Prevalence of Caries in Mainland China: Evidence from 1980 to 2018: A Systematic Review and Meta-Analysis

Zhi Wen GU[1]*, Shan Shan ZHANG[1]*, Rui Juan ZHANG[1], Han TANG[1], Xiang Yu SUN[1], Xue Nan LIU[1], Shu Guo ZHENG[1]

Objective: *To systematically review the prevalence of dental caries from 1980 to 2018 to provide evidence for caries prevention in mainland China.*

Methods: *Four databases were selected with online search tools to offer maximum coverage of the published literature on the provincial or national level of caries prevalence: Medline, EMBASE, China National Knowledge Infrastructure (CNKI, in Chinese) and Wanfang databases (in Chinese). We supplemented the results with relevant publications from the government health sectors, textbooks and web-based databases. Studies published between 1 January 1980 and 26 March 2018 were included. The quality of literature was assessed, and a meta-analysis was conducted using Stata12.0.*

Results: *A total of 82 studies were included in the final analysis. There were 1.49 million samples retrieved from 1980 to 2018, and the overall pooled prevalence of caries was 52.0% (95% CI: 49.4%–54.6%) in mainland China. The overall prevalence of caries increased from 36.4% (95% CI: 31.5%–41.5%) in the 1980s to 51.8% (95% CI: 34.9%–68.7%) in the 1990s, stabilised at 50.7% (95% CI: 43.8%–57.6%) in the 2000s and slightly increased to 53.1% (95% CI: 50.8%–55.5%) in the 2010s. The pooled caries prevalence was 64.8% (95% CI: 61.7%–67.8%), 47.3% (95% CI: 43.1%–51.5%), 42.4% (95% CI: 38.3%–46.5%), 66.7% (95% CI: 50.8%–82.6%) and 82.0% (95% CI: 72.5%–91.4%) for the ages/age groups 5, 12, 15, 35-44 and 65-74, respectively. The average dental caries pooled prevalence in urban areas was 51.4% (95% CI: 48.5%–54.2%), which was lower than 54.6% (95% CI: 47.9%–61.4%) in rural areas.*

Conclusion: *The prevalence of dental caries in mainland China is generally high, and an increasing trend was observed over the past 38 years. The prevalence of dental caries in mainland China varied geographically, and its characteristics differed over time. Regional disparities between eastern/western China and rural/urban areas still exist. Comprehensive local prevalence data on caries are summarised here for the first time, which provide valuable evidence for the oral disease burden in China.*

Key words: *dental caries, prevalence, systematic review, China*
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1 Department of Preventive Dentistry, Peking University School and Hospital of Stomatology, National Engineering Laboratory for Digital and Material Technology of Stomatology, Beijing Key Laboratory of Digital Stomatology, Beijing, P.R. China.
*These two authors contributed equally to this work.

Corresponding author: Dr Xue Nan LIU and Prof Shu Guo ZHENG, Department of Preventive Dentistry, Peking University School and Hospital of Stomatology, 22# Zhongguancun South Avenue, HaiDian District, Beijing 100081, P.R. China. Tel: 86-10-82195510; Fax: 86-10-62173402. Email: lxn1968@163.com; zhengsg86@gmail.com

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Dental caries is a progressive destructive lesion that occurs in the hard tissues of the teeth. It manifests as a change in tooth surface colour, tissue texture, and appearance, involving most adults and 60% to 90% of school aged children[1]. Dental caries is a major oral disease and reduces the quality of life of patients, and places a heavy burden on the national health care system and individuals. Dental caries is widespread in all regions of the world, across all ages and genders, and has a high prevalence worldwide. The global prevalence of untreated caries was 9.2% in primary teeth and 35.4% in permanent teeth in 2010[2]. Its prevalence and inci-

dence are related to many factors, including age, diet, education, geographical, health care and economic conditions[3]. The damage caused by dental caries does not only affect teeth, since if dental caries is not treated promptly, some complications may occur, such as oral and systemic problems[4]. The World Health Organisation (WHO) ranked dental caries as one of the three major human diseases[4].

The prevalence of dental caries in mainland China has been reported higher than the global estimates. There were four national oral health epidemiological surveys conducted over the past 38 years. The first national oral health epidemiological survey, conducted in 1982, showed that caries on permanent teeth had a prevalence ranging from 15.9% to 40.7% in the 7- to 17-year-old age group[5]. The second national oral health epidemiological survey conducted in 1995 involved 11 provinces in China and reported that the caries prevalence on the ages/age groups 5, 12, 15, 35-44 and 65-74, were 76.6%, 45.8%, 52.4%, 63.0% and 64.8%, respectively[6]. The third national oral health epidemiological survey in 2005 showed that the caries prevalence in China were 66.0%, 28.9%, 88.1% and 98.4% for the ages/age groups 5, 12, 35-44 and 65-74, respectively[7]. Of these, more than 89% were untreated. The fourth national oral health epidemiological survey, conducted from 2015 to 2016, reported that the prevalence of caries continued to increase and is currently 71.9%, 38.5%, 89.0% and 98.0%, for the ages/age groups 5, 12, 35-44 and 65-74, respectively[8-11]. These local data were significantly higher than the data reported at global level, and more importantly, it varied greatly from the current estimates for the Chinese situation; this is because only a limited number of Chinese references might have been included in global studies due to language restrictions[2].

