

Social Marketing and the Health of School-Aged Children: A Co-Word Analysis of Four Decades of Research

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Abstract

Context: Despite the growing emphasis on social marketing as a tool for improving the health of school-aged children, there is little comprehensive understanding of how research is evolving in this field. In the present study we aimed to conduct a co-word analysis to give a systematic account of the trends that describe the role of social marketing in promoting children's health.

Evidence Acquisition: This study employed a PRISMA-guided systematic review combined with bibliometric and co-word analysis to examine research trends in social marketing interventions targeting school-aged children. Peer-reviewed English-language articles published between 1985 and 2024 were retrieved from Web of Science (WoS), Scopus, and PubMed. After removing duplicates, titles and abstracts were screened according to predefined inclusion and exclusion criteria. This screening was performed independently by two reviewers, with discrepancies resolved through consensus, resulting in 762 articles being included in the final analysis. Keyword normalization and co-word analysis were conducted to identify major research themes and conceptual structures. Bibliometric mapping and visualization of research trends were performed using VOSviewer and the R programming environment.

Results: The results of the co-word analysis showed that the application of social marketing in promoting the health of school-aged children and adolescents has been organized into seven categories, including "social marketing and behavior change strategies", "health behaviors and lifestyle", "health policy and public health", "health education and promotion", "social and community factors", "prevention and risk management", and "ethics and sustainability".

Conclusion: Based on the seven thematic categories identified through co-word analysis, the findings demonstrated that research on social marketing interventions for school-aged children is structured around interconnected domains, including behavior change strategies, lifestyle-related health behaviors, public health policy, health education, social and community influences, risk prevention, and ethical and sustainability considerations. Together, these categories highlight the multidimensional and integrative nature of social marketing research in this field. The prominence of themes related to parents, communities, media, and digital platforms further indicates that social marketing interventions increasingly rely on multi-level and socially embedded approaches to support positive health-related behaviors among school-aged children.

Keywords: Social Marketing, Behavior Change Campaigns, School-Aged Children and Adolescent, Health Promoting, Co-Word Analysis

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1. Context

General health and well-being in children and adolescents are clearly associated with long-term social prosperity and sustainability of a population (1). The populations of school-age children and adolescents represent age-specific life transitions whose physical, mental, and social health uniquely impacts academic engagement and the maturation processes required to ultimately serve social progress and continuity (2-4). This group, however, faces numerous health issues related to obesity (5, 6), malnutrition (7, 8), mental health (9, 10), substance use (11, 12), and lack of physical activity

(13), all of which have been accentuated by changes in lifestyle. Public health programs for this age group have increasingly recognized the need for innovative strategies to meet such multidimensional health challenges. However, Social marketing has emerged as a promising strategy for influencing behavior and promoting health (14, 15).

Social marketing has been defined as commercial marketing techniques applied for the benefit of citizens or society rather than for payment or profit to promote public goods, services, and policies (16). When audiences, evidence-based techniques, and behavior change theories are combined, individuals

are more likely to make long-term changes in their health habits (17). Social marketing may encourage individuals to do things like healthily eating and exercise, which can have long-term health benefits (15). Understanding the applications of social marketing can be effectively used to promote healthy behaviors in this demographic, and is therefore a vital area of research.

Social marketing has shown considerable promise in changing adolescents' and school students' behavior across a wide range of health promotion domains. For example, smoking prevention (18), obesity reduction (19), and mental health promotion (20) campaigns illustrate the potential range of social marketing to influence attitudes, norms, and behaviors among young audiences. For example, the "Som la Pera" study in Spain reported that a school-based, peer-led social marketing intervention increased physical activity among adolescent boys (14, 21). Furthermore, some studies demonstrated that social marketing interventions can improve adolescents' sexual health by raising awareness and promoting preventive behaviors to reduce the risk of sexually transmitted infections and unintended pregnancies (22-23). In Thailand; for instance, a high concentration of social marketing efforts increased parents' knowledge, attitudes, and actual abilities or practices in talking about sex with children and young people in their care (24). In the UK, the same kind of program resulted in increased use of condoms by teenagers. This suggests that social marketing may have some potential for improving reproductive health knowledge, particularly about AIDS and HIV. Longer programs are needed to achieve behavior change (25).

