in different parts of the state (north, northwest, center and south), the same being observed in spatial autocorrelations. As for the spatio-temporal clusters, 13 clusters were obtained, one of which was statistically non-significant and was duly excluded. **Conclusion:** An association was observed between socioeconomic variables and the performance of Body Practices, highlighting municipalities with better levels of quality of life, which reinforces what the scientific literature highlights. Therefore, it is important to highlight the importance of Body Practices provided by the SUS as public health policies, supporting the increase in physical activity at population levels.

## INTRODUCTION

Body Practices (PC) are one of the forms of health interventions for therapeutic purposes, with actions that promote better functioning of the human being, and should be provided by equal and quality services, understood as a right to health. These characteristics are even more relevant for the elderly, a portion of the population that naturally needs measures that increase their autonomy, which can be promoted by practices in different activities, contributing to social relationships, improvements in mental health, quality of life and self-esteem <sup>(1-5)</sup>.

Thus, CPs should be contemplated as public health policies, contributing to the increase in physical activity at population levels, reinforcing scenarios that promote better health conditions. As for the elderly, many are in a situation of dependence associated with social vulnerabilities, requiring support networks for the prevention of diseases and that can be stimulated by the provision of public services that promote improvements in this framework <sup>(6-7)</sup>.

The state of Mato Grosso has been going through a rapid demographic transition, marked by the growth of the share of the elderly in its population, drawing attention to health needs and public policies that promote active aging, in addition to reducing the pressure on social security policies <sup>(8)</sup>.

The present study aimed to analyze the PC in elderly residents in the state of Mato Grosso, the Federative Unit that makes up the Brazilian Amazon Region, during the period from 2013 to 2023. Through thematic maps, it was sought to highlight priority areas for intervention, aiming to provide inputs for health service management policies.

## METHODOLOGY

Ecological study, with the use of geoprocessing techniques for analysis methodology in time and space and with the use of secondary data, from records of procedures of Body Practices Outpatient Production of DataSUS, derived from the Outpatient Information System of the Unified Health System (SIA/SUS) (9). Records of body practice procedures in traditional Chinese medicine, body practice/physical activity in group and body practices in a psychosocial care center were used. Subsequently, the records were properly filtered by age groups referring to the elderly (from 60 to 64 years, from 65 to 69 years, from 70 to 74 years, from 75 to 79 years and 80 years of age or older) and organized by sex and by municipalities of residence in the state of Mato Grosso, from 2013 to 2023.

The estimated population was also obtained from DataSUS, referring to residents in all Brazilian municipalities from 2000 to 2021 <sup>(10)</sup>. In sequence, the estimated populations for the municipalities of the state of Mato Grosso were filtered, filtered for the period from 2013 to 2021. From the percentage variation of the population from 2020 to 2021, the estimated resident populations for 2022 and 2023 were calculated.

Annual CP rates were calculated from the division of the number of procedures by population per year and by municipalities, multiplied by 100,000. Subsequently, average rates per study period (2013-2014, 2015-2017, 2018-2020 and 2021-2023) were calculated by the sum of the annual rates divided by the number of years by periods.

For spatial autocorrelation, the average rates for the entire period were calculated by the sum of all annual rates, with a result divided by eleven. Local Moran Index was calculated, with values from -1 to +1, classified under high-high (high priority), low-low (low-priority), high-low and low-high (both intermediate priority) strata <sup>(11)</sup>. The autocorrelations were analyzed between average rates for the entire period and socioeconomic variables, acquired from the System of Health Indicators and Monitoring of Policies of the Elderly (SISAP) and the Atlas of human development in Brazil (Atlas Brazil). SISAP <sup>(12)</sup> was the source for the variables Number of elderly people registered in the Family Health Strategy according to the Primary Care Information System for the year 2015, Number of elderly people without income (2010), Proportion of elderly people living in households with a sewage network (2010), Proportion of elderly people living in households with collection service (2010) and Dependency ratio (2019). In Atlas Brazil (13), the variables Distortion Rate Age-Serie in high school (2017), Transfer per capita of Bolsa Família (2017), Life expectancy at birth (2010), Percentage of people enrolled in the Single Registry who receive Bolsa Família (2017), Gini Index (2010) and Illiteracy rate in people aged 18 years or older (2010) were collected. After the collection of the variables, the aforementioned spatial autocorrelations were evaluated, and only statistically significant associations remained in the study.

