A bibliometric analysis of three decades of research on the correlates and determinants of physical activity in China

Uma análise bibliométrica de três décadas de pesquisa sobre os correlatos e determinantes da atividade física na China

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ABSTRACT

Objective: This study examines three decades of research progress on the correlates and determinants of physical activity in China, by analyzing the trends and characteristics of publications from 1990 to 2019. Methods: A systematic review was conducted by the Global Observatory of Physical Activity on physical activity publications globally between 1950 and 2019, of which 162 publications on correlates and determinants of physical activity in China were included in this study. Key variables analyzed were: types of correlates and determinants, study design, age group, instruments measuring physical activity, first author's affiliation, geographical characteristics of the study population's distribution, and publication decade. Results: The number of publications on the correlates and determinants of physical activity in China has shown an increasing trend since the first one was identified in 1998. Most publications were cross-sectional studies (79.6%), about eight times more than cohort studies. Most publications focused on individual-level correlates and determinants (72.8%) of physical activity. Regarding study population, most studies selected participants from economically developed cities and few took place in smaller cities. Children 0-9 years were the age group with the least number of studies identified. Questionnaires were the most common measurement tool (72.2%). Conclusions: Despite a marked increase in the number of publications over three decades, research efforts remain characterized by persistent homogeneity, underscoring the need for more cohort studies, broader geographical representation, balanced attention across age groups and different layers of correlates and determinants.

Keywords: Physical activity; Physical activity research; China; Correlates; Determinants.

RESUMO

Objetivo: Esse estudo avalia o progresso de três décadas na pesquisa sobre os determinantes e fatores associados à inatividade física na China, ao analisar tendências temporais e as características dos artigos publicados entre 1990 e 2019. Métodos: Uma revisão sistemática foi conduzida pelo Observatório Global de Atividade Física identificando publicações na área de atividade física e saúde entre 1950 e 2019 na China, das quais 162 foram sobre os determinantes e fatores associados à inatividade física. As principais variáveis analisadas foram: tipos de determinantes e fatores associados investigados, delineamento do estudo, grupos etários investigados, instrumentos usados para avaliar a atividade física, afiliação do primeiro autor, características geográficas da população em estudo e década da publicação. Resultados: O número de publicações sobre os determinantes e fatores associados à inatividade física na China mostrou uma tendência crescente desde a publicação do primeiro artigo em 1998. A maioria dos estudos utilizou um delineamento transversal (79,6%), cerca de oito vezes mais frequentes do que estudos de coorte. A maioria das publicações (72,8%) avaliou determinantes e fatores associados à inatividade física no nível individual. Em termos da população em estudo, a maioria das pesquisas foram conduzidas em cidades grandes, com maiores níveis de desenvolvimento. Crianças de 0 a 9 anos de idade foram o grupo com menor número de estudos identificados. Os questionários foram os instrumentos mais usados (72,2%). Conclusões: Apesar de um marcado aumento na quantidade de publicações sobre determinantes e fatores associados à inatividade física na China nas últimas três décadas, as pesquisas são caracterizadas por uma persistente homogeneidade, destacando-se a necessidades de mais estudos de coorte, ampliação da representação geográfica dos estudos, atenção balanceada entre os diferentes grupos etários e a investigação de diferentes camadas de determinantes e fatores associados à inatividade física.

Palavras-chave: Atividade física; Pesquisa em atividade física; China; Fatores associados; Determinantes.

