OnLine Journal of Biological Sciences

Original Research Paper

An Evaluation of Childhood Overweight Studies from South Africa: A Bibliometric Review from 2003-2023

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Article history
Received: 22-11-2024
Revised: 22-11-2024
Accepted: 18-12-2024

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Abstract: Overweight/obesity exists as a severe threat to the well-being of children globally, with its prevalence in South Africa steadily increasing in recent years. Childhood obesity/overweight can be linked to several life-threatening ailments and, in some cases, death. The present bibliometric review aimed to quantify and map out scholarly outputs on obesity/overweight research published in South Africa through a bibliometric analysis. Publications on childhood obesity/overweight studies were obtained from the Web of Science (WoS) dataset, making use of a standardized search stratagem. Biblioshiny software was utilized to group and assess organizations' and journals' contributions to the discipline. Rstudio, Microsoft Excel, and Vosviewer tools were employed for network visualization. A sum of 115 documents related to childhood/overweight research were identified from South Africa (2003-2023). The average citation per document was 136.5. The result showed that the yearly increase of research on the subject was 6.71, which is indicative of growth in the number of articles as the year increases. The institutions with the highest number of research in childhood overweight/obesity are the University of Cape Town (n = 40), North-West University (n = 37), Witwatersrand University (n = 37) and University of KwaZulu-Natal (n = 25), while "stunting" was the most decisive trending topic in the research field. The leading authors' keywords are "obesity" (n = 47) and "overweight" (n = 30), while "BMC Public Health" and "International Journal of Environmental Research and Public Health" were the leading journal sources for publication in the field. This bibliometric assessment offers an antique overview of advancement in childhood obesity/overweight investigation from South Africa and has emphasized the primary duties carried out by several institutions in combating overweight/obesity conditions amongst children. Furthermore, the bibliometric review projects the necessity for more research on childhood overweight/obesity and strategic intervention programs for result-oriented prevention and control studies.

Keywords: Bibliometric Analysis, Obesity, Over-Weight, Scholarly Outputs, Web of Science

Introduction

Obesity and overweight (ob /ow) in children is a grave public health concern, resulting in a worrisome escalation in its prevalence globally (Jia *et al*., 2017). The condition of ow/ob amongst children affects both developed as well as developing nations of the world. In 2016, the Global Health Organization alerted the world that more than 41 million children below five years old were estimated to be obese or overweight all over the world, and the numbers have since been increasing (Kawuki *et al*., 2021). Besides, approximately one-quarter (1/4) of these obesity /overweight (ow) children lived in Africa (Kawuki *et al*., 2021). It was projected that 1 out of every 10 children universally and 1 out of every 8 children in Africa will either live with obesity or be overweight (ow) by 2020 (Otitoola *et al*., 2021). The highest rate of childhood ob/ow within the African continent can be traced to South Africa (SA) (Muthuri *et al*., 2014). Conversely, in contemporary years, the incidence of ob/ow children in SA has also increased (Rossouw *et al*., 2012;

Pienaar & Kruger, 2014; Nomatshila *et al*., 2022; Idamokoro and Goon, 2024).

The notable risk factors leading to obesity/overweight conditions among children include eating junk food, sedentary behaviors, genetic transfer, and socioeconomic status, among others (Bhadoria *et al*., 2015). In situations where this is unchecked, childhood ob and ow exposes children to numerous protracted health disorders, including diabetes, hypertension, high cholesterol, heart disease, joint pain, diabetes, asthma, and even death, to say the least (Biro and Wien, 2010; Zhang *et al*., 2018). In addition, obesity in children affects their self-esteem as a result of low self-image as well as depression (Strauss, 2000). In the absence of an intervention program, ow/ob children will possibly remain to be overweight in both their youth and adult phases of life, which may be related to a high threat of life-limiting co-morbidities (Kawuki *et al*., 2021).

Research has shown from statistics that 17.1 percent of SA children within the age ranges of 1-9 years residing in township settlements are ow/ob (Steyn *et al*., 2005). The result revealed by Armstrong *et al*. (2006) showed an occurrence of 14 and 17.9% (in boys) as well as 3.2 and 4.9% (in girls) with respect to ob and ow children within the age of 6 and 13 years old. Again, Kemp *et al*. (2011) reported an incidence of 7.8% overweight (ow) and 3.8% obesity (ob) children between the ages of 6 and 7 years old from the North-West region of SA. Meanwhile, Jacobs and De Ridder (2012) reported that 5 percent of boys were overweight (ow) and 4% were obese of rural children, mainly from black communities between the ages of 11 and 13 years in the North-West Province of SA. With respect to a girl child, it was reported that 10 percent were overweight and 10 percent were obese (Jacobs & De Ridder, 2012). The study by Mlangeni *et al*. (2018) indicated that sedentary behavior is a strong factor that leads to obesity in black South African girls. According to a recent report, obesity among South African children has risen from 17.1-22.8% (Otitoola *et al*., 2021). Another possible factor leading to obesity in children is the high level of inactivity in most children, especially from rural areas in South Africa (Kubayi, 2021). Another study further ascribed the high prevalence of OW in rural regions of SA to the intake of foods rich in starch and fats, reduced physical activities, and a sedentary lifestyle (Rossouw *et al*., 2012). Furthermore, multiple sociocultural, physiological, and behavioral lifestyles increase the likelihood of obesity among people in SA (Nwosu *et al*., 2022). Although SA as a country has gone through speedy socioeconomic and infrastructure expansion, some severe problems limiting child and adolescent growth and development are still recounted (Nwosu *et al*., 2022; Idamokoro *et al*., 2023; Idamokoro and Goon, 2024).

