



Subject Area : Chidambaram, Cuddalore

AWARENESS OF ECO-FRIENDLY ORAL HYGIENE PRODUCTS AMONG CHIDAMBARAM POPULATION-A CROSS SECTIONAL STUDY

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ARTICLE INFO	ABSTRACT
Received 18 th July 2025 Received in revised form 28 th July, 2025 Accepted 19 th August, 2026 Published online 28 th August, 2026	Background: The growing environmental challenges of the 21 st century highlight the need for sustainability in all sectors, including Dentistry. Ecofriendly oral hygiene products have emerged as an alternative to conventional products in order to reduce environmental impact. However awareness and acceptance of these products among the general population remains uncertain. This study aims to assess awareness of eco-friendly oral hygiene products and identify the related barriers to their use among the population of Chidambaram town. Methods: A cross sectional study was conducted among 300 adults, aged 25-40 years, who were randomly selected from Chidambaram town using a simple random sampling technique . A modified validated questionnaire was used to collect information regarding awareness, attitude and barrier related to ecofriendly oral hygiene products. A 100% response rate was achieved . The collected data were analysed using a statistical software(SPSS version 21.0 software, IBM statistics, Chicago). Conclusion: The study highlights the need to improve public awareness regarding ecofriendly oral hygiene products and to address the barriers that limit their adoption. Promoting sustainable oral health practices through education and further evidence based research may encourage greater acceptance and usage of ecofriendly oral hygiene products among the population.
Key words:	
Eco-friendly oral hygiene, Sustainable dentistry, Environmental sustainability, Oral health awareness, Cross-sectional study	
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INTRODUCTION

Environmental sustainability has become an important global concern in recent decades. One of the major challenges faced by the world today is climate change and its environmental consequences. These challenges highlight the need for sustainable practices across various sectors, including healthcare and dentistry. In response to these concerns, the United Nations introduced the 2030 Agenda for Sustainable Development, which focuses on improving environmental, social, and economic conditions worldwide while enhancing the quality of life of population¹.

Sustainability is increasingly recognised as an essential component of healthcare delivery. In dentistry integrating sustainable practices into routine clinical activities can contribute to environmental protection while maintaining high standards of patient care. Oral health professionals play an important role in supporting sustainable development by

minimising environmental impact promoting responsible use of resources and encouraging patients to adopt environmentally friendly oral hygiene practices.²

Historically, natural substances and plant based materials were widely used for maintaining oral hygiene and overall health. Early communities demonstrated considerable knowledge regarding the medicinal properties of natural materials and their role in maintaining hygiene and sanitation.³ By fostering awareness, we can encourage more individuals to make informed decisions that benefit both their health and the planet¹.

This article explores the awareness and adoption of eco-friendly oral hygiene products among the Chidambaram town population. Despite the growing availability of alternatives, many consumers remain unaware of the ecological impacts of conventional dental care items, such as plastic toothbrushes and non-biodegradable toothpaste tubes, etc. Understanding the current level of awareness is crucial, as it highlights the need for education and accessibility to sustainable options¹. The aim of this present study was to assess knowledge about eco-friendly oral hygiene products, identify barriers to their adoption, and thereby promoting the benefits of making greener choices in oral care. There is no previous study

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assessing awareness and barriers toward eco-friendly oral hygiene products among the Chidambaram population, making this study important in understanding public perception and promoting sustainable oral health practices.

MATERIALS AND METHODS

1.Study Population

The target population for this study were community areas of Chidambaram town, Tamil Nadu. Mostly the young and middle-aged adults were chosen for this study because they have the purchasing power to select and buy their own products. Participants who were mentally challenged and who cannot read Tamil and English were excluded from the study.

2.Time Frame:

The time frame for study population was approximately 6 months and conducted between March 2025 and October 2025.

3.Sample Size and Sampling Technique:

The sample size was calculated using G power software version 3.1.9.7. A sample size of 300 participants was targeted to ensure statistical significance. This size is based on the previous article.

