

RESEARCH ON PHYSICAL ACTIVITY FUNDED BY THE MINISTRY OF HEALTH: TEMPORAL TRENDS AND REGIONAL DISTRIBUTION

PESQUISAS EM ATIVIDADE FÍSICA FINANCIADAS PELO MINISTÉRIO DA SAÚDE: EVOLUÇÃO TEMPORAL E DISTRIBUIÇÃO REGIONAL 

INVESTIGACIONES SOBRE ACTIVIDAD FÍSICA FINANCIADAS POR EL MINISTERIO DE SALUD: EVOLUCIÓN TEMPORAL Y DISTRIBUCIÓN REGIONAL 

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Abstract: The promotion of health research is a constitutional responsibility of the Brazilian Unified Health System (SUS). This study aimed to: a) analyze the temporal evolution and regional distribution of research on physical activity (PA) funded by the Ministry of Health; b) identify the funding modalities of these studies. This is an ecological study based on data from the Health Research System, covering the period from 2002 to 2023. Differences were observed in the number of studies and in the total deflated amount across funding modalities, National Health Plan (PNS) periods, and macro-regions. The 2004–2007 PNS, the South region, and the Research Program for SUS (PPSUS) registered the highest number of studies, whereas the 2008–2011 PNS, the Southeast region, and national-level funding received the largest amount of resources. It is necessary to expand and ensure a more equitable distribution of funding for such research, particularly through PPSUS.

Keywords: Health research policy. Research funding. Health policy. Health promotion.

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1 INTRODUCTION

The promotion and encouragement of health research are constitutional responsibilities of the Unified Health System (SUS) and should be guided by the National Policy on Science, Technology and Innovation in Health (PNCTIS), as an integral part of the National Health Policy (Brazil, 2008). In this way, scientific and technological development can directly contribute to solving health problems, improving the quality of care and the management of SUS policies.

In this context, the Ministry of Health (MoH) funds health research in accordance with the National Policy for Science, Technology and Innovation in Health (PNCTIS) and the National Agenda of Priorities for Health Research (ANPPS) (Brazil, 2018). These initiatives seek to align research with health priorities and the needs of the SUS (Brazilian Unified Health System) services, as well as to guide investments and reduce regional inequalities in the promotion of health research (Brasil, 2008, 2018). In this way, the Ministry of Health establishes priorities and fosters scientific and technological development. However, ensuring adequate and equitable funding for this research remains an important challenge (Souza; Calabro, 2017).

Physical activity (PA), recognized for its health benefits (Garcia *et al.*, 2023; Martinez-Gomes *et al.*, 2024), has gained prominence on the global public health agenda (WHO, 2018, 2020), and strengthening the scientific basis on the subject is a relevant element to support and improve public policies (Ramirez Varela *et al.*, 2021a). However, there still exists some disconnection between the development of this research and its application in health policies (Ramirez Varela *et al.*, 2021a). This scenario requires realignment of the research agenda, aiming to broaden its impact at the population level. In this sense, funding for research on PA by the MoH (Brazil, 2022) can contribute to consolidating this agenda as a public health policy within the SUS.

It is worth highlighting that Brazil is internationally recognized as a leader in policies and research on PA (Machado *et al.*, 2025; Ramirez Varela *et al.*, 2021b). Since the National Health Promotion Policy, launched in 2006 and updated in 2014, there have been important advances in the PA agenda within the SUS, especially in the context of Primary Health Care (PHC) (Vieira; Carvalho, 2024). However, only approximately 30% of the Brazilian adult population is physically active in their free time, and inequalities persist, mainly related to socioeconomic issues, with lower prevalence values among older adults, women, Black people, and individuals with lower income and education levels (Mielke *et al.*, 2021).

Furthermore, there are significant regional disparities in the offer of PA in PHC within the SUS, with a greater concentration in the Southeast and Northeast regions (Carvalho *et al.*, 2025; Dutra; Knuth, 2025). Similarly, asymmetries persist in the regional distribution of scientific production, with the South and Southeast regions predominating (Machado *et al.*, 2025). These disparities hinder the advancement of the agenda to promote PA within the SUS.

Given the above, it is important to investigate how MoH funding has contributed to stimulating research on PA aligned with the priorities of the SUS. Furthermore, better understanding of the role of different funding modalities in reducing regional disparities in scientific production on PA and health is necessary. This knowledge can contribute to filling a gap in the literature and promote strengthening of PA as a public health policy. Thus, the current study aimed to: a) analyze the temporal evolution and regional distribution of research on PA funded by the Ministry of Health; and b) identify the funding modalities for this research.

2 METHODS

This is a nationwide ecological study that analyzed the temporal evolution and macro-regional distribution of the number and total value of research projects in PA funded by the MoH between 2002 and 2023.

The data were extracted from the Health Research system using the advanced search tool¹. The search procedures for the research followed the methodology used in a previous study (Vieira *et al.*, in press).

The following descriptors were used: “physical activity”, “physical activities”, “body practice”, “body practices”, “sport”, “sports”, “exercise”, “exercises”, “physical exercise”, “physical exercises”, “physical training”, “physical fitness”, “physical inactivity”, “sedentary behavior”, “sedentary”, “sedentary people”, and “sedentarism”. All surveys from the Federative Units, with statuses “completed” or “in progress,” were included. The data were exported to a *Microsoft Excel*® spreadsheet. After exporting, any duplicates were removed.

Based on the reading of titles, keywords, abstracts, objectives, methodologies, and results, research in PA from all Federative Units, with the status “completed” or “in progress” was included. All types of research, regardless of design, were considered in studies on PA, in which PA, in its different domains (free time, commuting, work or study, and household chores), was treated as an exposure factor or as an outcome of the investigation (primary or secondary). Considering the focus of PA on human health care and its applicability in public health policies, experimental studies with animals were excluded.

