



# A Systematic Review on Prevalence of Dental Fluorosis in Tamil Nadu

**N.Sai Swetha**

*Undergraduate, Department of Public Health Dentistry. SRM Dental College, Chennai.*

**Dr. N.DivyaLalitha**

*Postgraduate, Department of Public Health Dentistry. SRM Dental College, Chennai.*

**Dr. Bharathwaj.V.V**

*Senior Lecturer, Department of Public Health Dentistry. SRM Dental College, Chennai.*

**Dr. Rajmohan**

*Reader, Department of Public Health Dentistry. SRM Dental College, Chennai.*

**Dr. Sunayana Manipal**

*Reader, Department of Public Health Dentistry, SRM Dental College, Chennai.*

**Dr. Prabu.D**

*Professor & Head, Department of Public Health Dentistry,SRM Dental College, Chennai.*

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## Abstract:

### Background:

Increased fluoride content in drinking water is a major source of dental fluorosis. It is considered to be the most common public health problem. It is found that dental fluorosis is more prevalent in southern parts of India mainly in Tamil Nadu.

**Aim:** To assess the prevalence of dental fluorosis in different districts of Tamil Nadu.

**Methodology:** A systematic review analysis was performed using pub med, science direct, Wiley online library, OSF Healthcare, research gate, scopus using key words dental fluorosis and Tamil Nadu.

**Result:** Total of 443 articles appeared from various sources, all articles were screened and 8 were related to this study. This review was based on PRISMA guidelines

**Conclusion:** In the available articles, Kanchipuram, Namakkal, Salem, Dharmapuri, Rameswaram are the districts show highest prevalence of dental fluorosis in Tamil Nadu.

**Keywords:** Dental fluorosis, Prevalence, Tamil Nadu

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## INTRODUCTION:

Excessive fluoride content in Drinking water contributes to the prevalence of Dental fluorosis. It is a common Public Health problem in endemic areas of India. It is found that it is more prevalent in various districts of Tamil Nadu.

Dental fluorosis occurs when excessive fluoridated water is ingested during the years of calcification and usage of fluoridated toothpaste before the age of 2 years also contributes to this condition.

About 62 million people in India suffer from fluorosis, out of these 80% of the people are affected by dental fluorosis<sup>[1]</sup>. Tamil Nadu is one of the 18 states affected by fluorosis in India.<sup>[2]</sup>

Dental fluorosis is characterized by hypo mineralization of tooth enamel<sup>[3]</sup>. This hypo mineralization is mainly due to insitu toxic effects of fluoride on the ameloblasts of the enamel formation, and not caused by the general effects of fluoride on the calcium metabolism

Dental fluorosis is a condition which can easily detected clinically. It is characterized by mottling of enamel, change of colour from yellow to brown to black. In moderate to severe forms tooth may get physically damaged. The clinical findings depends on the degree of

dental fluorosis. People with fluorosis are relatively resistant to dental caries

Dental fluorosis is endemic in some areas of Tamil Nadu but it is also found that it is also encountered in non-endemic areas like Kanchipuram<sup>[4]</sup>

## OBJECTIVE:

To assess the prevalence of Dental fluorosis in various districts of Tamil Nadu

## METHODOLOGY:

### Inclusion Criteria:

- Original research articles
- Full text articles
- The articles emphasizing on the disease prevalence in Tamil Nadu.

### Exclusion Criteria:

- Systemic review articles
- Articles stating about other forms of fluorosis
- Repeated study in the same area