In recent years, the prevention and control of dental caries has become a national policy priority as part of the noncommunicable disease management in China[12], and the research of dental caries prevalence and disease burden has been receiving increased attention. Apart from national surveys, a large number of local epidemiology studies have reported caries prevalence, which can complement the missing data of national surveys. However, there has been little research on the overall trend of dental caries prevalence in mainland China in the recent decades, and the local oral disease burden estimates rely on global estimates, which may not reflect the real prevalence status. Therefore, we aimed to conduct a systematic review and meta-analysis of the published and unpublished literature from 1980 to 2018 to better understand the dental caries prevalence and trends, and provide evidence for oral disease burden studies and policymaking on the prevention and treatment of caries.

Materials and methods

Four online databases were selected to provide the maximum coverage of the relevant literature in English and Chinese. To assess the prevalence of dental caries in oral diseases in mainland China, we strictly followed the protocol developed by the PRISMA[13] (preferred reporting items for systematic reviews and meta-analyses) guidelines.

Search strategy

Four databases with online search-tools were selected to offer maximum coverage of the relevant literature: Medline, EMBASE, China National Knowledge Infrastructure (CNKI, in Chinese) and Wanfang databases (in Chinese). The results were supplemented with relevant publications from the government health sectors, textbooks and web-based databases. The general search terms identified were ‘caries’, ‘incidence’, ’prevalence’ and ‘China’. The final search strategies were checked and approved by two independent parties to ensure validity and accuracy. Two reviewers (Zhi Wen GU and Han TANG) independently screened the titles and abstracts of all records retrieved. The reference lists of all included articles were screened for relative studies. Articles published between 1 January 1980 and 26 March 2018 were included, with the final search being conducted on 26 March 2018. Any disagreements were discussed among Shan Shan ZHANG, Xue Nan LIU and Shu Guo ZHENG.

Study selection

Articles with data on caries prevalence at the provincial level were included, using the following inclusion and exclusion criteria.

Inclusion criteria:

- Cross-sectional study;
- Articles published in Chinese or English;
- Based on a representative sample of the general population;
- National, provincial or municipal data from mainland China;
- Samples that were selected through clinical examination and that met the criteria for clinical examination;
- Adequate data on the prevalence and incidence of dental caries was reported.

Exclusion criteria:

- Research based on special populations (eg, hospital population, ethnic minorities or special occupational populations, etc);
- Unrelated topics such as genetic studies, laboratory diagnostic tests, animal experimental studies, social letters, case reports, case series reports, etc;
- When there was no explicit description of data sampling methods or strict random sampling;
- When the result data were incomplete or inconsistent;
- Duplicate data from other studies.

Data collection and quality assessment

Caries prevalence data from the general population in rural and urban areas, aged 5 to 74 years old, from 31 provinces, municipalities and autonomous regions in mainland China, were collected. Three members of the expert group (ZSS, LXN and ZSG) conducted a rigorous assessment of the full text of the final entries and discussed the controversial literature or data. The quality of included studies was evaluated following the STROBE[14] (Strengthening the Reporting of Observational Studies in Epidemiology) statement, which includes a total of 22 attributes. The quality assessment scores were made based on the criteria of each attribute. One point was given for each attribute. The 22-item score reflects the quality of the literature and the accuracy and reliability of the data. Low quality studies were excluded in the final analysis. The Newcastle Ottawa Scale[15] was also used to assess the quality of the included studies. The risk of bias was assessed by Newcastle Ottawa Scale and the risk of bias was low.

Statistical analysis

Based on the prevalence data extracted, we conducted meta-analysis and calculations on the overall population and each subgroup. The pooled prevalence and 95% confidence interval (95% CI) were analysed using the Stata12.0 (StataCorp, College Station, TX, USA) software for meta-analysis. The heterogeneity of the included studies was tested using the Q-test and I^2 test. When there was no heterogeneity or the heterogeneity was small, a fixed model was used to merge and analyse the data. When $P > 0.1$ and I^2 was greater than 50%, a random effect model was used to calculate the results using the DerSimoninan-Laird method. When heterogeneity existed, the publication time, patient's age, location, and urban/rural subgroups were tested and discussed for the source of heterogeneity. The Begg's test and the Egger's test were used to evaluate the presence of publication bias to avoid the subjectivity of the funnel plot.

