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Status, Hotspots, and Future Trends: Bibliometric Analysis of Research on the Impact of the Built Environment on Children and Adolescents' Physical Activity

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Abstract: Applying the visualized bibliometric analysis method, we explored the overall distribution characteristics, research progress, and hotspots of current research on the effect of the built environment on the physical activity of children and adolescents from 2003 to 2022. The research results indicate that the United States, Canada, Australia, and other Western countries are the primary forces of relevant research and have a solid foundation in the research on the impact of the built environment on the physical activity of children and adolescents. Sallis, Saelens, Gile-Corti, and other early authors have had a long-term, important role in this area. The research results have continuously guided new scientific research output for a long time, and emerging research forces have also played a directional role in future research trends, represented by publications such as *American Preventive Medicine* and *Preventive Medicine*. Obesity, health behaviors, home–school environment, and various correlations are the research hotspots in this field. This study systematically summarizes and analyzes research on the built environment's promotion of physical activity among children and adolescents, and it provides valuable guidance and reference for follow-up research in the near future.

Keywords: built environment; physical activity; Citespace; children; adolescent; health; school

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1. Introduction

The continuous expansion of urbanization has improved people's lifestyles, but it has also greatly reduced physical activity, exacerbating a series of health problems, such as obesity and cardiovascular and cerebrovascular diseases [1,2]. More importantly, the aforementioned issues indicate a significant trend of younger age. In recent decades, the proportion of overweight and obese children in the world has significantly increased, aggravating arterial hypertension, dyslipidemia, and blood sugar in this group. [3] This has created an abnormal prevalence of disorders such as impaired glucose tolerance and hyperinsulinemia, elevated transaminases, and nonalcoholic fatty liver disease (NASH) [4]. Additionally, environmental issues have gradually led to in-depth discussions on urban construction, and the concept of the built environment has increasingly expanded from a purely architectural field to a field of public health [5]. In this context, how to use the rational planning of the built environment to influence the physical activity of children and adolescents has gradually become an important health consideration [6]. Research on the built environment promoting the physical activity of children and adolescents has also become more in-depth. Faced with increasing sedentary behavior and the increasingly serious problem of childhood obesity, the researchers started a special study on children and adolescents based on the previous research on the physical activity-promoting built environment, trying to determine whether the changes in the built environment in the past decades have made a positive change in the physical health and obesity of children and

adolescents [7]. Researchers have also begun to study the correlation between the built environment, physical activity, and obesity of children and adolescents [8,9]. Related research topics mainly include the following: the impact of the distribution of fast food restaurants in the neighborhood on children and adolescents' obesity [10]; the cross influence between diet, physical activity, and the built environment [11]; and the important role of parents in children and adolescents' physical activity participation [12]. In addition, accelerometers have been more and more used in research of the built environment promoting children and adolescents' physical activity [13], and more accurate research has been started on specific indicators of the built environment, such as street connectivity, traffic exposure, etc. [14], and the independent travel rate of children and adolescents has gradually become an important focus in this field [15]. The research in this field shows outstanding interdisciplinary characteristics, and the related research is carried out based on many different perspectives. However, the existing research lacks a clear grasp of these dimensions or perspectives. At the same time, there is no research that can comprehensively summarize the research frontier and knowledge base of the development of this field. Therefore, it is necessary to summarize the research in this field through a comprehensive bibliometric analysis.

As an important literature analysis tool, a bibliometric analysis performs well in summarizing literature characteristics and discovering research hotspots [16]. Due to its excellent analytical capabilities, it is currently widely used in several disciplines, including medicine [17–19], physical education [20], economics [21], sociology [22], and other research fields, and their analytical value has also been generally recognized.

This study applies bibliometric analysis to analyze and summarize the core research on the impact of the built environment on children and adolescents' physical activity, with an attempt to achieve the following points: (1) understand the basic distribution characteristics and cooperation relationship of countries, authors, and institutions in the field of research; (2) identify key authors, journals, and literatures in this field; (3) identify the important topics of research in this field. The primary research significance of this study lies in the following: (1) it covered an extensive range of representative papers to reflect the whole status of research in this field; (2) exploring important countries, institutions, authors, and journals in this field provides a comprehensive way to explore the huge knowledge base. This research scientifically and comprehensively presents the basic status quo, latest progress, and development trends of the research in this field, so as to provide valuable guidance and reference for relevant research and promote the further development of this field.

2. Methodology

2.1. Data Acquisition and Processing

The Web of Science is an academic resource database with the widest coverage and a complete range of disciplines among the available databases, and it comprises a large number of core journals in various fields. On this basis, this study selects its core collection database as the data source, with TS = (built environment AND physical activity) AND TS = (children OR adolescent OR child OR youth OR teenager OR youngster) being the search type, limited to the English language and Article document type. The search occurred on 3 November 2022. The retrieval results include a total of 1313 articles, and the amount of data can ensure the effective conduct of the research. Afterward, the relevant literature information required for the analysis was downloaded and preliminarily processed for subsequent use in specific analysis work. The inclusion criteria used for the study are as follows:

1. Basic search (1342 records)
2. English language (1331 records)
3. Incomplete literature information (18 deleted)
4. Literatures finally included (1313 records)

2.2. Analysis Tools and Strategies

The bibliometric analysis of this study is based on the Citespace 6.1.R3 software, designed and developed by Professor Chen Chaomei from Drexel University in the United States. This research tool can summarize and count key information such as authors, countries, institutions, etc., and display the entity distribution and knowledge structure characteristics of related research fields in a structured visual format. Bibliometric analysis was carried out on the research on the built environment's impact on the physical activity of children and adolescents, and the Citespace 6.1.R3 software was run. "Country", "Institution", "Author", "Cited Author", "Cited Journal", and "Cited Reference" were respectively selected. "Keyword" was selected as the node type of literature analysis, the "Time slice" was set to 1, and set "50" was the number of nodes selected in each time slice in the "Top N" threshold items. The "Pathfinder" algorithm was then run. After pruning and running the software, the bibliometric map of the research on the impact of the built environment on the physical activity of children and adolescents was obtained. Based on this, the basic situation, hot spots, and other important conclusions of the research in this field were sorted and summarized.

