

Content Analysis of Oral Health Information in Science Textbooks: A Cross-sectional Study in Schools of Bareilly City, India

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ABSTRACT

Background: Oral health affects general health, way of life, and well-being. Early tooth loss is an indication that the general population is ignorant about dental disorders. Books can influence children's thinking regarding habits and how to incorporate them into their lifestyles in addition to serving as their primary source of knowledge. This study evaluated the oral health information presented in science textbooks for standard I–X across various school boards in Bareilly city.

Materials and methods: A total of 26 schools from standards I to X across a variety of boards were involved in the current survey. To conduct content analysis for different standards based on content, extent, and evidence, an assessment instrument of important components associated with oral health was employed. The data were analyzed descriptively using Microsoft Excel 2013.

Results: A maximum of 17 core components were found in the ICSE Board, followed by 11 core components in the CBSE Board, and only one core component was found in the State Board of Bareilly city. About 109 messages and 74 pictures were found on the CBSE Board, and 102 messages and 55 pictures were found on the ICSE Board. Only three messages and four pictures were found on State (UP) Board.

Conclusion: The textbooks from various publications used in Bareilly city State Board schools severely lack information on dental health. Included oral health-related material is essential for decreasing the prevalence of dental illnesses among teachers and students.

Keywords: Content analysis, Health messages, School textbooks.

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INTRODUCTION

Globally, oral diseases have been a burden. Between 64 and 78% of Indian school-age children have dental caries in their primary teeth, and between 18 and 67% have it in their permanent teeth.¹ These alarming findings provide additional for a detailed analysis of how schools may provide general and dental healthcare services on-site for children, with the ultimate goal of enhancing oral health. The World Health Organization advised using the school as a setup for oral health promotion interventions 2002.

One of the most significant sources of information and tools for students learning in any educational system is the school textbook, which is utilized for the official study of a subject. In addition to imparting knowledge, textbooks can influence a child's perspective on habits and how to apply them to their way of life. It is necessary to analyze these materials because schoolbooks play a significant role in India and many other nations.

"Content analysis" is a sort of analysis that is very significant and helpful to those who design and write primary school curricula as well as those who make those decisions. The content analysis supports the scientific and practical research of the ideas, drives, requirements, attitudes, and all other elements inferred from the instructional content of books. This is done to compare these things to the lesson plans for primary school. This research assessed and examined the science textbook material for elementary schools in terms of the achievement motivation construct and its components.

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MATERIALS AND METHODS

A cross-sectional study was done to conduct a content analysis of the information on oral health in science textbooks. The study was carried out in the month of September 2021 in and around Bareilly city, Uttar Pradesh, India, wherein recently published school textbooks of CBSE, ICSE, and State Board were acquired from the concerned authorities.

There were 25 schools in total. Quota sampling was employed to estimate the sample size. The study sample was as follows—

CBSE ($n = 20$), ICSE ($n = 4$), and State Board ($n = 1$). Only one school was selected for the content analysis since textbooks for State Boards in Bareilly are mainly published by a single publishing house. The criteria for inclusion were English language textbooks with oral health-related content that were used in primary and secondary schools under the ICSE, CBSE, and State Board curricula (I–X standard). The exclusion criteria were textbooks content unrelated to health and textbooks other than English languages. An evaluation of the content, extent, and evidence was done as part of the three phases of the content analysis. Kasey’s examples of age-specific dental subject material² served as the basis for evaluating the content by the various core elements indicated for the relevant standards I, II–IV, V–VI, VII–VIII, and IX–X (Table 1).

It required five steps—obtaining biology, science, and environmental science textbooks for standard I–X from the librarian or teachers with the principal’s permission; attentively reading and manually searching the textbooks for any references to oral health; photographing the book pages that included details, images, and any activities related to dental health; printing the images and highlighting the data that was required in red; counting of statements and images. A single health message was described in a single sentence. One sentence was used to describe a single health message.

In terms of the core components, the content outcome was marked as present or absent. The extent was recorded based on the number of messages and pictures present concerning the core components for each standard (Table 1). Each standard’s core component evidence was recorded as correct or incorrect. For the purpose of evaluating the evidence, the author (SS) looked at the assertions pertaining to oral health and decided whether or not each assertion was true or false in light of her experience. The author (SS) conducted the analysis, while the other two researchers (JM and SN) double-checked the findings.

If a publishing house is used again for the same standard, it is not considered again when collecting data (for CBSE and ICSE).

Statistical Analysis

The total number of pages, the publisher, whether or not there is a message about oral health, and how extensive that message is were all recorded into the Excel sheet by each board. Calculations were made using descriptive analysis (numbers and percentages).

