

# Effectiveness of Dental Education Program on Knowledge and Attitude Regarding Dental Caries and Its Management among School Children from Selected Schools of Kolar

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## ABSTRACT

This study was conducted at schools to investigate the prevalence of dental caries and effect of dental education programs on knowledge and attitude regarding dental caries and its management among school children. An evaluative research approach with one-group pre- and post-test design was adopted to collect data. The prevalence of dental caries was determined using the decayed, missing, filled teeth (DMFT)/decayed, missing, filled surface (DMFS) index using the World Health Organization criteria 1997. After obtaining ethical clearance and permission from authorities, children were subjects for dental screening. Mouth mirror, probe, and explorer were used for carrying out the dental examination in the classroom under natural light with the children seated on a stool, followed by administration of dental education program. The prevalence of dental caries among government and private school students is 31 (77.5%), mean DMFT scores are 2.47 with a standard deviation of 2.184, and their mean DMFS scores are 5.38 with a standard deviation of 6.436. Majority of 31 (77.5%) school children were with dental caries and 9 (22.5%) with no tooth decay, the majority (100%) of school children had insufficient knowledge in pre-test, 10% of school children had adequate knowledge on dental caries, and the majority (100%) of school children had an unfavorable attitude toward dental caries in pre-test, 45% had a moderately favorable attitude toward dental caries. The difference in knowledge and attitude about dental caries and its management between post- and pre-test scores among school-aged children was statistically significant. The study's findings may be utilized to organize a school-based dental program for children and their parents to practice routine oral hygiene and get frequent dental checkups, allowing them to lead a healthier life.

**Keywords:** Dental caries, Dental education program, DMFT/DMFS, School children.

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## INTRODUCTION

### Dental Caries in Children

Oral health has long been an integral element of overall health and has a significant impact on people's overall well-being. The formation of a healthy personality, perceptions, and overall enjoyable experience are all linked to the oral cavity. Dental caries and periodontal disease are the two most prevalent oral illnesses, and they commonly start in childhood. Periodontal disorders are the most common illness in the world, according to the World Health Organization. Despite technological breakthroughs, the illness remains a serious public health concern. People who have poor oral hygiene have more restricted activity days than those who do not. Oral disorders cause nearly 50 million school hours to be missed each year, affecting children's overall performance. In metropolitan India, there is a high frequency of oro-dental disorders, with caries prevalence ranging from 45 to 55%.<sup>1</sup>

Infections, cosmetic issues, feeding difficulties, linguistic changes, the emergence of malocclusions, and undesirable oral habits, as well as physical, emotional, and financial consequences, are all consequences of caries in children. Low socioeconomic status and low levels of education, poor eating and sanitary habits, medical history, and other variables unique to each individual might influence susceptibility to the disease's development.<sup>2</sup>

Early childhood caries is a fast-growing condition that can damage teeth in a short period of time. It can spread to the proximal surfaces, causing irritation, suffering, and possibly affecting the tooth pulp, causing deciduous teeth to fall out prematurely. This

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damage or early tooth loss is not a serious issue for the child's parents, mainly because they are unaware of it. As a result, people seldom take the essential precautions to avoid it; as a result, it is not treated in a timely manner, resulting in significant damage to the afflicted areas. It may potentially cause a variety of problems in the baby's mouth.<sup>3</sup>

Early childhood caries is a substantial problem in both developed and developing nations, despite the drop in the prevalence of dental caries in children in Western countries.<sup>4</sup> The frequency of this form of caries varies widely based on characteristics such as race, culture, and ethnicity; socioeconomic position, lifestyle, food standards, and dental hygiene practices; and a variety of other factors that vary by location. According to a previous study, the incidence rate of early childhood caries ranges from 1 to 12% in most industrialized nations.<sup>5</sup> Prevalence has

been claimed to be as high as 70% in less developed nations and among disadvantaged populations in industrialized ones, with low socioeconomic groups being more affected.<sup>6</sup>

A high prevalence has been reported in some Asian countries, such as Palestine (76%) and the United Arab Emirates (74.1%).<sup>7,8</sup> In other countries of the continent, an inconsistent prevalence of early childhood caries was found: in India (51.9%) and in Israel (64.7%).<sup>9</sup> In addition, the research by Ismail et al.<sup>6</sup> found a prevalence of 85.5% in Chinese children in rural areas.<sup>4</sup>

In the United States, the prevalence was estimated to range between 3% and 6%, which is consistent with the prevalence in other Western countries, noting that the highest prevalence is found in the age group of 3–4 years and boys are significantly more affected than girls, aged between 8 months and 7 years.<sup>4,10</sup>

Millions of children suffer from dental caries and periodontal disease, which causes pain, difficulties eating, swallowing, and speaking, as well as significant medical costs and missed time. It is vital to analyze oral health in order to design a treatment plan for a dental health program. To evaluate the magnitude of the preventive obligation, it is critical to first understand the severity of the illness.