With regard to the spatio-temporal clusters, a statistical scan was carried out by means of the Relative Risk (RR), calculated based on the resident population, with a radius of 150,000 Cartesian units, in order to identify CP groups from the municipalities of Mato Grosso. Non-significant clusters were excluded. This step was performed in the SaTScan program, version 9.6. A significance level of 5% was used throughout the study. All the maps of this work were made in the QGIS program, version 2.18.20.

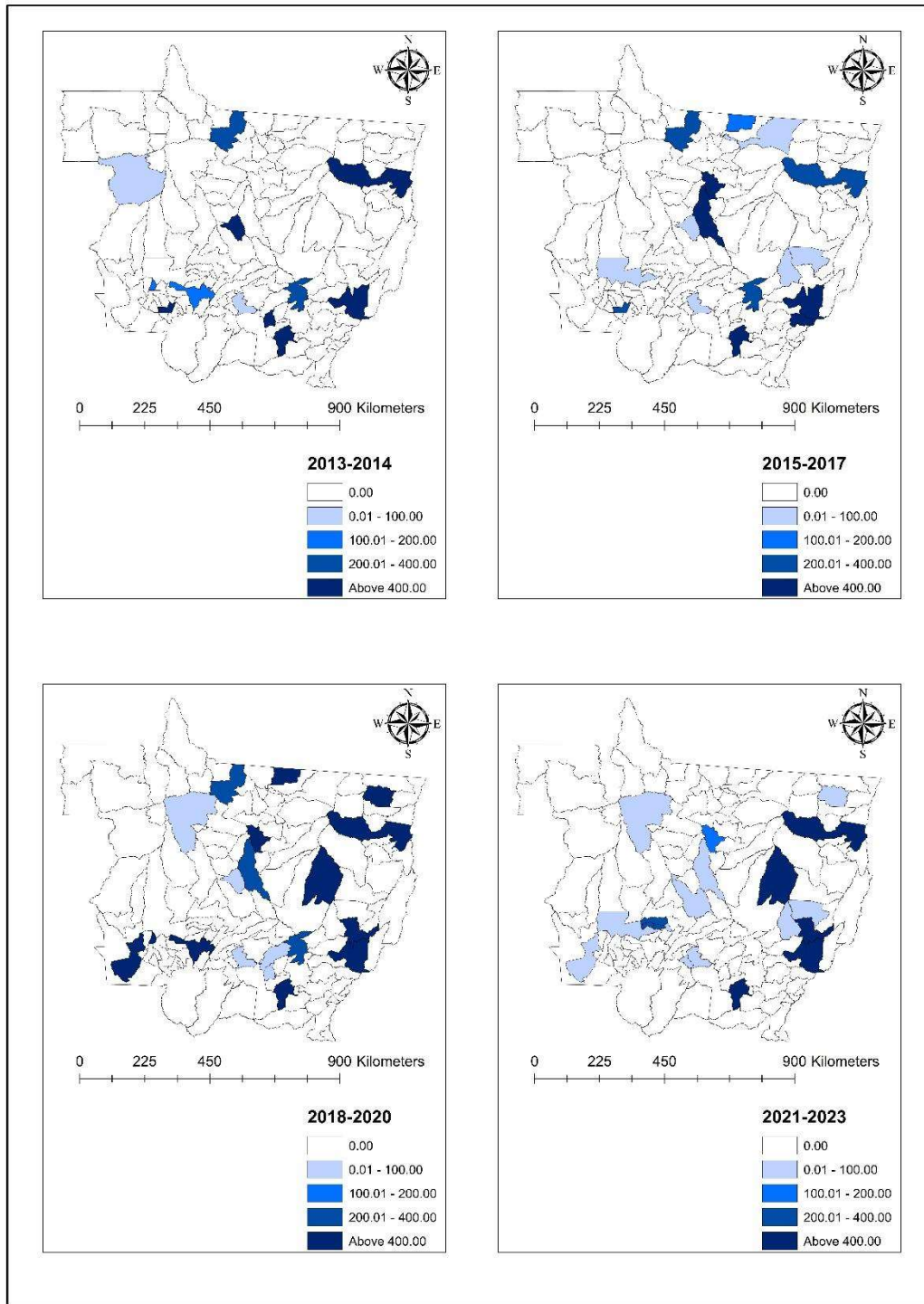
## RESULTS

6,309 records of CP procedures were observed during the years of study, of which 3,173 (50.29% of the total) were for men. It is noteworthy the largest number of records in women <sup>266</sup>

aged 80 years or older (76, representing 76.77% of the total procedures observed in this age group). The largest amounts of records per year were respectively observed in 2019 (913, representing 14.47% of the total), 2017 (757, 12.00%) and 2018 (741, 11.75%). In terms of municipalities, Rondonópolis (2,431, 38.53%), Barra do Garças (1,511, 23.95%), Gaúcha do Norte (491, 7.78%), Sinop (357, 5.66%), Pontes and Lacerda (292, 4.63%), Nova Xavantina (213, 3.38%) and Sorriso (167, 2.65%) were the cities with the largest amount of records.