2.3. The Interest in Children and Adolescent

According to the age classification criteria for different groups in the WHO Physical Activity Guidelines, we limit the age of children and adolescents to 5–17 years. In addition, we focus on children and adolescents together because (1) children and adolescents face common health threats and (2) many studies involve a mixture of children and adolescents, in which it is impossible to distinguish between children and adolescents. Taking children and adolescents as the target group, we hope to include as much relevant literature as possible in the research, so as to draw more universal research conclusions.

3. Results

3.1. Country Distribution Characteristics

Figure 1 indicates that a total of 47 countries participated in the research in this field. As can be seen from Table 1, the United States is ahead of other countries, with 620 research papers, nearly three times that of Canada, which ranks second, accounting for 47.2% of the total number of papers published. Canada, Australia, England, and China published a lower number of papers. International scientific research cooperation has always been a prominent feature of research in this field. With the acceleration of globalization, cross-border flow of researchers, and convenient access to information and resources, the comparative advantage of international scientific research cooperation has become increasingly obvious. Given the above, European and North American countries are the primary researchers and contributors in this field. Among them, the United States, Canada, Australia, and England form the first group of research on the built environment's impact on children and adolescents' physical activity; this is not only in terms of the number of research results. They have a prominent advantage and play an equally prominent intermediary role. Australia ranks third in the number of published papers. Although it has an excellent performance in quantity, its centrality is only 0.03. In contrast, India has a completely different research performance. Although the output of scientific research is only 11, its centrality ranks sixth, indicating that the country's results have outstanding scientific research value and promote many related research works. Although Mexico publishes fewer papers, its theoretical and practical value is reflected in its high centrality, and Asian and Latin American countries are also catching up in this field.

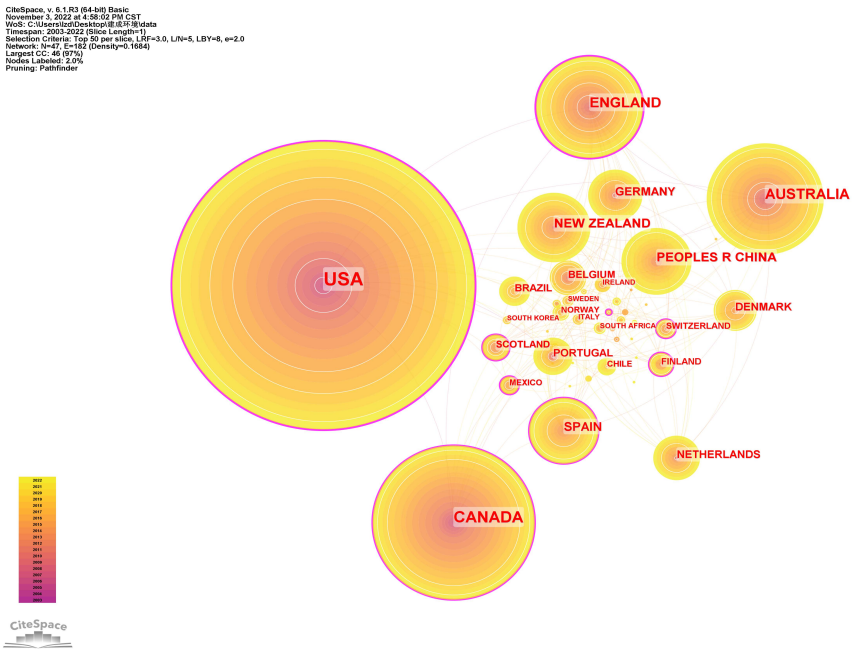

Figure 1. The network of countries.

Table 1. The volume and centrality of national publications.

	Rank of Publication		Rank of Centrality	
	Country	Publication	Country	Centrality
1	USA	620	England	0.29
2	Canada	221	USA	0.20
3	Australia	139	Spain	0.19
4	England	108	Canada	0.17
5	China	69	Switzerland	0.15
6	New Zealand	68	India	0.15
7	Spain	59	Finland	0.12
8	Germany	42	Scotland	0.11
9	Denmark	37	Mexico	0.11
10	Netherlands	34	Denmark	0.09

Note: Centrality is the degree to which a node plays a connecting role in the whole network, which can reflect the influence of the research field. The higher the centrality, the greater the influence of the node. Nodes with centrality ≥ 0.1 are considered as important nodes.

3.2. Distribution Characteristics of Research Institutions

Scientific research institutions are physical units in related research fields. Understanding their distribution characteristics can further clarify the primary research forces on the impact of the built environment on the physical activity of children and adolescents. As depicted in Figure 2, a total of 250 research institutions have invested in related research. Combining this with Table 2, it can be seen that colleges and universities are the primary force of related research. The top 10 research institutions, in terms of the number of publications, belong to the United States, Canada, Australia, and New Zealand, with 3, 3, 2, and 2 research institutions entering them, respectively, which indirectly reflects the research strength in this field of the above countries. The United States, Canada, and Australia are particularly prominent and consistent with the national distribution characteristics, demonstrating the solid foundation of European and North American countries in the research on the impact of the built environment on the physical activity of children and adolescents. Additionally, San Diego State University and Harvard University have darker graphics, which indicates that their scientific research output was primarily concentrated before 2012. It can be seen that the two institutions invested in this research field earlier and obtained basic research results. It provides important preliminary support for

continuous research in this field. In addition, the data demonstrate that the University of British Columbia (0.25), the University of Southern Denmark (0.21), the University of Alberta (0.18), the University of California, Berkeley (0.14), the University of Ghent (0.13), the University of Washington (0.13), and other university intermediaries are the primary leaders of relevant research and have gradually opened up the in-depth development of this field. In the field of research on the impact of the built environment on the physical activities of children and adolescents, many representative research institutions with high influence have gradually emerged through long-term development. At the same time, these important research institutions have formed their own representative research themes. Through the presentation of the distribution characteristics of research institutions, the above information can be better obtained.