Although there is extensive research on the use of social marketing in public health, most previous studies used traditional methods, including randomized controlled trials (14, 19), simulation (18), one-group pretest-posttest designs (22), and scoping reviews (23). These methods are insufficient to explain the themes and topics on the benefits of social marketing interventions in the health of school-aged children. These issues have left a significant gap in our understanding, demonstrating the need for using bibliometric tools, particularly co-word analysis, to identify major concepts, new trends, and areas that have not yet received much attention in this regard. Such an approach

can help bridge the gap and provide valuable guidance for future research as well as for the design of health interventions tailored to the needs of children and adolescents.

2. Methods

The present study systematically investigated the role and influence of social marketing strategy in behavior change among school-aged children through a comprehensive review of trends, research patterns, and the state of this field with the aid of bibliometric analysis. A systematic review was therefore performed using the PRISMA guidelines (26). Given the extensive research on the use of social marketing among children, the present study employed bibliometric analysis to identify trends and patterns over time and explore the conceptual frameworks used across studies, including phrase co-occurrence (27).

2.1. Data Collection

2.1.1. Search Strategy

For data collection, a thorough evaluation was conducted on the available literature in three large databases of PubMed, Scopus, and Web of Science. These libraries were selected due to their abundance of social studies, education, and health literature. This indicates that they are excellent resources for school-age children seeking to learn about social marketing. To conduct an accurate and comprehensive search, a set of specified phrases and Boolean operators were used. The following search keyword was used:

("social marketing" OR "social advertising" OR "social campaign*" OR "behavioral change campaign*") AND ("Child" OR "student*" OR "children" OR "adolescent*" OR "school-aged children" OR "Juvenile*" OR "Teenager*" OR "Pediatric*" OR "School-age children" OR "Young learners" OR "Children of school age" OR "School-going children" OR "Middle childhood" OR "Kids in school age" OR "Education-aged children")

The search only examined works published in peer-reviewed publications between 1985 and 2024 in order to get the most recent information. This period of time was selected to provide a complete overview of how social marketing was first used in this context as well as how it is now applied.

2.2. Inclusion and Exclusion Criteria

Documents were included if they fulfilled the following criteria:

- Peer-reviewed articles published in English
- Articles on social marketing interventions targeting school-aged children for healthy behavior, disease prevention, or behavior change

Studies were excluded if they met any of the following criteria:

- Studies not specifically targeting school-aged children or adolescents (e.g., studies focusing exclusively on adults, parents, teachers, or the general population without child-focused outcomes)
- Documents lacking empirical or analytical content, including conference abstracts, editorials,

commentaries, letters to the editor, opinion pieces, and book reviews

- Evidence with insufficient bibliographic information for bibliometric analysis (e.g., missing keywords, abstracts)

Studies were excluded during screening if they met any exclusion criterion in their title or abstract, or during full-text assessment when eligibility could not be confirmed.

2.3. Screening Process

The screening was done in two successive ways. First, the documents retrieved from WoS, Scopus, and PubMed were merged. Also, duplicates were removed by the bibliometrix R-Tool. Then, title and abstract screening was conducted to eliminate irrelevant articles. The PRISMA flow diagram has been adopted to trace the process of screening for transparency and methodological rigorousness (Figure 1).