Introduction

Physical inactivity is responsible for more than 5 million deaths per year worldwide[1]. Globally, more than a quarter of adults and 80% of adolescents are physically inactive[2]. Although some progress has been noted in terms of physical activity (PA) surveillance, research, and policy worldwide[3-12], physical inactivity levels remain high, and it is unlikely the World Health Organization target of a 15% reduction in the prevalence of inactivity by 2030[13] will be achieved[14]. The prevalence of physical inactivity, particularly in leisure time, is concerning, particularly in low- and middle-income countries[15,16], where most of the world's population lives. Although physical inactivity is often regarded as an individual's issue, it also exerts considerable consequences at the societal level. In 2013, physical inactivity cost healthcare systems $53.8 billion globally[17]. In China, the cost of physical inactivity to the country's healthcare system was estimated to be more than $4.8 billion in 2013[17], while engaging in moderate-to-vigorous PA may lead to potential reductions in healthcare utilization, healthcare expenditures, and household financial risk[18], a study also estimated that a reduction of 10% in the prevalence of physical inactivity in Canada could save their healthcare system $2.6 billion between 2015-2040. Enhancing PA levels has increasingly become an effective means to addressing global health and social issues[19]. Thus, understanding the capacity for PA globally and in individual countries is essential. However, few studies have systematically reviewed and analyzed PA and health research, particularly in low- and middle-income countries.

The Global Observatory for Physical Activity (GoPA!)[20] is an independent evidence- and expert-based surveillance system that monitors PA surveillance, research, and policy. A PA report card for each country has been published periodically by GoPA! In 2021, GoPA! published a systematic review on the progress in PA research globally from 1950 to 2019[21]. They found substantial disparities in research capacity. It is most visually visualized in the number of PA publications, while the overall publication rate in the field worldwide was almost 0.46 articles per 100,000 inhabitants, the publication rate in Southeast Asia was only 0.04 articles per 100,000 inhabitants[21].

A better understanding of trends in research publications in a certain field is a first step towards improving global or national research capacity[21]. According to the United Nations, China has around 18% of the world's population. Zhang et al.[22] conducted a bibliometric analysis of publications on PA and health in China from 1950 to 2019 based on the GoPA! systematic review. They found that China only published its first article on PA and health in 1990, and although there was significant progress in the number of publications in these three decades, the per capita contribution remained relatively small as compared to other countries[22]. Zhang et al.[22] have also divided the PA and health articles coming from China into five areas: surveillance, correlates & determinants, health consequences, interventions, and policy. Among them, studies on correlates and determinants can provide evidence for a better understanding of why people are physically active or inactive[23], leading to the development of effective policies and interventions. While China is currently the main driver of research on correlates and determinants of PA in low- and middle-income countries, the gaps and limitations in the field identified in the 2012 Lancet series remain[24]. Since the first Chinese PA and health publication identified in the systematic review dates back to 1990, for the present article, we further analyze PA and health publications from China over these three decades (1990-1999, 2000-2009, 2010-2019), with a focus on the publications about the correlates & determinants of PA, using the socio-ecological framework[23]. The aim of the study is to summarize the trends and main characteristics of Chinese research on the correlates and determinants of PA between 1990 and 2019.

Methods

In this study, we used the dataset from a systematic review published by GoPA![21]. Methodological details used for the review can be found elsewhere[21]. In short, the PubMed, Scopus, and ISI Web of Knowledge databases were used to retrieve all publications in the field of PA and health. The publication dates of the retrieved papers were limited to 1950-2019, with search terms including 'physical activity' in the title or abstract and the country name in English, papers that focused on PA and used 'sports' or 'exercise' as keywords were also included. The original review included 23,860 articles globally. Based on this multi-country dataset, Zhang et al.[22] selected 610 articles from China published between 1990 and 2019. An article was defined as from China if data collection took place in the country. Of these 610 articles on PA and health in China, 236 publications were originally classified as potentially being

on the correlates and determinants of PA. Studies that met all the following criteria were eligible for the present analysis: (1) use of PA as the outcome variable, and either qualitatively or quantitatively measure its association with correlates and determinants; (2) the study had to be published between 1950 and 2019 – because the first article from China was published in the 1990s, we refer to three decades throughout this article. After screening the 236 publications initially retrieved based on these criteria, 162 articles were on the correlates and determinants of PA and were therefore included in the present analysis.

