









## SCIENTIFIC PRODUCTION BASED ON THE BRAZILIAN NATIONAL ADOLESCENT SCHOOL-BASED HEALTH SURVEY (PENSE): A BIBLIOMETRIC REVIEW

A PRODUÇÃO CIENTÍFICA BASEADA NA PESQUISA NACIONAL DE SAÚDE DO ESCOLAR (PENSE): UMA REVISÃO BIBLIOMÉTRICA

LA PRODUCCIÓN CIENTÍFICA BASADA EN LA ENCUESTA NACIONAL DE SALUD ESCOLAR (PENSE): UNA REVISIÓN BIBLIOMÉTRICA

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**Funding:** Fundo Nacional de Saúde - FNS, Secretaria de Vigilância em Saúde - SVS, Ministério da Saúde - MS. (TED: 66/2018).

**Submitted on:** 03/08/2022

**Approved on:** 10/16/2022

**Responsible Editor:**

 Tânia Couto Machado Chianca

### ABSTRACT

**Objective:** to analyze the published scientific productions that used the results of the National School Health Survey (*Pesquisa Nacional de Saúde do Escolar*, PeNSE) as data source. **Method:** this is a bibliometric review. The review included articles published in indexed journals in English, Spanish and Portuguese, dated from 2009. For the process of systematization and presentation of the results, the following variables were considered: year of publication; language; authorship; institutional affiliation of the first author; keywords; thematic categories; and journal in which the study was published. A descriptive data analysis was performed from the survey of absolute and relative frequencies for each variable. **Results:** a total of 31 studies published between 2010 and 2021 were included in this review. In 2014, 2018 and 2021, there was a significant increase in the number of publications. Most of the studies were published in the following journals: *Revista Brasileira de Epidemiologia*, *Ciência & Saúde Coletiva* and *Cadernos de Saúde Pública*. The main thematic category was related to "Risk and Protection Factors for chronic non-communicable diseases". **Conclusion:** the results show the importance of PeNSE in the production of Brazilian scientific knowledge and in the health surveillance of Brazilian adolescents.

**Keywords:** Adolescent Health; Health Surveys; Scientific Publication Indicators; Bibliometric Indicators; Brazil.

### RESUMO

**Objetivo:** analisar as produções científicas publicadas que utilizaram os resultados da Pesquisa Nacional de Saúde do Escolar (PeNSE) como fonte de dados. **Métodos:** trata-se de uma revisão bibliométrica. Foram incluídos na revisão artigos publicados em periódicos indexados, em inglês, espanhol e português, datados a partir de 2009. Para o processo de sistematização e apresentação dos resultados, consideraram-se as seguintes variáveis: ano de publicação; idioma; autoria; vinculação institucional do primeiro autor; palavras-chave; categorias temáticas; e periódico em que foi publicado o estudo. Foi realizada análise descritiva dos dados a partir do levantamento das frequências absolutas e relativas para cada variável. **Resultados:** nesta revisão, foram incluídos 31 estudos publicados entre 2010 e 2021. Em 2014, 2018 e 2021, houve um aumento expressivo do quantitativo de publicações. A maioria dos estudos foram publicados dos seguintes periódicos: *Revista Brasileira de Epidemiologia*, *Ciência & Saúde Coletiva* e *Cadernos de Saúde Pública*. A principal categoria temática foi referente aos "Fatores de Risco e de Proteção para as doenças crônicas não transmissíveis". **Conclusão:** os resultados evidenciam a importância da PeNSE na produção do conhecimento científico brasileiro e na vigilância em saúde dos adolescentes brasileiros.

**Palavras-chave:** Saúde do Adolescente; Inquéritos Epidemiológicos; Indicadores de Produção Científica; Indicadores Bibliométricos; Brasil.