The district of Kolar is a geographical region situated in the state of Karnataka on the Andhra Pradesh – Tamil Nadu frontier. Many of the people who remain here have a lower socio-economic position. Karnataka's state has several zones with high drinking water fluoride levels. There are also areas of skeletal and dental fluorosis in the district of Kolar. No current research was done in this area to show the prevalence of dental caries and thus the prevalence of dental caries in the Kolar district school children was determined by a study.

Keeping in mind that the investigator is interested in assessing children who are suffering from dental caries, for this purpose underwent DMFT/DMFS indices in assessing training, so that children can be recognized at an early stage and preventive measures can be implemented, thus reducing the burden of diseases with objectives: (1) to determine the prevalence of dental caries among school children. (2) To examine school children existing knowledge and attitudes on dental caries and its management. (3) To assess the efficacy of dental education program. (4) To compare pre- and post-test knowledge and attitude ratings among school children about dental caries and their management. (5) To determine the association between the pretest knowledge and attitudes scores of school-going children with selected demographic variables.

## Research Hypothesis

The hypothesis of this study is as follows:

*H01:* The mean post-test knowledge scores will not be significantly higher than pre-test scores.

*H02:* The mean post-test attitude scores will not be significantly higher than pre-test scores.

## CONTENTS

### Study Design

The current study used an evaluative research technique to analyze the impact of a dental education program on school children's knowledge and attitudes about dental caries and its management in the Kolar government and private schools. The current study's aims were met using a one-group pre- and post-test (pre-experimental) design. The independent variable is a dental education program, and dependent variable is the knowledge and attitude of school children regarding dental caries and their management.

## Participants

The target population of the present study comprises of school-going children studying at government and private schools of Kolar. By adopting non-probability convenient sampling technique, 40 children from government and private school was used to collect data.

## Sample Selection Criteria

### Inclusion Criteria

School-going children at government and private schools in Kolar are:

- Studying at selected government and private schools, Kolar.
- Between the age group of 6 and 10 years.
- Willing to participate in the study.
- Available throughout the study.
- Able to understand read and write English or Kannada.

### Exclusion Criteria

School-going children at government and private schools, Kolar, are:

- On leave, on the day of data collection.
- Treatment with dental problems.
- Suffering from cleft lip and cleft palate.

## Selection and Development of the Tool

To find the prevalence of dental caries is: The DMFT/DMFS index was utilized, as well as a structured interview schedule to measure school-aged children's knowledge of dental caries and its management and an Opinniare – Likert scale to assess school-aged children's attitude toward dental caries and its management.

## Reliability

Structured knowledge questionnaires' dependability Cronbach's alpha value of 0.63 (acceptable) and Cronbach's alpha value of 0.93 for the attitude tool are both outstanding. This means that the tool was trustworthy.

## Method of Data Collection

Data were collected from 40 participants after receiving official authorization from the relevant authority. On the first day, each child was examined for dental caries using the DMFT/DMFS index, using the World Health Organization criteria 1997. After obtaining ethical clearance and permission from authorities, children were subject to dental screening. Mouth mirror, probe, and explorer were used for carrying out the dental examination in the classroom under natural light with the children seated on a stool, followed by a structured interview schedule to assess knowledge and attitudes about dental caries and its management. On the same day, the research scholar delivered an integrated awareness session to the participants. Knowledge and attitude were examined after the 7th day of post intervention using the same measure to see if the integrated awareness program had any effect. The sample data was uploaded to an Excel sheet for statistical analysis.

## RESULT

The data were analyzed on the basis of the study objectives, using both descriptive and inferential statistics. Findings are organized in the following headings:

### Distribution of School Children based on Demographic Variables

The frequency and percent-wise allocation of samples based on demographic characteristics reveal that the bulk of samples are at the age 25% of government school children belong to 10 years of age and 30% of private school children belong to 6 and 8 years of age, respectively (Table 1). Sample distribution depends on the gender majority. Females made up 60% of students in private schools, while males made up 55% of students in public schools.