The research was analyzed between February and March 2024, in a blind and independent manner, by two researchers experienced in the subject matter, after prior agreement. Disagreements were resolved by consensus.

The research projects were classified according to funding modalities, as per the Health Research system: a) direct contracting (projects contracted directly with researchers due to technical specificities); b) national funding (projects supported by thematic calls for proposals of national scope, with support from institutions such as the National Council for Scientific and Technological Development (CNPq), and the Coordination for the Improvement of Higher Education Personnel of the Ministry of

¹ BRASIL. Ministry of Health. **Health research system**. Available at: <http://pesquisasaude.saude.gov.br/pesquisas.xhtml>. Accessed on: March 6, 2025.

Education (CAPES), among others); and c) decentralized funding (projects supported by the Research for the SUS Program – PPSUS, launched biennially in each state, with the support of CNPq, the Research Support Foundations (FAP), and the State Health (SES) and Science and Technology Secretariats) (Brasil, 2024).

Additionally, for the temporal analysis, the surveys were grouped according to the National Health Plan (PNS) in effect in the year of contracting: a) Pre-PNS (2002–2003); b) 2004–2007; c) 2008–2011; d) 2012–2015; e) 2016–2019; f) 2020–2023.

In addition, for the purpose of comparability of temporal evolution, the total nominal value was deflated based on the Broad National Consumer Price Index (IPCA), considering December 2023 as the reference for standardization (Central Bank of Brazil, [s.d.]). For a balanced analysis, the regional distribution of funding and research on PA financed by the MoH, and demographic (resident population) and economic (Gross Domestic Product – GDP) criteria were used.

The research rate per capita was calculated as the ratio between the total number of researches conducted and the resident population, multiplied by 100,000. The research investment rate was calculated as the ratio between the total deflated value invested in research and the GDP value, multiplied by 100. To calculate these rates, data from the Brazilian Institute of Geography and Statistics (IBGE) on the resident population were used, based on the 2022 Demographic Census², and on the GDP at current prices for 2021, as this is the last year with available data by Brazilian macro-region³. These indicators have previously been used to analyze scientific output and research funding (Ramirez Varela *et al.*, 2021b; Brasil, 2023).

The variables analyzed were: a) number of surveys; b) number of surveys per inhabitant; c) total deflated value; d) mean value per survey; e) research investment rate in relation to GDP; f) funding modality; g) period of the PNS; h) macro-region of the institution of the coordinator responsible for the research; and i) year of contracting.

Descriptive and inferential statistical analyses were performed. To verify the normality of the data regarding the number of research projects and the amounts funded, the Shapiro-Wilk and Kolmogorov-Smirnov tests were applied. Given the observed non-normality, non-parametric tests were performed. The differences in the distribution of the number of funded research projects and the amounts funded (dependent variables), according to the funding modalities, periods of the PNS, and Brazilian macro-regions (independent variables), were evaluated using the Kruskal-Wallis test. For results with statistical significance (p -value < 0.05), Dunn's post-hoc test with Bonferroni adjustment was applied to identify differences between groups for each dependent variable. Analyses were conducted using RStudio software (version 2024.04.2; Posit, PBC), with the following packages: *stats*, *dplyr*, *readr*, and *dunn.test*.

This study used publicly available secondary data. Therefore, it is exempt from review by a Research Ethics Committee.

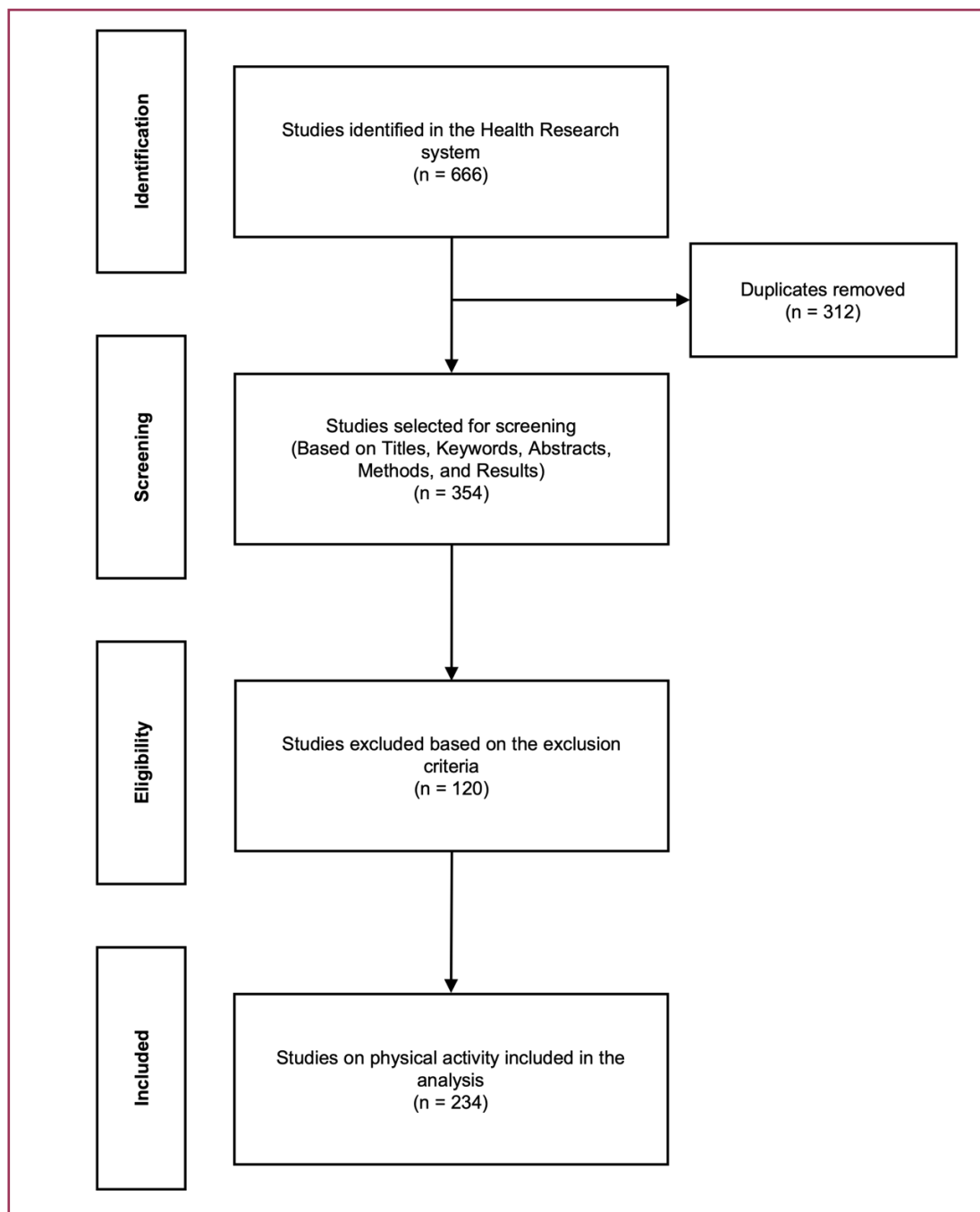
² IBGE. Sidra. **Table 4714** - Resident Population, Territorial Area and Population Density. Available at: <https://sidra.ibge.gov.br/tabela/4714>. Accessed on: March 6, 2025.