### RESUMEN

**Objetivo:** analizar las producciones científicas publicadas que utilizaron los resultados de la Encuesta Nacional de Salud Escolar (PeNSE, por sus siglas en portugués) como fuente de datos. **Métodos:** se trata de una revisión bibliométrica. La revisión incluyó artículos publicados en revistas indexadas, en inglés, español y portugués, publicados a partir de 2009. Para el proceso de sistematización y presentación de los resultados, se consideraron las siguientes variables: año de publicación; idioma; autoría; afiliación institucional del primer autor; palabras clave; categorías temáticas y revista donde se publicó el estudio. Se realizó un análisis descriptivo de los datos, basado en las frecuencias absolutas y relativas de cada variable. **Resultados:** se incluyeron en esta revisión 31 estudios publicados entre 2010 y 2021. En 2014, 2018 y 2021 se produjo un aumento significativo del número de publicaciones. La mayoría de los estudios se publicaron en la *Revista Brasileira de Epidemiologia*, *Ciência & Saúde Coletiva* y en *Cadernos de Saúde Pública*. La principal categoría temática estaba relacionada con los "Factores de riesgo y protección de las enfermedades crónicas no transmisibles". **Conclusión:** los resultados destacan la importancia del PeNSE en la producción de conocimiento científico brasileño y en la vigilancia de la salud de los adolescentes brasileños.

**Palabras clave:** Salud del Adolescente; Encuestas Epidemiológicas; Indicadores de Producción Científica; Indicadores Bibliométricos; Brasil.

### How to cite this article:

Ferreira ACM, Silva AG, Sá ACMGN, Prates EJS, Alves FTA, Santi NMM, Oliveira MM, Malta DC. The scientific production based on the Brazilian National School Health Survey (PeNSE): A bibliometric review. REME - Rev Min Enferm. 2022[cited \_\_\_\_];26:e-1482. Available from: DOI: 10.35699/2316-9389.2022.38671

## INTRODUCTION

The National School Health Survey (PeNSE) is a survey conducted by the Brazilian Institute of Geography and Statistics (*Instituto Brasileiro de Geografia e Estatísticas*, IBGE), in partnership with the Ministry of Health and support from the Ministry of Education (MEC). The research is part of the surveillance of Risk Factors and Protection of Chronic Non-Communicable Diseases (CNCDS) in Brazil<sup>(1)</sup>.

PeNSE was the first national survey that addressed several aspects of adolescents' lives, such as habits, care, risk factors and protection for their health.<sup>2</sup> Its first edition was carried out in 2009, with planning for a three-year period. Since then, three more editions have been conducted: in 2012, 2015 and 2019. PeNSE provides data of national and regional scope that help to map the behavior of Brazilian adolescents, as well as to identify social determinants that influence the health of this population segment.<sup>2</sup>

The target audience of the research corresponds to students enrolled in and attending public and private schools throughout the country. In its first two editions, PeNSE used only one sample, consisting of students from 9<sup>th</sup> grade of Elementary School. In the 2015 edition, two different samples were used: one comprised students from 9<sup>th</sup> grade of Elementary School and another sample consisting of students from 6<sup>th</sup> grade of Elementary School to 3<sup>rd</sup> year of High School, with ages ranging from 13 to 17 years old.<sup>3,5</sup> In the 2019 edition, the sample consisted only of students from aged 13 to 17 years old, from 7<sup>th</sup> grade of Elementary School to 3<sup>rd</sup> year of High School.<sup>2</sup>

PeNSE's results contribute to the development of management policies and strategies in the various administrative spheres and assist in the identification and monitoring of factors related to biopsychosocial development and exposure to risk conditions for this age group. In addition to that, it provides data and information on the profile of Brazilian adolescents and can be compared with international indicators.<sup>2</sup> The survey also contributes to the surveillance, monitoring and evaluation of adolescents' health, being widely used for the development of scientific and academic research studies.

Public domain research data favor the production of scientific knowledge, such as publications of articles and academic papers, such as monographs, dissertations and theses, which shows their importance for the science.

Despite the great potential of PeNSE, there are still scientific gaps in relation to the studies that used it as data source. As an example, we can mention the number of publications and which the most researched topics were and that still need research.

From this perspective, considering the relevance of PeNSE in the national scenario, it is important to map the studies that used its results to generate diverse scientific evidence, thus allowing to highlight its contribution to Brazilian science, as well as to identify the most addressed themes. Thus, the objective of this study was to analyze the published scientific productions that used the results of PeNSE as data source.

## METHODS

This is a bibliometric review, a type of study capable of providing an overview of a given research field through a quantitative analysis of bibliographic material.<sup>6</sup>

To guide formulation of guiding question formulation in this research, the Population, Concept and Context (PCC) strategy was adopted with the following question: Which scientific productions used the results of the PeNSE as data source? Thus, based on the guiding question, the following was defined: Population - Adolescents participating in the survey; Concept - PeNSE results; and Context - Studies published about PeNSE.

