Knowledge and Attitude Regarding Dental Caries and its Management among School Children: An Educational Interventional Study

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Abstract

Aim: to investigate the prevalence of dental caries and the impact of dental education programs on school children's knowledge and attitudes regarding dental caries and its management.

Materials and Methods: The research employed an evaluative approach with a one-group pre- and post-test design to collect data. The prevalence of dental caries was assessed using the decayed, missing, filled teeth (DMFT)/decayed, missing, filled surface (DMFS) index based on the World Health Organization's 1997 criteria. Following ethical clearance and informed consent, children underwent dental screenings using mouth mirrors, and WHO probe in classroom settings under natural light, with children seated on stools. Subsequently, a dental education program was administered.

Results: The prevalence of dental caries among government and private school students was found to be 31 (77.5%). The mean DMFT score was 2.47 with a standard deviation of 2.184, while the mean DMFS score was 5.38 with a standard deviation of 6.436. A majority of 31 (77.5%) school children exhibited dental caries, while 9 (22.5%) had no tooth decay. Prior to the educational intervention, all school children (100%) had insufficient knowledge about dental caries. Following the program, 10% of students showed adequate knowledge. Similarly, all children initially had an unfavourable attitude toward dental caries, with 45% showing moderately favourable attitudes post-intervention.

Conclusion: The difference in knowledge and attitudes between pre- and post-intervention scores was statistically significant among the school-aged children. These findings suggest the potential for organizing school-based dental programs aimed at promoting routine oral hygiene practices and regular dental check-ups for children and their parents, thereby fostering healthier lifestyles.

Keywords: school children, caries, oral hygiene

Introduction

Dental health is an important aspect of personal health of individual. Teeth are essential not only for mastication of food but also for good appearance and clear speech. In 2016, the Federal Dental International (FDI) redefined oral health comprehensively, acknowledging it as multifaceted. This definition includes the ability to smell, touch, taste, chew, swallow, smile, speak, and convey emotions confidently, without discomfort, pain, or disease affecting the craniofacial area through facial expressions [1].

Oral diseases are globally recognized as a significant public health issue, impacting nearly 3.9 billion people worldwide [2]. They remain the most prevalent chronic condition among adolescents aged 12–19 years, affecting as many as 67.5% to over

80.0% of school children in some countries [3]. Several factors contribute to increased rates of dental caries in developing nations, such as heightened exposure to sugary products, insufficient fluoride, limited access to dental care services, socio-economic status, and lifestyle factors [4].

The school-age period plays a pivotal role in shaping individuals' lives, influencing the development of lifelong, sustainable oral health behaviours, beliefs, and attitudes. Children are particularly receptive during this phase, and establishing habits early has a lasting impact [5]. Therefore, schools are well-suited environments for promoting oral health. Positive health behaviours are firmly established during preadolescence and adolescence and often continue into adulthood. Schools are ideal for delivering oral

health education (OHE) in collaboration with preventive services, thereby promoting oral hygiene, knowledge, and behaviours worldwide [6]. Additionally, school-based approaches have been found to be more cost-effective and efficient than community-based methods in delivering both preventive and curative oral health care [7].

Numerous studies have identified various sources of information regarding oral health, including parents, schoolteachers, dentists, and mass media, which significantly influence the awareness of oral health among schoolchildren [8]. Health education programs implemented in schools have proven effective in promoting awareness and fostering positive changes in attitudes and behaviours related to health [9]. Additionally, students represent an ideal demographic for early intervention, as health habits and lifestyles established during youth tend to be more enduring [10].

Aim and objectives:

The aim of this study was to examine school children existing knowledge and attitudes on dental caries and its management; and also to compare pre- and post-intervention knowledge and attitude among school children about dental caries and their management.

Methodology:

A pilot study was conducted to evaluate the kknowledge and attitude regarding dental caries and its management among school children using an educational interventional programme. 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. The target population of the present study comprises of school- going children studying at government and private schools of Patna. By adopting simple sampling technique, 40 children from government and private school was used to collect data.

Inclusion Criteria

· Studying at selected government and private schools in Patna.

· 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 Hindi.

Exclusion Criteria

· School-going children on leave, on the day of data collection.

· Treatment with dental problems.

· Suffering from cleft lip and cleft palate.

To find the prevalence of dental caries is: The DMFT/DMFS index was used. A validated close ended structured interview was used to measure school-aged children's knowledge of dental caries, to assess their attitude toward dental caries and its management.