We then extracted the following variables across the studies to summarize the trends and main characteristics of Chinese research on the correlates and determinants of PA between 1990 to 2019: (a) types of correlates and determinants studied, which were categorized as individual, interpersonal, environmental, regional or national policy, and global according to the adapted ecological model[23]; (b) study design (cross-sectional and descriptive studies, cohort or longitudinal studies, experimental studies, case-control studies, others); (c) age group (children ≤9 years, adolescents 10-19 years, adults 20-64 years, older adults ≥65 years, no specific age); (d) instruments measuring PA (questionnaires, accelerometers, pedometers, others); (e) type of 1st author's affiliation (department in the fields of public health or medicine, department in the fields of physical education, sports, or kinesiology, affiliation with both a public health/medicine department and a "physical education/sports/kinesiology" department, others); (f) geographical characteristics of the study population's distribution, which is divided into regional level and national level; (g) publication decade (1990-1999, 2000-2009, 2010-2019).

Results

Since the first Chinese PA and health publication identified in the systematic review dates back to 1990, we will present the progression in the number of publications on the correlates and determinants of PA from 1990 onwards. In this period, the number of PA and health publications related to correlates and determinants showed an increasing trend. The first publication was identified in 1998, which was also the only publication on the topic in the first decade (1990-1999). From 2000 onwards, the number of correlates and determinants of PA publications had a significant increase from one article published in 1998 to 23 articles

published in 2019. In the most recent decade (2010-2019), China averaged 14.5 publications on the correlates and determinants of PA per year (Figure 1).
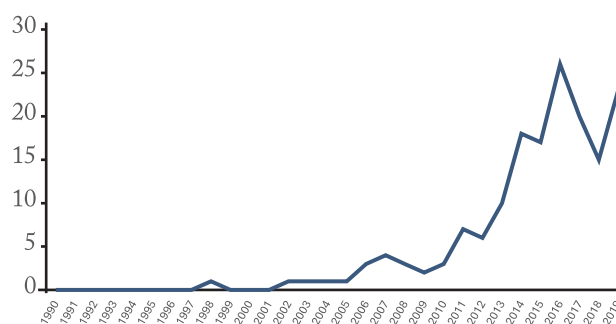

Figure 1 – Number of Chinese publications on the correlates and determinants of physical activity between 1990 and 2019.

Out of all the publications on the correlates and determinants of PA from China identified in the review, 44.8% had a first author affiliated exclusively in the fields of public health or medicine, whereas 22.8% of the first authors had an affiliation in physical education, sports, or kinesiology. Only 4.3% of the first authors had joint affiliations with both public health/medicine and "physical education/sports/kinesiology".

Of the 162 articles on the correlates and determinants of PA analyzed, 102 (63.0%) included adults aged 20 to 64 years, 91 (56.2%) included adolescents (10-19 years), 69 (42.6%) included older adults (65+ years), and only 27 (16.7%) included children 0 to 9 years (Table 1). Regarding the geographical characteristics of the study population, out of the 162 articles analyzed, 131 (80.9%) articles had a study population limited to the local level (local level means that the populations sampled in a study are selected only from individual cities and that the results are valid only within the population of the selected cities), of which 96 (73.3%) articles had a study population consisting exclusively of China's first-tier cities including Beijing, Shanghai, Guangzhou or Shenzhen. The number of times people from different cities were selected as the study sample in the local-level studies is presented in Figure 2. Of the 162 articles analyzed, only 31 (19.1%) had a study population at the national level. In terms of the measurement of PA, out of the 162 publications, 117 (72.2%) used questionnaires to evaluate PA, 15 (9.2%) used accelerometers, and 2 (1.2%) used pedometers. Of all studies using accelerometers, 15 (100%) took place in the last decade analyzed (2010-2019). In terms of study design, the vast majority (79.6%) of the articles were cross-sectional, followed by cohort studies (9.9%).

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Table 1 – Number of publications on the correlates and determinants of physical activity with different study designs, analyzed groups and measurement methods by decade.