In the bibliometric review, full original articles were included, published in journals indexed in English, Spanish and Portuguese and published from 2009 (year when the first edition of the PeNSE was launched). The materials excluded were those whose access was restricted, articles that did not use PeNSE as data or analysis source, articles not available in full in the databases, reflection articles, experience reports and reviews, as well as Gray Literature such as monographs, dissertations, theses, debate texts and Internet.

The searches were carried out between December 2021 and January 2022 in the Medical Literature Analysis and Retrieval System Online (MEDLINE - via PubMed) database and in the Virtual Health Library (*Biblioteca Virtual em Saúde*, BVS). For this purpose, standardized terms available in the Health Sciences Descriptors system (DeCS/MeSH) and the free term “*Pesquisa Nacional de Saúde do Escolar*” was used, selected because for being name of the survey, as well as “PeNSE”, which is the standardized abbreviation for the name of the survey.<sup>2</sup> It is noted that these strategies were adapted according to the specificities of each database used (Figure 1).

The search was carried out considering dates of publication until January 5<sup>th</sup>, 2022. Guided by the eligibility criteria, selection of the publications to be analyzed in this study was made in three stages:

- **Identification stage:** In this stage, studies were searched in the databases, the results of which were exported to *Rayyan Systems Inc*<sup>®</sup> in order to exclude duplicates.

- **Screening stage:** The titles and abstracts of the articles were read, followed by a full reading, focusing on the methods used in the studies. This reading was performed in pairs, independently. Any and all divergences in selection were discussed and solved by consensus between the parties and the reasons for excluding the publications were recorded.

Figure 1 - Databases and search strategies used for retrieval of the indexed studies. Bibliometric Review - National School Health Survey, 2022

Database/Library	Strategy
BVS	("Pesquisa Nacional de Saúde do Escolar" OR "National Adolescent Health Survey" OR "Encuesta Nacional de Salud de los Adolescentes" OR PeNSE OR "Monitoramento Epidemiológico" OR "Epidemiological Monitoring" OR "Monitoreo Epidemiológico" OR "Inquéritos Epidemiológicos" OR "Health Surveys" OR "Encuestas Epidemiológicas") AND (Adolescente OR Adolescent) AND (Brasil OR Brazil)
MEDLINE via PUBMED	("National Adolescent Health Survey" OR PeNSE OR "Epidemiological Monitoring" OR "Health Surveys") AND (Adolescent) AND (Brazil)

Source: Prepared by the authors. 2022.

Four nurses and two undergraduate Nursing students did the reading, all selected for being part of a research group at *Universidade Federal de Minas Gerais* (UFMG), for having expertise in epidemiological studies and for having already worked with PeNSE data.

- **Inclusion stage:** The studies selected were introduced into a Microsoft Office Excel spreadsheet (Microsoft<sup>®</sup> 2016), prepared by the authors to extract the data of interest for this study.

For the process of systematization and presentation of the results, the contributions of Bibliometrics were used as a reference, which corresponds to a set of research methods that combines the quantitative approach, statistics and data visualization techniques.<sup>7</sup> In this sense, the following variables were considered: year of publication; language; authorship (number of authors and name of the first author); institutional affiliation of the first author; keywords; thematic categories; and journal in which it was published.

The following thematic categories were defined, divided according to the 2019 PeNSE thematic modules<sup>(2)</sup> (Figure 2).

The results of the keywords most commonly used in the studies and the affiliation institutions of the first authors were presented in the format of a “word cloud” or “text cloud”, which consists of a visual proposal for the presentation of linguistic data that displays the frequency with which the terms appear. It also makes it possible to identify the importance of a given word in relation to the total number of words.<sup>8</sup> For the analysis of the most used keywords, it was sought to identify which the single words were and the number of times they were repeated.

