



ORIGINAL RESEARCH PAPER

Community Medicine

CONTENT ANALYSIS OF NUTRIENT-RELATED CONTENTS IN SCHOOL SCIENCE TEXTBOOKS OF KARNATAKA STATE

KEY WORDS: Content analysis, nutrition education, school curricula, nutrition

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ABSTRACT

School textbooks are primary learning tools and crucial sources of any health-related information for students, analysing their content is essential. Objective: To identify the nutrition related content and to determine the proportion of space in the general science textbooks of grades (VI-X) from state board, CBSE and CISCE syllabi. Methods: Review of the selected textbooks was done to extract and identify all content related to nutrition. Quantitative Measurement was done to calculate the proportion of space dedicated to nutrition content. Results: In terms of chapter-wise allocation, highest proportion was found in grade IX of CBSE Board. In state board, highest proportion of pages with nutrition content was observed in grade VI whereas grade VII and X have the lowest coverage with no nutrition contents. In contrast, in CBSE and CISCE textbooks, grade VII had highest contribution. The textbooks had nutrition related topics like classification of nutrients, their functions and sources, balanced diet and nutrient deficiency disorders. Conclusions: CBSE board distribute the content more evenly across multiple grades, whereas CISCE and state boards had gradually decreased trend with higher grades, focusing on nutrition more in lower grades.

INTRODUCTION

As school textbooks are the primary learning tools and crucial sources of health information for students analysing their content is essential. Young people's minds are greatly shaped by textbooks, which have an impact on their knowledge, attitudes, and behaviors.^[1] A large audience, including students, their families, and the wider community, may be effectively reached through schools.^[2]

In order to engage in healthy and healthy eating behaviour, nutrition education is also required. Integrating food safety with nutrition education is highly important as it ensures the provision of adequate and safe foods to meet different nutritional requirements of the individuals.^[3] Content analysis can be defined as a technique for making replicable and valid inferences from the text/data to their context.^[4] It is a systematic approach to deriving objective inferences from texts, and it can be useful in improving nutrition education.^[3] It's a set of qualitative and quantitative methods for collecting and analyzing data from verbal, print, or electronic communication.^[5]

Indian schools are primarily based on three systems — those are the Central Board of Secondary Education (CBSE), the Council for the Indian School Certificate Examinations (CISCE) and state education boards. Though they may use textbooks published by commercial publishers, most CBSE schools follow the National Council of Educational Research and Training (NCERT) curriculum.^[6,7,8] Schools in CISCE follow the syllabus as prescribed by each of the councils. State education boards supervise schools that use curricula developed by statewide agencies that reflect local educational interests and policies. Karnataka Textbook Society (KTBS) publishes textbooks for schools in Karnataka state.^[9]

Textbooks are designed to align with national core curricula, ensuring that the content is relevant and standardized across different educational institutes. It should employ a constructive approach, encouraging participative learning through exercises and activities and supports students in developing a deeper understanding of nutritional concepts.^[10] The format and content of textbooks can significantly influence student engagement and perceptions of nutrition education.^[11] Particularly in resource limited settings, school textbooks play an important role as a source of reliable information to the school going children and their families.^[12] School textbooks provide health information on

the disease prevention and essential health skills; the information they contain must be reliable.^[13]

Nutrition is constantly evolving with new research uncovering insights in terms of dietary patterns, nutrient requirements and their health effects. Similarly, education also undergoes revisions to keep up with the new advancements and needs. Hence, nutritional content analysis helps to identify gaps, inconsistencies, and areas for improvement to ensure students receive updated knowledge on nutrition. The objective of this study was to determine the proportion of space allocated for the nutrition component in relation to the other topics in biology in each of the textbooks and to identify the nutrition related content in the general science textbooks of grades (VI-X) from state board, CBSE and CISCE syllabi and followed by comparing the coverage of nutrient-related topics across different educational boards. This research helps to improve the nutrition education through the academic textbooks focused on nutrition. Also, the nutritional information in academic textbooks would eventually lead students to have a better lifestyle.

METHODOLOGY

Study Design: Content analysis

Study Period: 1 month

Sampling Method: All science textbooks prescribed for grades VI to X in Karnataka by the State Board, CBSE and CISCE had been selected for the study.

Inclusion Criteria:

All science textbooks prescribed for grades VI to X in Karnataka by the State Board, CBSE and CISCE for the current academic year. Textbooks in English that explicitly contain topics related to nutrition were included.

Topics related to food, food intake, its functions, nutrients, and their role in human health. Also, nutrient deficiencies and diseases or disorders, unhealthy foods, over nutrition/obesity and lifestyle diseases were included.

Exclusion Criteria:

Supplementary materials, guidebooks, or reference books that are not officially part of the prescribed syllabus.

Topics like food-borne diseases, water related, human, plant and animal processes like respiration, digestion,

reproduction, excretion, food & water handling, storage, preservation & cooking, food additives and impact on health.

Method Of Data Collection And Analysis:

Review of the selected textbooks was done to extract and identify all content related to nutrition.

