

A Bibliometric Analysis of Childhood Obesity Research From China Indexed in Web of Science

Joseph Kawuki (✉ joseks256@gmail.com)

Southeast University <https://orcid.org/0000-0002-2440-1111>

Upama Ghimire

Southeast University

Shireen Salome Papabathini

Southeast University

Nathan Obore

Southeast University

Taha Hussein Musa

Southeast University

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Abstract

Background: Childhood obesity (CHO) is a serious global health threat, whose prevalence in China has gradually increased in the past two decades. The study aimed to quantify and map the scientific output of research concerning CHO published from China through a Bibliometric perspective.

Methods: CHO-related publications were retrieved from the Web of Science database by using the keywords 'childhood obesity', and 'childhood overweight'. HistCite and Biblioshiny software were used to categorise and evaluate authors', institutions' and journals' contribution. VOSviewer was used for network-visualisation.

Results: A total of 230 CHO-related documents were identified from China (1900-2020), which was 3.8% of the global output of CHO research. The majority (74.8%) of the papers were research articles, and the average citations per document were 18.4. The results show a gradual increase in publication trend over the last 20 years. The leading institutions in CHO research were Peking University (n=22), Chinese CDC (19) and Chinese University of Hong Kong (18), while "Endocrinology Metabolism" (50) was the most decisive research field. The most contributing authors included Wang YF (17), Xue H (11), and Ma GS (10), while "Obesity Reviews" (15) was the most-crucial journal. The most cited article was from Olds T et al. published in 2011.

Conclusion: This analysis provides a historical perspective of progress in CHO research from China and has highlighted the leading role played by various stakeholders in addressing CHO. Besides, it highlights a need for more focus on CHO research as well as targeted interventions for effective prevention and control.

Introduction

Childhood obesity (CHO) has become a serious global health challenge, with an alarming increase in its prevalence all over the world [1]. The condition affects both developed and developing countries. According to the World Health Organisation, over 41 million children under the age of five were estimated to be overweight or obese worldwide in 2016. Besides, approximately half of these obese children lived in Asia, whereas one quarter lived in Africa [2]. In the last decades, the prevalence of CHO in China has gradually increased, now almost equal to that in developed countries [1, 3]. Between 2000 and 2011, the prevalence of CHO in China nearly tripled from 6.5–16.8% [4].

The notable causes of CHO include unhealthy eating habits, lack of physical activities, family history, among others [5, 6, 7]. If unchecked, CHO predisposes children to several chronic health conditions such as diabetes, high cholesterol, hypertension, heart disease, diabetes, asthma, joint pain, among others [8, 9]. Besides, CHO affects children's self-esteem due to poor self-image and depression [10]. Without intervention, obese children will likely continue to be overweight during adolescence and adulthood, which is linked to a high risk of life-limiting comorbidities [6].

Research shows that approximately 260 million people in China are overweight or obese, and 50% of them are reported in the major cities in China [11, 12]. In a recent study conducted by Musa et al., a significant change in overweight and obesity rate among children and adolescents in Jiangsu Province, China was reported. However, the rate remains higher among males compared with females, and overweight and obesity rate was highest in urban children compared with rural where substantial change has been reported in early childhood, middle childhood and adolescence [12]. Although China has undergone rapid socio-economic and infrastructure development, several serious problems impeding child growth and development were still reported [13, 14].

In response to the increasing burden of CHO in China, several studies have been done to address this public health challenge. This raises the need to collectively quantify and evaluate CHO research, and give a historical perspective, owing to the considerable efforts and resources that have been injected into the control, treatment and prevention of CHO.

This study thus aimed to map research efforts related to the CHO published from China through a bibliometric perspective using documents indexed in the Web of Science database. The study would help fill vital gaps and provide beneficial insight and information to public health authorities and researchers into the control, treatment and prevention of childhood obesity.

Materials And Methods

Study design.

This study used a Bibliometric analysis, a technic that has been progressively used as a tool and basis for monitoring research performance of various scientific disciplines, as well as supporting appropriate policy actions [15-17].

Data source.

The study used the Web of Science Core Collection (WoS), which is a multi-disciplinary scientific citation indexing database and maintained by Thomson Reuters (New York, NY, USA) [18]. The database covers the most important international journals. Ethical approval for this study was not necessary because the data used were obtained from a public database and involved no interaction with human or animal subjects.

Search strategy.

The study used keywords: "Childhood obesity" or "Childhood overweight" to retrieve relevant documents from WoS published within 1900-2020 (14th March). To maximise the accuracy of the retrieved research output, the keyword was searched in the article titles and was limited to only articles from China, Hong Kong and Taiwan. In order to include all published documents, the basic search method was used, and no language restriction was set.