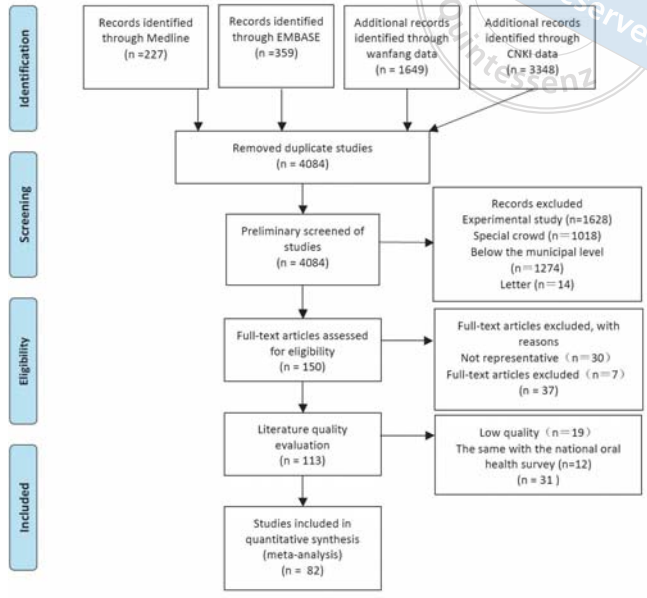

Fig 1 The PRISMA flowchart.

The Stata12.0 software was used for sensitivity analysis to evaluate the stability of the experimental study results. Each of the included studies was excluded, once a time, to see whether there were significant differences between the results obtained and the total combined estimates and to evaluate the proportion of single articles affecting the results.

In the data analysis of various provinces, municipalities and autonomous regions of Chinese mainland, an online graphic service (Dituhui Technology, Beijing, China) was used to illustrate the prevalence of diseases in the Chinese provinces.

Results

Search results

After searching the four databases, a total of 227 Medline studies, 359 EMBASE studies, 1,649 Wanfang studies and 3,348 CNKI studies were identified. After removing duplicate documents, a total of 4,084 studies were identified including 3,655 studies published in Chinese and 429 studies published in English. After screening the titles, abstracts and relevant full texts, a total of 82 studies were included in this review. The detailed search results are presented in a PRISMA flowchart (Fig 1).

Table 1 Pooled prevalence of caries for different age groups in mainland China from 1980 to 2016.

Caries		Number of studies	Sample size	Number of cases	Pooled prevalence (%)	95% CI
Total		82	1,491,725	690,752	52.0	49.4–54.6
Published year	1980 to 1989	2	135,581	46,115	36.4	31.3–41.5
	1990 to 1999	5	32,843	18,994	51.8	34.9–68.7
	2000 to 2009	26	320,207	179,118	50.7	43.8–57.6
	2010 to 2018	49	1,003,094	447,785	53.1	50.8–55.5
Sample age	5	27	85,128	59,186	64.8	61.7–67.8
	12	36	136,072	51,682	47.3	43.1–51.5
	15	15	94,689	42,106	42.4	38.3–46.5
	35-44	8	57,378	39,936	66.7	50.8–82.6
	65-74	8	55,511	44,758	82.0	72.5–91.4
Sample area	Urban	82	1,146,473	525,285	51.4	48.5–54.2
	Rural	37	345,252	165,467	54.6	47.9–61.4

Quality assessment, bias and sensitivity analysis

A modification of the STROBE statement was used to assess all the included literature. The average score of the included studies was 18.2. We excluded 19 low quality studies that had quality scores below 16, because they did not describe statistical methods, and/or failed to address potential bias, and/or reported incomplete results such as no decay, missing and filled teeth (DMFT) results. The Begg's test and the Egger's test were used to evaluate publication bias. The *P* values were 0.604 and 0.134, respectively, all greater than 0.05; thus, no significant publication bias was judged. Sensitivity analysis showed that the meta-analysis results were stable.

Study characteristics

A total of 1,491,725 samples were collected between 1980 and 2018, covering a total of 31 provinces, municipalities and autonomous regions and included the first, second, third and fourth national oral health epidemiological survey results (Table 1)[5-8,16-93]. The number of studies increased gradually from two in the 1980s to 49 in the 2010s. The research was divided into five ages/age groups: 5, 12, 15, 35-44 and 65-74. The number of included studies was 27, 36, 15, 8 and 8 in each age group, respectively. All the 82 studies reported data in urban areas and nearly half (37 studies) reported rural data.

National prevalence and trends over the decades

The total pooled prevalence of dental caries in China was 52.0% (95% CI: 49.4%–54.6%) between 1980 and 2018. The pooled prevalence of dental caries was 36.4% (95% CI: 31.3%–41.5%) in 1980-1989 and then increased significantly to 51.8% (95% CI: 34.9%–68.7%) in 1990-1999. The prevalence dropped slightly to 50.7% (95% CI: 43.8%–57.6%) in the 2000s. From 2010 to 2018, the pooled prevalence rose slightly to 53.1% (95% CI: 50.8%–55.5%) (Table 1).

A total of 82 studies were included in this review. The heterogeneity test results showed that there was a high degree of heterogeneity among the studies (I^2 = 99.9%, $P < 0.001$, df = 95). Therefore, using the random effects model to conduct the meta-analysis, a detailed forest plot was obtained (Fig 2). Because of the heterogeneity, a subgroup analysis was carried out by year of prevalence data, age group and urban/rural split.