Samples are distributed based on religion. In government schools, 80% of the students were Hindu, whereas, in private schools, 75% of the students were Hindu. In terms of family structure, 95% of children in government schools come from nuclear families, whereas 100% of pupils in private schools come from nuclear families. In terms of family members, 45% of government school students had three family members compared to 45% of private school students who had four. The distribution of samples was dependent on the father's educational status. In government schools, 30% of fathers

**Table 1:** Distribution of subjects based on demographic variables (N = 40)

Sr. no.	Demographic variables	Government school (N = 20)		Private school (N = 20)	
		Frequency	%	Frequency	%
1	Age in years				
	6 years	4	20.0	6	30.0
	7 years	4	20.0	2	10.0
	8 years	4	20.0	6	30.0
	9 years	3	15.0	2	10.0
	10 years	5	25.0	4	20.0
2	Gender				
	Male	9	45.0	12	60.0
	Female	11	55.0	8	40.0
3	Religion				
	Hindu	16	80.0	15	75.0
	Muslim	3	15.0	3	15.0
	Christian	1	5.0	2	10.0
4	Family type				
	Nuclear	19	95.0	20	100.0
	Joint	1	5.0	0	0.0
5	Members in family				
	Two	1	5.0	3	15.0
	Three	9	45.0	7	35.0
	Four	6	30.0	9	45.0
	More than four	4	20.0	1	5.0
6	Education of father				
	Primary	1	5.0	1	5.0
	Secondary	2	10.0	2	10.0
	Matriculation	6	30.0	7	35.0
	PUC	3	15.0	3	15.0
	Diploma	3	15.0	3	15.0
	Graduation	3	15.0	2	10.0
	Postgraduation	2	10.0	2	10.0
7	Education of mother				
	Primary	6	30.0	2	10.0
	Secondary	7	35.0	7	35.0
	Matriculation	1	5.0	1	5.0
	PUC	6	30.0	6	30.0
	Diploma	0	0.0	2	10.0
	Graduation	0	0.0	2	10.0

(Contd...)

Table 1: (Contd...)

Sr. no.	Demographic variables	Government school (N = 20)		Private school (N = 20)	
		Frequency	%	Frequency	%
8	Father occupation				
	Daily wager	2	10.0	2	10.0
	Self-employee	5	25.0	5	25.0
	Private job	7	35.0	6	30.0
	Government employer	1	5.0	3	15.0
	On contract basis	4	20.0	3	15.0
	Others	1	5.0	1	5.0
9	Mother occupation				
	Daily wager	13	65.0	12	60.0
	Self-employee	2	10.0	4	20.0
	Private job	4	20.0	4	20.0
	Government employer	1	5.0	0	0.0
10	Ordinal position in the family				
	First	6	30.0	8	40.0
	Second	13	65.0	7	35.0
	Third	1	5.0	5	25.0
11	Area of residence				
	Rural	14	70.0	14	70.0
	Urban	6	30.0	6	30.0
12	Dietary pattern				
	Vegetarian	0	0.0	3	15.0
	Mixed	20	100.0	17	85.0
13	Source of information				
	Mass media	5	25.0	5	25.0
	Peers/friends	1	5.0	2	10.0
	Family members	0	0.0	3	15.0
	Teachers	14	70.0	10	50.0

PUC, pre university course

finished matriculation, whereas, in private schools, 35% of fathers completed matriculation. According to the distribution of samples depending on the mother's educational status, 35% of government school children's mothers finished PUC, whereas 35% of private school children's mothers completed secondary education. In terms of parent occupation, 35% of government school children's fathers work in the private sector, whereas 30% of private school children's fathers work in the private sector. In terms of mother's profession, 65% of government school children's mothers work as daily wagers, whereas 60% of private school children's mothers work as daily wagers. Samples distribution is based on ordinal position majority: Children at government schools were born in the second ordinal position 65% of the time, whereas children in private schools were born in the first ordinal position 40% of the time. According to the distribution of samples based on the area of residence, 70% of government school students were from rural areas, whereas 70% of private school children were from rural areas solely. The majority of students in government schools ate a mixed diet, whereas 85% of children in private schools ate a mixed diet. According to the distribution of samples based on information

sources, 70% of government school students received information from instructors, whereas 25% of private school children received information from the media.