Quantitative Measurement was be done to calculate the proportion of space dedicated to nutrition-related content in relation to other topics in biology.

Space Allocation Analysis was done to assess how much emphasis is placed on nutrition compared to other subjects in the textbooks.

Later, comparison of the coverage of nutrition-related topics across different systems were done in terms of, variations in the depth and breadth of nutrition topics covered.

RESULTS

Proportion of nutrition related content in the general science textbooks

In state board textbooks, the highest proportion of nutrition related content was observed in grade VI with total 9 pages dedicated to nutrition which constitutes 13% of the total biology content. Grade VII and X has the lowest coverage where no pages were allocated to nutrition related contents.

In contrast, CBSE textbooks had more consistent but limited coverage across all grades from VII to X, with only 2 to 3 pages per grade. grade VII had the highest contribution with nutrition content in 9 pages which constitutes 17% of biology content.

The CISCE textbooks had no nutrient related contents in grade X, whereas grade VII had highest contribution of 10 pages i.e., 8% of biology content.

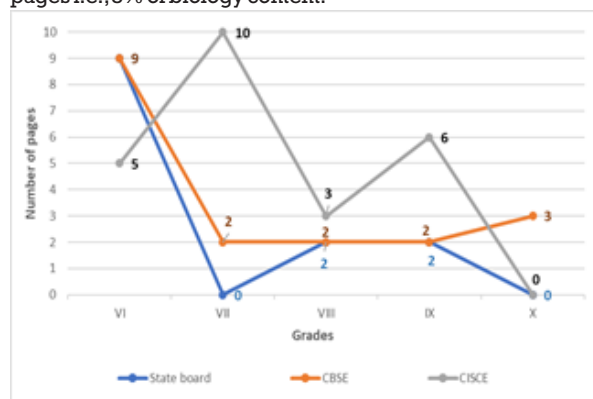


Figure 1: Page-wise Allocation Of Nutrition Contents In Biology Textbooks

Comparison Of Coverage Across Different Boards



Figure 2: Chapter-wise Allocation Of Nutrition Contents In Biology Textbooks

CBSE textbooks had exhibited the highest proportion of nutrition related contents, with 33% in grade IX and maintaining 20–25% coverage across most grades. However, state board textbooks showed moderate inclusion, with 16.7%–20% in grades VI, IX and VIII but grades VII and X had no nutrition related contents in the textbooks. CISCE textbooks had highest allocation of 22% in grade VI, and found a consistent decline in further grades, with no chapters related to nutrition content in grade X.

Nutrition Related Topics Covered

The State Board textbooks primarily had covered concepts such as classification of nutrients as carbohydrates, proteins and fats, also had different sources of nutrition, and diseases caused due to nutritional deficiency.

The CBSE textbooks in contrast, presented a more comprehensive approach, covering topics such as balanced diet, nutritional deficiency diseases, classification of nutrients and fortification.

The CISCE textbooks included topics like balanced diet, nutritional deficiency diseases, obesity, classification of nutrients, their functions and their sources.

DISCUSSION

The findings of our study align with a previous descriptive study carried out in Andhra Pradesh, India in 2012. It was found that medium level of evidence was related to balanced diet and malnutrition (2%) and almost a quarter (21%) of the health messages included have unknown scientific evidence. Our study found that textbooks primarily had covered concepts such as classification of nutrients, their functions and their sources, diseases caused due to nutritional deficiency, balanced diet, fortification, obesity, etc.^[1]

A study by Subba Rao GM, et al, showed that biology component in NCERT textbooks occupies relatively less space compared to physical and environmental science, particularly in higher grades (VIII to X), where nutrition topics are absent. The nutrition related topics covered in the study were, cereals, pulses, oilseeds, tubers, roots leaves, vegetables, deficiency diseases, components of food, balanced diet, etc. This is similar to our findings were CISCE and state boards had gradually decreased trend with the higher grades, focusing on nutrition more in lower grades.^[3]

A systemic review of 14 studies on content analysis of school textbooks on health topics showed that 3 studies were focusing on nutrition. These studies found that excessive emphasis on sweets in both words and pictures and needs adjustments to today's perceptions. Also, that studies were mostly confined to developed nations.^[14]

A study carried out in Spain in the year 2011 analysing about 844 health messages in school textbooks, found that 61% had an unknown level of scientific evidence, while less than 6% had high evidence. Topics like balanced diets had over 70% of messages with unclear evidence. Thus, the study highlights the need for standardized guidelines to ensure accurate health information in textbooks.^[15]

CONCLUSION

Highest proportion of nutrition-related content was found in Grade IX of the CBSE Board, with 33% of total biology chapter has been dedicated to nutrition related content.

Only CBSE board had nutrition related content in the Grade X, other boards do not include any nutrition related topics in their Xth Grade textbooks.

CBSE board distribute contents more evenly across multiple grades, whereas CISCE and state boards had gradually decreased trend with the higher grades, focusing on nutrition

more in lower grades.

Nutrition topics covered in textbooks of grades beyond VI repeat had topics like classification of nutrients, their functions and sources, balanced diet, and nutrient deficiency disorders.

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