Prevalence by age groups

The pooled prevalence of caries in the 5-year-old group was 64.8% (95% CI: 61.7%–67.8%), which was significantly higher than the pooled prevalence of 47.3% (95% CI: 43.1%–51.5%) in the 12-year-old group. The 15-year-old group had a slight decrease of 42.4% (95% CI: 38.3%–46.5%). The prevalence of dental caries increased with age in adulthood; rose significantly to 66.7% (95% CI: 50.8%–82.6%) in the 35-44-years-age group and finally 82.0% (95% CI: 72.5-91.4%) in the 65-74-years-age group (Table 1).

Figure 3a shows the prevalence of caries among different age groups from 1980 to 2018. The prevalence of caries in different age groups varied inconsistently. The age groups 5, 65-74 and 35-44 as a whole showed a downward trend. Prevalence in the 15-year-old age

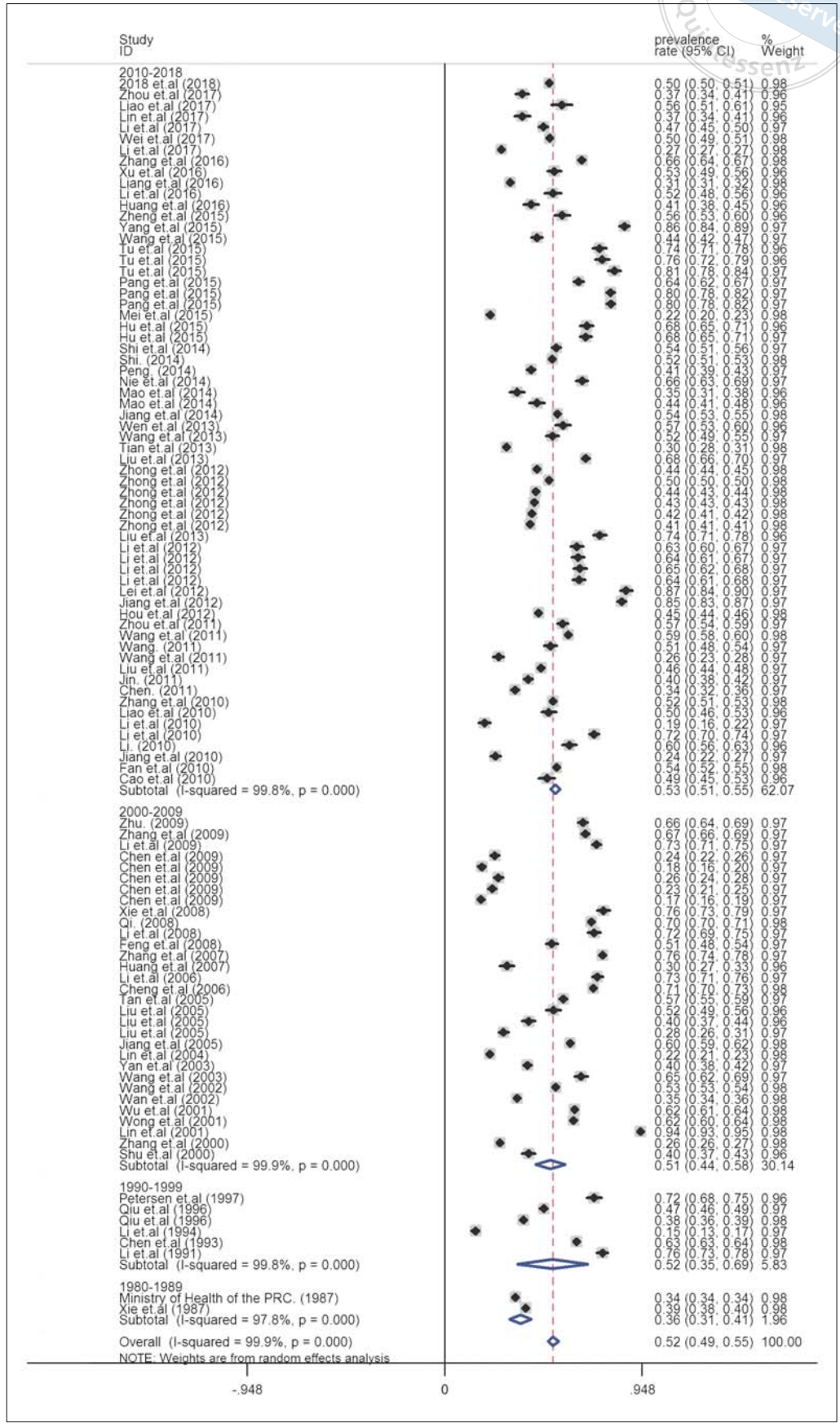

Fig 2 Forest plot of the pooled prevalence of dental caries in mainland China from 1980 to 2018. The pooled effect estimates (bold) from the random-effects meta-analysis are shown. The heterogeneity was assessed using the Q-test and I^2 statistics. Publication bias or small-study effects were evaluated using the Begg's regression and the Egger's regression intercept tests. If the latter indicated the presence of publication bias, the trim and fill were used to adjust the pooled effect estimate (#). Asterisks are used to represent speculation studies. Forest maps are used to detect the heterogeneity including literature and are divided into two parts (a) and (b).