Reacting to the current growing burden of childhood ob/ow in SA, numerous studies have been carried out in the past to tackle this communal health menace. More research on the subject is still ongoing. For this reason, there is the need to collectively quantify as well as evaluate childhood ob/ow research that has been done over the years and to present a past viewpoint, making reference to the significant exertions and funds that have been spent by government agencies and Department of Education (DoE) for the treatment, control as well as prevention of obesity among children in South Africa.

Regardless of the rise in the participation of scholars studying childhood ob/ow in SA, there appears to be no bibliometric report on the subject that quantitatively evaluates the research productivity in order to ascertain how researchers are getting closer in looking for a long-lasting answer to solving the increasing quandary of incidences and prevalence of childhood ob/ow facing the nation. Hence, this may be the first study on bibliometric description of ob/ow research in SA from 2003-2023 to the best of the author's understanding.

Thus, the aims of this study are to determine the yearly scientific publications on obesity/ overweight research among children in SA, examine the most productive authors, active centers of learning, as well as journal outlets, determine the authors' and institutions' networks, investigate other nations collaborating with SA on childhood ob/ow research, evaluate the bibliographic coupling existing between institutions, investigate the authors, references and sources of co-citation networks and assess the co-occurrence keywords utilized in the research discipline.

Bibliometric evaluation of research for a particular discipline helps to determine the most relevant papers/journals/institutions within a research domain by estimating their impact based on the number of times that they were cited and their global h_index score (Ahmad *et al*., 2019). The art of indexing the most cited papers of a research discipline is very helpful in finding knowledge gaps, which may apparently help to move the research field forward in a progressive direction (Varela *et al*., 2018). The profile of the most cited manuscript in a research field can further be employed as a guiding benchmark for growing scholars and emerging researchers to follow (Shuaib *et al*., 2015; Azer & Azer, 2016). This study would significantly assist in filling these vital gaps as well as provide valuable insight and information to public health agencies and scientists on scholarly outputs the management, control, and deterrence strategies of childhood ob/ow in SA.

Materials and Methods

Study Design

The current study utilized a bibliometric evaluation approach, which is an approach that has been increasingly employed as an instrument and source for monitoring the research impact of several scholarly fields and backing up suitable policy plans over the years (Kawuki *et al*., 2020).

Bibliographical Data Source

The data used for this study were collected from the WoS bibliographical dataset. The Web of Science (WoS) stands as a comprehensive as well as impeccable data source and a beacon of scholarly excellence, covering over 190 fields globally (Han *et al*., 2023; Petermann-Rocha *et al*., 2024). This data hub houses a wide range of repositories of over 12,000 well-known and impactful scientific journals, helping is a testament to its profound scholarly influence (Wang *et al*., 2024). The data set covers the most vital international journal sources. Recognized as the embodiment of bibliometric research across different fields, WoS offers unparalleled facilities in literature exploration as well as citation assessment while guaranteeing real-time data updates (Jiang *et al*., 2018). Additionally, the common agreement for the utilization of a single data set (such as WoS) for analysis of bibliometric studies is generally approved for most scholars as a result of the difficulties encountered in doing this type of study with multiple datasets, which may lead to loss of some essential publications in the course of coding when combining multiple data sets (Sweileh, 2020). Meanwhile, ethical consent for this type of study was not required because the data utilized were obtained from a public dataset, and it involved no interaction with animals or humans as subjects.

Search Strategy for Data Collection on Childhood Obesity/Overweight

The study employed the listed search query: TI = [(child*) AND (obes* OR overweight)] to retrieve appropriate documents from WoS published within 2003-2023. In order to maximize the correctness of the collected research output, the keyword was searched in the article titles and was restricted to only articles from South Africa. To include all published articles, the advanced search technique was adopted, and no language limitation was set.

Statistical Permutations and Bibliometric Assessment

The selected appropriate documents were downloaded in a BibTex format for further analysis. More importantly, this study mostly used descriptive statistics to report the results. The research trends, as well as selected bibliometric indexes, were grouped and analyzed using the "Bibliometrix app." from the R-studio (version 4.3.0. 2023-04-21 ucrt) software package (Aria and Cuccurullo, 2017). The analysis included the frequency and distribution of article types, author keywords, keywords plus most productive regions, institutions, authors, research trends, relevant journal sources, as well as the individual journal impact factor and Total Citations (TCs) and networking among authors and keywords. Likewise, Microsoft Excel and VOSviewer (v.1.6.19) were utilized for data mapping, mining, and network evaluation visualization (Waltman *et al*., 2010).

Criteria for Inclusion and Exclusion of Articles for this Study

Inclusion criteria

The study employed the following inclusion benchmark:

i) Original peer-reviewed articles, reviews on research studies done on childhood obesity and overweight
ii) Articles published online in the WoS dataset between 2003 and 2023

Exclusion Criteria

The exclusion benchmarks for the study include the following:

i) Unpublished articles
ii) Unrelated articles
iii) Publications involving plagiarism and retracted manuscripts.

Earlier studies by King *et al*. (2018) and Fesseha *et al*. (2020) have employed this type of approach to screening data for bibliometric analysis. The inclusion and exclusion of data for this study are further explained in Fig (1).