³ IBGE. Sidra. **Table 5938** - Gross domestic product at current prices... Available at: <https://sidra.ibge.gov.br/tabela/5938>. Accessed on: March 6, 2025.

3 RESULTS

Based on the search terms used in the Health Research system, 666 studies were found. After removing duplicates, 354 studies were evaluated, and a total of 234 studies on PA funded by the MoH were included in the analysis (Figure 1).

Figure 1 - Flowchart of the selection process for research on physical activity funded by the Ministry of Health between 2002 and 2023.



Source: Prepared by the authors.

Throughout the analyzed period, the MoH invested approximately R\$ 60 million (total deflated value) in research on PA, corresponding to a mean value of approximately R\$ 260,000 per research project (Table 1).

The funding modalities with the highest and lowest number of funded research projects were, respectively, the PPSUS and direct contracting. Regarding the periods analyzed, the PNS 2004–2007 recorded the highest number of funded research projects, while the pre-PNS period presented the lowest. Regionally, the South region concentrated the highest number of funded research projects, while the North region had the lowest number (Table 1).

Regarding the total deflated value invested, national development was the modality that received the largest amount of funding, while direct contracting received the smallest. The largest volume of resources was allocated to research during the PNS 2008–2011 period, while the smallest was recorded in the pre-PNS period. Among the macro-regions, the Southeast received the largest amount of resources, while the North received the smallest (Table 1).

Regarding the mean value per survey, direct contracting registered the highest value, and PPSUS the lowest. The PNS 2008–2011 period presented the highest mean value per survey, and the pre-PNS period the lowest. Additionally, the Southeast region presented the highest mean value per survey, while the Northeast region presented the lowest (Table 1).

In the Kruskal-Wallis test, statistically significant differences were identified in the number of funded research projects and in the total deflated value between the funding modalities, the Brazilian macro-regions, and the PNS periods (Table 1). In the Dunn post-hoc test with Bonferroni adjustment, both in the analyses that considered the number of funded research projects and in those that evaluated the deflated total value, statistically significant differences were found in the following comparison categories: “direct contracting - national funding”, “direct contracting - PPSUS”, “national funding - PPSUS”, “North - Southeast”, “North - South”, “PNS 2004–2007 - Pre-PNS” and “PNS 2004–2007 - PNS 2020–2023” (Table 1).

Table 1 - Number of studies, total deflated value, and mean value per study on physical activity funded by the Ministry of Health, by National Health Plan, funding modality, and Brazilian macro-region, between 2002 and 2023

Variables	Number of searches on PA			Deflated value (in millions of reais - R\$)			Mean value per PA research in millions of reais - (R\$)
	Total (%)	Maximum*	Mean (± SD)	Total (%)	Maximum**	Mean (± SD)	
Funding modality							
Direct Contracting ^{a,b}	2 (0.9)	1	0.02 (0.13)	4.74 (7.9)	4.04	0.04 (± 0.39)	0.14
National Development ^{a,b}	64 (27.4)	8	0.58 (1.53)	32.28 (53.8)	15.17	0.29 (± 1.52)	2.35
PPSUS ^{a,b}	168 (71.8)	17	1.53 (3.04)	23.01 (38.3)	2.38	0.21 (± 0.46)	0.50