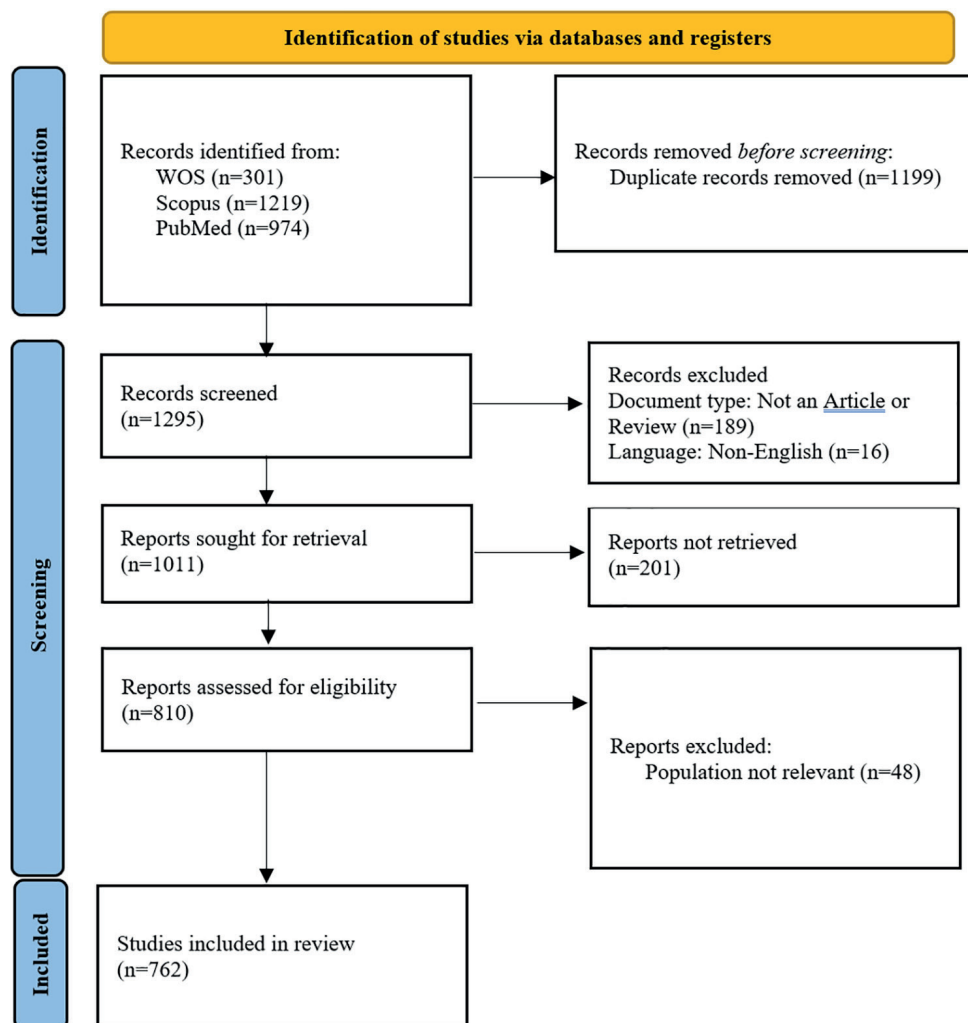


Figure 1: The figure shows the PRISMA flow diagram.

Using the search string, we selected 301, 1219, and 974 articles from WoS, Scopus and PubMed, respectively. A total number of 1295 unique documents remained after combining the three databases and removing 1199 duplicates. After applying the exclusion criteria, 1011 English-language articles and reviews from 1985 to 2024 were retrieved. Consequently, we excluded 810 studies in the process of title and abstract screening. The present study, therefore, included a total number of 762 scientific articles. Screening of titles and abstracts was first conducted independently by two reviewers, based on the inclusion and exclusion criteria, followed by consensus to resolve discrepancies.

2.4. Data Extraction

The keywords in each article were identified and subjected to a co-word analysis, which is very important in understanding the current trends and directions in research adopted and used by the researcher or author concerned in his work or study (28, 29). Extracted data required some standardization in order to undergo accurate co-word analysis. Pre-treatment or normalization entailed developing some standardized words or phrases for developing a uniform database. For example, singular and plural forms of words (e.g., “parent” and “parents”) were normalized, while typographical errors or variant spellings (e.g., “behavior” vs. “behaviour”) were corrected. Abbreviations and acronyms were also expanded, such as “HIV” being expanded to “Human immunodeficiency virus,” ensuring consistency across the dataset. The extracted data were cleaned and refined, resulting in a normalized set of

keywords and terms, which were then used for the bibliometric and co-word analysis (30). These words are visualized as a network, and, therefore, allowed for a deeper understanding of the structure of the relationships between various research themes and areas of interest within social marketing in school-aged children. Visualizations of research trends and co-word analysis network were made using the VOSviewer and R packages.