Bibliometric Analysis.

The identified relevant documents were downloaded as a plain text format for further analysis. The study mainly reported descriptive statistics. The research trends and selected bibliometric indicators were classified and analysed using HistCite and “Bibliometrix app.”— (using R-studio cloud) [19]. These included the distribution and frequency of document types, keywords, most productive territories, institutions, authors, research field and journals, as well as h-index, impact factor and total citations. In this regard, the Journal impact factors were obtained from the Journal Citation Reports (JCR) © Ranking: 2018 [20]. In addition, Microsoft excel and VosViewer (Van Eck & Waltman, Leiden University, The Netherlands) were used for data mining, mapping and visualisation of the network analyses [21].

Results

Document types and trends of publication

The initial search identified a total of 6,049 documents from all countries and after refining the search to China and Taiwan, they reduced to 230 (3.8%). For comparison, USA had 2,513 (41.5%) CHO documents, followed by UK 615 (15%) and Australia 373 (6.2%).

The 230 documents were considered for analysis, of which only one article was in the Chinese language, and the rest in the English language. Of the total papers, 16 were Single-authored documents, while 172 (74.8%) were research articles, 23 (10%) reviews, and 21 (9.1%) meeting abstracts, 8 (3.5%) editorial material and the rest were of other document types (**Fig. 1**).

Globally, CHO research begun in 1996 from which it had gradually increased over the last two decades. (**Fig. 2 (a)**). CHO documents in China were produced within a period of 20 years (2001-2020). In the first six years (2001-2006), the output as little with less than 5 documents per year. However, the publications gradually increased in 2010, attaining a maximum peak of 32 publications in 2015, after which they gradually reduced over the recent years. The analysis showed that 88.3% of the publications were published in the last ten years (2010-2020). The mean citation per year also followed an almost similar trend, where it attained a peak of 8.3 citations per year. The average citation per document of the analysed documents was 18.4 (**Fig. 2 (b)**)

Most productive institutions and their collaborations.

The studies were produced by 373 institutions, of which 15 produced eight and more articles. The most influential institutions were Peking University (n=22), Chinese Centre of Disease Control & Prevention (19), Chinese University of Hong Kong (18), Fudan University (15), among others. (**Fig. 3**).

Most influential Funding agencies and Research fields

A total of 23 institutions were identified as funding agencies of CHO research in China, of which over 10 financed atleast 5 study. These included the National Natural Science Foundation of China (48), National Institutes of Health NIH USA (39), and the United States Department of Health Human Services (39), among others. Coca Cola Company was also noted to finance six CHO studies (**Table 1**).

The analysed articles belonged to 48 research fields categorised according to the WoS fields, and of these, ten fields had atleast 7 articles. The most crucial research field included “Endocrinology Metabolism” (50), “Public Environmental Occupational Health” (46), “Pediatrics” (44), and “Nutrition Dietetics” (33) among others, as shown in **table 1**.

Table 1 The 10 top funding agencies of CHO research and the most crucial research fields in CHO

Funding Agencies			Research Fields	
Rank	Agency	Number of papers (%)	Research area	Number of papers (%)
1	National Natural Science Foundation of China	48 (20.9)	Endocrinology Metabolism Public	50 (21.7)
2	National Institutes of Health NIH-USA	39 (17.0)	Environmental Occupational Health	46 (20.0)
3	United States Department of Health Human Services	39 (17.0)	Pediatrics	44 (19.1)
4	NIH Eunice Kennedy Shriver National Institute of Child Health Human Development	16 (7.0)	Nutrition Dietetics	33 (14.3)
5	NIH National Institute of Diabetes Digestive Kidney Diseases NIDDK	9 (3.9)	Environmental Sciences Ecology	17 (7.4)
6	National Basic Research Program of China	7 (3.0)	Science Technology Other Topics	15 (6.5)
7	Coca Cola Company	6 (2.6)	General Internal Medicine	13 (5.7)
8	Ministry of Science and Technology China	6 (2.6)	Research Experimental Medicine	8 (3.5)
9	National Key Technology R D Program	6 (2.6)	Biochemistry Molecular Biology	7 (3.0)
10	Fundamental Research Funds For The Central Universities	5 (2.2)	Psychology	7 (3.0)

Most contributing authors and their collaborations

The analysed publications were produced by a total of 1010 authors, of which 13 were authors of single-authored documents. Twelve authors produced atleast 8 CHO documents and included; Wang YF (17), Xue H (11), Ma GS (10) among others. (Table 2)