Variables	Number of searches on PA			Deflated value (in millions of reais - R\$)			Mean value per PA research in millions of reais - (R\$)
	Total (%)	Maximum*	Mean ($\pm$ SD)	Total (%)	Maximum**	Mean ($\pm$ SD)	
PNS periods							
Pre-PNS ^{c,d}	2 (0.9)	1	0.07 (0.25)	0.11 (0.2)	0.09	0.004 ($\pm$ 0.02)	0.05
PNS 2004–2007 ^{c,d}	72 (30.8)	9	1.20 (2.28)	13.88 (23.1)	4.07	0.23 ($\pm$ 0.65)	0.19
PNS 2008–2011	37 (15.8)	7	0.62 (1.40)	25.92 (43.2)	15.17	0.43 ($\pm$ 2.02)	0.70
PNS 2012–2015	58 (24.8)	17	0.97 (2.96)	11.22 (18.7)	2.07	0.19 ($\pm$ 0.48)	0.19
PNS 2016–2019	36 (15.4)	8	0.60 (1.46)	4.86 (8.1)	1.41	0.08 ($\pm$ 0.22)	0.14
PNS 2020–2023	29 (12.4)	14	0.48 (2.23)	4.05 (6.7)	1.70	0.07 ($\pm$ 0.31)	0.14
Region							
Central-West	20 (8.5)	3	0.30 (0.72)	3.44 (5.7)	1.50	0.05 ($\pm$ 0.20)	0.10
Northeast	65 (27.8)	17	0.99 (2.93)	6.39 (10.6)	1.70	0.10 ($\pm$ 0.32)	0.23
North	9 (3.8)	2	0.14 (0.46)	1.12 (1.9)	0.36	0.02 ($\pm$ 0.06)	0.17
Southeast ^{e,f}	67 (28.6)	9	1.02 (2.14)	32.54 (54.2)	15.17	0.49 ($\pm$ 1.95)	0.12
South ^{e,f}	73 (31.2)	14	1.11 (2.59)	16.55 (27.6)	4.04	0.25 ($\pm$ 0.63)	0.49
Total	234 (100.0)	17	0.71 (2.06)	60.04 (100.0)	15.17	0.18 ($\pm$ 0.94)	0.26

Source: own elaboration, based on data from the Health Research repository.

Legend: PA – Physical Activity; SD – standard deviation; PPSUS – Research Program for the SUS; PNS – National Health Plan; R\$ – real (Brazilian currency; value in millions of reais).

Note 1: (*) The minimum number of studies and the median were equal to 0. (**) The minimum deflated value in millions of reais (R\$) and the median were equal to 0.00.

Note 2: Dunn's post hoc test with Bonferroni adjustment was applied, as a statistically significant value was found in the Kruskal-Wallis test, indicating differences in the number of funded studies and the amount funded in relation to the funding modality, the PNS period, and the Brazilian macro-regions. ^(a) There was a significant difference in the number of research projects funded between the PPSUS funding model and direct contracting, between PPSUS and national funding, and between direct contracting and national funding. ^(b) There was a significant difference in the total deflated value between the PPSUS funding modalities and direct contracting, between PPSUS and national funding, and between direct contracting and national funding. ^(c) There was a significant difference in the number of funded research projects between the pre-PNS and PNS 2004–2007 periods, and between the PNS 2004–2007 and PNS 2020–2023 periods. ^(d) There was a significant difference in the total deflated value between the pre-PNS and PNS 2004–2007 periods, and between the PNS 2004–2007 and PNS 2020–2023 periods. ^(e) There was a significant difference in the number of funded research projects between the South and North regions and between the Southeast and North regions. ^(f) There was a significant difference in the total deflated value between the South and North regions and between the Southeast and North regions.

The national mean for research on PA was 0.12 studies per 100,000 inhabitants. The South region presented the highest rate of research per inhabitant, followed by the Northeast, Central-West, Southeast, and North regions (Table 2). It is noteworthy that both the rate of research per inhabitant and the total number of studies were higher in the South region. The rate in the South region was three times higher than in the Southeast region (Table 2), which, in absolute numbers, presented the second highest number of funded studies (Table 1).

Regarding the rate of investment in research on PA, the mean in Brazil was equivalent to 0.0007% of GDP. The South region had the highest rate of investment in research, followed by the Southeast, Northeast, Central-West, and North regions (Table 2). The rate of investment in research in the South region exceeded that recorded in the Southeast region by more than one and a half times (Table 2), although the latter was the region that, in absolute numbers, received the largest amount of resources (Table 1).

Table 2 - Number of research studies on physical activity funded by the Ministry of Health per capita and investment rate in relation to Gross Domestic Product, by Brazilian macro-region and in Brazil, between 2002 and 2023

	No. of studies on PA	No. of inhabitants	Rate of research on PA per 100,000 inhabitants	Total deflated value (in millions of reais - R\$)	GDP value (in millions of reais - R\$)	Investment rate in research on PA (% of GDP)
Central-West	20	16,289,538	0.12	R\$ 3.44	R\$ 932,165.60	0.0004%
Northeast	65	54,658,515	0.12	R\$ 6.39	R\$ 1,243,103.30	0.0005%
North	9	17,354,884	0.05	R\$ 1.12	R\$ 564,063.70	0.0002%
Southeast	67	84,840,113	0.08	R\$ 32.54	R\$ 4,712,981.70	0.0007%
South	73	29,937,706	0.24	R\$ 16.55	R\$ 1,559,827.60	0.0011%
Brazil	234	203,080,756	0.12	R\$ 60.04	R\$ 9,012,142.00	0.0007%