With regard to CP rates for periods, there was no pattern of spatial distribution of their values, to the extent that the records were observed in municipalities of various parts of the state (north, northwest, center and south), not establishing a concentration behavior throughout space. In the first period (2013-2014), the municipalities of Barra do Garças (3368.93), Lucas do Rio Verde (1268.75), Rondonópolis (1230.77), São José dos Quatro Marcos (802.25), São Félix do Araguaia (623.89), Jaciara (531.41) and Primavera do Leste (352.57) stood out. In the second moment (2015-2017), higher rates were observed in Barra do Garças (2626.07), Pontal do Araguaia (1278.06), Rondonópolis (1023.91), Sorriso (504.39), Sinop (465.01), Primavera do Leste (335.94) and Alta Floresta (302.06). From 2018 to 2020, Pontes e Lacerda (2011,20), Barra do Garças (1433.68), Gaúcha do Norte (1218.16), Rondonópolis (1103.22), Nova Xavantina (800.42), Barra do Bugres (661.48) and Guarantã do Norte (557.05) had the highest rates. In the last period (2021-2023), the highest values were observed in Gaúcha do Norte (23937.78), São Félix do Araguaia (1653.83), Nova Xavantina (1331.99), Rondonópolis (591.89), Barra do Garças (404.15), Santo Afonso (249.88) and Nova Maril.

**Figure 1** - Average rates by periods of Body Practices in the elderly living in municipalities in the state of Mato Grosso, Brazilian Amazon, from 2013 to 2023.