Category	Subcategory	1990-1999	2000-2009	2010-2019	Total	Percentage (%)
	Cross-sectional studies	1	12	116	129	79.6
	Cohort studies	0	3	13	16	9.9
Study design	Experimental studies	0	0	1	1	0.6
	Case-control studies	0	0	0	0	0.0
	Others	0	1	15	16	9.9
	Children ≤9 years	0	1	26	27	16.7
	Adolescents 10-19 years	1	11	79	91	56.2
Analyzed population	Adults 20-64 years	1	11	90	102	63.0
	Older adults ≥65 years	0	5	64	69	42.6
	No specific age	0	0	10	10	6.2
	Questionnaires	1	13	104	117	72.2
Measurement method	Accelerometers	0	0	15	15	9.2
	Pedometers	0	0	2	2	1.2
	Others	0	3	25	28	17.4

Figure 2 – Graduated Symbols of the frequency of populations from different cities being selected as the study sample in the local-level studies.

We then analyzed all publications on the correlates and determinants of PA from China identified in the review according to the types of correlates and determinants included in the analyses, based on the socio-eco-logical model presented in the article by Bauman et al[23]. Out of the 162 articles on the correlates and determinants of PA analyzed, 118 (72.8%) addressed individual factors, such as sex and age. A little less than half

of the studies (77; 47.5%) assessed environmental correlates and determinants of PA, followed by 47 studies (29%) evaluating the effect of interpersonal factors on PA levels. The number of articles addressing regional and national policy (21; 13%) or global (13; 8%) factors was much lower than that evaluating the other types of correlates and determinants of PA. In Table 2, we present the distribution of articles addressing each type of correlates and determinants of PA by decade analyzed. In each of the five areas, more than 80% of the Chinese publications on the correlates and determinants of PA came from the last decade.

Table 2 – Evolution of Chinese publications on the correlates and determinants of physical activity by decade and according to the five main layers of the socio-ecological model.

Study Level	1990-1999 n (%)	2000-2009 n (%)	2010-2019 n (%)
Individual	1 (0.8)	16 (13.6)	101 (85.6)
Interpersonal	1 (2.1)	2 (4.3)	44 (93.6)
Environmental	0	5 (6.5)	72 (93.5)
Regional/National Policy	0	2 (9.5)	19 (90.5)
Global	1 (7.7)	1 (7.7)	11 (84.6)

Because articles can incorporate analyses on more than just one layer of the socio-ecological model, we also evaluated the intersection of such analyses (Table 3). Of the 118 articles addressing individual correlates and determinants of PA, 44 (37.3%) also assessed environmental factors, 33 (28%) evaluated interpersonal factors, 13 (11%) analyzed regional or national policy, and 7 (5.9%) also addressed global correlates and determinants of PA. Only three articles analyzed national, regional, and global correlates and determinants of PA combined.

Discussion

This study systematically analyzed publications on the correlates and determinants of PA in China over three decades. The number of such publications has been rising since 2000, with a sharp upward trend since 2010. It is worth mentioning that, at the same time, China's GNI per capita has risen from US$940 in 2000 to $10,410 in 2019. This rise in the number of publications on PA when the country's economy improved is consistent with the literature[25,26]. Moreover, the present study believes that the dramatic increase in the number of articles published is closely related to China's financial investment and policy development in promoting PA. For example, China launched the *Outline of the Healthy China 2030 Plan* in 2016[27], emphasizing the improvement of the public service system for national fitness, the extensive development of national fitness campaigns, and the promotion of physical activities for key populations. The *Implementing the National Fitness Program (2016–2020)*[28], released in the same year, aimed to achieve the goal that by 2020, 700 million people would participate in physical exercise one time or more per week, and 435 million people would participate in physical exercise on a regular basis. In addition, China's 'strategy of rejuvenating the country through science and education' has boosted the country's investment in research[29], and with the increase in research infrastructure and funding, China has attracted many well-trained scientists back from other countries, particularly the United States[30], which have spurred the development of PA research.