### Search Strategy:

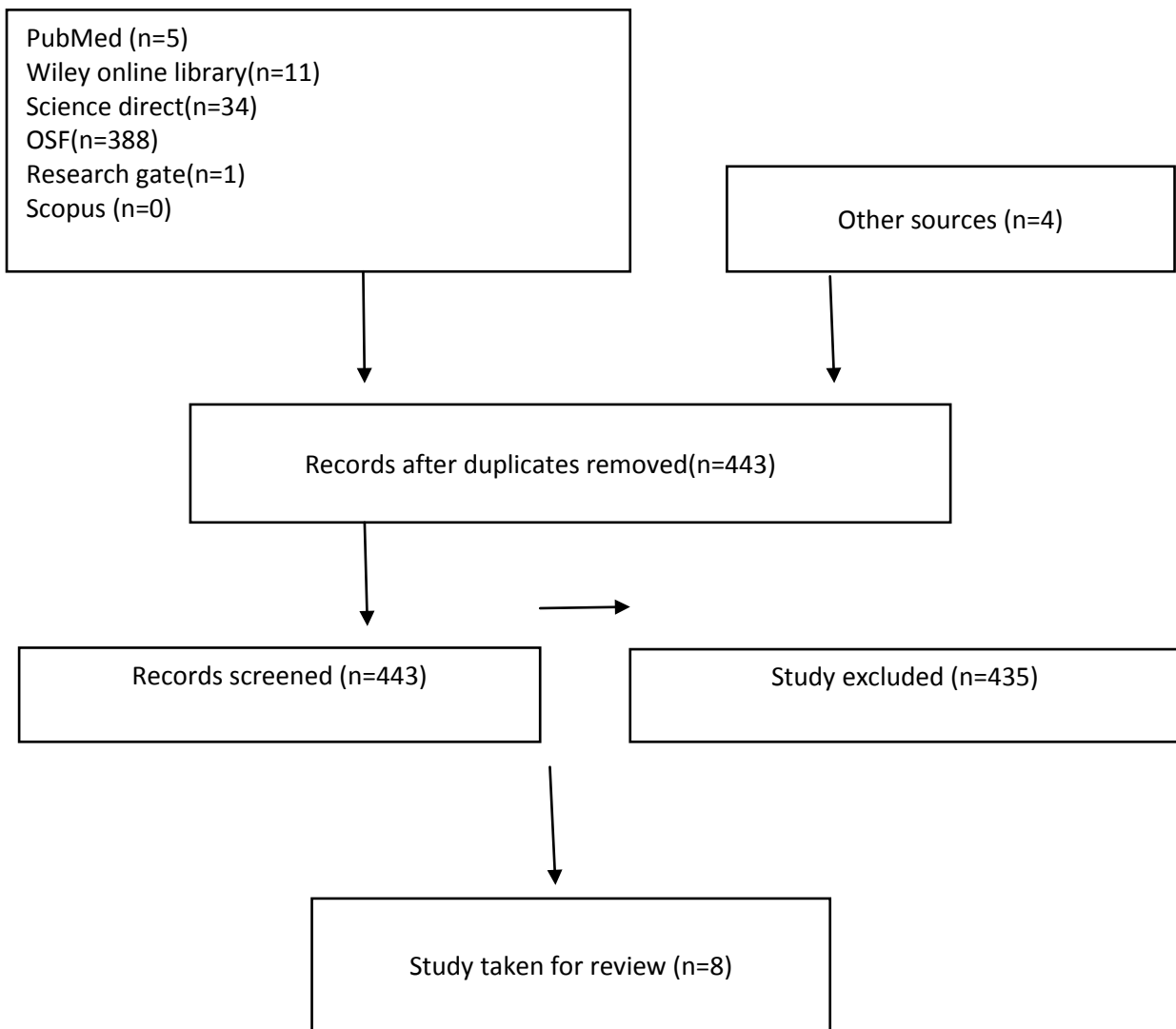
Published articles related to dental fluorosis in Tamil Nadu which Includes original articles and research Papers in

Databases Such as PubMed, Science direct, research gate, Wiley online library, OSF etc Were taken into study for review The Search was based on the key words Dental fluorosis and Tamil Nadu. A total of 443articles appeared with this combination.Out of these 8 articles were research related. After complete Analysis 8 articles were taken into consideration and was retrieved for review.

Wiley Online library  
Scopus  
OSF Healthcare  
Research gate

The search showed 438 articles and full text articles were independently assessed. Among these,6 articles were included for review. Figure 1 shows the flow chart of the reports that were identified, duplicates removed, screened, excluded, assessed for eligibility and included in the systemic review.

**Search engine:**  
Cochrane  
Pub Med  
Ovid Medline  
Science direct



**FIGURE 1: RECORDS IDENTIFIED THROUGH ELECTRONIC DATABASE SEARCHING**

**RESULTS:****TABLE 1: METHODOLOGY OF VARIOUS STUDIES**

S.NO	AUTHORS	YEAR	SAMPLE SIZE AND AGE GROUP	PLACE OF STUDY	METHODOLOGY
1.	V.C. Punitha, et.al. <sup>[4]</sup>	2014	348 children of age group 7- 15 years	Kanchipuram, Tamil Nadu	A cross sectional study was conducted in which 348 children were examined for fluorosis by a qualified dentist using dean's fluorosis index
2.	V.Sivasankar et.al. <sup>[5]</sup>	2011	School children -2519 girls and 2519 boys of age 7-13 years	Rameswaram, Tamil Nadu	The dental fluorosis survey was conducted in 12 schools by a dentist
3.	Dr. Prabhu, et.al. <sup>[6]</sup>	2013	220 children,12 year old	Sriperumbudur taluk, Kanchipuram district, Tamil Nadu	The cross-sectional study was conducted in Sriperumbudur among 220 children. Dental caries was recorded by DMFT index; dental fluorosis was recorded using dean's fluorosis index and the quality of life was assessed using a Tamil version of the child perception questionnaire CPQ
4.	Maya Ramesh, et.al. <sup>[7]</sup>	2014	965 children	Salem, Tamil Nadu	A pilot study was conducted in a private school in Salem, Tamil Nadu where oral examination was done using mouth mirror and probe under sunlight in 965 students, for the presence or absence of dental fluorosis, as it was a pilot study, the fluorosis index was not taken into consideration
5.	G.Ganesh, et.al. <sup>[8]</sup>	2013	2000 children	Dharmapuri ,Tamil Nadu	A total of 2000 school children who are exposed to fluoride drinking water in endemic areas of Dharmapuri, Salem and Krishnagiri districts, Tamilnadu. All children were examined for dental caries and divided into three groups based on fluoride levels in water as group I (1-2ppm), group II(2-3ppm) and group III(3-4ppm)