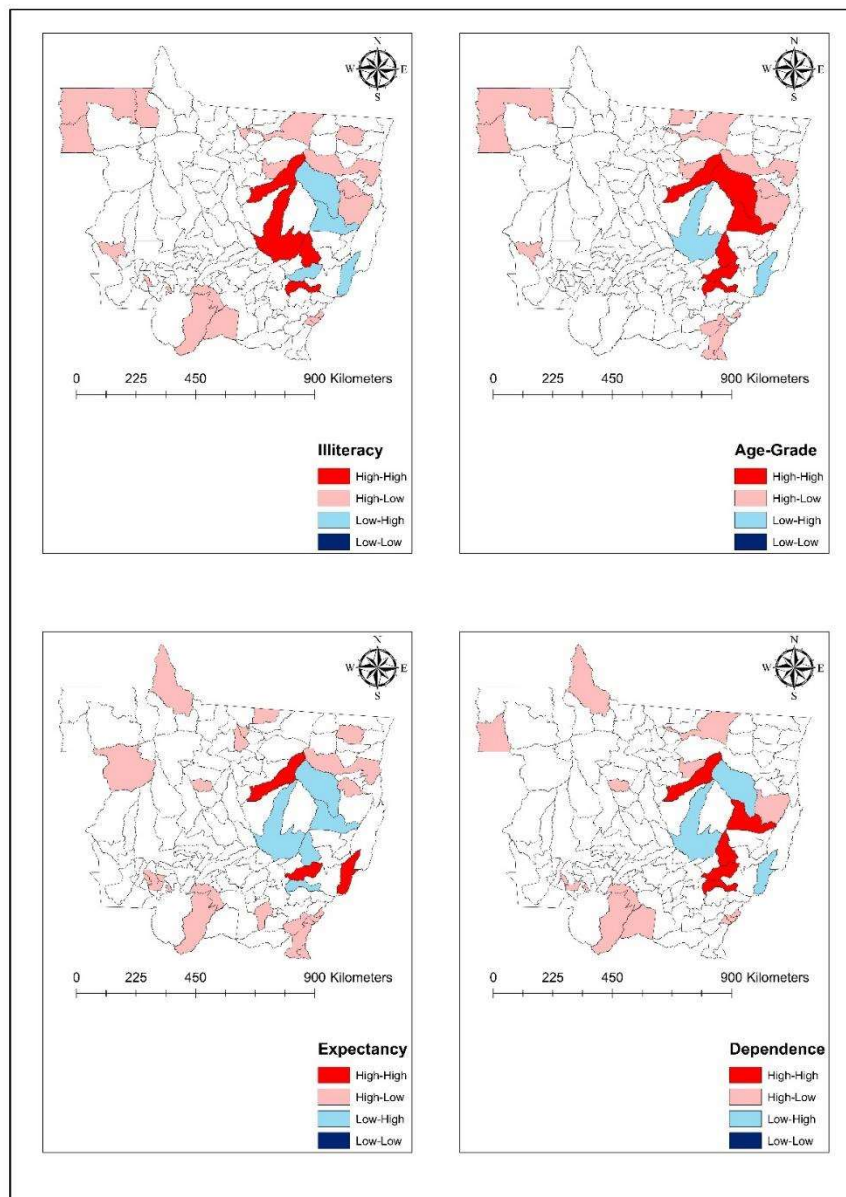


**Source:** Made by the author himself, 2024.

In relation to the spatial autocorrelations under Moran Index, only the variables Illiteracy rate (with a Moran Index value of 0.081), Distortion rate (0.075), Life expectancy (-0.074) and Dependency ratio (0.063) had statistical significance. A pattern of spatial distribution similar to that of the average rates by periods was observed: in municipalities of various parts of the state (Alto 268

Araguaia, Alto Garças, Alto Taquari, Bom Jesus do Araguaia, Colniza, Curvelândia, Nossa Senhora do Livramento, Poconé, Ponte Branca, Ribeirãozinho and União do Sul) association Alto-Baixo was recorded; however, in some cities of the eastern portion, different patterns were observed from the autocorrelations Alto-Alto (Campinápolis, Canarana, Feliz Natal, General Carneiro and Novo São Joaquim) and Baixo-Alto (Araguaiana, Paranatinga and Querência), standing out from the other parts of the state. No Low-Low association was observed (Figure 2).