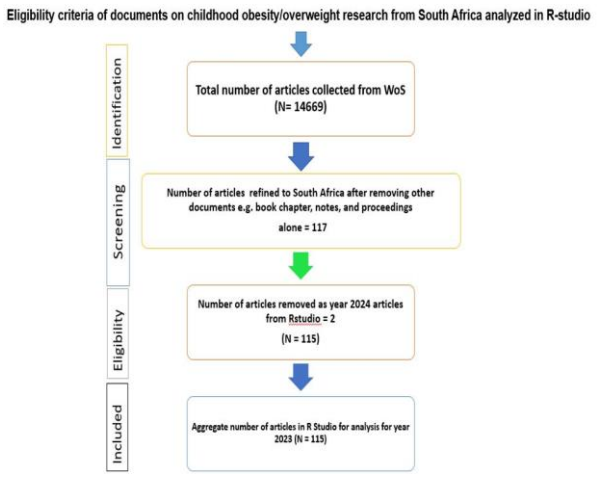

Fig. 1: The inclusion and exclusion criteria of articles on childhood obesity/overweight research from South Africa

Results

Types of Document and Publication Trends

The original search for documents for this study identified a total of 14669 publications from all nations, and after refining the search to South Africa and the year 2023, it became 115 (0.79 %), a reduction in numbers. In order to compare the results, the USA had (n = 4925; 33.6%) childhood ob/ow documents, followed by the UK (n = 1163; 7.9 %), China (n =1089; 7.4 %), Australia (n = 966; 6.5%) and Germany (n = 906; 6.1%). The 115 documents that were considered for analysis were all in English language. The summary of the main findings of the bibliometric review is displayed in Table (1), with the total single-authored documents being 5 (0.2 %) from an aggregate of 2197. Meanwhile, Fig. (2) lists the document types for the study on childhood obesity/overweight research from South Africa.

Table 1: Summary of childhood obesity/overweight research in South Africa from 2003-2023

Description	Results
Main Information About Data	
Timespan	2003:2023
Sources (Journals, Books, etc)	72
Documents	115
Annual Growth Rate %	6.71
Document Average Age	7.05
Average citations per doc	136.5
References	4204
Document Contents	
Keywords Plus (ID)	368
Author's Keywords (DE)	301
AUTHORS	
Authors	2197
Authors of single-authored docs	5
Authors Collaboration	
Single-authored docs	5
Co-Authors per Doc	22.1
International co-authorships %	73.91

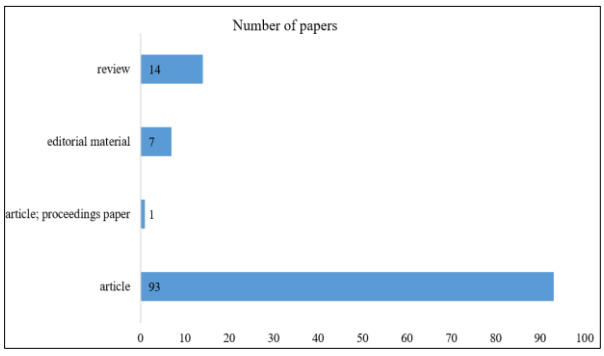

Fig. 2: Types and number of documents on childhood obesity/overweight research in South Africa (from 2003-2023) indexed in WoS

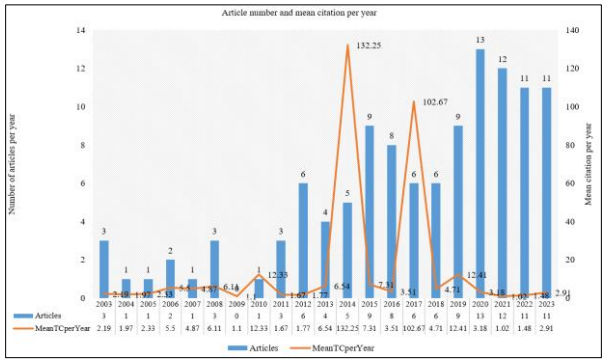

Fig. 3: Annual scientific production on childhood obesity/overweight-related research in South Africa from 2003-2023. The annual growth rate was 6.71%

The number of authors involved in research work on this subject matter was 2197, while the number of single authors was 5. There were 22.1% co-authors per document and 73.91% international co-authorships. The average citation per document was 136.5%, while the yearly growth rate was 6.71%. Figure (3) describes the trend for article and citation numbers. This analysis depicts the yearly growth in article numbers and citations. The result in Fig. (3) showed a fluctuating but steady increase in the growth of article numbers from 2003 (n = 3) to 2020 (n = 13). The article numbers, however, had a slight decrease from 2021 (n = 12) to 2023 (n = 11).

Most Contributing Authors from South Africa

The analyzed research publications were produced by 2197 authors (with several of them being international authors), of which 5 were authors of single-authored publications. These authors include Lambert EV (n = 120, Kengne AP (n = 5), and Kruger HS (n = 4), among others (Table 2).

Most Productive Research Institutions with Regard to Article Numbers

Table (3) presented the productive South African universities on the basis of publication numbers and their links with other universities with more than 3 articles. The most prominent institutions were the University of Cape Town (n = 31), North-West University (n = 18), University of Witwatersrand (n = 17), University of KwaZulu-Natal (n = 12), University of Stellenbosch (n = 9) among others (Table 3).

Most Productive Journals Based on Article Numbers

The retrieved articles on childhood ob/ow were published in top journals dedicated to childhood ob/ow and public health matters. Most of the journals had an above 2.0 impact factor, with the least being the "BMC Nutrition" journal, which had a 1.9 impact factor. Meanwhile, the journal with the highest impact factor is

the Lancet, with a huge impact factor of 98.4 (Table 4). It was observed that foreign journals dominated the list of top journal publishers, especially UK journals (n = 13), followed by the USA and Switzerland. It was further noted that only one journal, "SAMJ South African Medical Journal" from South Africa, made the list of top journals. The topmost productive journals included BMC Public Health (n = 8), International Journal of Environmental Research and Public Health (n = 8), International Journal of Obesity (n = 5), and SAMJ South African Medical Journal (n = 5), among others (Table 4).