Table 2 Authors with eight and more CHO publications

Rank	Author	Number of papers (%)	1 st Author	2 nd Author	3 rd or Last author	Total citations
1	Wang YF	17 (7.4)	2	2	13	176
2	Xue H	11 (4.8)	0	4	7	131
3	Ma GS	10 (4.4)	2	1	7	232
4	Wang HJ	10 (4.4)	0	1	9	116
5	Wang Y	10 (4.4)	2	0	8	260
6	Zhang J	10 (4.4)	1	0	9	151
7	Hu G	9 (3.9)	0	0	9	376
8	Jia P	9 (3.9)	4	0	5	55
9	Li Y	9 (3.9)	3	0	6	187
10	Ma J	9 (3.9)	0	1	8	126
11	Hu XQ	8 (3.5)	0	3	5	184
12	Zhang Y	8 (3.5)	1	2	5	88

Most productive Journals.

The retrieved CHO articles were published in 121 journals, of which 10 of them published 5 or more papers. It was noted that foreign journals dominated the list, especially UK journals. The most ten productive journals included; "Obesity Reviews" (15), "Biomedical and Environmental Sciences" (11), "BMC Public Health" (8), among others. The impact factor of the 10 top productive journals ranged from 1.17 to 7.34 (Table 3).

Table 3 Journals that published five or more CHO articles

Rank	Journal	Country location	Number of papers (%)	Impact Factor (2018)	Total citations
1	Obesity Reviews	United Kingdom	15 (6.5)	8.19	531
2	Biomedical and Environmental Sciences	China	11(4.8)	1.92	471
3	BMC Public Health	United Kingdom	8(3.5)	2.57	427
4	International Journal of Obesity	United Kingdom	7(3.1)	4.51	90
5	PLoS One	United States	7(3.1)	2.78	126
6	Childhood Obesity	United States	6(2.6)	2.43	59
7	Pediatric Obesity	United Kingdom	6(2.6)	3.71	52
8	Scientific Reports	United Kingdom	6(2.6)	4.01	81
9	International Journal of Epidemiology	United Kingdom	5(2.2)	7.34	146
10	World Journal of Pediatrics	Germany	5(2.2)	1.17	36

Collaborations and Network analysis

The analysis showed that China collaborated with 28 countries within CHO research. The strongest partnership was with the USA, with which it produced 90 studies, followed by Australia (20), UK (28), among others. China also collaborated with some African countries, including South Africa and Kenya, producing 6 studies with each. (Fig. 4 (a))

Analysis of institutional collaboration revealed that the Chinese Centre for Disease Control and Prevention (Chinese CDC) was the most collaborative institution with 14 links (L) and 27 link strength (LS). This was followed by Peking University (L=12, LS=15) and Fudan University (L=9, LS=24) among others. A minimum of 5 documents per institution was set, and 39 institutions met the threshold visualised in fig. 4(b).

The analysed papers were produced in collaboration among various authors, with a Collaboration index of 4.66. The most collaborative authors of CHO research included; Hu G (L=19, LS=101), Katzmarkzyk PT (L=18, LS=96), Standage M (L=18, LS=96), amongst others. A minimum of 4 documents per author was set, and 32 met the threshold visualised in fig. 4(c).

Most cited documents on CHO

Among the analysed publications, seven articles were cited more than 100 times and the most cited document was a review written by Olds T et al. It was published in the "International Journal of Pediatric Obesity" in 2011, under the title "Evidence that the Prevalence of Childhood Overweight is Plateauing: Data from nine Countries", with 355 total citations (TC), and 131.2 total citations per year (TC/year). This was followed by other documents which included an editorial material written by Ji CY et al. in 2008 (Table 4). The 10 top-cited papers altogether were cited 1,595 times in the last 20 years.