3. Results

The application of social marketing to promote school-aged children’s health showed a steady increase in scientific output from 1985 to 2024, with an annual growth rate of 6.17%. Figure 2 illustrates the annual publication trends over this period.

A co-word occurrence network is composed of nodes, lines, and connections that represent the relationships between words, as illustrated in Figure 3. In fact, co-word analysis is a bibliometric technique used to study the relationships and structure of a research field by analyzing the co-occurrence of keywords or terms within a set of documents (27-29).

Following keyword normalization, a co-occurrence matrix of author keywords was constructed to examine the conceptual structure of the literature. Co-word analysis was conducted using the bibliometrix R package and VOSviewer software. For network visualization, the automatic layout option was applied, which selects the most appropriate network layout to maximize graph readability (31).

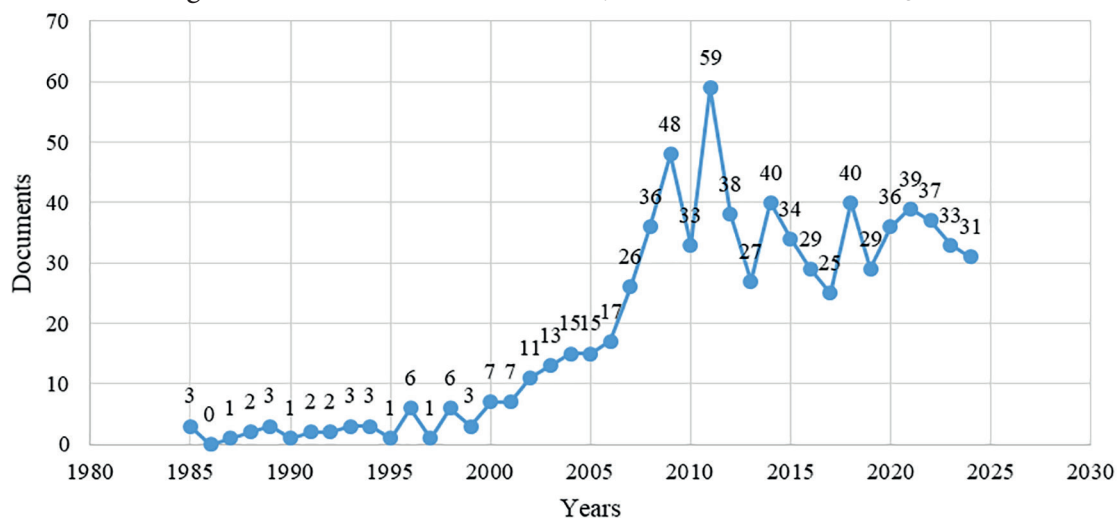


Figure 2: The figure shows the annual research on social marketing in children’s health (1985-2024).

Co-occurrence relationships were normalized using the association strength similarity measure, which is recommended for bibliometric mapping of co-occurrence networks (32). To identify thematic structures, network-based clustering algorithms were employed. In accordance with standard practices in bibliometric analysis, the Walktrap community detection algorithm was used to cluster keywords based on the strength and density of their co-occurrence relationships (33). In the Walktrap algorithm, the number of clusters is determined automatically through a hierarchical clustering process as following:

Merging Clusters: At each step, the algorithm merges similar clusters based on similarity measures, such as random walk probabilities.

mergers (no further cluster mergers occur) and, convergence (the algorithm converges to a stable clustering configuration). Given these criteria, the Walktrap algorithm can automatically determine the optimal number of clusters for the input data.

Specifically, with a minimum of 5 link strengths and 70 keywords, the most frequently studied topics in this field by scholars are grouped into 7 distinct clusters. Table 1 presents these clusters along with their respective themes and their frequency.

The centrality of Cluster 1 indicates the importance of *social marketing* in most health promotion campaigns aimed at school-going children. The frequent occurrence and close association with words such as *intervention* and *prevention* underscores a wide applicability on health-related behaviors with evidence-based practices. Social marketing uses the principles of marketing and advertising to change behavior in order to encourage desirable behaviors and to discourage unsafe actions (34).