Collaborations and Network Assessment with other Nations

The analysis indicated that South Africa collaborated with 47 nations in childhood obesity and overweight research. The strongest network was with the UK with both nations producing (n = 33) studies, followed by the USA (n = 26), Canada (n = 22), Australia (n = 20), among others (Fig. 4). South Africa also partnered with some African nations, including Kenya with both nations producing (n = 15) studies, followed by Ghana (n = 7), Ethiopian and Nigeria (n = 3), respectively (Fig. 4).

Collaborations and Network Assessment of Institutions and Authors

Analysis of institutional collaboration showed that the University of Cape Town was the most collaborative institution with 6 Links (L) and 7 Link strengths (LS). This was followed by the South African Medical Research Council (L = 6, LS = 8) and the North-West University (L = 5, LS = 8), among others. A minimum of 1 document per institution was set, and 20 institutions met the threshold (Fig. 5).

The analyzed documents were produced in collaboration among various authors. A minimum of 2 documents per author was set, and 18 met the threshold with a combined total link strength (LS = 1193) and aggregate link (L = 133) as visualized in Fig. (6). The collaboration network was categorized into three (3) clusters with different authors fitting into each cluster. Based on cluster one (1), the most collaborative authors of childhood obesity/ overweight included Lambart EV (L = 17, LS = 354), Armstrong MEG (L = 15, LS =156), Lambert MI (L = 14, LS = 156), Sartorius B (L = 16, LS = 66), Steyn NP (L =17, LS =65), Kruger HS (L =15, LS = 65), Toriola AL (L = 14, LS = 65), Goon DT (L = 15, LS = 33) and Mphekgwana PM (L= 10, LS = 18), amongst others. Secondly, based on cluster two (2), the most collaborative authors of childhood obesity/ overweight included Puoane T (L =16, LS = 153), Kengne AP (L =16, LS = 141), and Adom T (L = 15, LS = 119). Conversely, based on cluster three (3), the most collaborative authors of childhood obesity/ overweight included Pienaar AE (L =16, LS = 161), Monyeki MA (L =15, LS = 145), and Kruger R (L = 10, LS = 132).

Table 2: Top authors recognized doing research on childhood obesity/overweight from South Africa (2003-2023) as indexed in WoS

S/N	Element	h_index	g_index	m_index	TC	NP	PY_start
1	LAMBERT EV	10	12	0.526	1040	12	2006
2	KENGNE AP	5	5	0.455	12590	5	2014
3	KRUGER HS	4	4	0.19	176	4	2004
4	KRUGER R	3	3	0.158	111	3	2006
5	LEVITT NS	3	3	0.15	4914	3	2005
6	MONYEKI MA	3	3	0.231	66	3	2012
7	PIENAAR AE	3	3	0.25	26	3	2013
8	PUOANE T	3	3	0.3	28	3	2015
9	SARTORIUS B	3	3	0.429	33	3	2018
10	STEYN NP	3	5	0.15	152	5	2005
11	ADOM T	2	2	0.286	28	2	2018
NB = PY_start: Publication Year start; TC: Total Citation; NP: Number of Publications							

Table 3: Productive research institutions on childhood obesity/overweight research based on article numbers and links with other universities in South Africa

S/N	Institutions	Documents	Total link strength	Links
1	University of Cape Town	40	42	16
2	University of Witwatersrand	37	28	13
3	North-West University	37	28	11
4	University of KwaZulu-Natal	25	48	13
5	South Africa Medical Research Council	15	10	8
6	University of Pretoria	14	24	10
7	University of Limpopo	13	16	10
8	Stellenbosch University	9	2	2
9	University of South Africa	9	2	2
10	University of Johannesburg	5	2	3
11	Tshwane University of Technology	4	4	2

Table 4: Top journals that published childhood obesity/overweight articles as indexed in WoS

S/N	Sources	Journal location	Articles	Impact factor (2023)
1	BMC public health	UK	8	4.8
2	International Journal of Environmental Research and Public Health	Switzerland	8	4.6
3	International Journal of Obesity	UK	5	4.2
4	SAMJ South African Medical Journal	South Africa	5	2.2
5	Plos One	USA	4	2.9
6	BMJ Open	UK	3	2.9
7	Public Health Nutrition	UK	3	3.2
8	Bmc Nutrition	UK	2	1.9
9	Bmc Pediatrics	UK	2	2
10	Children-Basel	Switzerland	2	2
11	European Journal of Clinical Nutrition	UK	2	3.6
12	International Journal of Behavioral Nutrition and Physical Activity	UK	2	8.7
13	Journal of Human Hypertension	UK	2	2.7
14	Journal of Hypertension	USA	2	4.9
15	Lancet	UK	2	98.4
16	Lancet Global Health	UK	2	19.9
17	Nutrients	Switzerland	2	5.7
18	Obesity	USA	2	4.2
19	Obesity Reviews	UK	2	10.8
20	Pakistan Journal of Medical Sciences	Pakistan	2	2,3
21	Pediatric Obesity	UK	2	3.9