Table 4 The 10 most-cited articles of CHO from China

Rank	Title and Journal	First Author	Year of publication	Document type	T ci
1	Evidence that the Prevalence of Childhood Overweight is Plateauing: Data from nine Countries International Journal of Pediatric Obesity	Olds T	2011	Review	3
2	Report on Childhood Obesity in China (1) - Body Mass Index Reference For Screening Overweight and Obesity In Chinese School-Age Children Biomedical and Environmental Sciences	Ji CY	2005	Article	2
3	The Association between Breastfeeding and Childhood Obesity: A Meta-Analysis BMC Public Health	Yan J	2014	Review	1
4	What Childhood Obesity Prevention Programmes Work? A Systematic Review and Meta-Analysis Obesity Reviews	Wang Y	2015	Review	1
5	The International Study of Childhood Obesity, Lifestyle and the Environment (ISCOLE): Design and Methods BMC Public Health	Katzmarzyk PT	2013	Article	1
6	Nutrition in Pregnancy and Early Childhood and Associations with Obesity in Developing Countries Maternal and Child Nutrition	Yang ZY	2013	Article	1
7	Gender Difference of Childhood Overweight and Obesity in Predicting the Risk of Incident Asthma: A Systematic Review and Meta-Analysis Obesity Reviews	Chen YC	2013	Review	1
8	Prevalence and Geographic Distribution of Childhood Obesity in China in 2005 International Journal of Cardiology	Ji CY	2008	Editorial Material	9
9	Maternal Employment and Childhood Obesity: A Search for Mechanisms in time use data Economics & Human Biology	Cawley J	2012	Article	8
10	Improving Wear Time Compliance with a 24-hour waist-worn Accelerometer Protocol in the International Study of Childhood Obesity, Lifestyle and the Environment (ISCOLE) International Journal of Behavioral Nutrition and Physical Activity	Tudor-Locke C	2015	Article	8

Analysis of keywords

Keyword distribution was analysed to detect directions and topics in CHO research and to understand discipline development. The retrieved documents had 388 author's keywords and 612 keywords plus. The most common keywords plus in the retrieved documents included; children (99), overweight (88), body mass index (83), adolescents (53), amongst others, as visualised in **fig. 5 (a) and (b)**. The size and centrality of the word reflect its frequency and magnitude. Note that keywords plus are words that frequently appear in the titles of an article's references, but do not appear in the title of the article itself, and are vital in exploring the knowledge structure of scientific fields.

Discussion

This bibliometric analysis provided an insight in the trend and scientific output of CHO-related publications from China. The study revealed that the documents were produced within the last 20 years, with over 80% being published in the recent ten years. This can be explained by the rapid increase in the prevalence of CHO in china, which has almost tripled just within the last two decades [4]. This has resulted in increased attention being given to addressing CHO, which is reflected in research output. However, when compared to the global production, CHO research from china is less (3.8%), implying more focus is still required in this field.

Of the analysed documents, over 74.8% were original research articles, followed by reviews among other documents. The published original articles directly translate into the efforts towards CHO research during the last two decades.

The analysis noted that the list of most productive journals was dominated by the USA and other foreign journals, in which English is the dominant language used. This can be because most of the Chinese journals are not indexed in international databases. This implies that the preventive recommendations of CHO made by these studies may not be fully accessed to the Chinese community, especially if not translated into Chinese. Therefore there is a need to build and strengthen local journals and databases to improve on the regional as well as international recognition of CHO studies from China.

Research concerning CHO was mainly funded by Chinese public or government institutions of which National Natural Science Foundation of China financed led the list. However, several USA institutions had a significant role in financing CHO studies in China, which included National Institutes of Health NIH USA, among others. This has also been noted in other previous studies [15, 22]. Besides, Coca-Cola was the only food processing/beverage company noted to finance CHO research in China. It should be noted that the food processing industry plays a significant role in public nutrition and health, which is a vital

predisposing factor to CHO and other health issues [23, 24, 25]. Addressing CHO should be a joint responsibility; thus, the food processing industry and the private sector, in general, should increase its involvement in CHO research.

Network analysis showed that China exhibited a considerable degree of collaboration with several countries in carrying out CHO research. The most robust research collaboration was with the USA, followed by other countries. This further demonstrates the importance of knowledge transfer and sharing in addressing public health issues [26].

The analysis showed that the leading institutions of CHO research are mainly Chinese Universities, where Peking University lead the list, followed by Chinese CDC, among others. Besides, the most contributing authors of CHO research included both Chinese and authors of other nationalities. The most productive authors included Wang YF, Xue H, and Ma GS. Furthermore, network analysis revealed authors with the highest collaborations. This information could be helpful to future researchers in this field, to quickly identify the crucial researchers for potential partnerships or even consultation, concerning CHO research.

The most highly cited article was a review written by Olds T et al. in 2011, which summarised the evidence of the stagnant high prevalence of CHO using data from nine countries including China [27]. The top citations could be because this article had a broader coverage; addressing CHO in several countries. As noted by previous studies, CHO obesity is still not considered a serious public health issue by some communities in China; which could be due to the cultural perception of chubby children as healthy and a display of family's wealth [4, 11]. This calls for culturally-sensitive health promotion programs to curb the incidence and prevalence of CHO in China [28]. In addition, implementing and strengthening of policies on the marketing of foods to children are needed [29, 30], if the World Health Organization's target of "no increase in obesity prevalence by 2025" is to be achieved [2, 31].