Table 1: Clusters, themes and most frequent author keywords in the 762 included publications

Clusters	Themes (Frequency)
Social Marketing and Behavior Change Strategies	Social Marketing (207), Intervention (24), Marketing (23), Prevention (22), Advertising (12), Advertising and Promotion (4), Campaign (8), Consumer Behavior (12), Behavior Change (21), Market Segmentation (10), Gamification (5), Fear Appeal (4)
Health Behaviors and Lifestyle	Obesity (81), Nutrition (49), Physical Activity (62), Alcohol Consumption (45), Smoking (32), Tobacco (31), Diet (15), Vegetables and Fruits (12), Food Marketing (9), Sugary Drinks (5), Electronic Nicotine Delivery Devices (4), Food (4), Mental Health (4)
Health Policy and Public Health	Public Health (20), Policy (11), Public Policy (10), Health Policy (9), Determinants of Health (8), Legislation (4), Health Belief Model (4), Theory of Planned Behavior (4)
Health Education and Promotion	Health Promotion (38), Education (16), Health Education (9), Health Literacy (5), Awareness (4)
Social and Community Factors	Parents (19), Health Communication (14), Community-based Participatory Research (11), Social Norms (10), Community Health (4), Social Media (15), Media (8), Internet (7), Mass Media (5), Community (5)
Prevention and Risk Management	Vaccination (12), Immunization (5), Substance Abuse (6), Sexual Health (19), HIV (21), Drug-Use Prevention (6), HPV (9), Cancer (8), COVID-19 (5)
Ethics and Sustainability	Corporate Social Responsibility (8), Ethics (4), Sustainability (7), Environment (5), Ecological Model (3), Health Disparities (4), Altruism (3), Waste Food (3)

Core strategies involve those such as targeted *campaigns*, *market segmentation*, *advertising*, and *promotion* that, in turn, ensure messages are properly fit for a target demographic or sub-cultural subset that it increases campaign effectiveness (15, 22, 35).

Most notably, keywords such as *gamification* and *fear appeal* were noticed; both reflect the varied approaches that one can undertake in social marketing. Gamification has become a new tool to engage children in a more playful and encouraging manner, such as health-related mobile Apps or school-based challenges (36, 37). *Fear appeals*, on the other hand, are used to demonstrate emotional responses to certain behaviors, such as drug abuse or smoking. Another sign of how commercial marketing techniques have permeated social marketing operations is the focus of consumer behavior and behavior change. This combination of corporate ideas and public health goals exemplifies how social marketing may lead to considerable and long-term behavioral change (16).

3.2. Cluster 2: Health Behaviors and Lifestyle

Cluster 2 gives an insight into thematic areas of concentration in research regarding strategies of social marketing for school-aged children. The preponderance of certain keywords underlines the main areas of concern and intervention within this domain. The high hit rate on *obesity*, *physical activity*, and *nutrition* shows great concern about health issues, especially regarding lifestyle issues affecting children's health and wellbeing (5, 7, 14).

These are in tandem with the international move to address obesity among children, which is a serious public health threat since it mostly leads to chronic non-communicable diseases such as diabetes type 2 and cardiovascular diseases (38). Social marketing interventions that aim to prevent obesity among school-age children are commonly based on the behavior change models with an attempt to foster behaviors of healthy eating and physical activities (15, 39).

The strong co-occurrence of such terms as *diet*, *vegetables and fruits*, and *food marketing* would indicate that great emphasis has been placed on dietary behaviors. These findings will therefore mean that the common strategy for social marketing interventions has indeed been the promotion of diets balanced in their nutritional composition along with increased consumption of more nutrient-dense foods (40, 41). This may indicate that *sugary drinks* and *food marketing* receives very limited attention but is at its nascent stage. The highly restricted food marketing regulations ensure healthier attitudes toward consuming food among children, as stated in recent studies. Thus, this area should be given considerable attention (42, 43).

Other behavioral issues are *smoking*, *tobacco*, and *alcohol consumption*, which have also come to the fore, showing that in most instances, social marketing strategies try to prevent or reduce harm among school-aged children. These views are also consistent with public health initiatives that employ education and communication efforts

to delay or prevent young people from becoming drug users (12, 18). The fact that the phrase “mental health” appears alongside other terms indicates that the psychological elements of children’s health are becoming more widely acknowledged in social marketing research. Interventions aimed at increasing children’s resilience, stress reduction, and self-confidence are becoming increasingly popular. These are part of a larger initiative to promote the health and well-being of school-aged children (44).