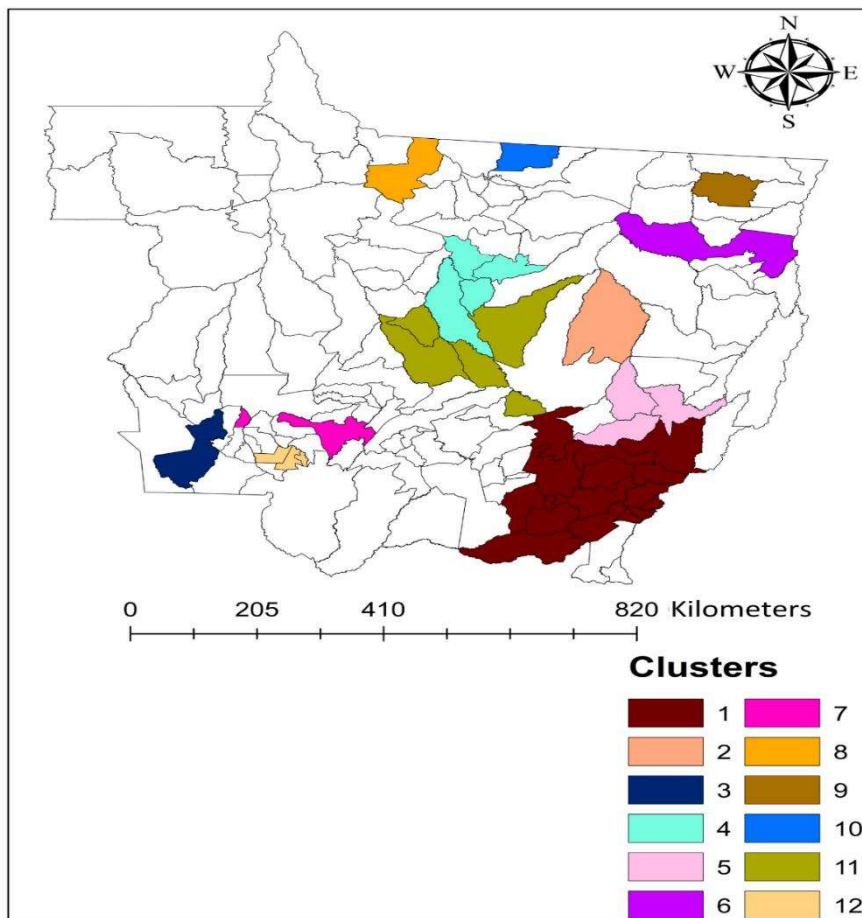
Figure 2 - Spatial autocorrelations between average rates of Body Practices for the entire period and socioeconomic variables in elderly residents in municipalities in the state of Mato Grosso, Brazilian Amazon, from 2013 to 2023.



Source: Made by the author himself, 2024.

As for the spatio-temporal clusters, 13 groupings were obtained, one being statistically non-significant and that was duly excluded. Agglomeration 1 (southeastern part of the state) was the largest in terms of number of municipalities, being formed by 16 cities, followed respectively by agglomerations 11 (Lucas do Rio Verde, Nova Mutum, Nova Ubiratã, Planalto da Serra and Santa Rita do Trivelato) and 4 (Santa Carmem, Sinop, Sorriso and Vera). The largest RR was observed in Agglomerate 2 (163.58), referring to the municipality of Gaúcha do Norte. The other prominent values occurred in Aglomerado 3 (Pontes and Lacerda), Aglomerado 5 (Novo São Joaquim, Campinápolis, Nova Xavantina) and Aglomerado 6 (São Félix do Araguaia), being respectively 19.86, 15.48 and 10.59. Agglomerado 7 (Barra do Bugres), Aglomerado 8 (Alta Floresta), Aglomerado 9 (Confresa), Aglomerado 10 (Guarantã do Norte) and Aglomerado 12 (Curvelândia, Mirassol D'Oeste and São José dos Quatro Marcos) must also be registered (Figure 3).

**Figure 3** - Spatio-temporal clusters of Body Practices in elderly residents in municipalities in the state of Mato Grosso, Brazilian Amazon, from 2013 to 2023.



**Source:** Made by the author himself, 2024.

# DISCUSSION

From data from the Ministry of Health <sup>(9)</sup>, it was found that the state of Mato Grosso had one of the highest percentages of Body Practices in the elderly (in relation to records of Body Practices in the general population) by Federative Unit in the country (9.10%), being behind only Ceará (9.80%) and the Federal District (9.19%), which motivated the beginning of this work, to the extent that no studies were observed that addressed the topic in question under space-temporal methodologies, which reinforces the relevance of this work.