RESULTS

The core components for each standard are analyzed in the section below.

Oral hygiene and a dentist visit or dentist role, the two prerequisites for standard I, were both covered by the CBSE Board, while ICSE covered only one and the State Board covered none.

For standard II, the results showed that among the four essential factors (benefits of teeth, oral hygiene, diet, dentist visit, and the dentist’s role), two were covered by the CBSE Board, one by the ICSE Board, and none by the State Board. In ICSE textbooks, standard III only had one core component covered. The CBSE and ICSE textbooks for grade IV included two core components. Six core components—the advantages of teeth, oral structures, oral hygiene, dental disease, and diet—were examined for standards V and VI. In standard V, just two out of the six were covered by CBSE, three by ICSE, and there was no information at all in the State Board books.

Three of the five core components for standard VII were covered in the CBSE textbooks, while none were in the ICSE or State Board textbooks. A maximum of four out of the five core components for standard VIII were covered in ICSE textbooks but not in CBSE or State Board textbooks.

For standards IX and X, seven core components—oral structure, dental disease, preventative measures, diet, tobacco use, mass media, and dental care—were looked at. CBSE and State Boards covered no information for standard IX, while only the ICSE Board covered two components. No core elements were covered in all three-board books for standard X. The State Board books lacked information on oral health, except for standards VI and VIII. These data are presented in Table 2. In total, 55 pages from CBSE textbooks, 28 pages from ICSE textbooks, and five pages from the State Board were evaluated.

Standards III, IX, and X had no oral health message or pictures in the CBSE textbooks. Only the books for standards I, II, and IV–VIII contained pictures of oral health. Except for book VII, all of the ICSE books included material on dental health. Except for standards VII and X, the publications included illustrations of oral health. The State Board textbooks for standards VI and VIII were the only ones that provided information on dental health. There were pictures only in standards VI through VIII.

Table 3 shows that the most oral health messages and pictures were found in the CBSE, followed by the ICSE Board and with only

Table 1: Content analysis assessment tool for each standard’s core components related to oral health

<i>Standard I</i>	<i>Standard II–IV</i>	<i>Standard V–VI</i>	<i>Standard VII–VIII</i>	<i>Standard IX–X</i>
Oral hygiene: to promote the importance of baby teeth and tooth brushing, maintaining oral hygiene, cleaning, and rinsing the mouth. Dentist role/ dentist visit: discuss the role of the dentist.	Benefits of teeth: the importance of maintaining healthy teeth through routine care. Oral hygiene: keeping teeth clean and rinsing mouth after eating. Diet: simple facts about diet, especially chocolates. Dentist role/dentist visit: the importance of a visit to the dentist.	Benefits of teeth: the link between good oral health and total physical wellness. Oral structure: introduce tooth structure. Oral hygiene: the significance of using the right oral hygiene methods. Maintenance of proper oral hygiene. Dental disease: a thorough explanation of how serious dental issues are. Diet: information about diet. Dentist role/dentist visit: the significance of dental care.	Oral structure: chemical processes that form teeth. Dental disease: the prevention of periodontal disease and dental hygiene might be emphasized. Preventive measure: importance of preventive measures. Fluorides Diet: understand the difference between nutrition facts and fads. Scientific research on diet. Tobacco: information about tobacco’s harmful consequences.	Oral structure: teeth development in the embryo and the value of teeth in later life. Dental disease: oral cancer, periodontal disease, and dental caries: scientific causes. Preventive measure: importance of preventive measures. Diet: importance of nutrition. Tobacco: the negative consequences of tobacco. Social norms and influences. The reason for smoking. The ability to adapt and resist. Mass media: evaluate news coverage and look into research results. Dental care: adult behavior toward dental care.

Table 2: Core components of each board content analysis

Classes	Number of core components recommended	CBSE core components present	ICSE core components present	UP Board core components present
1	2	2	1	0
2	4	2	1	0
3	4	0	1	0
4	4	2	2	0
5	6	2	3	0
6	6	0	3	1
7	5	3	0	0
8	5	0	4	0
9	7	0	2	0
10	7	0	0	0

Table 3: Extent of oral health messages

Classes	CBSE		ICSE		State Board	
	Message	Picture	Message	Picture	Message	Picture
1	5	5	2	2	0	0
2	13	31	5	6	0	0
3	0	0	3	1	0	0
4	44	15	12	12	0	0
5	19	12	34	14	0	0
6	0	1	14	12	2	3
7	27	8	0	0	0	0
8	1	2	17	1	1	1
9	0	0	13	7	0	0
10	0	0	02	0	0	0

three oral health messages and four pictures in the State Board. The ICSE Board had the most core components (17), followed by the CBSE Board (11) and the State Board (one).