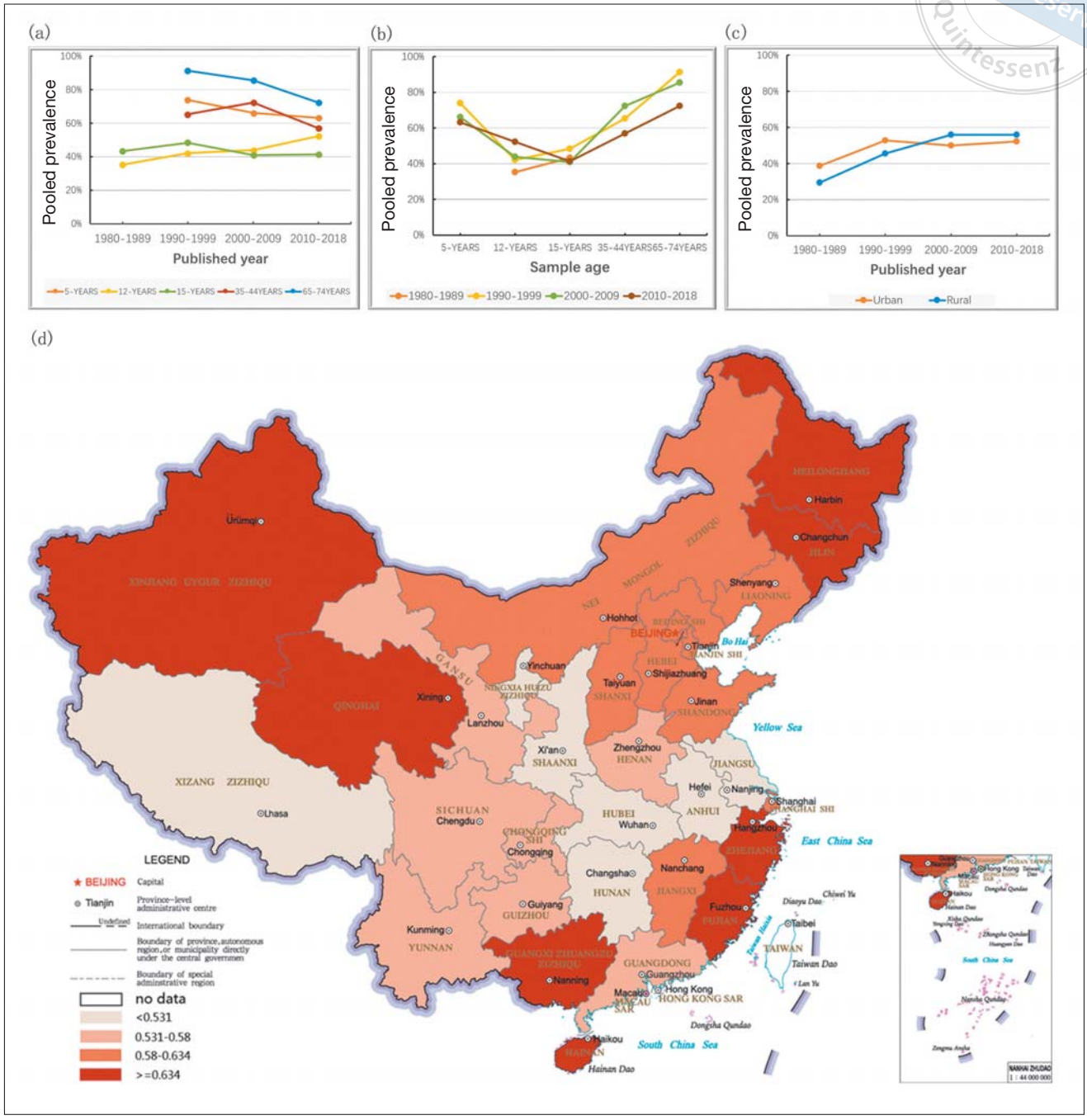

Fig 3 The trend of pooled prevalence of dental caries in mainland China from 1980 to 2018. This figure shows the changes in the pooled prevalence of dental caries in mainland China combined with time, age, urban and rural areas and provinces. Pictures were used to show the changes in the pooled prevalence of dental caries in mainland China **(a)** from different years, **(b)** from urban and rural areas, **(c)** from different ages and **(d)** from different provinces.

group rose firstly and then fell. Prevalence in the 12-year-old group was on the rise.

Figure 3b shows the pooled prevalence of dental caries for the 5-74 year-old group in different years. The pooled prevalence of each age group dropped roughly initially, then rose. This was due to the high prevalence of primary teeth in the 5-year-old age group. As the age increases, root caries appears and the incidence of dental caries increases. Within the studies published from 1990 to 1999, this trend was even more pronounced.

Table 2 Pooled prevalence of dental caries in provinces, autonomous regions and municipal cities in mainland China from 1980 to 2018.