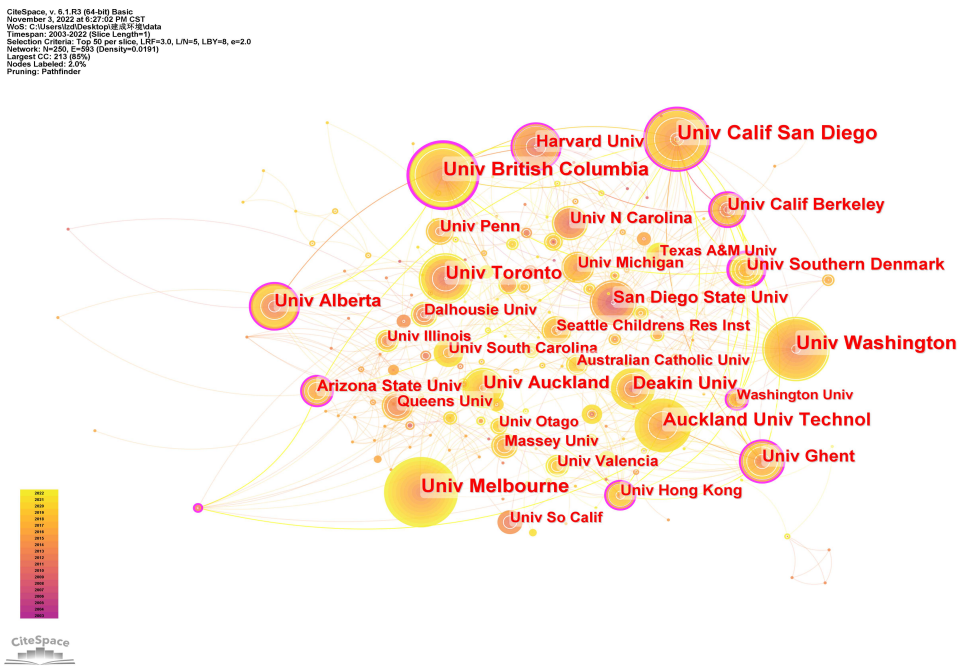

Figure 2. The network of institutions.

Table 2. The volume and centrality of documents issued by institutions.

	Institution	Country	Publication	Centrality
1	University of California San Diego	USA	47	0.15
2	University of Washington	USA	46	0.10
3	University of British Columbia	Canada	44	0.25
4	University of Melbourne	Australia	42	0.03
5	University of Toronto	Canada	39	0.05
6	Auckland University Technology	New Zealand	36	0.02
7	Deakin University	Australia	32	0.05
8	University of Auckland	New Zealand	32	0.05
9	University of Alberta	Canada	29	0.18
10	Harvard University	USA	28	0.14

3.3. Distribution Characteristics of High-Yielding Authors

Taking "Author" as the analysis parameter, the distribution of the authors of studies related to the built environment affecting the physical activity of children and adolescents was obtained. Researchers with rich achievements who keep up with the forefront are the direct undertakers of the research work in this field, leading the latest research direction and determining the research level in this field. Therefore, understanding the distribution of core authors can demonstrate the breadth and depth of relevant research to a large extent

and is of great significance for sorting out research on the built environment's impact on children and adolescents' physical activity.

Figure 3 shows 347 nodes in the author's co-occurrence network, resulting in 878 (E = 878) connections. The author with the largest number of published papers was Sallis, with 41 papers, and his centrality reaches 0.10, ranking at the forefront in both quantity and mediation. His primary authorship institution, San Diego State University, is also a core unit among numerous research institutions. Sallis is the first author of the article "The role of built environments in physical activity, eating, and obesity in childhood" [7]. His research paper "Active commuting to school: Associations with environment and parental concerns" has a high citation frequency [12]. This shows his key position and role in the research in this field and can be regarded as a foundational achievement. Table 3 shows that more authors have reached 10 in the number of results, but the centrality polarization is more prominent. Only 3 of the 10 authors have a centrality above 0.1, while the remaining authors have more achievements. However, the mediating effect is low, and effective cooperation has not been formed in this field. In addition to Sallis, two other authors have obvious advantages in both quantity and centrality, namely, Conway and Saelens. Although many other authors published less papers, their intermediary role was more prominent. Mandic and Hopkins also have a centrality of 0.10, which has a great influence. It can be seen that several scholars play an important role in this field. Through the specific reading of the highly cited literature, it can be found that there is close cooperation among many high-yield and high-impact authors. According to the obtained map, it can also be found that the main high-yield authors have different degrees of connection and cooperation. A relatively clear core group of authors has been formed, which also helps to find potential important authors.