4.Consent Form:

This study was approved by the ethical committee of Government dental college,Cuddalore to ensure that the study adheres to ethical guidelines for research involving human subjects.

5.Ethical Clearance:

Informed consent was obtained from all participants before data collection. The consent form has clearly outlined the purpose of study, the voluntary nature of participation and confidentiality assurance.

6.Questionnaire:

The questionnaire was obtained from the previous study¹⁴. Some questions were modified according to the aim of the study. The questionnaire collected information about demographic characteristics, use of eco-friendly oral hygiene products (practices, perceptions, opinions, and the barriers) and sustainable lifestyle practices. The participants were given for a period of 10 minutes to complete the questionnaire.

7.Statistical Analysis:

The data was analysed using a statistical software(SPSS version 21.0 software, IBM statistics, Chicago). Frequency analysis was conducted to determine the general characteristics of the respondents, while multiple response frequency analysis was used to analyse multiple response items. The results were presented in the form of frequency distributions and percentages and summarised in Table 1 and Table 2.

RESULT

The present study contains sample size of 300 individuals, of which and 100% response were obtained. Majority of the participants(181 participants)were aware of the eco-friendly oral hygiene products and 147 participants were aware about those eco-friendly oral hygiene products through dentists followed by 81 participants through social media.

Predominantly, 89.7%of the participants had reported that no initiative programme has been conducted. Regarding the awareness of harmful nature of conventional oral hygiene products, 60% were not aware of it. Despite the awareness of eco-friendly oral hygiene products,145 participants of participants were not aware of the materials used and 244 participants of participants are not using those eco-friendly oral hygiene products. (Table 1)

When questioned about the main concern of choosing these products, the effectiveness (34%) and the environmental sustainability (25.3%) were frequently mentioned. The barriers in implementing eco-friendly oral hygiene products in the daily routine were lack of knowledge (35.3%), accessibility (25%), high price of products (20.3%), doubts about effectiveness (12.7%)and personal disinterests (6.7%). Most of the participants (114 participants) have no idea in improving those products and 31.7% suggested to promote those products through advertisement. 90 participants revealed that they are most likely to try new eco-friendly oral hygiene products. (Table 2).

Table 1. Knowledge And Behaviour Based Assessment Among Study Participants:

Question	Categories	% (N)
Are you aware of eco-friendly oral hygiene products?	Yes No	60.3% (181) 39.7% (119)
Where did you learn about eco-friendly oral hygiene products?	Dentist Magazine Neighbours Social Media Television	49% (147) 5.3% (16) 9% (27) 27% (81) 9.7% (29)
Does anyone around you conduct initiative programme promoting eco-friendly oral hygiene products?	Yes No	10.3% (31) 89.7% (269)
Do you know the conventional oral hygiene products are harmful to environment?	Yes No	40% (120) 60% (180)
Are you aware that eco-friendly products are made using sustainable materials like bamboo, bioplastic, coconut shell, etc...	Aware Aware But Not Sure Not Aware	24.7% (74) 27% (81) 48.3% (145)
Do you currently use any eco-friendly oral hygiene products?	Yes No	18.7% (56) 81.3% (244)

Table 2. Attitude Based Assessment Among Study Population:

Question	Categories	% (N)
What influences your choice of oral hygiene products the most?	Effectiveness Environmental Sustainability Price Others	34% (102) 25.3% (76) 23.7% (71) 17% (51)

What do you think as barriers in implementing eco-friendly oral hygiene products in daily routine?	Accessibility Disinterest Doubts About Effectiveness Expensive Lack Of Knowledge	25% (75) 6.7% (20) 12.7% (38) 20.3% (61) 35.3% (106)
What improvements you would like to see in the eco-friendly oral hygiene products?	Access Advertisement Innovation Low Price No Idea	10.3% (31) 31.7% (95) 7.6% (23) 12.3% (37) 38% (114)
How likely are you to try new eco-friendly oral hygiene products in the future?	Least Likely Likely Most Likely	20.7% (62) 49.3% (148) 30% (90)