Province	Sample size	Sample cases	Pooled prevalence	95% CI
Guangxi	13,197	8,542	0.736	0.572–0.900
Hainan	4,553	3,304	0.73	0.572–0.888
Zhejiang	18,010	11,524	0.685	0.540–0.830
Heilongjiang	14,901	8,916	0.681	0.492–0.870
Fujian	12,112	7,171	0.672	0.467–0.878
Jilin	16,251	9,976	0.667	0.511–0.824
Qinghai	7,157	3,707	0.643	0.328–0.957
Xinjiang	11,506	5,998	0.634	0.371–0.898
Neimeng	10,403	5,553	0.627	0.360–0.894
Shanxi	7,664	3,499	0.617	0.256–0.974
Liaoning	645,845	294,021	0.613	0.568–0.658
Jiangxi	8,213	3,890	0.598	0.281–0.916
Shandong	23,628	12,340	0.597	0.443–0.751
Hebei	16,187	8,291	0.597	0.360–0.833
Tianjin	16,741	9,154	0.584	0.411–0.757
Beijing	20,434	10,956	0.58	0.421–0.738
Chongqing	16,309	6,523	0.579	0.270–0.888
Shanghai	32,844	16,883	0.573	0.450–0.697
Henan	10,339	4,037	0.569	0.194–0.944
Gansu	19,869	10,208	0.569	0.395–0.744
Yunnan	19,979	10,002	0.565	0.387–0.742
Guangdong	93,394	49,715	0.564	0.464–0.663
Sichuan	37,611	16,966	0.539	0.409–0.669
Guizhou	7,761	3,178	0.531	0.215–0.846
Hubei	29,558	13,143	0.522	0.290–0.755
Hunan	11,474	4,320	0.521	0.220–0.821
Anhui	18,434	7,467	0.519	0.279–0.758
Jiangsu	120,454	34,390	0.517	0.302–0.733
Shaanxi	11,653	4,808	0.502	0.209–0.796
Xizang	2,000	985	0.493	0.471–0.514
Ningxia	23,149	7,459	0.388	0.221–0.555

Caries prevalence in urban and rural area

The pooled prevalence of dental caries in rural areas was 54.6% (95% CI: 47.9–61.4%), slightly higher than 51.4% observed in urban areas (95% CI: 48.5%–54.2%) (Table 1). Figure 3c shows the prevalence of dental caries in urban and rural areas in different years. Between 1980 and 1999, the pooled prevalence of caries in rural areas was lower than that in urban areas. Between 2000 and 2018, the pooled prevalence of caries in rural areas was higher than that of urban areas. This result may be associated with the good oral hygiene awareness and good brushing habits practiced in the urban areas. From 1980 to 2018, the pooled prevalence of dental caries in urban and rural areas showed an upward trend. The pooled prevalence of dental caries in urban areas

decreased slightly from 2000 to 2009, which may be related to the improvement of medical conditions and people's attention to oral health care.

Figure 3d shows the pooled prevalence of dental caries in various regions of mainland China from 1980 to 2018. While the white areas represent data gaps, the darker to lighter colours of the remaining four colour segments represent the highest prevalence in the region, and the number of segments in each colour is approximately the same. In the figure, a high prevalence in the eastern and central regions is indicated.

Caries prevalence by province

Table 2 shows the pooled prevalence of dental caries in various provinces in mainland China from 1980 to 2018. There is a large difference in the sample size and pooled prevalence between regions. These differences may be related to many factors such as dietary habits, lifestyle, economic level, oral health education and knowledge, and medical standards.

Figure 4 shows the prevalence of dental caries in various regions of mainland China in the past four decades. The pooled prevalence of dental caries varied greatly in different regions at different time periods. During 1980 to 1989, the pooled prevalence of dental caries in the western region and the eastern coastal areas was relatively high in the beginning of the decade, but then the central region caught up over the following years.

Discussion

This study systematically reviewed 82 studies of the pooled prevalence of caries in mainland China using local epidemiology data, and analysed the prevalence of dental caries from different regions and age bands across mainland China from 1980 to 2018. The results of the present study indicate that, in the past 38 years, the pooled prevalence of dental caries in mainland China has gradually increased. The pooled prevalence of dental caries varies greatly among different ages and regions, but it is still at a relatively high level.

The summaries of the studies included in the present research showed that dental caries is still a serious and pressing problem in China, despite continuous efforts made by the government and dental healthcare professionals, to improve public health policies and improve people's oral health awareness over the years. Since 1988, the national campaign 'Love Teeth Day' launched by the National Committee for Oral Health, has continuously promoted oral health and improved dental awareness to the Chinese population. In 1992, the Ministry of Health and the Ministry of Education jointly promulgated the 'Common Programme for Prevention and Treatment of Common Diseases of Students', which listed dental caries as one of the most common diseases in schools that needed to be controlled[94]. Since 1995, the national student physical health survey added the screening of dental caries as an official mandatory procedure. Over the years, the health departments of schools across the country have made a tremendous effort in the prevention of caries in students. The establishment of a school oral health care network, the development of oral health education, the promotion of health toothbrushes, toothpaste and pit and fissure sealants has increased the level of oral health self-care in Chinese students. Since 2008, a series of government-led oral health prevention programmes has been successfully conducted, especially in the midwestern region, where one programme aimed to control oral diseases in 7- to 9-year-old children. The programme comprised oral health promotion, oral examination and preventive treatment, such as fit and fissure sealing of the first permanent molars. In 2012, a fluoride application project for 3-5-year-old children was started in the same area. According to the third national survey of oral health epidemiology, published in 2008, the population general knowledge and attitude towards oral health had greatly improved[7]. With all these efforts, we should expect a positive change over the coming years[95].