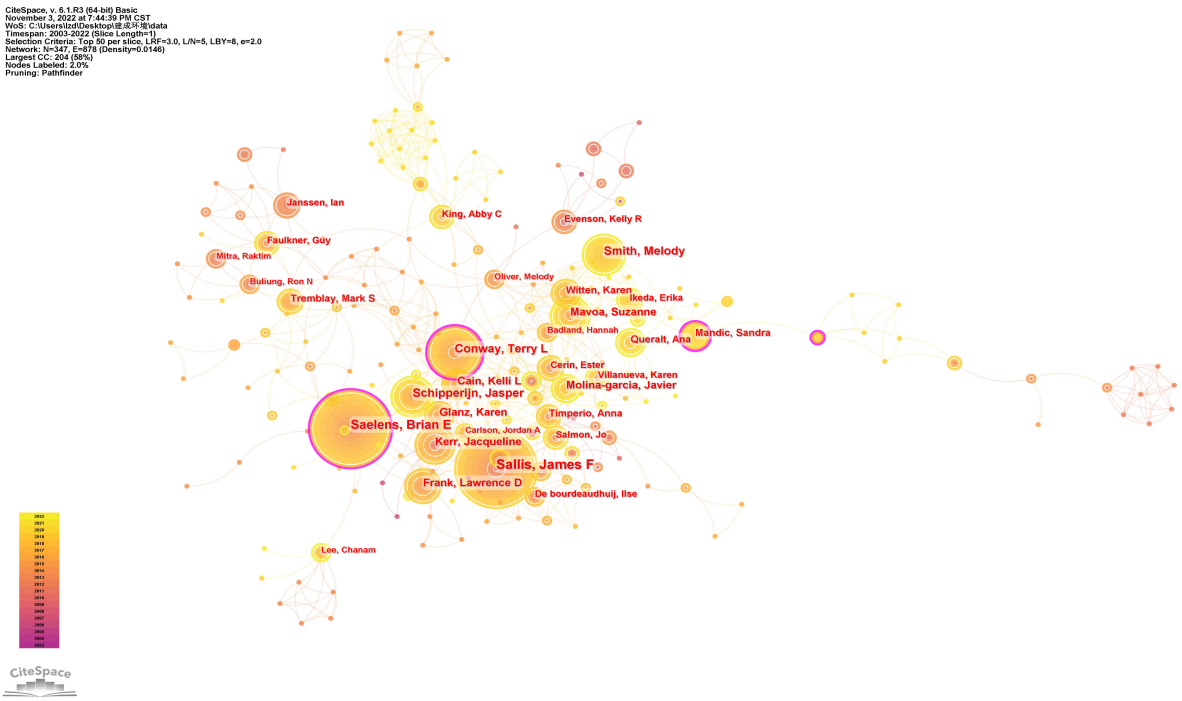

Figure 3. The network of authors.

3.4. Distribution Characteristics of Highly Cited Authors

Taking "Cited Author" as the analysis parameter, after running the software, the author's co-citation visual knowledge map was obtained. The analysis and statistics of this parameter indicate the researchers who have an important reference role in this research field. As shown in Figure 4, there were 313 highly cited authors, and 1120 (E = 1120) citation relationships occurred among them. Table 3 counts 10 authors with over 195 citations and

their centrality. The identification of highly cited authors with strong influence can, on the one hand, evaluate the breadth and depth of researchers' social contributions, and on the other hand, help measure the research potential of relevant researchers.

Table 3. High-yielding and highly-cited authors.

	The Author of the Article			Cited Authors		
	Author	**Publication**	**Centrality**	**Author**	**Co-Cited**	**Centrality**
1	Sallis JF	41	0.10	Sallis JF	536	0.11
2	Saelens BE	32	0.12	Timperio A	302	0.07
3	Conway TL	23	0.15	Frank LD	292	0.11
4	Schipperijn J	23	0.09	Ding D	285	0.05
5	Smith M	21	0.08	Saelens BE	284	0.09
6	Mavoa S	19	0.05	Gile-Corti B	279	0.18
7	Frank LD	18	0.02	Carver A	222	0.11
8	Kerr J	17	0.03	Gordon-Larsen P	211	0.12
9	Glanz K	17	0.00	Davison KK	207	0.13
10	Cain KL	16	0.05	Evenson KR	195	0.19

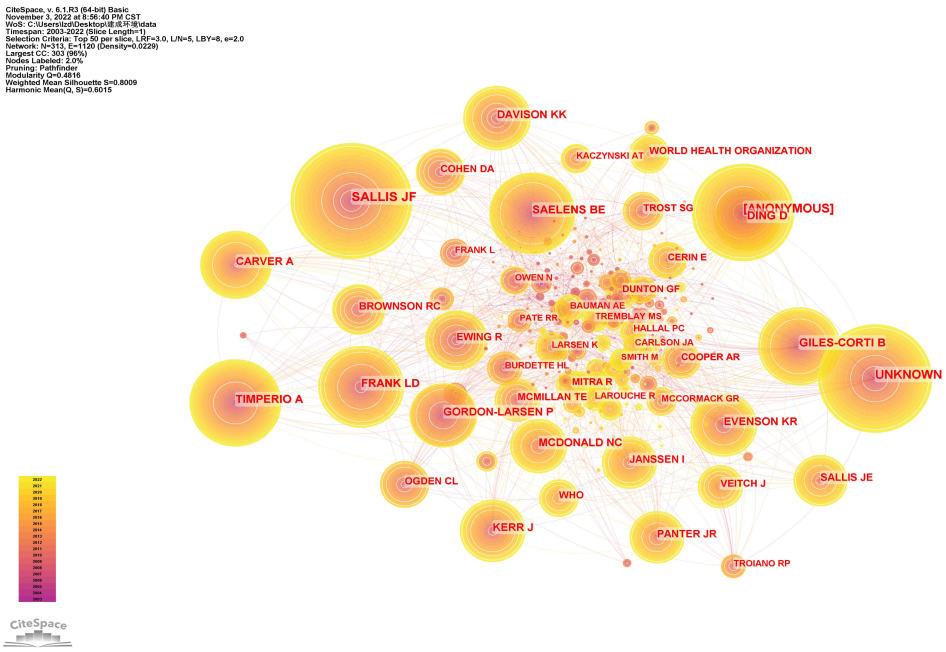

Figure 4. The network of cited authors.