3.3. Cluster 3: Health Policy and Public Health

In cluster 3, the phrase public health, emphasizes the importance of broad health promotion aims as an approach when using social marketing efforts. It shows social marketing supports public health strategy to promote healthy habits and children’s overall well-being (25, 45). The frequent co-occurrence of phrases like policy, public policy, and health policy, highlight the interaction between social marketing programs and policy actions. Policies such as school dietary standards and physical activity requirements offer support structures for behavior change activities, thereby increasing the effectiveness of social marketing programs (46). The inclusion of health determinants demonstrates a knowledge of the numerous aspects influencing children’s health habits, such as socioeconomic position, cultural norms, and environmental circumstances (47) that integrally seamlessly incorporates both behavioral and systemic approaches (48). The *health belief model* and the *theory of planned behavior* are the most popular theoretical frameworks. These models show how cognitive and motivational factors influence health behaviors, allowing for the development of evidence-based social marketing strategies that target key attitudes and perceptions (49).

3.4. Cluster 4: Health Education and Promotion

Cluster 4 promotes health as the major focus of a social marketing campaign for school-aged children. This procedure consists of many components, including health education, reading, and comprehension. Health education is still important because it teaches children how to make informed decisions about eating and food, physical exercise, mental health, and drug use (50, 51). This is an attempt to intervene at a tender age in the life

of a child so that the habits and practices inculcated can last a lifetime.

Health literacy enhances these approaches even further by providing children not only with the information but also with the competencies to understand, make judgments about, and act on it. Studies also linked higher health literacy with better decision-making and healthier lifestyle choices (52, 53). *Awareness* campaigns allow the prevalence of risky behaviors, along with associated consequences, to be highlighted (54). This motivates families to pursue an education and maintain healthier practices for their family’s benefit.

3.5. Cluster 5: Social and Community Factors

Cluster 5 highlights some of the themes on the involvement of *parents*, *communities*, and the *media* in the social marketing research targeting the school-going populations. The predominance of parents implies their position as behavior change facilitator agents. Previous studies concluded that interventions engaging parents through social marketing strategies, including workshops, campaigns, and online tools, would result in longer-term effects on behavioral changes among children (55, 56).

Moreover, studies showed that *Health communication* and age-related approaches are required to influence health-related attitudes and behaviors among this age group (56-58). Health communication also effectively communicates information through multiple media. Newer media, such as social media and interactive media, offer new opportunities for reaching younger people, greatly improving the effectiveness of older methods of communication (59).

Community-based participatory research indicated that the design and implementation of interventions focus on collaborative approaches. Participatory models, by including active community stakeholders, assure cultural relevance and local buy-in that enhance the efficiency of health promotion campaigns (60). Use of keywords like *community health* and *community* also further expounds on the centrality that collective efforts will enjoy in handling or confronting health challenges mediated socially.

Additionally, media (e.g., *social media*, the *Internet*, and *mass media*) play a very active role in spreading the message of social marketing campaigns. Social media allows communication in a mirrored approach to school-aged children and their families effectively. These digital tools allow for interactive and visual forms of content, which helps retain the messages with a stronger grip and brings about positive behavior modification (35). The frequency of terms such as *social norms* provides an indication that campaigns often apply norm-setting strategies to promote positive behaviors by presenting the desirable actions as standard and widely accepted within the peer groups.

3.6. Cluster 6: Prevention and Risk Management

Cluster 6 outlines those general themes represented within social marketing research that explore the health risks and precautionary behaviors taken by school-aged children with relation to *HIV/AIDS* and *sexual health*. Social marketing campaigns also work to improve knowledge about *HIV/AIDS* prevention through selective, culturally sensitive, and age-appropriate communications strategies (22, 23).