Despite a marked increase in the number of publications, nearly 80% of the articles on PA correlates and determinants in China were cross-sectional or descriptive. This result is consistent with global trends identified in the GoPA! review, in which 82.5% of PA studies globally were observational (mostly cross-sectional). The use of longitudinal studies to better explore causality on the correlates and determinants of PA should be a priority in the future. In addition, the system of 'Up-or-Out' in Chinese universities may be a deeper reason. 'Up-or-Out' is a tenure track system introduced in many Chinese universities[31], where new faculty members are required to be promoted to a higher rank within the employment period[32,33], based on a stringent set of criteria, such as the number of publications or funding, and those who fail to meet the requirement are not

Table 3 – Analyses of Chinese publications on the correlates and determinants of physical activity according to the combined evaluation of two or more layers of the socio-ecological model.

Layers of the socio-ecological model addressed	Individual n	Interpersonal n	Environmental n	Regional/ National Policy n
Global	7	7	5	3
Regional/National Policy	13	9	18	
Environmental	44	18		
Interpersonal	33			

reappointed[34]. Because the publication of papers is the main indicator of this evaluation, and the quantity is more valued than the quality, it contributes to a research environment that is eager for quick success, where 'the publish or perish' culture has significantly p ressured young faculty to pursue 'publishing more' as the only academic goal[35]. Most longitudinal studies in public health require longer duration and sustainable funding and therefore are not perceived as a wise choice for most young faculty. A similar reliance on cross-sectional designs is also evident in Brazil, where 77% of studies on PA followed this approach[36]. However, Brazil has taken concrete steps to support long-term research capacity by establishing a national surveillance system—comprising instruments such as VIGITEL and the National Health Survey—to monitor PA at the population level[36]. Furthermore, institutional support has been reinforced through national platforms like the Brazilian Society of Physical Activity and Health (*Sociedade Brasileira de Atividade Física e Saúde* - SBAFS) and the Brazilian Congress of Physical Activity and Health (*Congresso Brasileiro de Atividade Física e Saúde* – CBAFS)*, which contribute to researcher training and collaboration across the region[37]. These coordinated efforts in Brazil offer useful insights for China and other Low and Middle Income Countries (LMICs) striving to strengthen the connection between research, policy, and practice in the PA field.

In terms of the 1st author's affiliation, this study found that close to half of the authors were from the fields of public health or medicine, which is twice that the proportion of authors coming from physical education, sports, or kinesiology colleges. In our view, the more interdisciplinary the field becomes in China, the more likely it is to continue growing, as PA is determined by many sectors, as recognized by the socio-ecological model. For example, architectural or environmental engineering disciplines are experts at using tools such as behavioral mapping to explore the impacts of the environment (building location, neighborhood walkability, etc.) on PA[38], while psychology and sociology tend to use statistical methods including structural equation modeling to examine the impact of factors such as attitudes, beliefs, and perceptions on PA behaviors[39,40]. Improving PA in China is a comprehensive and systematic project, the combination of expertise from various fields will add value to the research on PA and health in China.

Because the effect of different correlates on different age groups varies, the present study analyzes articles on PA correlates and determinants in China based on four age groups. However, the results show important differences in the number of articles addressing different age groups. Most articles assessed PA correlates and determinants in Chinese adults, and only 16.7% of the studies included the age group of children 0-9 years old, of which only three studies focused exclusively on children. PA and aerobic exercise during early childhood are not only beneficial for the child's current physical and mental health[41-43], but are also likely to be positively correlated with health outcomes in adulthood[44]. However, the lack of research on the correlates and determinants of PA in young children prevents the implementation of evidence-based interventions to reduce physical inactivity and sedentary behavior, which, in turn, may negatively impact adult health and undermine China's target of having 60% of adolescents achieve 'excellent' physical fitness levels by 2030[45]. Accelerometers are commonly used to measure PA levels worldwide, and in this review, all three child-only studies used accelerometers as an instrument to measure PA. In general, using questionnaires to measure children's PA levels is challenging[46], whereas accelerometers are more precise[47], but also more expensive, this may explain the absence of studies on the correlates and determinants of children's PA in economically underdeveloped areas of China. Additionally, of all studies involving children, 74.1% addressed interpersonal or environmental correlates, and all of them addressed individual, interpersonal, or environmental correlates. This finding provides some evidence of an association between PA levels and gender, interpersonal and household correlates and determinants in Chinese children[48-50,53] but further research on these topics is required to deepen our understanding of the correlates and determinants of PA in Chinese children[23,54-56].