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, permission from authorities and informed consent from parents children were subject to dental screening. Mouth mirror and WHO probe 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.

Results:

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 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.

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

		Government school ($N = 20$)		Private school ($N = 20$)	
Sr. no.	Demographic variables	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
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
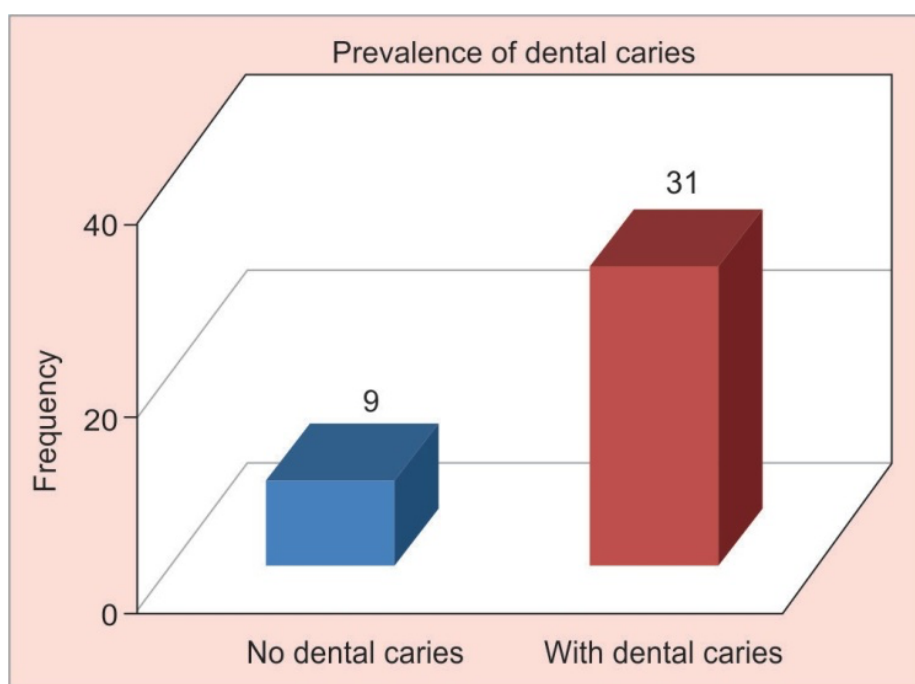
Figure 1: Frequency-wise distributions of samples based on the occurrence of dental caries

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).

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	**82.6**	**45.81**
N	24	24		
Standard deviation	0.000	0.000		
Girls				
Mean	4.56	15.81	**125.6**	**181.1**
N	16	16		
Standard deviation	3.265	12.254		
Overall				
Mean	3.63	8.73		
N	40	40		
Standard deviation	2.168	9.597		

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).

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

	Government school				Private school			
Knowledge level	Pre-test		Post-test		Pre-test		Post-test	
	N	%	N	%	N	%	N	%
Inadequate knowledge	20	100.0	13	65.0	20	100.0	2	10.0
Moderate knowledge	0	0.0	7	35.0	0	0.0	16	80.0
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

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).

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

Attitude level	Government school				Private school			
	Pre-test		Post-test		Pre-test		Post-test	
	N	%	N	%	N	%	N	%
Unfavorable attitude	20	100	15	75.0	20	100	11	55.0
Moderately favorable attitude	0	0.0	5	25.0	0	0.0	9	45.0
Favorable attitude	0	0.0	0	0.0	0	0.0	0	0.0
Total	20	100	20	100	20	100	20	100

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).

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

Paired t-test	Mean	N	Std. deviation	p-value
Pre-knowledge score	17.8	40	3.275	<0.001*
Post-knowledge score	27.6	40	4.407	

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

Table 7: Comparison of the post-test scores with pre-test scores of attitude scores regarding dental caries and its

Paired t-test	Mean	N	Std. deviation	p-value
Pre-attitude score	40.8	40	5.737	<0.001**
Post-attitude score	48.6	40	5.498	

management among school children ($N = 40$)

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.

Conclusion: 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. The difference in attitude between before and after the intervention among school-aged children on tooth decay and its treatment was statistically significant, indicating that the intervention had changed their attitude These findings suggest the potential for organizing school-based dental programs aimed at promoting routine oral hygiene practices and regular dental check-ups for children and their parents, thereby fostering healthier lifestyles.

Despite the results, the study had limitations too. It used a questionnaire with answers based on respondents subjective interpretation which may be biased.

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