Keywords such as *HPV*, *vaccination*, and *immunization* point out efforts toward vaccine promotion, especially the *HPV* that protects against *cancers* of the virus etiology. Indeed, studies proved that social marketing strategies for vaccine hesitancy through focused education and addressing misinformation improve the rates of vaccination (57, 61). The co-occurrence of cancer further underscores the relationship between vaccine-preventable diseases with long-term health outcomes, placing emphasis on early intervention (57).

Inclusion of *substance abuse* and *drug-use prevention* stresses the need to prevent risky behaviors with potential harms in both the long and short run. Most social marketing programs that aim at reducing the levels of substance use among school-aged populations focus on norm-based communications and exploiting the forces of peer influences for preventing uptake (12, 50). The presence of COVID-19 signifies that during times when health actions would help such as in pandemics, the need for social marketing communications will keep on rising.

3.7. Cluster 7: Ethics and Sustainability

Cluster 7 speaks to a wider social and environmental focus within the social marketing research directed toward school-aged children. The emergence of *corporate social responsibility* (CSR) indicates that businesses are becoming more conscious of their role in promoting social good by creating initiatives to enhance children's behavior and health. CSR initiatives show how private sector involvement can expand the reach and impact of social marketing efforts. Examples include collaborations with schools to support physical activity programs or offer healthier food (62). The development of the intervention design in terms of social and environmental accountability as well as effectiveness is further indicated by ethics and sustainability.

Ethics and *sustainability* further denote the development of the intervention design in terms of not only effectiveness but also social and environmental accountability. Ethical issues in social marketing campaigns usually relate to protection against manipulative advertising and assurance that messages correspond with developmental needs and cognitive skills of target children (63). Moreover, sustainability indicates that long-term outcomes, such as the development of healthy behaviors across the lifespan and the reduction of environmental footprints through initiatives like waste reduction and recycling programs, need to be given attention (21).

Keywords such as *environment*, *ecological model*, and *food waste* suggest an interest in the topic of environmental stewardship in applying ecological models to health behavior at broader levels of social and environmental contexts. For example, interventions related to food waste could be educational campaigns to increase environmentally sensitive behavior for children and families through community programs (64). Lastly, inclusions of *health disparities* and *altruism* indicate equity and prosocial behavior. Social marketing strategies often aim to reduce health disparities by targeting interventions toward underserved populations, thereby fostering inclusivity and community solidarity (65). This analysis therefore points to a growing trend of socially responsible, environmentally sustainable, and equity-focused approaches in social marketing research that targets school-aged children.

4. Conclusions

The present study used co-word analysis to map the intellectual structure of research on social marketing interventions targeting behavior change among school-aged children. The study results identified seven distinct thematic categories: social marketing and behavior change strategies, health behaviors and lifestyle, health policy and public health, health education and promotion, social and community factors, prevention and risk management and ethics and sustainability. These categories encompass social marketing and behavior change strategies, lifestyle-related health behaviors, public health and policy contexts, health education and promotion, social and community influences, prevention and risk management, and ethical and sustainability considerations. The prominence of keywords related to parents, communities, media, and digital platforms underscores the central role of social and communication environments in shaping children's health behaviors. Furthermore, the emergence of themes related to ethics, sustainability, and health equity suggests a growing scholarly focus on socially responsible and long-term approaches to behavior change. Overall, our findings indicated that social marketing research addressing school-aged children is increasingly characterized by integrated, multi-level perspectives that combine behavioral, social, and structural dimensions. These insights provide a structured foundation for future research by highlighting well-established themes as well as underexplored areas within the existing literature.

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Declaration of AI

The authors acknowledge the use of AI-assisted tools (Grammarly) for language editing. All content was manually reviewed and edited by the authors to ensure its accuracy and academic integrity; the authors take full responsibility for the final content of the manuscript.

Authors' Contribution

Zahra Sadeqi-Arani: Contribution to the

conception and design of the study; acquisition, analysis, and interpretation of data; drafting the manuscript and reviewing it critically for important intellectual content. Hamed Taherdoost: Contribution to the analysis of data; drafting the manuscript and reviewing it critically for important intellectual content. All authors have read and approved the final manuscript and agree to be accountable for all aspects of the work, such that the questions related to the accuracy or integrity of any part of the work.

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