DISCUSSION

Nearly 3.5 billion individuals worldwide experience oral problems, with caries of permanent teeth being the most common disease, according to the Global Burden of Disease Study 2019.³

The conventional approach to preventing dental problems has traditionally been dental camps. The results, however, are contradicted by the Cochrane review because it is unable to evaluate a large population, notably India. Another way to prevent dental diseases is through classroom teaching using the knowledge provided by textbooks and teachers.

Schools provide an opportunity to promote oral health because kids spend the majority of their time. By addressing risk factors for oral diseases at a young age, school-based programs can help to improve children's oral health outcomes.⁴⁻⁷ It is widely known that students absorb the knowledge presented in textbooks; in other words, how a subject is taught to students depends on how that subject is presented in the textbook. A content analysis of the book's content can be used to determine how effective school textbooks are.

There have only been six studies⁷⁻¹² on the analysis of content related to oral health published in the literature, with only two focusing on the overall content about oral health (Geetha et al.,⁷

and Dagar et al.,¹¹) and the other three focusing on specific topics like nutrition, oral cancer, and tobacco use.

A content analysis of the oral health content in science textbooks for standard I–X across State Boards in Bareilly city was the main objective of this study. This study, which focuses on three separate boards in Bareilly city, Uttar Pradesh, India, is the first of its type.

The following is an explanation of each standard's core components.

For standard I, the CBSE Board covered the core components—oral hygiene and dentist role—while the ICSE Board covered just one core component, oral hygiene, and the State Board covered none. Similar to Standard I, only two of the four specified core components for Standard II were found on the CBSE, ICSE, and the State Boards. These results are in contrast to a study done in Pune city by Dagar et al. in standards I–V, which discovered that their textbooks contained appropriate information.¹¹

The core components for grades V and VI were only partially addressed by the ICSE and CBSE Boards.

The results were in contrast to those of Dagar et al.¹¹ Studies by Saito et al.,¹⁰ and de Irala et al.,¹² show the books did not provide any information about illness-preventative behavior. Maximum core components such as benefits of teeth, dental disease, and diet were present in the ICSE Board, followed by the State Board.

For standard VII, the CBSE Board had the most messages, while for standard VIII, the ICSE Board had the most messages. The

results were consistent with those of Saito et al.,¹⁰ de Irala et al.,¹² and Barrio-Cantalejo et al.,¹³ who discovered that the textbook contained accurate scientific data but was deficient in information on tobacco use and disease prevention practices.

Oral structure, tobacco, mass media, and dental care were not addressed in any significant way for standards IX and X across the two boards (CBSE and ICSE). However, preventative measures, diet, and the main causes of dental disease were.

The investigation was divided into three sections: content, extent, and evidence. Overall, the evidence in this study was true most of the time, according to the three authors' competence (SS, JM, and SN). Barrio-Cantalejo et al.,¹³ reported that all oral health messages were supported by 100% reliable scientific evidence. Additionally, it appeared that the State Board books had the least amount of information and were equally incompetent in covering every aspect of oral health.

In this study, only Kasey's example of an age-specific dental subject was used; however, Age-appropriate anticipatory guidance and recommendations for pediatric oral health assessment by American Academy of Pediatric Dentistry guidelines/ recommendations could have been used as an update for references like injury prevention of facial trauma, the significance of fluoride in prevention, inhibition, and reversal of caries, the significance and need for pit and fissure sealants, and caries-risk assessment counsel.¹⁴

Limitations

The study's shortcomings were that only science textbooks were used for content analysis, despite the fact that textbooks produced in English and other regional languages probably contained information about maintaining teeth and oral health (in the form of poetry or activities).

CONCLUSION

Oral health information is sadly underrepresented in the Bareilly city science textbooks, so there is an urgent need to increase the content. This information could assist the local authorities in this area in improving and planning dental healthcare services because children are viewed as the nation's future. The study's findings led to the following suggestions, among them that the National Education Policy 2020 review its textbooks and call attention to the absence of information on oral health in them. School materials should include several health messages that are supported by recent research and wholly developed or recommended by medical and dental specialists. Local governments, nongovernmental organizations, and dental associations should all actively take part in a campaign to increase public knowledge of oral health. Lastly, information on routine dental check-ups and workshops for schoolteachers should be available to promote good oral habits and available to promote good oral habits and oral hygiene.

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