Figure 2 - Thematic categories used in this bibliometric review to allocate the existing topics in the National School Health Survey and addressed in the studies selected in the review, 2022

Thematic Category	Definition/Topics included in the category
Risk and protective factors for CNCDS	Diet, physical activity, alcohol and smoking
External causes	Physical fights, bullying, assault, sexual violence, traffic safety and traffic accidents
Mental health	Social life, presence of friends, concerns, mood and desire to live
Oral health	Oral diseases, oral hygiene, toothache and visits to the dentist
Sexual and reproductive health	Using contraceptive methods, sexual initiation, sexual education and pregnancy
Use of health services	Perception of health status and search for health services
Family context	Missing classes, parents' knowledge about free time, duties, children's concerns and problems, presence of the parents
Body image perception and anthropometry	Body acceptance and anthropometric data
Respiratory disease	Asthma
Others	It includes studies that had methodologies for analysis of confounding variables in epidemiological studies, health self-assessment, discussion of public policies, or that included characteristics of PeNSE and the schools

Source: Extracted from the book entitled *Pesquisa Nacional de Saúde do Escolar* 2019, IBGE, 2021, and adapted by the authors, 2022.

There was a combination of synonyms, similar terms or that dealt with the same subject matter, in order to reduce the total number words used. Thus, words that appeared five or more times in the set of abstracts selected were included in the figure.

The descriptive data analysis was performed from the survey of absolute and relative frequencies for each variable analyzed in this study. These analyses were performed using Microsoft Office Excel (Microsoft® 2016).

As this is not a study with humans, this research did not need to be evaluated by the competent bodies. PeNSE was approved in all its editions, receiving the following numbers from the National Research Ethics Committee: 2009: No. 11,537; 2012: No. 16,805; 2015: No. 1,006,467; and 2019: 3,249,268. This study had financial support from the National Health Fund, Health Surveillance Department, Ministry of Health (TED: 66/2018).

## RESULTS

Through the search strategy, 2,292 articles were identified and 637 duplicate documents were excluded. 1,665

studies were selected for reading their titles and abstracts and, subsequently, 1,490 were excluded for not meeting the inclusion criteria. Finally, 165 studies were read in full, of which 34 were excluded for the following reasons: 8 were Gray Literature, such as theses and dissertations; 16 were not available in full in the databases; and 10 did not use PeNSE data. At the end, a total of 131 studies were included in this review (Figure 3).

Figure 4 shows the annual number of publications of studies that used PeNSE data in their analyses. The first publications were in 2010 (n = 08). 2018 was the year that concentrated the largest number (n = 29), followed by 2019 (n = 22), 2014 (n = 17) and 2021 (n = 17).

Table 1 shows the main bibliometric characteristics of the studies selected. The studies were published in Portuguese (n = 60), in English (n = 55) and in both languages (n=16). The articles have, mainly, between 5 and 6 authors (n = 52). The authors who published the most were the following: Deborah Carvalho Malta (n = 20); Catarina Machado Azeredo (n = 4); Flávia Carvalho M. Mello (n = 3); Max Moura Oliveira (n = 3); Rita de Cássia Ribeiro-Silva (n = 3) and Thiago Sousa Matias (n =