The most key research fields in CHO were "Endocrinology Metabolism" "Public Environmental Occupational Health", "Pediatrics", "Nutrition Dietetics", amongst others. These fields are a deeper reflection of the pathogenesis and aetiology of CHO [32, 33]. Besides, the analysis of keywords disclosed that the studies covered various crucial aspects of CHO, including prevalence, causes and risk factors, social-economic effects as well as prevention and treatment. Body mass index (BMI) is also highlighted as the keyword with the most co-occurrence among the analysed articles. This is because BMI is the central index for the classification of overweight and obesity, and so it cuts across most studies concerning CHO [34, 35].

Like any other bibliometric studies, this one also had some limitations, such as the use of a single database, not all Chinese journals are indexed in the WoS, thus a possibility of missing out some key publications [16, 17]. Besides, the citation numbers might be deceptive [22], owing to self-citations, time of publications, among other factors. Therefore, further studies are required using different databases to validate these findings.

Conclusions

The study tried to summary CHO research output from China, in which it highlighted a gradual increase in the last two decades. The study has revealed the leading roles played by various authors, institutions and journals in addressing CHO. The study also identified significant collaboration exhibited by China and other countries in CHO research, which vital as it enables knowledge sharing and transfer. However, the study has noted an implementation gap of the research recommendations evidenced by the increasing prevalence of CHO in China, especially in the last ten years. Therefore more efforts are needed in terms of focus and funding of CHO research, as well as strengthening local journals and indexing databases.

Data Availability

All research data used to support the findings of this study are included within the article, and the analysed data used can be freely accessed from the Web of Science data collection.

Declarations

Funding Statement

None

Ethical approval

No ethical approval required since secondary data was used and no human nor animal subject used directly involved in the study.

Conflicts of Interest

The authors declare that there is no conflict of interest regarding the publication of this paper.

Authors' Contribution

JK contributed to the conceptualisation, methodology, data analysis and writing of the first draft. UG and SSP contributed to data analysis, interpretation of results, and editing of the manuscript. ON and THM performed data visualisation, formal analysis, data interpretation and revised the manuscript. All authors approved the final manuscript as submitted.

References

1. Jia P, Xue H, Zhang J, Wang Y. Time trend and demographic and geographic disparities in childhood obesity prevalence in China—evidence from twenty years of longitudinal data. *Int J Environ Res Public Health*. 2017;14(4):369.