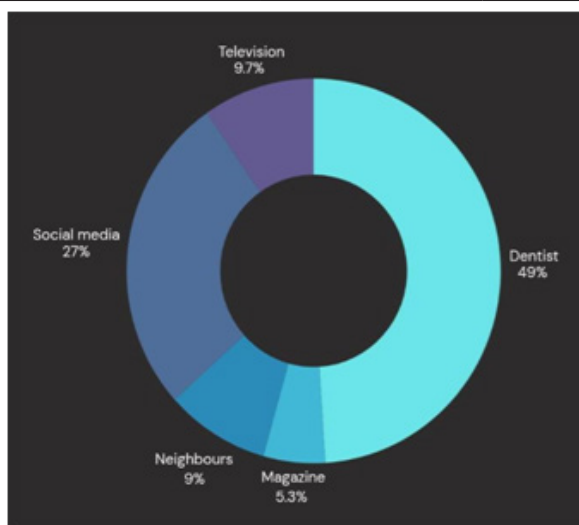


Figure 1. Source of information of the ecofriendly oral hygiene products

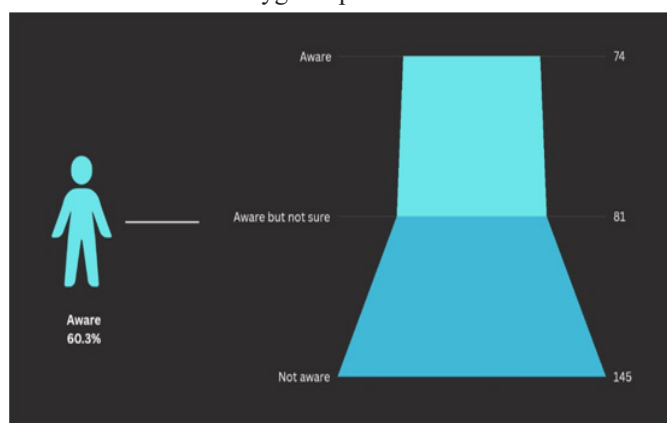


Figure 2. Awareness of how the Ecofriendly oral hygiene products are made

Question	Categories	% (N)
1.What influences your choice of oral hygiene products the most?	Effectiveness	34% (102)
	Environmental Sustainability	25.3% (76)
	Rice	
	Others	23.7% (71)
		17% (51)

2.What do you think as barriers in implementing eco-friendly oral hygiene products in daily routine?	Accessibility	25% (75)
	Disinterest	6.7% (20)
	Doubts About Effectiveness	12.7% (38)
	Expensive	
	Lack Of Knowledge	20.3% (61)
3.What improvements you would like to see in the eco-friendly oral hygiene products?		35.3% (106)
	Access	10.3% (31)
	Advertisement	31.7% (95)
	Innovation	7.6% (23)
	Low Price	12.3% (37)
4. How likely are you to try new eco-friendly oral hygiene products in the future?	No Idea	38% (114)
	Least Likely	20.7% (62)
	Likely	49.3% (148)
	Most Likely	30% (90)