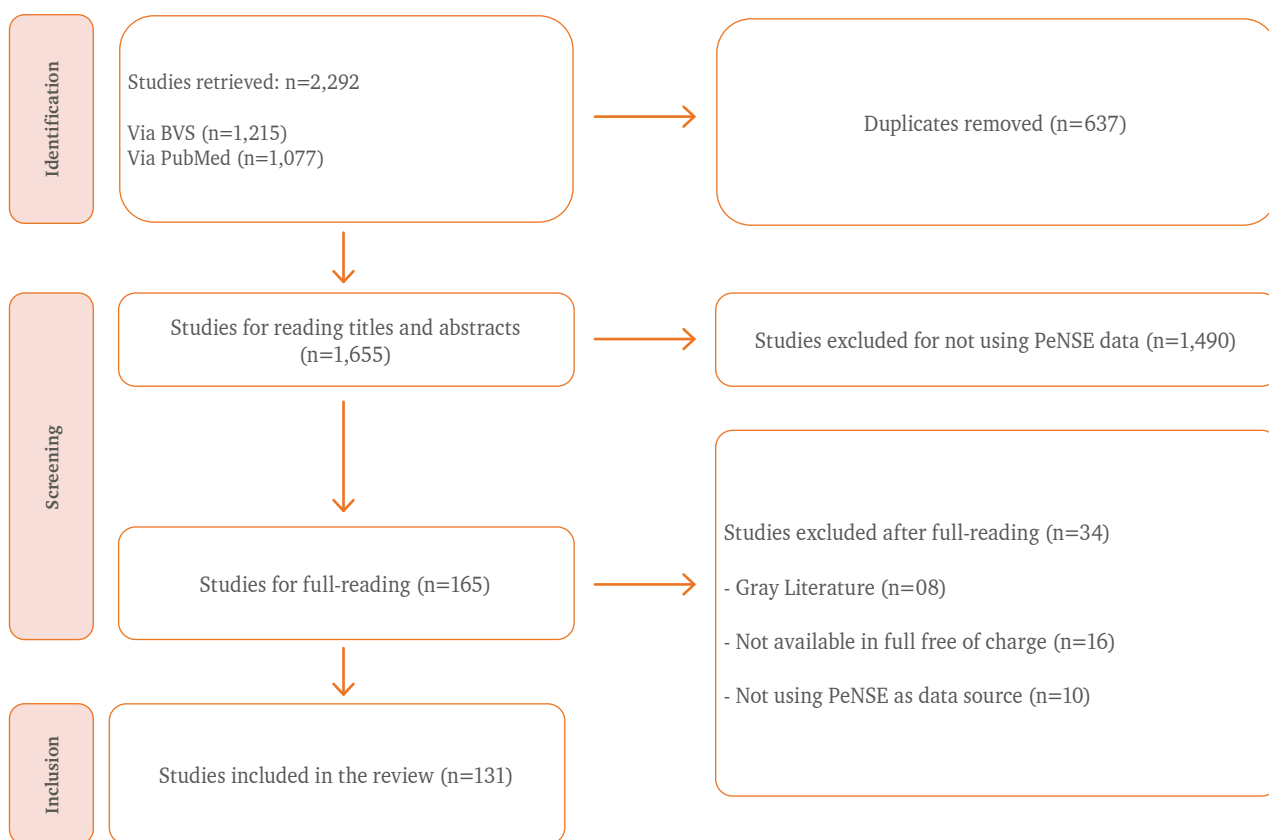


Figure 3 - Flowchart corresponding to selection of the indexed articles that analyzed data from the National School Health Survey, 2009-2019. 2022  
Source: BVS and Medline via PUBMED, 2022.

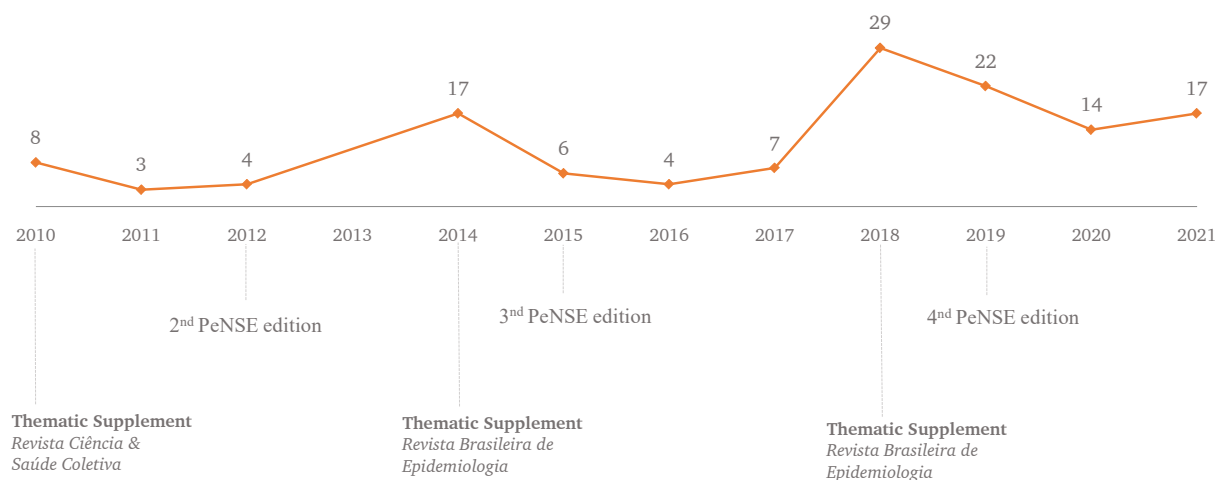


Figure 3 - Annual number of publications of studies that used data from the National School Health Survey and launch of thematic supplements of the National School Health Survey in journals, 2010-2021.  
Source: Prepared by the authors, 2022.