### Frequency of Dental Caries among School Children

From the above graph, it is evident that out of 40 school children screened, 9 (22.5%) were free from dental caries, and the remaining 31 (77.5%) had dental caries (Fig. 1).

School children's mean DMFT scores are 2.47 with a standard deviation of 2.184, and their mean DMFS scores are 5.38 with a standard deviation of 6.436 (Table 2).

Boys' mean DMFT scores are 3.00 with a standard deviation of 0.000, and their mean DMFS scores are 4.00 with a standard deviation of 0.000, with a mean percent of DMFT score of 82.6 and a DMFS score of 45.81. Girls' mean DMFT scores are 4.56 with a standard deviation of 3.26, while males' mean DMFS scores are 15.81 with a standard deviation of 12.254. The average DMFT score is 125.6, while the average DMFS score is 181.1. Boys have a mean percent of DMFT scores of 3.63 2.168 ( $n = 24$ ) while girls have a mean percent of DMFT scores of 4.56 3.265 ( $n = 16$ ) (Table 3).

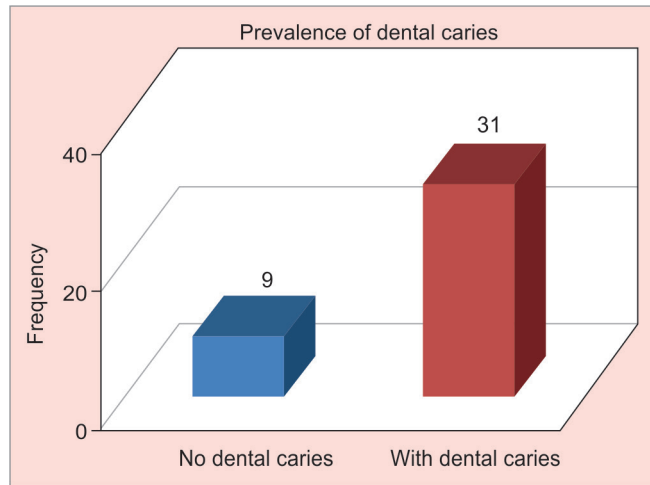


Fig. 1: Frequency-wise distributions of samples based on the occurrence of dental caries

Table 2: Mean and standard deviation of DMFT and DMFS scores (N = 40)

Descriptive statistics	N	Minimum	Maximum	Mean	Std. deviation
DMFT scores	40	0	7	2.47	2.184
DMFS scores	40	0	25	5.38	6.436

Table 3: Gender wise mean% of DMFT and DMFS scores (N = 40)

Gender	DMFT scores	DMFS scores	Mean % DMFT	Mean % DMFS
Boys				
Mean	3.00	4.00	<b>82.6</b>	<b>45.81</b>
N	24	24		
Standard deviation	0.000	0.000		
Girls				
Mean	4.56	15.81	<b>125.6</b>	<b>181.1</b>
N	16	16		
Standard deviation	3.265	12.254		
Overall				
Mean	3.63	8.73		
N	40	40		
Standard deviation	2.168	9.597		

### Knowledge and Attitude Level of School Children on Dental Caries

In the pre-test, the majority (100%) of school children had inadequate knowledge, whereas in the post-test, 65% of school children had inadequate knowledge and 35% had moderate understanding. In private school pupils, the majority (100%) had poor knowledge in the pre-test, whereas the majority (80%) had moderate knowledge and 10% had deficient knowledge in the post-test (Table 4).

Samples are distributed based on attitude and school level. In the pre-test, the majority (100%) of students in government schools had an unfavorable attitude, whereas, in the post-test, 75% had an unfavorable attitude and 25% had a moderately positive opinion. In private school students, the majority (100%) had an unfavorable attitude in the pre-test, whereas 55% had an

unfavorable attitude in the post-test, and 45% had a moderately positive opinion (Table 5).

The mean knowledge score before the exam is 17.8, with a standard deviation of 3.27, while the mean knowledge score after the test is 27.6, with a standard deviation of 4.407. At 0.001 levels, the resulting *t*-value of 12.76 was significant. The difference between post- and pre-test knowledge of dental decay and its management among school-aged children was statistically significant, indicating that the intervention enhanced their understanding (Table 6).