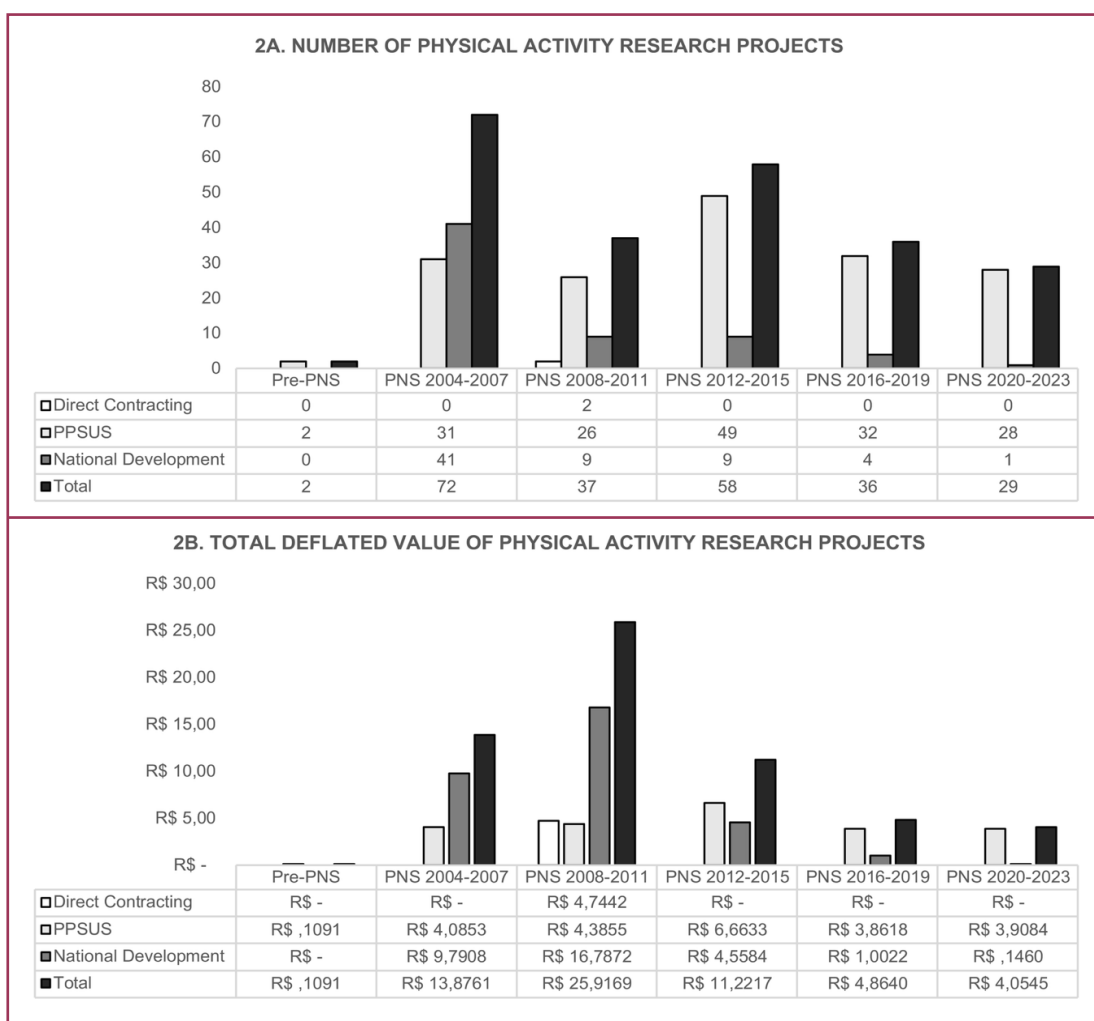
Source: own elaboration, based on data from the Health Research repository and the Brazilian Institute of Geography and Statistics (IBGE).

Legend: PA – Physical Activity; MoH – Ministry of Health; No. – number; GDP – Gross Domestic Product; R\$ – real (Brazilian currency).

Figure 2A shows the number of PA research projects by period of the PNS and by funding modality. The PPSUS was the funding modality that financed the largest number of research projects in all periods analyzed, except in the PNS 2004–2007 period, when national funding predominated. The percentages of research funded by PPSUS in each period were: 100% in the Pre-PNS period, 43.1% in 2004–2007, 70.3% in 2008–2011, 84.5% in 2012–2015, 88.9% in 2016–2019, and 96.6% in 2020–2023 (Figure 2A).

Figure 2B presents the total deflated value allocated to PA research by PNS period and by funding modality. The PPSUS was also responsible for the largest amounts of resources in the Pre-PNS periods, 2012–2015, 2016–2019, and 2020–2023, corresponding, respectively, to 100%, 59.4%, 79.4%, and 96.4% of the total value of resources in each period. However, national funding allocated the largest amount of resources to PA research in the periods 2004–2007 (70.6%) and 2008–2011 (64.8%) (Figure 2B).

Figure 2 - Number and total value (in millions of reais), deflated, of research on physical activity funded by the Ministry of Health, by period of the National Health Plan and funding modality, between 2002 and 2023.