3). Another 80 authors appear with two or fewer publications. The main thematic categories addressed in the studies were as follows: Risk and Protective Factors for CNCDS, which includes subject matters such as diet, physical activity, alcohol and tobacco use ( $n = 61$ ); External Causes, which includes bullying, physical fights, sexual abuse and traffic accidents ( $n = 28$ ); Sexual and reproductive health ( $n = 9$ ); in addition to Family Context and Oral Health, both with 7 publications each. The main scientific journals that published the studies were the following: *Revista Brasileira de Epidemiologia* ( $n = 42$ ); *Revista Ciência & Saúde Coletiva* ( $n = 22$ ) and *Cadernos de Saúde Pública* ( $n = 20$ ), another 25 journals appear with 6 or fewer publications.

Regarding the authors' affiliation institutions, 35 different institutions were identified, among which *Universidade Federal de Minas Gerais* (UFMG) and the Health Surveillance Department (SVS) belonging to the Ministry of Health stand out, representing the main affiliation institutions of the authors. They are followed by *Universidade de São Paulo* (USP), *Universidade Federal de Goiás* (UFG), *Universidade Federal da Bahia* (UFBA) and *Universidade Federal de Pelotas* (UFPel) (Figure 5).

Figure 6 shows the keywords most used in the studies, with emphasis on adolescents, epidemiology, risk factors, eating behavior, external causes, school, obesity, tobacco, alcohol and mental health.

Table 1 - Bibliometric characteristics of the publications, according to language, number of authors, main authors, thematic category and journals. PeNSE 2010-2021

Characteristics	n	%
<b>Language</b>		
Portuguese	60	45.8%
English	55	42.0%
English and Portuguese	16	12.2%
<b>Number of authors</b>		
5 and 6	52	39.7%
3 and 4	38	29.0%
7 and 8	25	19.1%
1 and 2	10	7.6%
9 or more	6	4.6%
<b>Main author</b>		
Deborah Carvalho Malta	20	15.3%
Catarina Machado Azeredo	4	3.1%
Flávia Carvalho M. Mello	3	2.3%
Max Moura Oliveira	3	2.3%
Rita de Cássia Ribeiro-Silva	3	2.3%
Thiago Sousa Matias	3	2.3%
<b>Thematic category</b>		
Risk and Protective Factors for CNCDS	61	46.6%
External causes	28	21.4%
Sexual and reproductive health	9	6.9%
Family context	7	5.3%

Continue...



Characteristics	n	%
<b>Thematic category</b>		
Oral health	7	5.3%
Others	4	3.1%
Body image	4	3.1%
Asthma	4	3.1%
Body image perception and Anthropometry	3	2.3%
Mental health	2	1.5%
Use of health services	2	1.5%
<b>Journal</b>		
<i>Revista Brasileira de Epidemiologia</i>	42	32.1%
<i>Ciência e Saúde Coletiva</i>	22	16.8%
<i>Cadernos de Saúde Pública</i>	20	15.3%

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2009 edition was published by *Ciência & Saúde Coletiva*. In the editorial of this supplement, it was portrayed that PeNSE composes the surveillance of Non-Communicable Diseases (CNCDS), which was structured in 2003; in addition, the important path of national surveys until their entry into the country in 2009 was presented.<sup>9</sup>

In 2014, *Revista Brasileira de Epidemiologia* published a supplement on the second edition of PeNSE, highlighting in its editorial the expansion of the research sample, representing Brazil, Brazilian regions, capital cities and the Federal District.<sup>11</sup> In 2018, *Revista Brasileira de Epidemiologia* launched a supplement referring to the third edition of PeNSE, with themes on risk factors for CNCDS and time analysis of indicators.<sup>12</sup> Subsequently, other studies on Brazilian adolescents' health were carried out using PeNSE, with more than 20 articles published in 2021, in which the database from the third edition of the 2015 survey was mainly explored with diversified themes such as oral health, physical activity, violence and diet, among others.<sup>13,17</sup>

The fact that most of the publications were in Portuguese can be related to it being a national survey and to publications occurring in national journals, in addition to the interest of Brazilian researchers to explore and study the theme.<sup>9,11,12,18</sup>