China has a large territory with significant geographical heterogeneity. Any survey on one city/province/region could not represent the whole country. This study analyzed publications on the correlates and determinants of PA in China based on the geographical characteristics of the study population. The results indicated that most of the articles (80.9%) were conducted at the local level, more studies at the national level are needed to provide more comprehensive evidence on the correlates and determinants of PA in China. In addition, as presented in Figure 2, the study found that of all 131 studies carried out at the local level, 96

(73.3%) had a study population consisting exclusively of first-tier cities or eastern coastal cities, such as Beijing, Shanghai, Guangzhou, Shenzhen, Hong Kong, or Taiwan province, which represent the most economically prosperous regions of China, while studies on the populations from the relatively economically underdeveloped regions of central and western China are lacking. The uneven regional distribution of the study population may bias government and societal understanding of the correlates and determinants of PA, therefore, research on the populations of economically underdeveloped regions or rural areas of central and western China should be a priority for future studies.

From the five categories of PA correlates and determinants, individual factors, such as age, gender, and socio-economic status, are the most frequently reported. This is consistent with the findings of Bauman and colleagues on the correlates of PA in middle-income countries[23]. It is noteworthy that of all the studies we analyzed, few addressed regional or national policy and global factors, and no study has investigated either of these two factors exclusively. China has seen a rapid increase in its PA policies from 2001 to 2021[57]. However, physical inactivity also increased, from 17.9% in 2010 to 22.3% in 2018[58]. Therefore, it is necessary to take a broader perspective to investigate the impact of policy interventions on PA in China. In terms of global factors, there is evidence from the literature that urbanization[59-60], mechanization, and changes in transportation patterns can lead to a decrease in PA in low- and middle-income countries[61,62], which indicates the need for future research to further investigate the impact of urban planning, transportation, education, and other sectors beyond the control of health and sports departments on PA[63].

This study has some limitations. First, the analysis was limited to publications indexed in PubMed, Scopus, and ISI Web of Knowledge, which may have excluded relevant studies published in other databases. Although these databases cover a substantial proportion of peer-reviewed literature in the field, incorporating a broader range of databases, such as Chinese-language databases or regional repositories, could provide a more comprehensive overview of PA research in China. Future studies should consider expanding search strategies to include additional databases to reduce potential publication bias and enhance the comprehensiveness of the literature reviewed. Second, we presented descriptive characteristics of the articles on the correlates

and determinants of PA but did not do a quality check. Third, the search period ended in 2019, and therefore, we did not capture the most recent trends in PA and health research in China.

There are also several strengths of this article. This analysis includes data from China, which is one of the most populous countries globally. It is worth noting that there is still a need for further development in PA research within China. In addition, by characterizing study designs, geographical characteristics of the study population's distribution, and layers of correlates and determinants of PA, our analysis highlights key priorities for future research on the correlates and determinants of PA in China, and offer evidence-based insights to inform the development of PA promotion policies by the government.

Conclusion

This study systematically summarized the trends and main characteristics of Chinese research on the correlates and determinants of PA over three decades (1990-1999, 2000-2009, 2010-2019). Despite a marked increase in the number of publications, most studies remain cross-sectional, future research should prioritize longitudinal studies to better explore causal relationships and expand research to underrepresented regions. Furthermore, expanding the use of advanced measurement tools, such as accelerometers, and strengthening interdisciplinary collaboration among public health, kinesiology, and environmental science could enhance research rigor. Of the five dimensions of the social-ecological model, regional or national policies and global factors were given less attention, and this gap should be addressed so that evidence-based interventions for physical inactivity in China can be developed based on a broader perspective.

Conflict of interest

The authors declare no conflict of interest.