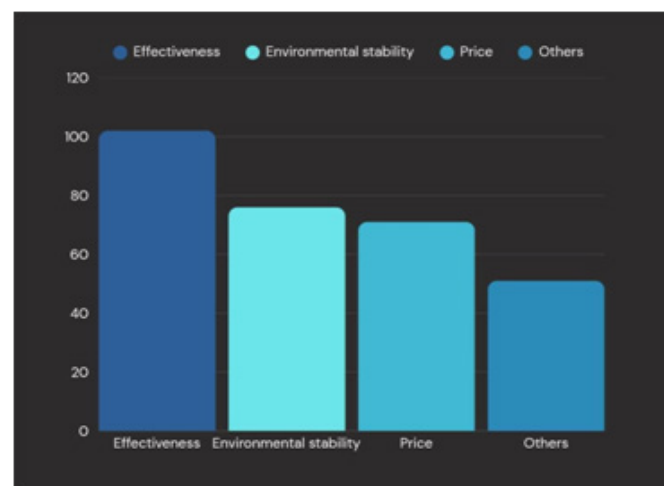


Figure 3. Choice of influence of Ecofriendly oral hygiene products

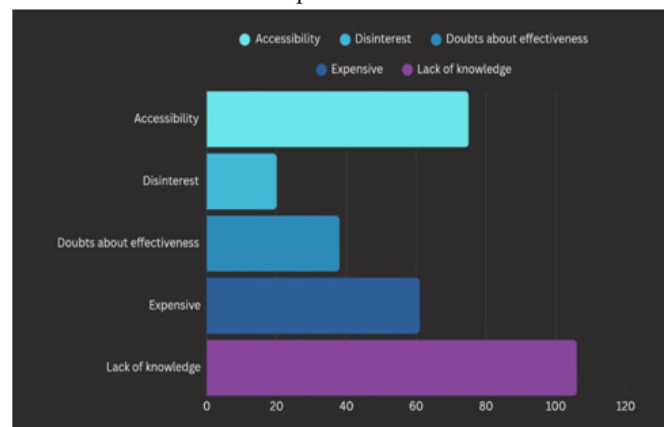


Figure 4. Barriers in implementing Ecofriendly oral hygiene products in daily life.

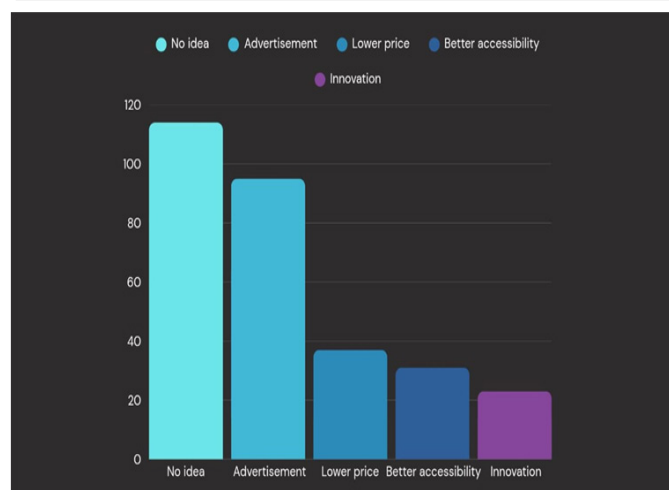


Figure 5. Suggestions for improvement of ecofriendly oral hygiene products.

DISCUSSION

Environmental sustainability has become a major global priority due to increasing impact of climate change, environmental degradation and excessive consumption of natural resources. Since the period of rapid industrialisation in the late nineteenth and early twentieth centuries, environmental changes have accelerated posing serious threats to ecosystem as well as human health⁷. One of the major contributors to environmental pollution is the accumulation of plastic waste, which persists in natural environments and affects both terrestrial and aquatic ecosystems⁸. These concerns have led to increased attention toward sustainable consumption and environmentally responsible practices.

The concept of sustainability emphasises the balanced integration of environmental protection, social well-being and economic development. Elkington's triple bottom line model highlights the importance of addressing these three dimensions—environmental quality, social equity, and economic prosperity—simultaneously in order to achieve long term sustainability¹¹.

India plays a significant role in achieving the Sustainable Development Goals (SDGs) at the global level due to its large population and growing economy. Sustainable development refers to meeting the needs of the present generation without compromising the ability of future generations to meet their own needs². The United Nations' 2030 Agenda outlines 17 SDGs that aim to address global challenges related to poverty, environmental protection, health, and sustainable consumption¹². Goals and targets included for good health and well-being (SDG 3) and for responsible consumption and production (SDG 12). State governments are key to India's progress on the SDGs as they are best placed to 'put people first' and to ensuring that 'no one is left behind'⁹. Counselling the patients for correct oral self-care with more sustainable ecofriendly products can be included in the clinical routine practices of oral health professionals contributing to achieving this SDGs.