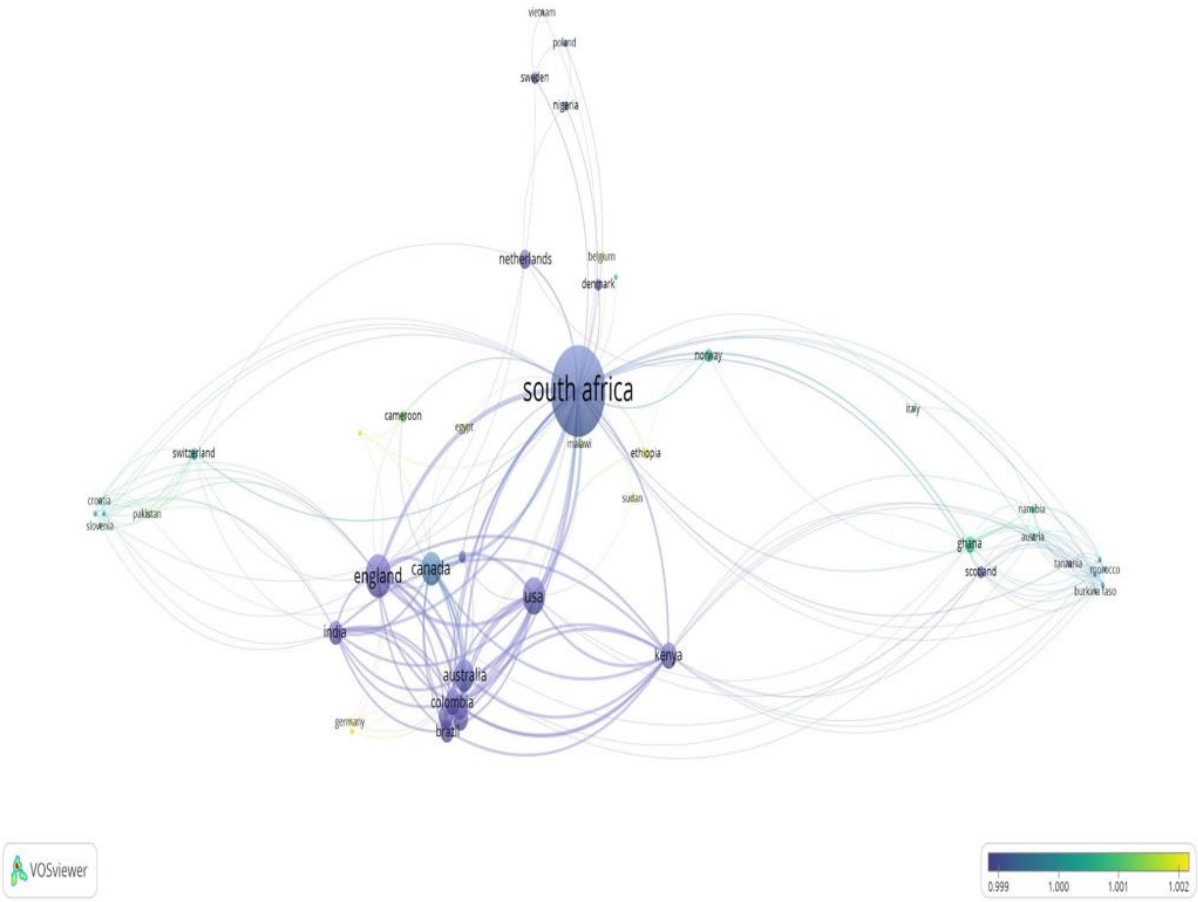

Fig. 4: Overlay visualization of network analyses of countries collaborating with South Africa in childhood obesity/overweight research

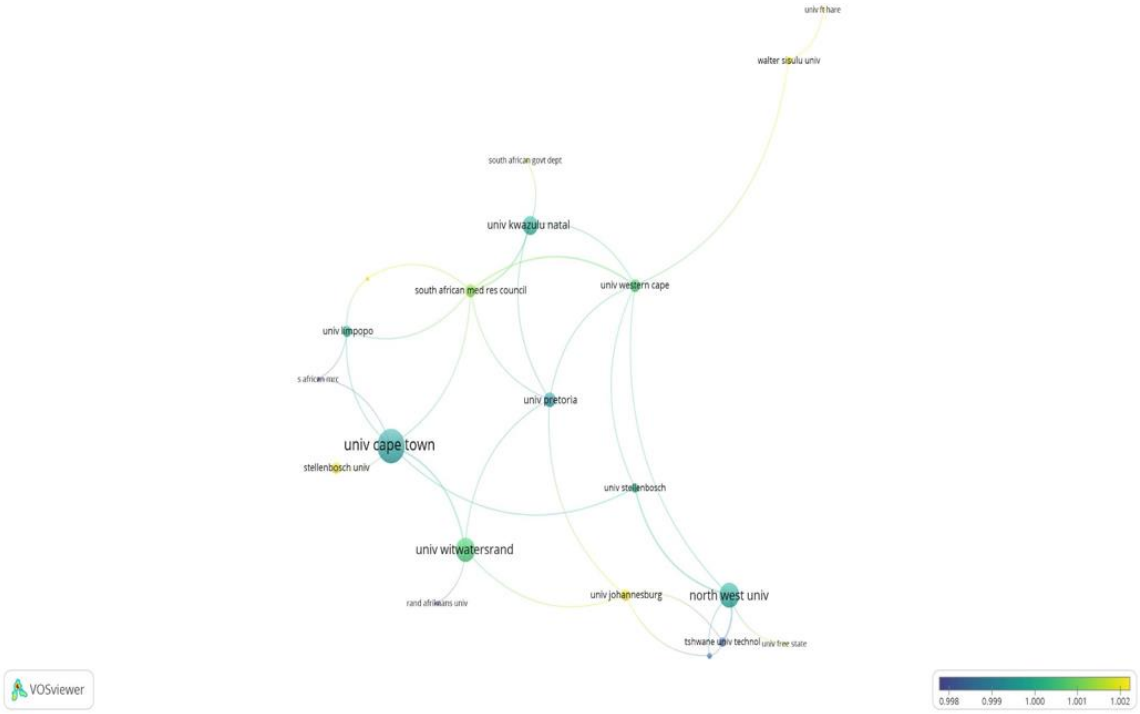

Fig. 5: Overlay visualization of network analyses of institution collaborations on childhood obesity/overweight research