S.NO	AUTHORS	YEAR	SAMPLE SIZE AND AGE GROUP	PLACE OF STUDY	METHODOLOGY
6.	Maya Ramesh, et.al. <sup>[9]</sup>	2017	206 patients	Salem , Tamil Nadu	A total of 206 patients who reported to the hematology Department for blood investigation were participants in this study. Age , sex , place, weight, height , dental fluorosis and skeletal complaints were noted down. Body mass index was calculated and statistical analysis was performed
7.	Baskaradoss J.K <sup>[10]</sup>	2008	1800 children	Kanyakumari,Tamil Nadu	A total of 1800 children,from all 9 blocks of Kanyakumari district,studying classes 6-10 were examined using type III examination .The assessment form designed specifically for this study was used while examining each patient
8.	S.Saravanan <sup>[11]</sup>	2008	Children from 6 primary school of 6 villages	Chidambaram, Tamil Nadu	Children studying in 6 primary schools of 6 villages in the field practice area of rural health centre of faculty of medicine, Annamalai university, Chidambaram were surveyed. Every child was clinically examined at the school by calibration examiners with Dean's index recommended by WHO. Chi – square test, Chi- square trend test and spearman's rank correlation coefficient test were used for statistical analysis

Table 1 shows the methodology of each study, V.C Punitha et.al conducted a cross sectional study conducted in Kanchipuram,345children of age group were examined for fluorosis using dean's index. , V.Sivashankar et.al conducted a study in rameshwaram among 12 schools with 2519 girls and 2519 boys of age group 7 to 13 years. Dr. Prabhu et.al conducted a cross sectional study conducted in Kanchipuram district among 220 ,12 year old children. Maya Ramesh ,et.al conducted a pilot study in a private school in salem . This study was conducted for 965

children. G.Ganesh,et.a;l conducted a study for 2000 children in endemic areas of tamilnadu like dharmapuri ,salem and krishnagiri districts.Maya Ramesh et.al conducted a study for 206 patients who reported to the haematology department. Baskaradoss.J.K conducted a Kanyakumari ,a total of 1800 children was examined for fluorosis. S.Saravanan conducted a study included children studying in 6 primary schools in the field practice area of rural health centre of faculty of medicine, Annamalai university at Chidambaram

**TABLE 2: RESULTS OF VARIOUS STUDIES**

S.NO	AUTHOR	YEAR	PLACE OF STUDY	RESULTS	P VALUE
1.	V.C. Punitha, et.al. <sup>[4]</sup>	2014	Kanchipuram, Tamil Nadu	A total of 348 children in the age group of 7- 15 years were screened of which 184(52.9%) males and 164(47.1%). The prevalence of fluorosis in this population was 67 out of 348 .According to Dean's fluorosis index around 20 children (29.8%) were in grade I ,10 children(14.9%) in grade II and 11 children(16.4%) in grade III and 26 children(38.8%)in grade IV and none in grade V. The prevalence of dental caries in total population is 37.6%	<0.0001
2.	V.Sivasankar et.al. <sup>[5]</sup>	2011	Rameswaram, Tamil Nadu	The fluoride content in ground water samples in various locations were noted. About 30 percent of the ground water samples were registered less than 0.5mg/L, 55 percent in range of 0.5-1.5/L and 15 % exceeding he fluoride limits . It is found that areas which contain highest fluoride content in water shows highest prevalence of dental fluorosis.	NA
3.	Dr. Prabhu, et.al. <sup>[6]</sup>	2013	Sriperumbudur taluk, Kanchipuram district, Tamil Nadu	Dental caries is present among 40% of the study population and dental fluorosis affecting 60.6% individuals of the study population	0.000
4.	Maya Ramesh, et.al. <sup>[7]</sup>	2014	Salem, Tamil Nadu	965 students were examined for dental fluorosis out of which,624 were boys and 341 were girls. Dental fluorosis was present in 31.1% of boys and 30.3% of girls 297 students out of 965(30.8%)showed the presence of dental fluorosis	NA
5.	G.Ganesh, et.al. <sup>[8]</sup>	2013	Dharmapuri ,Tamil Nadu	In group I among 750 individuals with dental fluorosis,203 have dental caries. In group II among 780 individuals with dental fluorosis,244 have dental caries. In group III among 750 individuals with dental fluorosis,203 have dental caries.	In group I P value- 0.207738 In group II P value- 0.000004 In group III P value- 0.207341
6.	Maya Ramesh, et.al. <sup>[9]</sup>	2017	Salem , Tamil Nadu	Dental fluorosis was present in 63.1% and absent in 36.9% of the samples reported .skeletal fluorosis was present in 24.8%. dental and skeletal fluorosis was compared and P value was found to be 0.000 significant.	0.000
7.	Baskaradoss J.K <sup>[10]</sup>	2008	Kanyakumari,Tamil Nadu	Dental fluorosis was present in 15.8% of the study population and the community fluorosis index was 0.27. The prevalence of dental fluorosis was higher in children who consumed pipe water compared to children who consumed ground water	<0.001
8.	S.Saravanan <sup>[11]</sup>	2008	Chidambaram, Tamil Nadu	525, 5 – 12 year old school children (255 boys and 270 girls) were surveyed. The overall dental fluorosis prevalence is found to be 31.4%. Dental fluorosis increased with age , where as gender difference was not statistically significantly .aesthetically objectionable dental fluorosis was found in 2.1 percentage of the sample .villages senjicherry,keezhaperabai, kanagarapattu revealed a community dental fluorosis index score of 0.43,0.54&0.54 with 5.6 percentage,4.8 percentage,1.4percentage of objectionable dental fluorosis, respectively.	<0.001