Globally, there has been increasing interest in the development and use of eco-friendly consumer products. Many companies are investing in the production of sustainable alternatives to conventional goods. However, several challenges remain, including limited public awareness, concerns regarding

product effectiveness, availability, and affordability¹.

Simple actions that are achievable and impactful would be a perfect starting point. Initial apprehension and resistance to environmentally sustainable behaviour changes in the dental practice can be addressed by increasing awareness and identifying common ground and strength of feelings amongst colleagues. Beyond the actions of the dental team, we should be mindful of the vital role that the patient has in their contribution to sustainable oral health care as the beneficiary of the service⁵.

The major barrier to the implementation of an eco-friendly oral hygiene products is the economic consideration. However, this should not deter us from adopting eco-friendly practices as every person holds the responsibility towards a safer and cleaner environment for the future generations⁶.

This study indicates that these initiatives are crucial in raising customer knowledge about and willingness to pay for environmentally friendly goods. Accessibility is yet another important element that might affect how consumers see environmentally friendly goods¹⁰.

The response rate of the participants in this cross-sectional study was found to be good as the respondents were contacted directly. This study aimed to contribute to the awareness and adoption of eco-friendly oral hygiene products offering an exploratory insight into the perceptions and expectations among Chidambaram population. This study uses a simple random sampling technique with data collected by face-to-face interviews.

Comparing with the similar study done in Portuguese "sustainable oral hygiene products and practices: Perspectives, expectations, and barriers of Portuguese residents", our study highlights region specific evidence from South India that the awareness of the sustainable ecofriendly oral hygiene products and the initiatives conducted by dental professionals are consistent with those reported by the author but the barriers in implementation of those products are in contrast with our finding¹.

Despite the awareness created this study has some limitations too which include more time consumption, possibility of interviewer bias and information bias, under coverage of the target population.

The participants considered it essential to acquire sustainable habits related to oral hygiene, but only a minority had used sustainable oral hygiene products. The main concerns when buying oral hygiene products were their quality or cost, and sustainability was not a frequent concern. Most individuals who already used sustainable oral hygiene products were satisfied and would recommend them. The main barriers to using sustainable oral hygiene products were the personal lack of interest, the availability of the products, and their cost.

Raising awareness and promoting ecofriendly oral hygiene products requires a mix of education, accessibility and motivation. To cause a long-lasting impact we can approach different groups of people - consumers, dental professionals, schools and communities. We recommend running public campaigns, CDE programmes and workshops, including sustainable behaviour in dental curriculum, easy access in

local stores. Thereby, incorporation and adoption of using ecofriendly oral hygiene products can be improved.

CONCLUSION

This study assessed the awareness, attitudes, and barriers related to eco-friendly oral hygiene products among adults in the study population. Although more than half of the participants were aware of eco-friendly oral hygiene products, a large proportion lacked knowledge about the materials used and most participants were not currently using such products. Dentists were identified as a major source of information, highlighting the important role of oral health professionals in promoting environmentally sustainable oral health practices. The major barriers identified were lack of knowledge, limited accessibility, and the higher cost of eco-friendly products, which may explain the low level of adoption despite moderate awareness.

The findings highlight the need for improved awareness and educational initiatives to encourage the use of environmentally sustainable oral hygiene products. Promotion through dental professionals and public awareness campaigns may help address misconceptions and improve accessibility and acceptance among the population. These findings contribute to the growing evidence supporting sustainable practices in dentistry and emphasise the importance of integrating eco-friendly alternatives into routine oral health care.

However, the study has certain limitations. As a cross-sectional study conducted in a specific population, the findings may not be generalisable to other regions. In addition, responses were self-reported and may be subject to reporting bias.

Overall, the results of this study are relevant for dental professionals, public health practitioners, policymakers, and community health workers. Encouraging sustainable oral health practices through education, policy support, and improved availability of eco-friendly products may contribute to both better oral health outcomes and environmental sustainability, aligning with global public health and sustainable development goals.

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