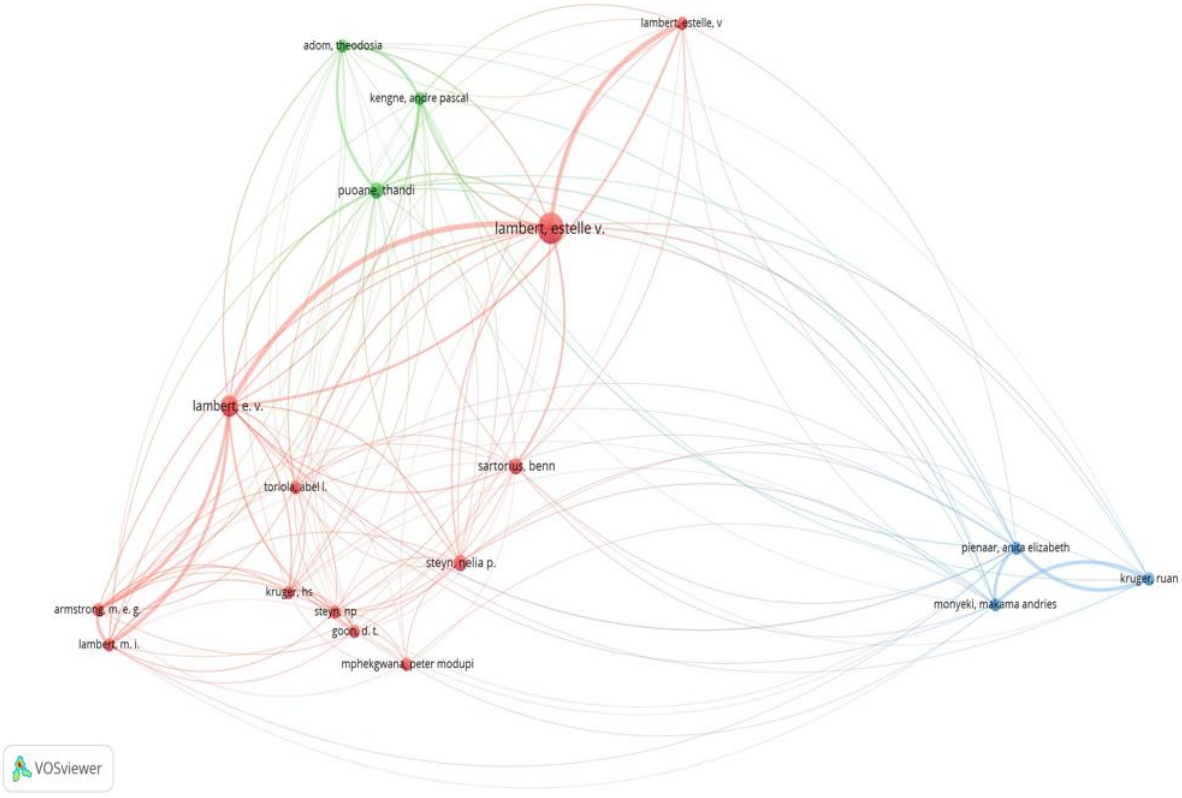

Fig. 6: Network visualization analysis of author collaborations on childhood obesity/overweight from South Africa as indexed in WoS

Keywords Assessment

Keyword evaluation was done to detect directions as well as subject matters in line with childhood obesity and overweight research and to understand specific discipline projections. The retrieved documents had 301 author's keywords and 368 keywords plus. The most relevant author's keywords from the field of current research included; "obesity" (n = 47), "overweight" (n = 30), "children" (n = 18), "childhood obesity" (n = 10), "stunting" (n = 10), amongst others (Table 5). The most frequent keywords plus comprises; "overweight" (n = 32), "adolescents" (n = 24), "prevalence" (n = 23), "body mass index" (n = 21), "physical activity" (n = 20), amongst others (Table 5). Important to note is the fact that in bibliometric studies, keywords plus are words that regularly appear in the titles of a paper's references but do not appear in the title of the paper itself and are essential in projecting the knowledge structure of scientific disciplines. The result in Table (6) described the contents of the author's keywords that could point research scholars to a good representation of childhood obesity/overweight research. This result further tells about the topic trends and growing focus of research for future directions on this subject. Top on the list is "stunting" (n = 10), among other trending topics on childhood obesity/overweight.

Table 5: Analysis of keywords: author keywords and keywords plus based on their frequency from 2003-2023 indexed in WoS

S/N	Words	Occurrences	Words	Occurrences
1	Obesity	47	Overweight	32
2	Overweight	30	Adolescents	24
3	Children	18	Prevalence	23
4	Childhood Obesity	10	Body-Mass Index	21
5	Stunting	10	Physical-Activity	20
6	Childhood	7	Association	17
7	Physical Activity	6	Obesity	17
8	Risk Factors	6	Health	16
9	Adolescents	5	Childhood Obesity	15
10	Blood Pressure	5	Children	14
11	Body Mass Index	5	Risk	14
12	Child	5	Risk-Factors	12
13	Nutrition	5	Trends	12
14	South Africa	5	Growth	11
15	Adiposity	4	Worldwide	9
16	BMI	4	Hypertension	7
17	Determinants	4	Socioeconomic-Status	7
18	Hypertension	4	Blood-Pressure	6
19	Activity	3	Cardiovascular-Disease	6
20	Adolescent	3	Childhood	6
21	Africa	3	Malnutrition	6
22	Body Composition	3	Prevention	6
23	Physical	3	United-States	6
24	Sedentary Behaviour	3	Youth	6
25	Abdominal Obesity	2	Behavior	5