However, the prevalence of dental caries in China has increased throughout the years and is still at a relatively high level; therefore, we need to bear in mind that many challenges in caries control and prevention still remain. First, the proportion of Chinese oral dentists in the total population is relatively small and the distribution of dental personnel in China is not even. Gao et al[96] showed in 2009 that there were only 8.64 dentists per 100,000 population, with an average of 11,579 people per dentist, which is much lower than the world average of 1:3,800[97]. Second, the utilisation of dental services was very low, with only 1.9% to 10.6% of caries restored in different age groups and only a 15% rate of utilisation of dental services during the last 12 months. Insufficient knowledge, economic problems and unawareness of the disease were the main reasons for not attending a dental clinic. Third, most of China's oral healthcare and treatment costs are paid out of pocket, accounting for about 85% of the total cost[98], so dental treatment is a huge economic burden to the Chinese population, especially those in poverty. To tackle these challenges, joint efforts from multiple national ministries are needed.

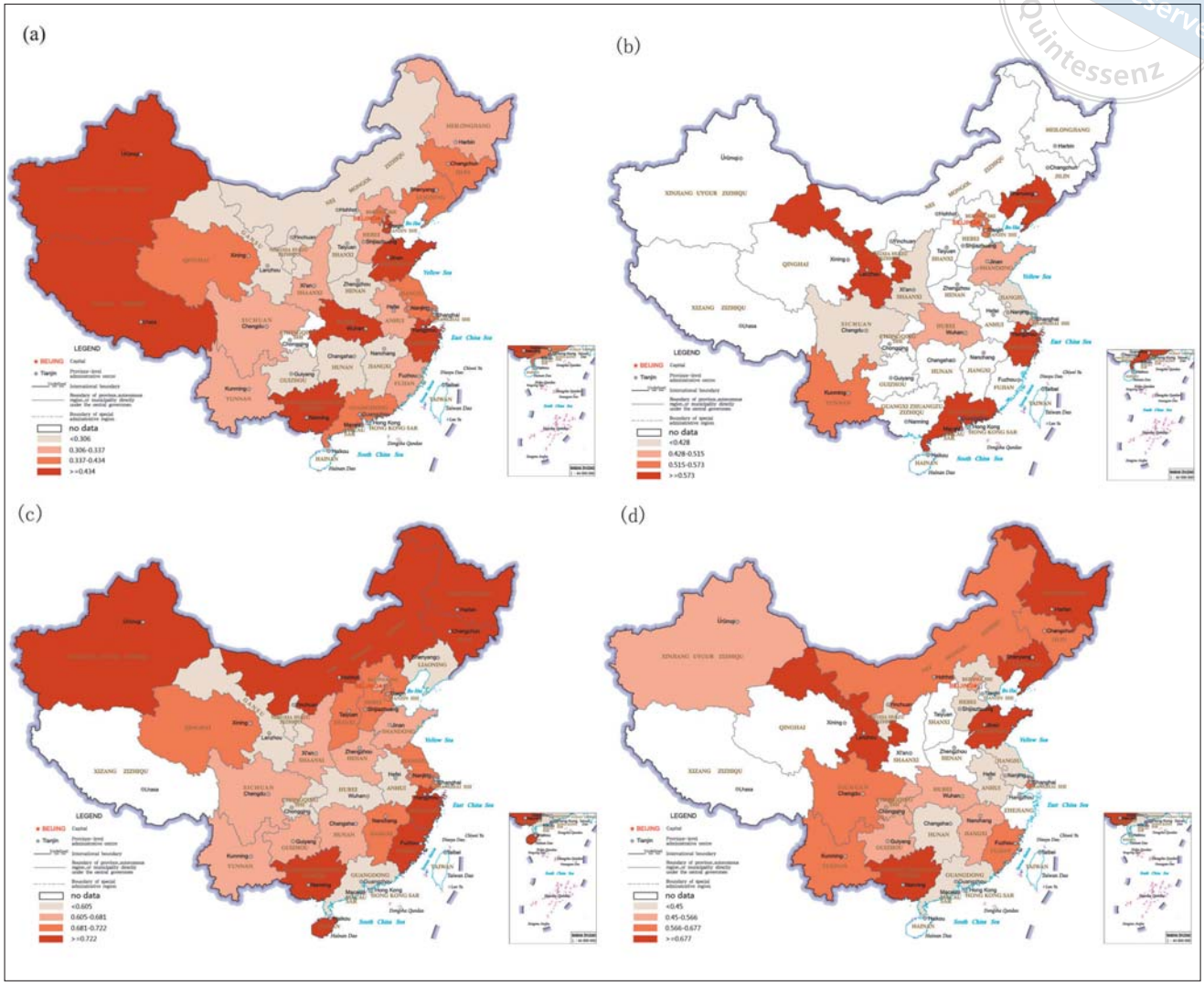

Fig 4 Pooled prevalence of dental caries in various provinces in mainland China from 1980 to 2018. This figure shows changes in the pooled prevalence of dental caries in provinces in mainland China in different years: **(a)** 1980 to 1989, **(b)** 1990 to 1999, **(c)** 2000 to 2009 **(d)** 2010 to 2018.