Based on the observation of the maps, there was no pattern of spatial distribution in relation to the prominent municipalities, at the same time that the absence of values was perceived in the municipalities of the northwestern part of the state (characteristics observed in another work carried out, which analyzed nutritional deficiencies and inequities in the municipalities of Mato Grosso) <sup>(14)</sup>. Basically, the municipalities highlighted in the analyses have better socioeconomic indicators, which corroborates the supply of CP in the elderly. From higher indicators of per capita income, Primavera do Leste, Sorriso, Nova Mutum, Lucas do Rio Verde, Rondonópolis, Barra do Garças, Feliz Natal and Alto Taquari have a tendency to contribute to better living conditions, being observed that a better salary income tends to contribute to a higher quality of life in the elderly. This is also observed in terms of public funding, where richer municipalities tend to have higher per capita spending on health, made from own resources <sup>(13, 15-17)</sup>.

This reality is also observed in the scenario of physical activity, because avoidable and unfair inequalities arising from social relationships are perceived, with fewer groups getting involved in practices during leisure time, but in occupational activities. In relation to the Gini index, the municipalities of Araguaiana, Nova Marilândia, Santo Afonso, Planalto da Serra and União do Sul had some of the lowest values in the state, demonstrating lower levels of social inequalities. In Araguaiana and Pontes and Lacerda, some of the lowest values of the age-grade distortion index were observed. As for life expectancy at birth, São Félix do Araguaia, Gaúcha do Norte, Primavera do Leste and Nova Mutum stand out. Municipalities with good socio-environmental indices were also observed, with Alto Taquari, Primavera do Leste and Alta Floresta being among the highest percentages of the population with piped water, with the first two also with high percentages of people in urban households with garbage collection. In Curvelândia, 100% of people live in households with electricity, a value close to those observed in Alto Taquari (99.98%) and Primavera do Leste (99.89%) <sup>(13, 15-17)</sup>.

Another consideration to be carried out refers to High-High autocorrelations with average and variable rates of illiteracy rate, age-grade distortion and dependence, since different results would be expected, according to the above considerations. On the other hand, the High-High



autocorrelation between average rates and life expectancy is highlighted, and this variable is representative of better socioeconomic levels, tending to reinforce the choice for the realization of CP by the elderly. The results also deserve to be recorded the increase in the number of municipalities with records of procedures throughout the study period and that, in general, a reduction in the values of CP rates was observed in 2021-2023, compared to previous periods. One of the possible explanations for these results was the COVID-19 pandemic, which restricted the circulation of the general population (and especially of the elderly, identified as one of the main risk groups for the disease) and that, after this period, may have had difficulties in resuming physical activities. Therefore, health awareness measures are reinforced, preventing diseases and diseases in this target audience.

The conditions of illiteracy and low family income context were associated with worse levels of cognitive flexibility and a higher level of stress perceived by the elderly and a worse self-reported health condition, understood as a greater chance of getting sick, requiring investments in equity of health care<sup>(15, 18, 19)</sup>, which is even one of the identity principles of the SUS. In this way, it is argued that CPs are contemplated in public health policies, leading to an increase in physical activity at population levels, reinforcing practices and discourses in favor of better health conditions<sup>(6)</sup>. In the case of elderly people in a situation of dependence, a study identified conditions of social, individual and programmatic vulnerabilities in this target audience and also in their caregivers, while reinforcing the importance of support networks with regard to the prevention of social and emotional problems, and should be guidelines stimulated by government actions for the respective improvements and expansions, promoting improvements in the situation of dependence, in addition to reinforcing the importance of the exercise of care<sup>(7)</sup>.

The scenario of causal relationship between physical activity and health, in addition to medicalizing and moralizing, ends up leading to the reasoning that it is simple to increase the amount of physical activity in leisure, commuting, in the domestic environment and at work, disregarding the health-disease relationship in different social contexts and the various possibilities of choices (especially in a country with as many regional particularities as Brazil), making the individual responsible for his health situation. In the case of the Amazon Region, this situation is still hampered by long distances characteristic of the territory itself, marked by the presence of streams, rivers, lakes and islands, which hinder logistics and displacement for health actions that meet local needs. Because of such inequalities inherent in Brazilian society, public health policies should invest in access to PCs for their democratization, since, for many individuals, they represent the only way to promote the movement in their daily lives<sup>(6,20,21)</sup>.