Sallis was cited up to 536 times among all cited authors and had a high mediation effect with a centrality of 0.11. Combined with the results of co-occurrence analysis of high-yield authors, it shows that Sallis has a well-deserved core position in this field and has an excellent performance in both the quantity and quality of personal scientific research output. After that, Timperio and Frank, who were ranked second and third, were cited close to each other, with 302 and 292 citations, respectively. They are also important authors in the research of related fields and have a prominent basic role. In the citation frequency, an important indicator for measuring the role of research, many authors have performed well since then, which has largely promoted the rapid development of international research on the built environment's impact on children and adolescents' physical activity. Ranking the centrality of cited authors, it was found that in addition to the above three authors, Evenson (0.19), Gile-Corti (0.18), Handy (0.16), Davison (0.13), Trost (0.13), and Gordon-Larsen (0.12) also play an important mediating role. The high centrality of a cited author means that the author connects more different cited authors to build a tight author network. Through the

observation of the co-occurrence network of highly cited authors, the color distribution of the graphs of many highly cited authors is relatively uniform. This indicates that there is a relatively average citation situation in each time slice, which has played a long-term supporting role in related research. Overall, the important influence of many early authors runs through the research in this field, laying a highly prominent foundational role for the development of this field, and their research results continue to guide new scientific research output. Emerging research forces are also emerging, which to a certain extent guides future research trends.

3.5. Distribution Characteristics of Highly Cited Journals

The journal co-citation analysis of the research field on the impact of the built environment on the physical activity of children and adolescents can conclude the early knowledge base distribution and discipline support of this research field and help to refine the discipline system and knowledge framework. In addition, research and analysis of the number of citations of various journals can typically determine more important journals in the field, so that readers can narrow the scope of reading in a targeted manner and more accurately grasp the cutting-edge information in the research field. In this study, journals with over 300 citations were ranked, and a total of 10 journals were included in the statistics.

According to Table 4, it can be seen that "AM J PREV MED", "PREV MED", "INT J BEHAV NUTR PHY", and "HEALTH PLACE" were the four most frequently cited journals, with 1022 times, 947 times, 854 times, and 839 times, respectively. Due to its significant influence, it can be called the most important source journal, and is also a key platform to show research on the physical activity of children and adolescents in the built environment. "SOC SCI MED", "TRANSPORT RES REC", and "J URBAN HEALTH" are also cited publications with a strong intermediary effect, and their centrality is over 0.1. They also play an important intermediary role as larger nodes. Regardless of the number of major cited publications, the disciplines to which it belongs are primarily medicine, public health, urban studies, and sports. The first citation time of the cited journals in the statistics was mostly between 2004 and 2006, which was the main knowledge base in the early stage of the development of this field and provided important support for the subsequent research. The above analysis results provide researchers with more accurate auxiliary basis for research, so that they can better formulate relevant research plans, selectively go deep into the past research, pay close attention to the information issued by key platforms, and grasp the cutting-edge trends and research progress in a timely manner.

Table 4. Journal citation frequency and centrality.

	Cited Journal	Co-Cited	Centrality
1	AM J PREV MED	1022	0.10
2	PREV MED	947	0.10
3	INT J BEHAV NUTR PHY	854	0.14
4	HEALTH PLACE	839	0.13
5	MED SCI SPORT EXER	693	0.04
6	J PHYS ACT HEALTH	687	0.06
7	AM J PUBLIC HEALTH	666	0.05
8	SOC SCI MED	589	0.11
9	BMC PUBLIC HEALTH	536	0.03
10	AM J HEALTH PROMOT	531	0.05

3.6. Distribution Characteristics of Highly Cited Articles

A high number of citations often corresponds to a hot topic in a certain research field. Co-citation analysis of the literature is a key method to find important literature in the research on the built environment's impact on children and adolescents' physical activity. In this work, through calculation and mapping using Citespace software, we obtained the co-citation knowledge map of the literature in this research field. As shown in

Table 5, the top 10 documents by citation frequency were counted, where V refers to the number of volumes in the journal, and P refers to the page number of the document in the journal. "Neighborhood Environment and Physical Activity among Youth A Review" was the most cited literature in this field, with a centrality of 0.11. The article uses relatively novel inclusion criteria and effective classification to rank previous studies. It provides theoretical support for the positive effect of environmental intervention in physical activity and establishes a scientific research starting point for subsequent research in related fields. "Inequality in the built environment underlies key health disparities in physical activity and obesity," the second most cited study in this field, groups geographic regions across the U.S. for recreational facilities. Regional demographics statistical analysis was carried out, and the positive relationship between socioeconomic status and facility use opportunities was obtained. It can be seen that the use of leisure facilities leads to significant differences in overweight individuals among different groups.

Table 5. Cited frequency and centrality of documents.

	Cited Reference	Co-Cited	Centrality
1	DING D,2011, AM J PREV MED, V41, P442	147	0.11
2	GORDON-LARSEN P,2006, PEDIATRICS, V117, P417	95	0.08
3	JANSSEN I,2010, INT J BEHAV NUTR PHY, V7, P0	68	0.05
4	DING D, 2012, HEALTH PLACE, V18, P100	65	0.05
5	DAVISON KK,2006, INT J BEHAV NUTR PHY, V3, P0	64	0.10
6	BROWNSON RC,2009, AM J PREV MED, V36, P0	63	0.08
7	McGrath LJ, 2015, SPORTS MED, V45, P841	62	0.07
8	Hallal PC,2012, LANCET, V380, P247	61	0.06
9	PAPAS MA,2007, EPIDEMIOL REV, V29, P129	58	0.05
10	Smith M, 2007, INT J BEHAV NUTR PHY, V14, P0	58	0.03

To explore the knowledge base and the latest progress in a research field, it is necessary to sort out the relevant references as the knowledge base of research achievements in this field and find the influence and contribution of previous classical literature to subsequent research based on induction and analysis. Through further observation and analysis of Figure 5, it can be seen that different nodes have a clear color gradient, roughly transitioning from purple to yellow, and the primary citation time of highly cited literature is concentrated after 2012, indicating that the built environment affects the research field of the physical activity of children and adolescents. With the enrichment and development of related research, a research upsurge has also started.