Table 6: Trending topics on childhood obesity/overweight research in South Africa from 2003-2023 indexed in WoS

S/N	Item	Frequency	year_q1	year_med	year_q3
1	Stunting	10	2006	2012	2022
2	Child	5	2008	2013	2013
3	Blood Pressure	5	2014	2014	2021
4	Children	18	2012	2016	2018
5	Physical Activity	6	2015	2016	2018
6	Overweight	30	2014	2019	2021
7	Risk Factors	6	2013	2019	2020
8	Body Mass Index	5	2017	2019	2020
9	Obesity	47	2016	2020	2021
10	Childhood Obesity	10	2018	2020	2021

Discussion

The global prevalence of childhood obesity in developed and developing nations has surged in recent years (Ng *et al*., 2014; Jia *et al*., 2017). This present bibliometric assessment attempts to give an understanding of the trend and scholarly publication of childhood ob/ow-related outputs from SA. The study showed that the articles were produced within the last 2 decades (20 years), with more than 75% of the documents being published in the last decade (10 years). This can be elucidated by the steady rise in the prevalence of childhood ob/ow in SA, which has increased in the last few decades (Otitoola *et al*., 2021). This has led to increased attention being given to tackling childhood obesity in SA, which is reflected in the growth of research publications (Armstrong *et al*., 2011; Rossouw *et al*., 2012). However, when compared to global article productions on the subject of childhood obesity research, South Africa is less compared to other developed nations (Kawuki *et al*., 2021), implying that extra attention is needed in this field for SA.

Of the analyzed documents, more than 90% were original research articles, followed by other documents. Notably, review articles constituted around 14% of the published childhood obesity articles from South Africa. The published original articles, editorial material, and proceeding papers openly interpret the research and consensus efforts to address childhood obesity within the area.

The analysis observed that the list of most productive journal outlets was dominated by the UK, USA, and other foreign journal outlets, in which English was the main language of communication. This observation is remarkable to note as it puts research work from South Africa on a global recognition. Again, the fact that these journals are indexed in an international database (WoS) is a good signal for research done in South Africa. It was also observed that only one local journal (SAMJ South African Medical Journal) among the top listed journals was from South Africa, which is also encouraging since it is indexed in WoS. However, there is a need to build and strengthen local journals as well as databases to improve the regional and international recognition of childhood obesity/overweight studies from South Africa. Some of the top journals listed in the present study for doing research in the research discipline include BMC Public Health, International Journal of Environmental Research and Public Health, International Journal of Obesity, Plos One, BMJ Open, Public Health Nutrition, BMC Nutrition and, BMC Pediatrics, among others. These aforementioned journals are reputable for their involvement in publishing peer-reviewed articles on the subject of discourse and other related matters such as child growth, nutrition, well-being, and general development. In support of the present results, Kawuki *et al*. (2021) also recounted similar observations.

The network analysis of this study showed that South Africa displayed a substantial degree of collaboration with several nations in carrying out research on childhood obesity/overweight. The most robust research collaboration by researchers on this subject was done in South Africa with the UK, followed by other notable nations across the globe, including the USA. The reason for this observation may be linked to the fact that the UK (Great Britain) was one of the nations that colonized South Africa (Oliver and Oliver, 2017), and as such, they have strong ties with her. This observation further reveals the significance of information sharing and transfer in tackling public health concerns (Dobbins *et al*., 2004). However, in contrast to our observation, the USA was reported to have more collaboration with China on childhood obesity research than other nations (Kawuki *et al*., 2021).

However, South Africa is known to invest heavily in research and innovations as well as international exchange programs in the continent. Intellectual exchange of expertise and knowledge sharing in a discipline among global researchers from different nations is very important because it creates room for effective executions of result-oriented research that will have a possible global impact in promoting that research field (Lloyd *et al*., 2023). Several authors have also reported that a lack of global networking among nations (developing or developed ones) in research may affect research citations because the intellectual exchange of inputs, funds as well as expertise from different countries helps to grow the number of citations of a research finding (Ekundayo and Okoh, 2020; Smith *et al*., 2021; Idamokoro and Hosu, 2022a; Idamokoro, 2023).

With regards to the analysis of top-ranked institutions from South Africa, the subject showed that the leading institutions of childhood obesity/overweight research were the University of Cape Town, the University of Witwatersrand, North-West University, and the University of KwaZulu-Natal, among others. Besides, the most contributing authors on childhood obesity/overweight research included Lambert EV, Kengne AP, Kruger HS, Kruger R, Levitt NS, Monyeki MA, and Pienaar AE, among others. Furthermore, network analysis revealed authors with the highest collaborations with authors, including; Lambart EV (L = 17, LS = 354), Pienaar AE (L =16, LS = 161), Armstrong MEG (L = 15, LS =156), Lambert MI (L = 14, LS = 156), Puoane T (L =16, LS = 153), Monyeki MA (L =15, LS = 145), Kengne AP (L =16, LS = 141) and Kruger R (L = 10, LS = 132) topping the list, among others. This information could be helpful to future researchers and scholars in this discipline, as it could help to quickly identify the crucial scientists/ researchers for potential

partnerships or even consultation with regard to childhood obesity and overweight research.

As observed by previous studies, childhood OB and OW are considered a serious public health concern in Africa, including SA (Otitoola *et al*., 2021; Nwosu *et al*., 2022). However, in another clan, like some communities in China, childhood obesity is not considered a severe public health challenge because of the cultural perception of seeing chubby children as healthy and a sign of family affluence (Min *et al*., 2018; Zhang *et al*., 2019). This contrasting evidence urgently calls for interventions of sensitive health promotion programs to curb the incidence and prevalence of this menace in every society globally (Zhang *et al*., 2015). This is because childhood ob has many short - and long-term negative health consequences, and it has been suggested that efforts should be more centered on children than on adults to prevent it (Shan *et al*., 2010; Wang *et al*., 2012). Being overweight and obese in children has been linked with a higher likelihood of adult obesity, hypertension, untimely demise, as well as incapacity (Danquah *et al*., 2020).