**DISCUSSION:**

Dental fluorosis is prevalent in many districts of Tamilnadu ,where most people among the population is exposed to high fluoride in drinking water which had manifestations of the teeth like mottling of enamel, discolouration etc.

Methodology and results of each study was tabulated. Based on that, V.C Punitha et.al<sup>[4]</sup> conducted a cross sectional study conducted in Kanchipuram,345children of age group were examined for fluorosis using dean's index. The prevalence of fluorosis in this population was 67 out of 348 out of which around 20 children (29.8%) were in grade I ,10 children(14.9%) in grade II and 11 children(16.4%) in grade III and 26 children(38.8%)in grade IV and none in grade V.

V.Sivashankar et.al<sup>[5]</sup> conducted a study in Rameswaram among 12 schools with 2519 girls and 2519 boys of age group 7 to 13 years. It is found that areas which contain highest fluoride content in water shows highest prevalence of dental fluorosis

Dr. Prabhu et.al<sup>[6]</sup>conducted a cross sectional study conducted in Kanchipuram district among 220 ,12 year old children. 60.6% individuals of the study population was affected by dental fluorosis.

Maya Ramesh ,et.al<sup>[7]</sup> conducted a pilot study in a private school in salem . This study was conducted for 965 children. Dental fluorosis was present in 31.1% of boys and 30.3% of girls 297 students out of 965(30.8%)showed the presence of dental fluorosis

G.Ganeshet.al<sup>[8]</sup>conducted a study for 2000 children in endemic areas of tamilnadu like dharmapuri ,salem and krishnagiri districts. In group I among 750 individuals with dental fluorosis,203 have dental caries. In group II among 780 individuals with dental fluorosis,244 have dental caries. In group III among 750 individuals with dental fluorosis,203 have dental caries.

Maya Ramesh et.al<sup>[9]</sup> conducted a study for 206 patients who reported to the haematology department. Dental fluorosis was present in 63.1%

Baskaradoss.J.K et.al<sup>[10]</sup> conducted a Kanyakumari ,a total of 1800 children was examined for fluorosis.The prevalence of dental fluorosis was higher in children who consumed pipe water compared to children who consumed ground water.15.8% of the study population was affected by dental fluorosis.

S.Saravanan,et.al<sup>[11]</sup> conducted a study included children studying in 6 primary schools in the field practice area of rural health centre of faculty of medicine, Annamalai university at Chidambaram.the prevalence of dental fluorosis was 31.4%.

Dental fluorosis is a major health problem in India<sup>[12]</sup> north and southern parts of india are affected , in tamil nadu there are certain endemic states like Salem, Dharmapuri, Krishnagiri are affected the most. Non endemic states like Kanchipuram also shows prevalence of dental fluorosis

Fluorosis is a cosmetic condition that affects the teeth, if it is mild no treatment is required . In severe cases there are many techniques like tooth whitening/bleaching ,micro /macro abrasion ,veneers ,crowns, compound restorations<sup>[13]</sup>

**CONCLUSION:**

Based on the available literature, fluorosis levels are higher in Kanchipuram, Namakkal, Salem, Dharmapuri, Rameswaram. These districts show highest prevalence of dental fluorosis in Tamil Nadu. This problem needs to be addressed.

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