3.7. High-Frequency Keyword Distribution Characteristics

Keyword are the core of any literature, and they can accurately show the research focus and direction of the article. By analyzing the keywords, we can summarize the basic research trend of the impact of the built environment on the physical activity of children and adolescents, and summarize the long-term research hot spots and trends. Statistics on high-frequency keywords can clearly show frontier hotspots in the current research field. Citespace software performed statistical processing on high-frequency keywords and obtained a high-frequency keyword co-occurrence map (Figure 6). The output results demonstrate that the frequency of the occurrence of keywords such as "built environment", "physical activity", and "child" is at the forefront. However, because the above keywords are the core referential pronouns in the research on the impact of the built environment on children and adolescents' physical activity, and have no practical significance, they were excluded from the analysis. Finally, the simplified high-frequency keywords were obtained (Table 6).

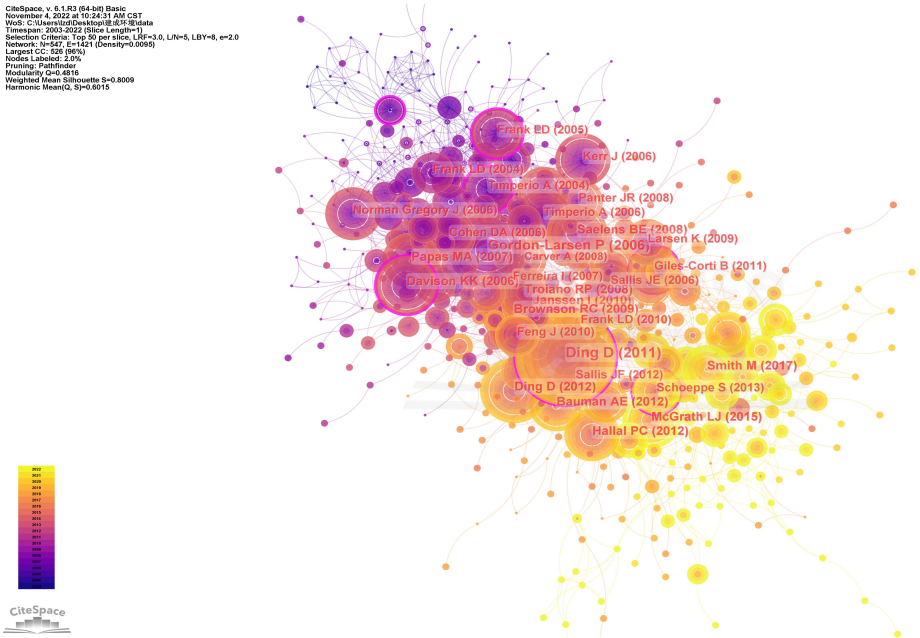

Figure 5. The network of cited references.

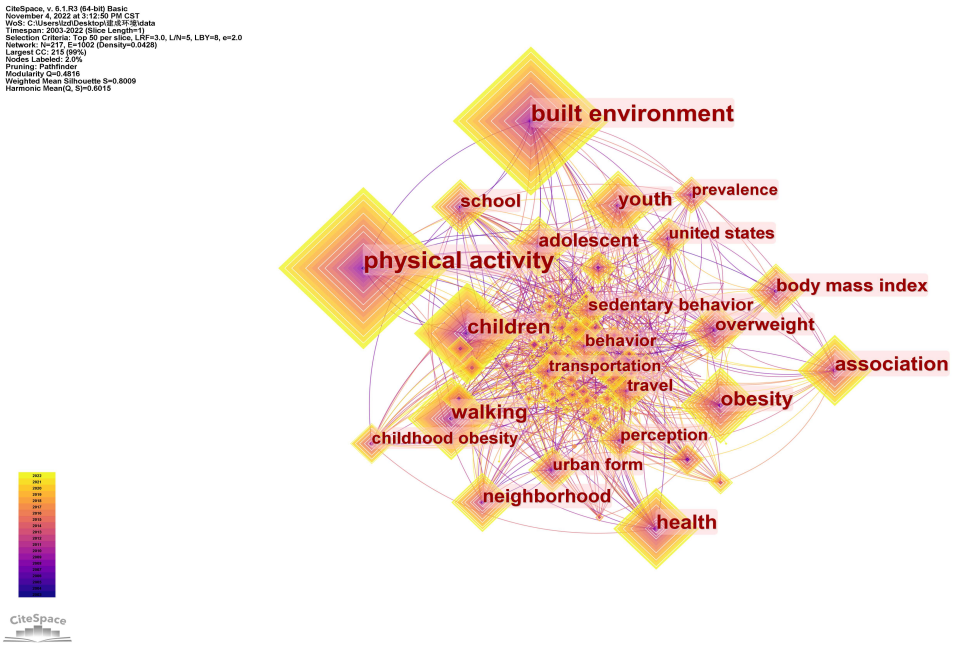

Figure 6. The network of keywords.

Table 6. High-frequency keywords and centrality.