Pre-test attitude scores average 40.83 with a standard deviation of 5.737, while post-test attitude scores average 48.65 with a standard deviation of 5.498. At 0.001 levels, the resulting *t*-value of 10.492 was significant. The difference in attitude ratings between before and after the intervention among school-aged children on

**Table 4:** Frequency and % allocation of knowledge stage of school children (N = 40)

Sl. no	Knowledge level	Government school				Private school			
		Pre-test		Post-test		Pre-test		Post-test	
		f	p	f	p	f	p	f	p
1.	Inadequate knowledge	20	100.0	13	65.0	20	100.0	2	10.0
2.	Moderate knowledge	0	0.0	7	35.0	0	0.0	16	80.0
3.	Adequate knowledge	0	0.0	0	0.0	0	0.0	2	10.0
	Total	20	100.0	20	100.0	20	100.0	20	100.0

**Table 5:** Frequency and % distribution attitude level of school children (N = 40)

Sl. no.	Attitude level	Government school				Private school			
		Pre-test		Post-test		Pre-test		Post-test	
		f	p	f	p	f	p	f	p
1.	Unfavorable attitude	20	100	15	75.0	20	100	11	55.0
2.	Moderately favorable attitude	0	0.0	5	25.0	0	0.0	9	45.0
3.	Favorable attitude	0	0.0	0	0.0	0	0.0	0	0.0
	Total	20	100	20	100	20	100	20	100

**Table 6:** Comparison of the post-test scores with pre-test scores of knowledge regarding dental caries and its management among school children (N = 40)

Paired t-test	Mean	N	Std. deviation	Std. error mean	t-value	df	p-value
Pre-knowledge score	17.8	40	3.275	0.518	12.76	39	<0.001*
Post-knowledge score	27.6	40	4.407	0.697			

**Table 7:** Comparison of the post-test scores with pre-test scores of attitude scores regarding dental caries and its management among school children (N = 40)

Paired t-test	Mean	N	Std. deviation	Std. error mean	t-value	df	p-value
Pre-attitude score	40.8	40	5.737	0.907	10.49	39	<0.001**
Post-attitude score	48.6	40	5.498	0.869			

tooth decay and its treatment was statistically significant, indicating that the intervention had changed their attitude (Table 7).

### To find Out the Association between Before-test Awareness and Attitude Scores with Demographic Variables of the Samples

The Chi-square test was used to find out the association among selected socio-demographic variables with pre-test knowledge score of school children. The selected population variables such as age, religion, family type, members in family, education status of the father, occupation of the mother, ordinal position, place of residence, dietary type, and sources show a significant statistical association with their pre-test knowledge levels. The population variables of school children such as age, family type religion, members in family, education status of the father, occupation of the mother, ordinal position, place of residence, dietary type, and sources show a significant statistical association with their pre-test attitude levels.

### RECOMMENDATIONS

Based on the results, the following recommendations were framed:

- According to the findings, a short-term oral health education program can help improve oral hygiene and gingival health.
- A large-scale cross-sectional investigation is required to reinforce the available data and generalize the findings.
- Develop a variety of educational program to increase school children's awareness of dental caries and how to treat it.
- To address the rising problem of dental caries among school children, a school program should be promoted through integration into the school curriculum and oral health care preventative services.
- Community-based oral health prevention initiatives emphasizing proper oral hygiene should be established.
- School instructors and parents can raise awareness among youngsters by acting as role models for them.
- Annual oral health education should be performed in schools, as well as the supply of oral hygiene aids at reduced prices, particularly in government schools.
- A comparison research can be conducted to determine the best teaching approach using additional instruments.
- According to the study, coordinating efforts between school staff, health professionals, and parents should be promoted in order to ensure long-term advantages of such initiatives.

- Further oral health promotion through a well-structured oral health education program and preventative school dental health program is recommended by investigators to maintain this increase in dental caries awareness.

### LIMITATIONS OF THE STUDY

- The study assessed on knowledge and attitude by knowledge questionnaire and Likert scale only, but practice scores were not assessed on tooth brushing techniques.
- The report was unable to analyze the additional factors that lead to decay, such as oral cleanliness, intake of sweets, and dental treatment.
- As the study sample were school children research scholar had difficulty in gaining their attention during delivering awareness program.

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