2. World Health Organisation. Global Strategy on Diet, Physical Activity and Health: Childhood overweight and obesity. 2016. Available: <https://www.who.int/dietphysicalactivity/childhood/en/> Accessed: 29 February 2020.
3. Ji CY, Cheng TO. Prevalence and geographic distribution of childhood obesity in China in 2005.
4. Min J, Fang Yan A, Wang Y. Mismatch in Children's Weight Assessment, Ideal Body Image, and Rapidly Increased Obesity Prevalence in China: A 10-Year, Nationwide, Longitudinal Study. *Obesity*. 2018;26(11):1777–84.
5. Sahoo K, Sahoo B, Choudhury AK, Sofi NY, Kumar R, Bhadoria AS. Childhood obesity: causes and consequences. *J Family Med Prim Care*. 2015;4(2):187.
6. Robinson TN. Television viewing and childhood obesity. *Pediatr Clin North Am*. 2001;48(4):1017–25.
7. Baidal JA, Locks LM, Cheng ER, Blake-Lamb TL, Perkins ME, Taveras EM. Risk factors for childhood obesity in the first 1,000 days: a systematic review. *Am J Prev Med*. 2016;50(6):761–79.
8. Biro FM, Wien M. Childhood obesity and adult morbidities. *Am J Clin Nutr*. 2010;91(5):1499S-505S.
9. Zhang X, Zhang F, Yang J, Yang W, Liu W, Gao L, et al. Prevalence of overweight and obesity among primary school-aged children in Jiangsu Province, China, 2014–2017. *PLoS One*. 2018;13(8).
10. Strauss RS. Childhood obesity and self-esteem. *Pediatrics*. 2000;105(1):e15-.
11. Zhang XY, Yang WY, Yang J, Wang Y, Xiang Y, Gao LW, et al. Epidemiological characteristics of childhood obesity in eastern China, 2017–2019. *World J Pediatr*. 2019;15(4):412–4.
12. Musa TH, Li WE, Li XS, Pu YP, Wei PM. Prevalence of Overweight and Obesity among Students Aged 7–22 Years in Jiangsu Province, China. *Biomedical and Environmental Sciences*. 2016 Oct 1;29(10):697–705.
13. Zhai F, He Y, Wang Z, Yu W, Hu Y, Yao X. The status and trends of dietary nutrients intake of Chinese population. [Ying yang xue bao]. *Acta nutrimenta Sinica*. 2005;27(3):181–4.
14. Wang X, Höjer B, Guo S, et al. Stunting and 'overweight' in the WHO Child Growth Standards—malnutrition among children in a poor area of China. *Public Health Nutr*, 2009; 12, 1991–8.
15. Garg KC, Kumar S, Madhavi Y, Bahl M. Bibliometrics of global malaria vaccine research. *Health Info Libr J*. 2009;26(1):22–31.
16. Wang Y, Wang Q, Zhu R, Yang C, Chen Z, Bai Y, et al. Trends of spinal tuberculosis research (1994–2015): A bibliometric study. *Medicine*. 2016;95(38).
17. Sa'ed HZ. Dengue research: a bibliometric analysis of worldwide and Arab publications during 1872–2015. *Virologia*. 2016;13(1):78.
18. Harzing AW, Alakangas S. Google Scholar, Scopus and the Web of Science: a longitudinal and cross-disciplinary comparison. *Scientometrics*. 2016;106(2):787–804.
19. Aria M, Cuccurullo C. bibliometrix: An R-tool for comprehensive science mapping analysis. *J Informetr*. 2017;11(4):959–75.
20. Thomson Reuters. "2018 Journal Citation Reports®," Available online: <http://www.isiknowledge.com>. (accessed on 4th March 2020).
21. Waltman L, Van Eck NJ, Noyons EC. A unified approach to mapping and clustering of bibliometric networks. *J Informetr*. 2010;4(4):629–35.
22. Tao T, Zhao X, Lou J, Bo L, Wang F, Li J, et al. The top cited clinical research articles on sepsis: a bibliometric analysis. *Crit Care*. 2012;16(3):R110. <https://doi.org/10.1186/cc11401>.
23. Joseph K, Musa TH, Pherry O. Dietary practices, WASH conditions, and disease occurrence among children below five years in households of Nangabo, Wakiso district, Uganda. *Scientific African*. 2020:e00291.
24. Wang Y, Wang L, Xue H, Qu W. A review of the growth of the fast food industry in China and its potential impact on obesity. *Int J Environ Res Public Health*. 2016;13(11):1112.
25. Fu Q, George LK. Socioeconomic determinants of childhood overweight and obesity in China: the long arm of institutional power. *Sociol Health Illn*. 2015;37(6):805–22.
26. Dobbins M, DeCorby K, Twiddy T. A knowledge transfer strategy for public health decision makers. *Worldviews Evid Based Nurs*. 2004;1(2):120–8.
27. Olds TI, Maher C, Zumin SH, Peneau S, Lioret S, Castetbon K, et al. Evidence that the prevalence of childhood overweight is plateauing: data from nine countries. *Int J Pediatr Obes*. 2011;6(5–6):342–60.
28. Zhang J, Wang H, Wang Y, Xue H, Wang Z, Du W, et al. Dietary patterns and their associations with childhood obesity in China. *Br J Nutr*. 2015;113(12):1978–84.
29. Zhang Q, Liu S, Liu R, Xue H, Wang Y. Food policy approaches to obesity prevention: an international perspective. *Curr Obes Rep*. 2014;3(2):171–82.
30. Wang Y, Xue H, Sun M, Zhu X, Zhao L, Yang Y. Prevention and control of obesity in China. *Lancet Glob Health*. 2019;7(9):PE1166–1167.
31. Atlas of Childhood Obesity
Lobstein T, Brinsden H. Atlas of Childhood Obesity. October 2019. World Obesity Federation. 2019. Available: http://s3-eu-west-1.amazonaws.com/wof-files/11996_Childhood_Obesity_Atlas_Report_ART_V2.pdf.
32. Allcock DM, Gardner MJ, Sowers JR. Relation between childhood obesity and adult cardiovascular risk. *Int J Pediatr Endocrinol*. 2009;2009(1):108187.
33. Freemark MS, editor. Pediatric obesity: etiology, pathogenesis and treatment. Humana Press; 2018 Jan 5.
34. Maynard LM, Wisemandle W, Roche AF, Chumlea WC, Guo SS, Siervogel RM. Childhood body composition in relation to body mass index. *Pediatrics*. 2001;107(2):344–50.
35. Freedman DS, Khan LK, Serdula MK, Srinivasan SR, Berenson GS. BMI rebound, childhood height and obesity among adults: the Bogalusa Heart Study. *Int J Obes*. 2001;25(4):543–9.