Author's contributions

Zijian Lu, Kaiyue Zhang and Diana Morales: Conceptualization; Methodology; Formal analysis; Investigation; Data curation; Visualization; Writing – original draft; Writing – review & editing; Approval of the final version. Ding Ding: Conceptualization; Methodology; Formal analysis; Investigation; Supervision; Writing – original draft; Writing – review & editing; Approval of the final version. Andrea Ramirez Varela, Michael Pratt and Pedro C. Hallal: Conceptualization; Methodology; Formal analysis;

Investigation; Resources; Supervision; Writing – original draft; Writing – review & editing; Approval of the final version.

Declaration regarding the use of artificial intelligence tools in the article writing process

The authors did not use artificial intelligence tools for preparation of the manuscript.

Availability of research data and other materials

The data of this study is available on demand from referees.

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Reviewers' assessment

The reviews of this article were originally conducted in Portuguese. This version has been translated using ChatGPT and subsequently reviewed by the Chief Editors.

Reviewer A

Anonymous

- Was any indication of plagiarism found in the manuscript?
  No
- Did the authors provide clarification regarding the ethical procedures adopted for conducting the research?
  Not applicable

Comments to the author

- It is a pleasure to review this manuscript for the Revista Brasileira de Atividade Física & Saúde (RBAFS). The manuscript entitled "A bibliometric analysis of three decades of research on the correlates and determinants of physical activity in China" aims to examine the progress of three decades of research on the correlates and determinants of physical activity in China, analyzing trends and characteristics of publications from 1990 to 2019.
- The article adopts a bibliometric approach to collect and analyze information related to publications in the field of physical activity in China, examining instruments used, correlated variables, study designs, age groups, among other aspects. The manuscript is well written, properly referenced, adheres to the journal's guidelines, and is clear, concise, and presents important points for discussion, offering new insights for the field.
- However, in this reviewer's opinion, the manuscript does not present sufficient relevance for publication in this journal. This decision is mainly based on the scope of RBAFS, considering the following factors:
- RBAFS is a journal with national (Brazil) and continental circulation, and it has predominantly published research conducted in Brazil and South America;
- The manuscript analyzes data from a country with economic, social, and cultural realities that are significantly different from those of Brazil or Latin America;
- A quick search in the RBAFS archives showed no records of articles conducted in China.
- I emphasize that this decision is based on the nature of the information presented in the manuscript, the origin of the data, and the potential interest that Brazilian researchers might have in reading this manuscript if published.
- In light of the above, this reviewer's decision is to reject the manuscript and recommend that the authors submit it to another journal with international or Asian circulation.

Final decision

- Reject

Reviewer B

Breno Farah 🔵
Universidade Federal Rural de Pernambuco, Recife, Pernambuco, Brazil.

- Was any indication of plagiarism observed in the manuscript?
- No
- Did the authors provide clarification on the ethical procedures adopted for conducting the research?
- Not applicable

Comments to the author

- I would like to congratulate the authors on the methodological rigor and valuable contribution of this study to understanding the scientific production on physical activity in China. The comprehensive review, covering three decades, provides a broad perspective on the correlates and determinants of physical activity using the socio-ecological framework. The findings indicate a growth in research output over time, although most studies are cross-sectional, rely on questionnaires as the primary data collection method, and focus predominantly on children. This highlights significant opportunities for improvement and diversification in future research.
- A key point I would like to raise is the chosen time frame for the analysis. Including studies from 2024 onward could yield more innovative findings, such as a greater use of accelerometers and other more robust methodologies. Additionally, I suggest that the authors expand their search strategies beyond GOPA. Incorporating traditional databases, in-

cluding those already used by GOPA, could further enrich the results and provide a more comprehensive overview of the topic.

- Moreover, presenting a table summarizing the study design, analyzed population, and measurement methods would enhance clarity and help readers better understand the characteristics of the collected studies.

- Lastly, the conclusion should be more concise and strictly aligned with the study's objectives. Currently, it is too extensive and does not effectively convey a clear "take-home message." I recommend that the authors revise this section to ensure a more focused and impactful summary of the key findings and implications.

Decision

- Major revision