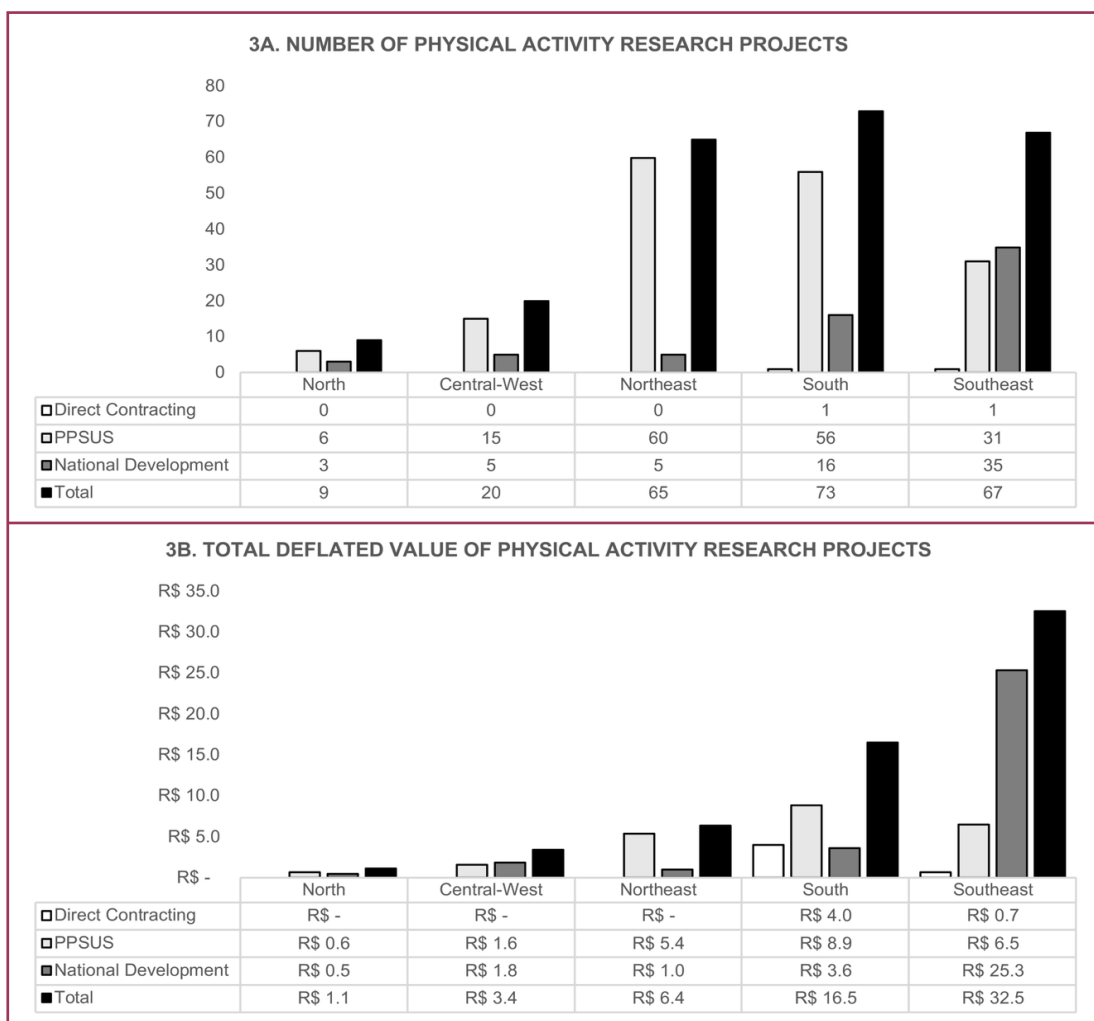
Source: Prepared by the authors, based on data from the Health Research repository.

Legend: PNS - National Health Plan; PPSUS - Research Program for the SUS; R\$ - real (Brazilian currency; value in millions of reais).

Figure 3A presents the number of PA research projects funded according to the funding modality and the Brazilian macro-region. The PPSUS stood out as the modality that funded the largest number of research projects in all regions of the country, except in the Southeast region, where national funding predominated. The percentages of research funded by PPSUS were 92.3% in the Northeast, 76.7% in the South, 75.0% in the Central-West, 66.7% in the North, and 46.3% in the Southeast (Figure 3A).

Figure 3B shows the total deflated value invested in PA research by funding modality and by Brazilian macro-region. The PPSUS accounted for the largest amount of resources for PA research in the North, Northeast, and South regions, representing 54.5%, 84.4%, and 53.9% of the total value invested in each region, respectively. In contrast, national funding was the main funding modality in the Central-West (52.9%) and Southeast (77.8%) regions (Figure 3B).

Figure 3 - Number and total value (in millions of reais), deflated, of research studies on physical activity funded by the Ministry of Health, by funding modality and Brazilian macro-region, between 2002 and 2023.



Source: Prepared by the authors, based on data from the Pesquisa Saúde repository.

Legend: PPSUS - Research Program for the SUS; R\$ - real (Brazilian currency; value in millions of reais).

4 DISCUSSION

Between 2002 and 2023, the MoH funded 234 research projects in PA. The total deflated value was approximately R\$ 60 million, with a mean value of R\$ 260,000 per project. Differences were observed in the number of projects and the total deflated value between funding modalities, periods of the PNS, and macro-regions. In the PNS 2004–2007, the Southern region and the PPSUS recorded the highest number of surveys, while in the PNS 2008–2011, the Southeastern region and national funding received the largest amount of resources.

The scarcity of studies on research funding in PA in Brazil makes it difficult to compare results regarding the number of studies and the total amount invested. A previous study showed that, in the period from 2002 to 2023, the number of PA studies and the total deflated amount invested in these studies represented, respectively, 3.2% of health research and 1.7% of the resources allocated to research funding by the MoH (Vieira *et al.*, in press). The same study also demonstrated that, between

2004 and 2020, there was a decreasing trend in the number of surveys, in the total deflated value, and in the deflated value per survey (Vieira *et al.*, in press).

In an international context, there is evidence that, between 2012 and 2017, 5% of the research funded by the National Institutes of Health in the United States was related to the topic of PA, which corresponded to 4.3% of the total resources invested (Vargas *et al.*, 2019). Despite this, establishing comparisons between countries with different economic and social conditions is complex and presents limitations, since there are significant inequalities in the capacity for scientific production in PA (Ramirez Varela *et al.*, 2021a).

These results go against the growing scientific production on PA in the global context (Ramirez Varela *et al.*, 2021a) and in Brazil (Machado *et al.*, 2025). Although the present study was restricted to research funded by the MoH, the number of studies and the amount invested by the MoH are relatively low, especially when considering the high annual costs of hospitalizations for Non-Communicable Chronic Diseases in the SUS, attributable to insufficient PA (Prodel *et al.*, 2023) and to the national goal of increasing PA during leisure time by 30% by the year 2030 (Brasil, 2021).