Figures

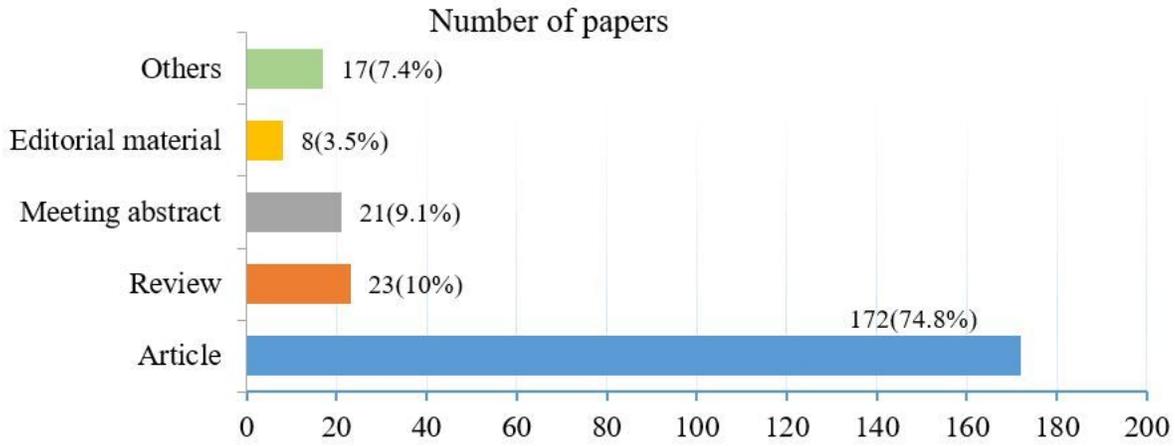
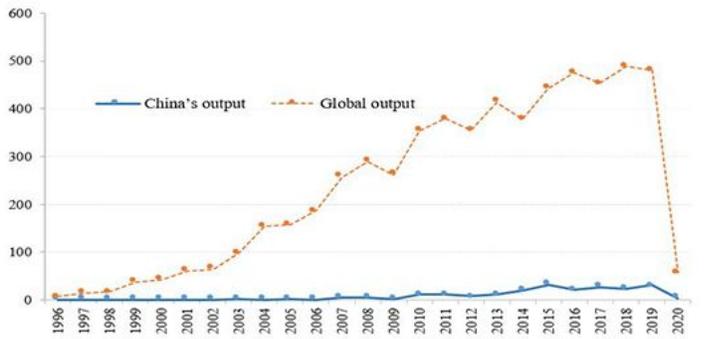
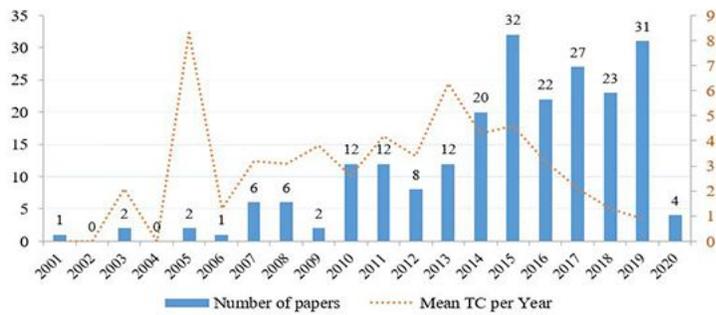


Figure 1

Types and number of CHO documents from China (1900-2020)



(a)



(b)

Figure 2

Trends of CHO Research output: (a) China's output compared to global output (1996-2020). (b) Number of CHO papers from China and mean total citation per year (2001-2020)