One notable risk factor that has been attributed to the high prevalence of obesity in children in SA is the consumption of foods with plenty of starch and fats (Rossouw *et al*., 2012). This risk situation can be tackled by the government and other stakeholders by employing and solidification of policies on the need for children to eat a healthy balanced diet (Zhang *et al*., 2014; Wang *et al*., 2019). Subsequently, these policies will help to achieve the World Health Organization's goal of "no increase in obesity prevalence by 2025" (Kawuki *et al*., 2021). In the past, the government of South Africa introduced several nutrition programs (Bourne *et al*., 2007), such as the Integrated Nutrition Program (INP), which was established in 1996 (Coutsoudis & Coovadia, 2001); this program should, however, be re-visited in order to ascertain the quality of food giving to children for the purpose of controlling obesity/overweight among children.

According to Kawuki *et al*. (2021), the chief research disciplines in childhood obesity include "endocrinology metabolism," "pediatrics," "nutrition dietetics," "public environmental occupational health," and "cardiovascular system," amongst others. These research disciplines are, however, a profound consideration of the etiology and pathogenesis of childhood obesity (Allcock *et al*., 2009). The present study's analysis of keywords showed that it covered various essential aspects of childhood obesity and overweight research, including prevalence, causes and risk factors, social-economic effects, prevention, and treatment of obesity in children. Notably, the keyword "Body Mass Index: (BMI)" is also among the highlighted author keywords and keyword plus with the most co-occurrence from the investigated documents from WoS. The reason for this observation is not far-fetched because BMI is the central index for the grouping of overweight and obesity in people, so the keyword "BMI" covers most studies in the discussed subject matter (Maynard *et al*., 2001).

Furthermore, the result in Table (6) described the contents of the author's keywords that could point research scholars to a good representation of childhood obesity/overweight research. This result further tells about the topic trends and growing focus of research for future directions on this subject. Top on the list is "stunting" (n = 10), among other trending topics on childhood obesity/overweight. The trending topic "stunting" is a major issue associated with childhood ow and ob in SA (Otitoola *et al*., 2021). Worthy of note is the fact that "stunting" is often referred to as a double burden of disease, whereas overweight is assumed to add to the burden of disease triggered by undernutrition and other communicable diseases. South Africa, like many other developing and under-developed nations (Steyn *et al*., 2005), faces this so-called double burden of disease (Rossouw *et al*., 2012). Several studies from developed nations have also shown an association between nutritional stunting and the peril of becoming Overweight (ow) not old. Thank you in adulthood (Sawaya *et al*., 1998; Hoffman *et al*., 2000; Florêncio *et al*., 2001; Walker *et al*., 2002). This is also true for studies done in South Africa (Steyn *et al*., 2005; Otitoola *et al*., 2021).

Study Limitations

Following the trends of other bibliometric investigations, this study may certainly have some limitations, which include the utilization of a sole dataset (i.e., WoS); not all studies on this subject from South Africa may have been indexed in the WoS, thus a likelihood of missing out on some key publications. Findings have shown that several studies are usually omitted when only one dataset is used in conducting bibliometric studies on a particular niche area (Wang *et al*., 2016; Zyoud, 2016). Besides, the citation numbers, h_indexes, and most influential authors on this subject might be deceptive (Tao *et al*., 2012; Idamokoro & Hosu, 2022b) owing to the time of data retrieval, period of publication and the use of one dataset among other factors (Kawuki *et al*., 2021). Therefore, further investigation on this subject is essential, using diverse databases to confirm these discoveries.

The present study was entirely from the WoS data archive. Thus, it may not have captured all published documents on childhood obesity/overweight research. Meanwhile, as previously alluded to in the methodology section of this manuscript, the WoS dataset is a widely accepted knowledge base that is used as a data source

among academics and scientists all over the world. It is recommended that other possible alternative datasets such as PubMed, Google Scholar as well as Scopus, among others, can be used in the future for this kind of study. Nonetheless, the study still offers great insights into the national viewpoints and trends as well as future directions in the field of childhood obesity/overweight as relates to public health and possible morbidity.

Conclusion

The present study attempted to give a deep insight into childhood obesity/overweight research in South Africa (2003-2023), which presented a steady increase in research in the last 10 years. About 115 articles were recovered from WoS, and the articles were written by 2197 authors, while the number of single authors was 5. There were 22.1% co-authors per document and 73.91% international co-authorships. The average citation per document was 136.5%, while the yearly growth rate was 6.71%. The study also discovered the foremost roles played by different authors, organizations, and journal sources in addressing childhood overweight and obesity in SA. The study further acknowledged the important network presented by SA and other nations in childhood obesity/overweight research, which is important to facilitate knowledge sharing and transfer. Again, it is believed that this study would help both old and emerging researchers discover local and international networks in future studies. With the increase in research financial support from the government and other stakeholders, it is believed that the scholars/researchers in the field would be able to carry out more research in this discipline, and this would, in turn, help to reduce the statistics of the prevalence related to childhood overweight and obesity in SA.

Acknowledgment

The author sincerely appreciates the research institute of the TUT for their support in writing this manuscript.

Funding Information

The author have not received any financial support or funding to report.

Ethics

This article is original and contains unpublished material. The corresponding author confirms and approved the manuscript, and that no ethical issues are involved.

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