Previous studies investigating research funding by the MoH on other topics have revealed similar challenges, indicating that this reality is not limited to the field of PA. For example, between 2002 and 2017, 283 research projects on food and nutrition were funded, representing 4.8% of the total research funded by the MoH (Couto *et al.*, 2019). These research projects received a nominal investment of approximately R\$ 17.3 million, which corresponds to 1.5% of the total amount financed during the period, with a mean value of R\$ 61,100 per project (Couto *et al.*, 2019). Regarding dengue fever, between 2004 and 2020, 232 research projects were funded, with a deflated investment of R\$ 164 million, which corresponds to a mean value of R\$ 707,000 per project (Melo *et al.*, 2023). These studies also revealed fluctuations in the number of research projects and the amount of funding, including a stationary trend in the funding for dengue research (Couto *et al.*, 2019; Melo *et al.*, 2023).

Regarding the funding modality, the results of the current study are similar to those observed in the financing of dengue studies, which indicated that the PPSUS was responsible for the largest number of funded projects, while national funding concentrated the largest volumes of financial resources (Melo *et al.*, 2023). This difference can be explained by the intrinsic characteristics of each modality, since PPSUS aims to support projects aligned with local health priorities, while national funding, in general, is intended for research of greater complexity and scope (Brazil, 2024), frequently of a multicenter nature and with greater budgetary demands.

However, the findings of this study diverge from the results observed in the funding of food and nutrition research, which indicated national funding as the main modality, both in terms of the number of projects and the volume of resources (Couto *et al.*, 2019). It is worth highlighting that the area of food and nutrition is one of the 24 sub-agendas of the ANPPS, encompassing a wide variety of research topics. This may explain the greater number of research projects and the larger amount of resources

allocated to epidemiological studies of national scope, predominantly funded through national funding (Couto *et al.*, 2019).

However, approximately 32.5% of research in food and nutrition was funded by PPSUS, corresponding to 29% of the total amount invested by the MoH (Couto *et al.*, 2019). These data reinforce the strategic role of PPSUS as a funding modality, regardless of the theme, by inducing research aligned with regional health needs, contributing to the reduction in territorial inequalities in knowledge production, and fostering scientific and technological development within the SUS (Souza; Calabró, 2017; Vieira-da-Silva; Silva; Esperidião, 2017).

Regarding the periods of the PNS, the greater number of research projects on PA funded in the period of 2004–2007 can be justified by the launch of the National Health Promotion Policy in 2006, which involved a set of actions promoted by the MoH, preceded by the development of research (Malta *et al.*, 2014). The increased funding for research in PA between 2008 and 2011 can be explained by the launch of the Academia da Saúde Program in 2011, which was implemented based on research evaluating the effectiveness of municipal initiatives (Malta *et al.*, 2014). Furthermore, the PNS 2008–2011 period marked the beginning of the inclusion of goals related to PA in the planning instruments of the SUS (Vieira; Carvalho, 2024), which may have contributed to prioritizing the physical activity agenda, in a “cascade effect” on the MoH agenda, including the promotion of research.

The observed decline in the number and amount of resources between 2016 and 2019 may be related to the strengthening of neoliberal policies and the adoption of fiscal austerity measures, which resulted in underfunding of the SUS (Menezes; Moretti; Reis, 2019), with a negative impact on PA promotional activities (Vieira; Carvalho, 2021), in addition to budget cuts for science and technology (Negri, 2022). Furthermore, the absence of targets in the PNS 2020–2023 (Vieira; Carvalho, 2024) and the attacks on science that occurred between 2019 and 2022, with the expansion of cuts in research funding (Hallal, 2021), can be pointed out as factors that contributed to the reduction in the number of research projects and the total amount invested during this period, especially the lack of funding between 2021 and 2023.

Regarding regional distribution, the concentration of research on PA in the South and Southeast regions is similar to the results of a previous study (Machado *et al.*, 2025). This can be explained, in part, by the existing asymmetries in the postgraduate system and in the promotion of research in Brazil. Taking Physical Education as an example, an area that plays a prominent role in research on PA, there is a greater concentration of institutions with postgraduate programs and research funding in the Southeast, Northeast, and South regions, compared to the Central-West and North regions (CAPES, [s.d.]; CNPq, [s.d.]). This scenario of disparities in structural aspects influences the regional capacity for scientific production, as demonstrated by the fact that, in 2023, 50.5% of scientific production in the field of Physical Education came from the Southeast, 18.7% from the Northeast, 13.9% from the South, 6.3% from the Central-West, 2.1% from the North, and 8.5% involved more than one region (CAPES, [s.d.]).

Although no recent studies are known, the work of Silva *et al.* (2014) revealed that the sub-area “PA and Health” accounted for 18% of the projects funded by CNPq in the area of Physical Education, with most researchers based in the South (44%) and Southeast (36%) regions. Furthermore, over 60% of the funding allocated to research in this sub-area was concentrated in the South and Southeast regions, while the North region did not register any funded projects (Silva *et al.*, 2014).

These results are, to some extent, similar to those of the present study, which identified a higher rate of research per capita and a greater proportion of GDP allocated to research funding in the Southern region. These disparities possibly contributed and still contribute to the asymmetry in the distribution of research funding in PA. Nevertheless, funding from the MoH has boosted the development of research on the topic in all Brazilian macro-regions, which may, to some extent, contribute to reducing regional inequalities in funding and scientific production.

Regional disparities in health research, including in the area of PA, are related to the characteristics of scientific and technological development in the country, historically concentrated in the South and Southeast regions (CAPES, 2024). Reducing these asymmetries is complex and multifactorial; funding for research by the MoH can contribute to their reduction, as well as to consolidating groups of research excellence in less favored regions.