The predominance of the group research - the type carried out by 3 or more authors - is related to partnerships and junctions of different knowledge areas and skills.<sup>19,20</sup> In relation to the authors with the highest number of publications with PeNSE data, it is noted that all are researchers and have experience with this survey and with the themes addressed in it, as stated in official publications of PeNSE and in other studies.<sup>1,3,5,21-25</sup> In addition to that, the important contribution of women in science is noted, as they were the ones who most published on PeNSE, especially as first authors. It is noteworthy that, between 2011 and 2015, female researchers answered for the authorship of approximately half of the publications in Brazil.<sup>26</sup>

Regarding the interest in the theme of Risk and Protective Factors for CNCDS, evidenced in this study, it can be related to the commitment that the country has assumed to reduce these diseases through the Strategic Action Plan for Combating CNCDS in Brazil, 2011-2022. This Plan aimed at stimulating the development and implementation of sustainable and integrated evidence-based public policies and that would contribute to mitigating CNCDS in the country, which was done in line with the international agenda proposed by the World Health Organization (WHO).<sup>27-28</sup> Among the risk and protective

factors, alcohol consumption, tobacco use, physical activity and diet stand out. The studies also addressed external causes, which include violence, showing that they are prevalent among adolescents, both at school and at home.

The studies were published mainly in the *Revista Brasileira de Epidemiologia*, *Ciência & Saúde Coletiva* and *Cadernos de Saúde Pública* journals. It is noted that these journals are important sources of scientific publications on the epidemiology and surveillance of CNCDS and their risk and protective factors, being among the main journals of the Public Health collections found in the Scientific Electronic Library Online (SciELO). The approach to this theme in such journals portrays the magnitude, priority and transcendence of the issue.<sup>19</sup> It shows that its scopes are aligned with national and global agendas based on the national and global plan to confront CNCDS and on the Sustainable Development Goals.<sup>29-31</sup> Such journals fulfill their roles in disseminating scientific evidence, promoting the debate on CNCDS and strengthening their relevance.<sup>19</sup>

Public institutions were the ones that most published research studies on PeNSE, accounting for the main institutional affiliations of the authors. This shows that, even in the face of the challenges related to the scarcity of financial resources for public universities and Brazilian science, especially in times of fiscal austerity and the underfunding of science and technology, there is mobilization of these institutions and their researchers to foster fulfillment of their social and scientific roles.<sup>19,32,33</sup> In addition to that, Brazil is experiencing one of the largest economic, political and social crises in its history, this situation being aggravated by the COVID-19 pandemic.<sup>34</sup> However, even with difficulties, there is a new growth in publications on PeNSE in 2021. Scientific research is essential for the Unified Health System (*Sistema Único de Saúde*, SUS), as it produces subsidies capable of contributing significant changes to the lives of individuals, families and communities, as well as to work processes.<sup>19,35</sup>

The keywords most used in the publications confirm the most studied thematic categories. It becomes important to mention the need to use controlled words (such as those registered in the DeCS/MeSH systems) so that scientific production can be easily retrieved, in addition to reiterating the precautions authors must take when choosing these words. Those that in fact represent the theme and content of the study, should be selected.<sup>36</sup>

This study evidenced the importance of PeNSE, both in providing diverse information to support the implementation of policies aimed at Brazilian adolescents' health and for the country's scientific production. In this context, it becomes fundamental to maintain the survey in time,

as well as its constant expansion, consolidating it as the main component of the system for Brazilian adolescents' health surveillance. In addition to that, there is a clear need for researchers to explore all the topics addressed by PeNSE, such as vaccination among adolescents, use of health services and body image, in order to really have an overview of adolescents' health in its entirety.

This study had the following limitations: selection of articles in only two databases; on the other hand, those that gather significant scientific production in the health area were considered. There is also the possibility of subjectivity in defining and grouping the subject matters addressed by the various articles; however, the strategy was planned taking into account the categories arranged in PeNSE publications.

## CONCLUSION

The results show the importance of PeNSE for expanding knowledge and the impact of the research on the national scientific production. PeNSE is essential to know the risk and protection factors for CNCDS and for surveillance of Brazilian adolescents' health; in addition to being crucial to support programs, policies and actions aimed at CNCDS control and protection in this population group. Therefore, the importance of PeNSE continuity in the country is reinforced, following its triennial periodicity and with methodological coherence so that there is continuity and monitoring of the indicators over the years. Financial incentives for teaching and research are also essential, so that researchers and institutions are able to continue with the studies and publications that exert an impact on Brazilian science and public health.

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