Previous studies have shown that the risk of dental caries in rural areas is higher than in urban areas[99]. However, with the rapid development of rural economy and the improvement of health awareness, the gap in the prevalence of dental caries between urban and rural areas has still not reduced. The present study shows that the pooled prevalence of dental caries in rural areas and urban areas in mainland China has increased over time, and both are at a relatively high level. This may be related to the uneven distribution of oral health services and medical resources, and oral health service accessibility in urban and rural areas. It has been reported that the number of health professionals was higher in urban (9.70 per 1,000 population) than in rural (3.77 per 1,000 population) areas, where there were even fewer oral healthcare professionals in grass-roots healthcare facilities. It has also been reported that the percentage of utilisation of dental services during the last 12 months was 21% in urban areas and 9% in rural areas. Therefore, it is important to increase the emphasis on resource allocation for the prevention and treatment of dental caries in rural areas.

In the present study, we demonstrated the geographical distribution of the pooled prevalence of dental caries in mainland China vividly from 1980 to 2018, including data from the fourth survey, which fully reflects the status quo and trends on the prevalence of dental caries in mainland China. The disparities in various regions were

noted and this may be due to many factors. First, the government resources for the prevention and treatment of caries focused on the eastern region compared to the central and western regions over the years. Second, areas with better economic conditions and convenient access to oral healthcare receive more preventive measures for dental caries. Third, the oral health care awareness and behaviour vary greatly among regions, and dietary habits such as sugar intake can significantly affect the prevalence of dental caries. Last but not least, mainland China has a vast territory and unbalanced economic development. Culture and environment can also cause differences in the prevalence of dental caries between regions. This prevalence map can intuitively reflect the level of prevalence of dental caries in each region and the changing trends, and provides an overview and data basis for the government's dental caries prevention and treatment plan.

We also found that the caries prevalence and the disease burden may be underestimated by several global studies. The global prevalence of untreated caries was reported as 9.2% in primary teeth and 35.4% in permanent teeth in 2010[2]. However, in our study, we estimated that the pooled prevalence of dental caries was 63.2% and 57.0% in the age groups 5 and 34-44, respectively, between 2010 and 2018, and also, more than 89% of these caries were untreated[6,7]. This may be due to the limited number of caries prevalence studies included in the global estimates, which are conducted with different selection criteria and language restrictions. Therefore, our study has provided comprehensive local caries prevalence data for the first time, which provides useful information for further oral disease burden estimate studies.

There are some limitations and deficiencies in the present study. First, the heterogeneity is inevitable in a meta-analysis of cross-sectional studies[100]. We have established strict inclusion and exclusion criteria in the literature-screening process, such as only including random sample surveys and adopting subgroup analyses in an attempt to minimise heterogeneity. Second, the diagnosis error cannot be completely avoided due to subjectivity, although the diagnostic criteria for dental caries are relatively fixed. There is still the possibility of having missed diagnoses of hidden neighbourhoods, which would have led to an underestimation of the prevalence. Third, although the present research combined a literature quality evaluation with a weighted comparison, we did not conduct a population-weighted analysis because the data provided between the various studies were limited, and we could not accurately determine the ratio between the population in each region and surveyed population. Therefore, there might have been a partial deviation between the results of this research and the actual results.

Conclusion

In summary, this study systematically reviewed the caries prevalence in mainland China during the past 38 years and identified that the pooled caries prevalence has increased over time and is still at a relatively high level. The results of this study provide important evidence for the study of China's oral disease burden and the government's effective intervention in the prevention and treatment of dental caries in China. Continuous efforts are needed from the Chinese government to improve public health policies, improve the level of oral medical services and raise people's awareness of oral health care, to better control dental caries – the most prevalent noncommunicable disease in China.

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Conflicts of interest

The authors declare no conflicts of interest related to this study.

Author contribution

The study was conceptualised and designed by Drs Shan Shan ZHANG, Xue Nan LIU and Shu Guo ZHENG; data collection was performed by Drs Zhi Wen GU, Rui Jie Zhang and Shan Shan ZHANG; data verification was conducted by Han TANG and Zhi Wen GU; data analysis was conducted by Drs Shan Shan ZHANG and Zhi Wen GU; the original draft was written by Zhi Wen GU, Shan Shan ZHANG and Xiang Yu SUN; Drs Zhi Wen GU, Han TANG, Xue Nan LIU and Shu Guo ZHENG reviewed and edited the draft. All authors read and approved the final manuscript.

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