Finally, considering the recent signs of increased investment in policies promoting PA within the SUS (Carvalho *et al.*, 2024) and the inclusion of specific goals in the 2024–2027 Multi-Year Plan — the main budgetary planning instrument of the federal government — preceded by a broad strategy of social mobilization and participation (Carvalho; Sposito; Vieira, 2024), is possible to infer that this context may encourage research on PA. In addition, the existence of a National Policy on Body Practices and Physical Activities (PNPCAF) (Andrade *et al.*, 2025; Carvalho; Tavares; Pereira Filho, 2025) could contribute to expanding and encouraging research aligned with public policies and the needs of the SUS.

Key strengths include the novelty of the topic, the extensive analysis period, and the detailed breakdown of research funding by macro-region, including data on the research rate per capita and the proportion of GDP allocated to this funding. Research into methods for funding research in PA can also be highlighted as a pioneering and relevant aspect for bridging the gap between research and SUS policies. The existence of open data should also be acknowledged, as it fosters the development of new research and enables social control and advocacy actions related to PA as a public health policy.

Limitations include inconsistencies and incompleteness of data in the Health Research system, an aspect also identified in other studies (Couto *et al.*, 2019; Melo *et al.*, 2023). Despite this, this is the official system of the MoH that gathers information about funded projects. Furthermore, the present study did not allow an evaluation of the MoH’s investments in the preparation of technical documents, usually carried out through Decentralized Execution Agreements or Letters of Agreement with institutions and researchers, such as, for example, the Physical Activity Guide for the

Brazilian Population (Tenório *et al.*, 2022), whose development is generally preceded by research as a preliminary step in production.

Future studies, including qualitative works, are needed to evaluate the applicability and recommendations of PA research funded by the MoH for the policies and services of the SUS. Furthermore, it is important to investigate the influence of funding for PA research on the training of professionals and researchers, considering that human resource development is one of the SUS's responsibilities. In addition, analysis of the characteristics of the coordinators of the funded research projects is recommended—such as their initial training, areas of concentration, and institutional affiliation—as these aspects constitute relevant and still underexplored elements.

5 FINAL CONSIDERATIONS

This unprecedented study revealed that funding for research in PA by the MoH has fluctuated over the years. Periods of higher investment coincided with the implementation of the National Health Promotion Policy and the Health Academy Program. However, in recent years, there has been a reduction in the number of research projects and resources allocated to the topic. This decline may be associated with the absence of specific targets for PA in the SUS planning instruments and the adoption of fiscal austerity measures.

Despite the increased number of research projects funded by PPSUS, the amount of resources allocated to the program remains limited, given its strategic importance in decentralizing investments and aligning research with regional health needs, especially in historically disadvantaged regions.

In conclusion, it is essential to expand and promote a more equitable distribution of research funding in PA, with an emphasis on strengthening the PPSUS. The creation of the PNPCAF emerges as a relevant strategy to encourage the promotion of research that meets the health needs of the population and the demands of the SUS services.

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Resumo: O incentivo à pesquisa em saúde é uma competência constitucional do Sistema Único de Saúde (SUS). Este estudo teve como objetivos: a) analisar a evolução temporal e a distribuição regional das pesquisas sobre atividade física (AF) financiadas pelo Ministério da Saúde; b) identificar as modalidades de fomento dessas pesquisas. Trata-se de um estudo ecológico baseado no sistema Pesquisa em Saúde, no período de 2002 a 2023. Foram evidenciadas diferenças no número de pesquisas e no valor total deflacionado entre as modalidades de fomento, períodos do Plano Nacional de Saúde (PNS) e macrorregiões. O PNS 2004–2007, a região Sul e o Programa de Pesquisa para o SUS (PPSUS) registraram o maior número de pesquisas, enquanto o PNS 2008–2011, a região Sudeste e o fomento nacional receberam o maior montante de recursos. É necessário ampliar e promover uma distribuição mais equitativa do financiamento dessas pesquisas, especialmente por meio do PPSUS.

Palavras-chave: Política de pesquisa em saúde. Financiamento da pesquisa. Política de saúde. Promoção da saúde.

Resumen: El fomento de la investigación en salud es una competencia constitucional del Sistema Único de Salud (SUS). Este estudio tuvo como objetivos: a) analizar la evolución temporal y la distribución regional de las investigaciones sobre actividad física (AF) financiadas por el Ministerio de Salud; b) identificar las modalidades de fomento de esas investigaciones. Se realizó un estudio ecológico basado en el sistema de Investigación en Salud, correspondiente al período 2002–2023. Se observaron diferencias en el número de investigaciones y en el valor total deflactado entre las modalidades de fomento, los períodos del Plan Nacional de Salud (PNS) y las macrorregiones. El PNS 2004–2007, la región Sur y el Programa de Investigación para el SUS (PPSUS) concentraron el mayor número de estudios, mientras que el PNS 2008–2011, la región Sudeste y el fomento nacional recibieron el mayor volumen de recursos. Es necesario ampliar y promover una distribución más equitativa del financiamiento de esas investigaciones, especialmente mediante el PPSUS.

Palabras clave: Política de investigación en salud. Financiación de la investigación. Política de salud. Promoción de la salud.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest in this work.

AUTHORIAL CONTRIBUTIONS

Leonardo Araújo Vieira: Study conception, data curation, data collection, data analysis, writing, revision, and editing.

Fabio Fortunato Brasil de Carvalho: Study conception, data curation, data collection, data analysis, writing, revision, and editing.

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Danilo Sales Bocalini: Study conception, data curation, data collection, data analysis, writing, revision, and editing.

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RESEARCH ETHICS

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AVAILABILITY OF RESEARCH DATA

Research data are only available upon request.

HOW TO REFERENCE THIS WORK

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