Rank	Keyword	Count	Centrality	Rank	Keyword	Count	Centrality
1	Walking	297	0.05	8	Overweight	147	0.02
2	Health	288	0.06	9	Sedentary behavior	111	0.10
3	Obesity	276	0.04	10	Travel	109	0.09
4	Association	266	0.05	11	Urban form	106	0.08
5	Neighborhood	176	0.05	12	Perception	99	0.03
6	Body mass index	160	0.02	13	Childhood obesity	95	0.06
7	School	151	0.10	14	Transportation	81	0.06

4. Discussion

4.1. Basic Information

This study conducted a comprehensive bibliometric analysis of the composition and development trends of research related to the built environment promoting physical activity in children and adolescents from 2003 to 2022, including countries, institutions, authors, journals, citations, etc. The measurement results demonstrate that since the initial publication of this field, 347 researchers from 47 countries and 250 research institutions have invested in related research and published 1313 related papers and have achieved fruitful research results.

In the above bibliometric analysis of the research situation of countries, institutions, and researchers, it can be seen that relevant research institutions and researchers in the United States, Canada, Australia, and other countries have produced many important research results in this field. Many universities were also highlighted, including the University of Washington, the University of California, the University of San Diego, Deakin University, University of British Columbia, University of Southern Denmark, University of Alberta, University of California, Berkeley, University of Ghent, and University of Washington. Prominent researchers were Sallis, Conway, Gile-Corti, Janssen, Frank, Ding, Saelens, Carver, Gordon-Larsen, Davison, Evenson, and others. Papers in this field were published in publications such as *American Journal of Preventive Medicine*, *Preventive Medicine*, *International Journal of Behavioral Nutrition and Physical Activity*, and *HEALTH PLACE*, have a high number of citations. Their high centrality also reflects the important influence of the above publications and builds a good citation pattern. In addition, this study analyzes the literature citations in this field, and it identifies the core papers with an important influence in the related research.

4.2. Research Hotspots

Keywords are an important embodiment of the core ideas of relevant research, a highly condensed research content, and at the same time reflect the key areas and directions involved in any research. This study carried out a bibliometric and visual analysis of high-frequency keywords. Based on the results, the current hot research directions were summarized into four categories to present the current progress and hot directions of research in this field.

(1) Obesity, one of the keywords with a high frequency (276 times). Related keywords such as body mass index, overweight and childhood obesity were also high. The frequency of occurrence of obesity indicates that obesity is a frontier hotspot in the field of research on the impact of the built environment on children and adolescents' physical activity. Obese patients tend to be younger [23]. Based on changes in the urban built environment over a long period, researchers attempt to determine whether these changes impact childhood obesity [7] and study their specific effects on obesity and overweight influence patterns [24]. It was found that an increase in overweight and obesity in children and adolescents was indirectly affected by the adverse built environment [25]. The two high-frequency keywords, overweight and childhood obesity, have high centrality, indicating that obesity plays an important role in this research field and is the original starting point of related research.

Obesity has expanded from an individual problem to a group problem, and attention to obesity has thus risen from individual research to the exploration of group solutions. Construction has become a good approach to implement a wide range of policy interventions. Several studies have explored the impact of urban green space on obesity and used the specific quantitative relationship between the body mass index and green space rate to present the positive promoting effect of urban green space [26]. In the study of the environmental influence on obesity in children and adolescents, it was suggested that while paying attention to the physical environment, social background factors should also be considered, and the problem should be considered from a comprehensive perspective [27]. It is thus crucial to consider socioeconomic status, race, or ethnicity. Factors such as ethnicity and gender were included [28,29]. The living environment of disadvantaged groups largely

affects their obesity status [30]. Low-income groups have a strong dietary intake due to the difficulty in obtaining healthier and affordable food. High-fat and high-sugar consumers are thus more prone to obesity [11]. Other scholars have investigated preschool children from low-income families and found no association between crime, fast food restaurants, and sports fields and childhood obesity. They hypothesized that the effect of location may be ineffective due to population saturation [10].

Health ranked second in frequency of emergence and has been associated with hot topics such as obesity, weight, and diet in the related research. Several studies have analyzed the impact of the built environment on mental health and some diseases. Neighborhoods with high crime rates and high poverty rates tend to significantly affect people's outdoor participation in physical activities, which will affect physical health and physical activity [31]. Unreasonable urban environment design will lead to an increase in car usage and a decrease in physical activity. At the same time, problems such as exhaust pollution further increases the health risks of outdoor physical activity and reduces the health benefits of exercise [32]. A comprehensive analysis of the above results demonstrates that relevant researchers' attention to epidemics, such as being overweight and obesity among children and adolescents, has already constituted a frontier focus of international research on physical activity-promoting built environments for children and adolescents.

(2) Healthy behavior. Walking, sedentary behavior, and transportation are high-frequency keywords in this field. Transportation-related physical activity is the primary aspect of the built environment research efforts to change, hoping to influence people's daily commuting behavior [33], so that this crucial transportation activity can be completed in the form of physical activity as much as possible. Maximizing physical activity within a limited time and scope is key. Walking behavior has become an active commuting method currently advocated due to its low participation threshold and actual health benefits. As researchers pay more attention to it, related research in this field has gradually expanded, exploring urban planning policies from a macro perspective [34] and environmental specificity on a micro-scale [35]. One example is investigating the influence of youth travel patterns on road safety and traffic congestion [36] to verify the effectiveness of walking scores in evaluating the appropriateness of walking behavior in different geographical locations and different spatial ranges [37].

More sedentary behaviors appear in people's daily behaviors, and the resulting public health problems have attracted more attention. It has become a challenge to seek alternative behavioral activities to replace sedentary behaviors and solve the harm caused by them. A popular issue in research is on the impact of the built environment on the physical activity of children and adolescents. Countries with poor infrastructure have relatively more physical activity and less sedentary behavior, while countries with better infrastructure have less physical activity and prolonged sedentary behavior [38]. More attention should be paid to strengthening the guidance and mobilization of individuals' enthusiasm for physical activity in urban environment construction [39], and refining the urban built environment construction into the diversity of land use structure, traffic safety, crime, and street connectivity, as well as other indicators [40], so that people voluntarily reduce sedentary behavior and increase physical activity [41].