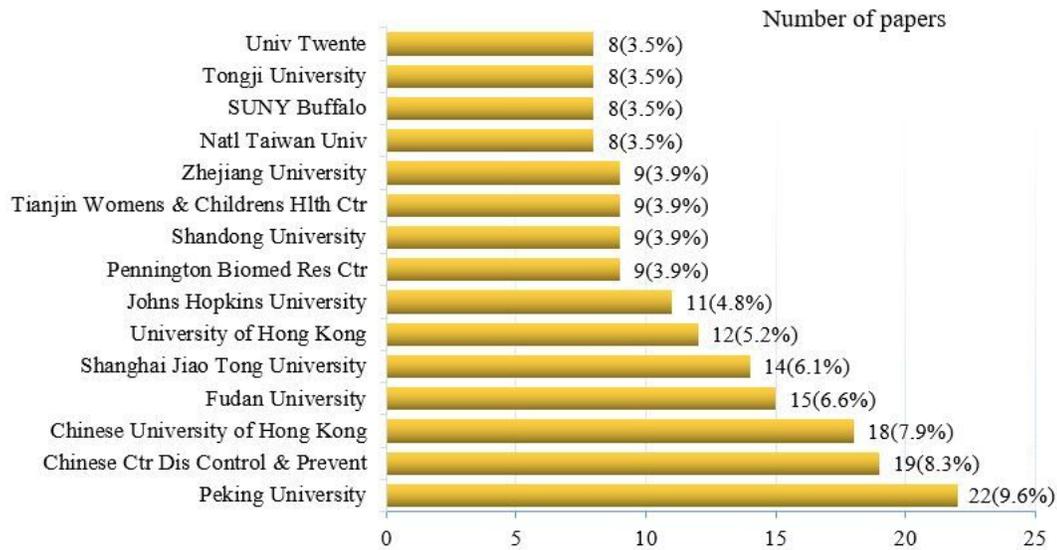


Figure 3

Institutions that produced eight or more articles of CHO

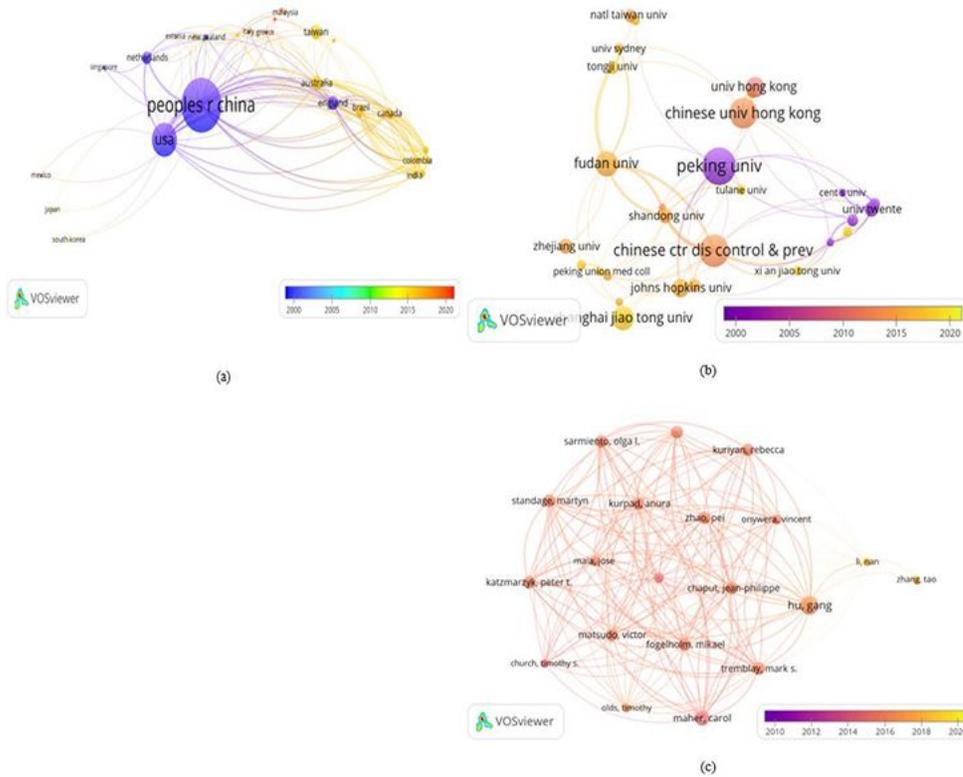
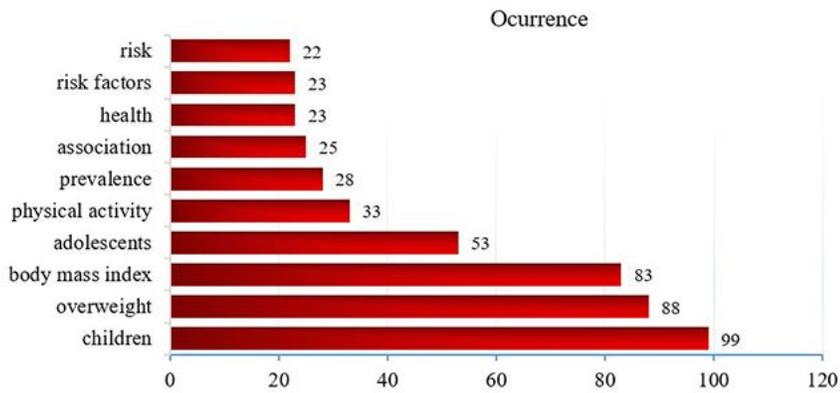


Figure 4

Overlay visualisation of Network analyses: (a) Countries collaborating with China in CHO research (b) Institution collaborations (c) Author collaborations



(b)

Figure 5

Analysis of keywords: (a) Keywords plus with atleast 22 occurrences (b) Word cloud of keywords pus based on their frequency.