According to the above, linking the movement to the daily routine is, in reality, an act of courage and escape due to the inequalities imposed by the Brazilian reality, marked by the

difficulty of access to services and health care, culturally configured. As well as social and health indicators, PCs are unequal in the country, being more frequent in populations with better purchasing power, which are sometimes conditioned to financial payments. Otherwise, physical activities by commuting on foot or by bicycle at times of work/study are more characteristic of lower-income populations (often occurring for the economy of the passage of transport, not being properly a conscious choice, nor synonymous with activities linked to leisure), demonstrating that there is an inverse relationship between access to PCs and socioeconomic conditions <sup>(6)</sup>.

The practice of leisure influences the levels of perceived stress, representing a possibility of encouraging public policies to offer CP, with physical activities associated with pleasure, taste and fun, which even generate a reduction in inequalities in the context of the fight against sedentary lifestyle, in addition to strengthening actions in health as a right of all (here, the CP would be, in fact, a choice of practitioners, even counting on the participation of professionals). In addition, integrated reflections on body and health are necessary for the understanding of practitioners to be identified, developing the work supported by reflections and dynamics <sup>(6,18, 22)</sup>. The realization of CP, from the recovery of physical exertion, aims to modify the scenario of physical inactivity, to the extent that sedentary lifestyle is a lifestyle to be fought, in addition to reducing the consequences of a hypercaloric diet and conditioning the body in order to avoid atrophies and diseases <sup>(23)</sup>.

As reported in the literature, there are few works that address CP as a topic of public health, especially with regard to the elderly population, to the extent that they represent the majority of the public that seeks this type of service in the SUS. Therefore, practices that corroborate the increase in the autonomy of the elderly should be encouraged, providing an increase in self-esteem and quality of life. As a suggestion, practices can be carried out in any location in the country, twice a week, lasting one hour each, exploring cultural and collective elements in a playful, integrative and creative way, corroborating for prevention and promotion of mental and physical health, avoiding isolation and reducing the chances of depression, in addition to improving social and family relationships through games, choreography and games <sup>(1-3)</sup>. These findings gain even more relevance when it is taken into account that, although the state of Mato Grosso is still a state considered young, there is a tendency to grow in its elderly population, which is a consequence of the demographic transition, reinforcing the need for public policies in health and even to encourage entrepreneurship and education, aiming to reduce the burden of social security, in addition to improving the quality of life from active aging <sup>(8)</sup>.

By using secondary data, the results of this work may have gone through biases with regard to information, to the extent that the level of analysis used from aggregate level data does not make it possible to perform correlations at the individual level. Although it cannot be confirmed by these results, underreporting of cases may also have occurred, which is reported by the scientific

## CONCLUSION

The results of this study showed associations between socioeconomic variables and CP performance, highlighting municipalities with better levels of quality of life. This scenario reinforces what the scientific literature highlights about PCs, which have different profiles according to social relations, being more related to labor activities in groups of lower purchasing power. Therefore, it is necessary to emphasize the importance of the CP provided by the SUS, and should be contemplated as public health policies, corroborating the increase in physical activity at population levels.

In a reality marked by a true demographic sedentary lifestyle, an expression that can be used to draw attention to the critical increase in physical inactivity in population terms, policies of awareness and promotion of CP are necessary (especially in the elderly, who represent a portion of the population that naturally needs greater care, being able to have their autonomy encouraged through non-medicalized activities, contributing to an increase in the quality of life). This situation is even more relevant when it comes to the state of Mato Grosso, where a growth trend of the elderly population is perceived, drawing attention to the need for public policies that promote active aging. In addition, the particularities of the Amazon Region should be reported as obstacles to be overcome by health actions, which need to understand the long distances and logistical difficulties of this large portion of the Brazilian territory.

The importance of this work is highlighted, as no studies addressing the topic in question have been observed. In addition, attention is drawn to the importance of the use of thematic maps, which here provided an overview of the PC provided by the SUS within the state of Mato Grosso, allowing to outline a profile of search and supply of these activities, in addition to creating a scenario that can be used for planning/management in health, from the enhancement of priority areas for intervention.

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