In summary, the primary focus of addressing physical activity through the built environment is a shift in people's daily modes of transportation, and if this positive shift can be effectively facilitated, it significantly increases physical activity and reduces daily sedentary behavior. This active commuting behavior relies on the safety of the traffic environment [42,43], convenience [44], and other aspects, and it is necessary to construct schools that affect students [41]. Starting from the travel mode of children and adolescents, more physical activities such as walking are encouraged by built environment-related factors, which has become the primary research focus of improving sedentary behavior.

(3) The home–school environment. The word "Neighborhood" is the 5th highest frequency keyword (176 times). In addition, School and Urban form also have a high frequency of emergence, which reflects the relevant research on "home–school" environment"

concerns. Urban form is the core issue of research related to the built environment [45], and the investigation and research on various aspects of the neighborhood unit is a more specific analysis and evaluation of the impact of the built environment on physical activity [46] and schools, as a built environment element in the neighborhood unit closely related to physical activity of children and adolescents has naturally become a hot topic of related research.

In related studies of such hotspots, green space in the neighborhood unit has attracted the attention of many researchers. The standard scores of children and adolescents in the high vegetation rate area were significantly reduced [47], and green vegetation [48] and parks [49] have played a positive role in the good BMI of children and adolescents. Establishing a theoretical framework for the relationship between different types of green spaces and health is beneficial for future related research programs [15]. Greening the schoolyard has played a significant role in promoting children's physical activities and is also an important direction to improve children's health [50].

Research on schools primarily focuses on the home–school commuting of children and adolescents, and its core focus is to discover the relationship between commuting distance and choice of commuting mode. Studies have found that the likelihood of choosing a walking or biking commute is positively correlated with shorter distances, male gender, higher land mix utilization, and green space rates, providing a reference for neighborhood school site selection [51]. Traffic congestion seriously affects the walking rate of students' commuting and is an important reference indicator for school site selection [14].

Looking at the research results on related topics such as neighborhoods, schools, and urban form, it is found that perception (Perception), as a high-frequency keyword in this field, is closely related to various elements of the built environment. Relevant studies have demonstrated that parents or children and adolescents' perception of the physical activity environment is a core part of this type of research and has become an important mediating variable to study the manner in which the built environment affects children and adolescents' physical activity [52]. Parents' perception of traffic congestion [36] and public security [53] affects the frequency of adolescents' choice of multiple traffic-related physical activities, and a good "perception" of the relevant situation can be effective in promoting more walking and cycling commutes among children and adolescents.

Parents, as the first guardians of children and adolescents, are the primary participants in physical activity behavior intervention for children and adolescents. Therefore, analyzing and understanding parents' perceptions of the home environment and various aspects of school commuting is an unavoidable key content in this type of research. It also explains some research results that exceed assumptions. For example, some studies have found that simply changing the physical activity environment is not enough to improve the physical activity status [54]. How to make parents aware of crime, traffic, and pollution in the physical activity environment can be guaranteed, which will be a long-term challenge in the field of the physical activity-promoting built environment for children and adolescents.

(4) Relevance. Looking at the relevant research results in this field, it was found that the research hotspots can be briefly summarized into obesity, health, behavior, family, school, and other aspects. Further analysis shows that the exploration of association is an important starting point for most of them. One study compared the relationship between children's physical activity and green space rates in communities with smart growth and traditional design and found that, in smart growth communities, children's physical activity was more significantly associated with green space rates [55]. Several studies have used the NEWS-Y scale to measure the mixed land utilization, crime rate, traffic safety, and other indicators in the neighborhood environment through standardized scores, combined with self-reported physical activity, and found that this scale score was significantly associated with some types of adolescent physical activity [40].

Additionally, related researchers also investigated the association between socioeconomic characteristics, behavioral characteristics, and physical activity in children and adolescents. They found an association between lower socioeconomic status, less sleep time, and physical activity [56]. It is common in this type of research to sort out demo-

graphic characteristics such as socioeconomic status, perception of the environment, green space rate, home–school distance, safety status, and the impact of built-environment characteristics on children and adolescents' physical activity with clear correlations. As a high-frequency keyword in this study, association represents another research element in this type of research.

5. Conclusions

After a long period of basic growth, global research on the built environment's impact on children and adolescents' physical activity has entered a stage of steady development, and relatively complete research has been achieved through basic construction during the early stages. In terms of primary research forces, including the primary research countries, primary research institutions, and core authors, European and North American countries occupy a leading position among them, and their research results have had a high influence. The disciplines involved have formed a large number of crossovers, and each has produced highly influential scientific research results, providing a variety of perspectives and rich theoretical foundations for research in this field. More frequent cooperation among the core authors has also formed a closely connected research network in this field.

Relevant research is still in the basic research stage. It is recommended that researchers, on the premise of learning from previous international research experience, conduct an in-depth analysis of the differences caused by various regional characteristics, economic income levels, and historical and cultural backgrounds, and strive to promote social reality. The preliminary basic construction research of the situation lays a core local foundation for the practical application of the research results in the near future. Through the aforementioned analysis results, researchers can provide more accurate research aids for researchers, so that they can better formulate relevant research plans, selectively transform beyond past research, and pay close attention to the information published on key platforms, to keep abreast of cutting-edge trends and research progress, while actively seeking interdisciplinary cooperation in their own research, with particular attention on medicine, public health, and other disciplines.

6. Research Limitations

This study presents the knowledge base and frontier hot spots in the research field of the impact of the built environment on the physical activity of children and adolescents, but there are also some limitations. First, the study failed to analyze more specifically for children or adolescents. Second, research data were not obtained from multiple databases. Although these limitations have realistic roots that are difficult to overcome, we will improve them through more research in the future.

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