

Demographics and Current Scenario Concerning Oral Health Behavior Patterns Amongst Pilgrims: A Cross-sectional Survey

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Abstract

Introduction: Oral health is an integral component in the general health of an individual and has become a significant public health issue with a substantial social impact. It is essential to evaluate three domains related to oral health at the population level, namely knowledge, attitude, and practice. *Objective:* To assess the level and aspects of knowledge, attitudes, and practice of oral health amongst Pilgrims Visiting Tirumala (Tirupati). *Methodology:* A descriptive cross-sectional study using the English language version of Hiroshima University-Dental Behavioral Inventory (HU-DBI) which was modified to 28 questions and distributed to 300 pilgrims out of whom 279 replied. Pre-tested structured open-ended questionnaires were self-administered to investigate by means their knowledge, attitude, and practice towards oral hygiene. According to the responses of questionnaires, the data analyzed by using Statistical Software package (SPSS version 21.0), and statistical significance was set at $p < 0.05$. *Results:* A total of 279 pilgrims included in the study; 65.5% ($n = 183$) males and 34.4% ($n = 96$) females, among the study group, 45.8% reported brushing their teeth twice daily using a toothbrush and toothpaste. The majority of respondents, 77% ($n = 215$) reported visiting the Dentist only when experiencing pain. The most common reasons for not visiting the Dentist were fear 51.2% ($n = 143$) and high cost 48.7% ($n = 136$). *Conclusion:* This study revealed that the overall understanding of oral health behaviors among the Pilgrims was good, although there were shortages in their insight in a few areas.

Keywords: Attitude; Knowledge; Behavior; Oral hygiene; Pilgrims.

Introduction

Oral hygiene is the practice of keeping the mouth healthy and clean by brushing and flossing to prevent tooth decay and gum disease.¹

Oral health means more than healthy teeth. According to World Health Organization (WHO) "Oral health means being free of chronic mouth and facial pain, oral and throat cancer, oral sores,

birth defects such as cleft lip and palate, periodontal (gum) disease, tooth decay, and tooth loss, and other diseases and disorders that affect the mouth and oral cavity."²

In 1948 the World Health Organization expanded the definition of health to include "a complete state of physical, mental, and social well-being, and not just the absence of infirmity." Knowledge is "understanding of or information about a subject

which a person gets by experience or study, and which is either in a person's mind or known by people generally."³

Oral health knowledge acquired by a subject is the basis that leads to proper oral health behavior. Attitude is "a feeling or opinion about something or someone or a way of behaving this causes that." Attitudes towards oral health determine the oral health of an individual.⁴

Good knowledge about oral hygiene is necessary to pursue healthy oral practices. Previous studies concluded that the primary references for oral health knowledge are mass media. Dental professionals and Dental literature as well as have a direct relation and association between increased awareness of oral hygiene and better oral health.⁵

Thus this study aimed to assess the oral health knowledge, attitude, and behavior amongst pilgrims visiting Tirumala (Tirupati).

Aims and Objectives

- (a) To assess the levels of oral health knowledge amongst pilgrims visiting Tirumala.
- (b) To assess the levels of oral health attitude and behavior amongst pilgrims visiting Tirumala.

Materials and Methods

Research Design

The design of this study was Descriptive cross-sectional. The convenience sampling technique used for this study. An epidemiological survey conducted from May 2019 to June 2019.

Targeted Population

The study conducted at Vellore (Tamil Nadu State). The targeted population, pilgrims visiting Tirumala, who had agreed to participate in the survey, was selected

Inclusion Criteria and Exclusion Criteria

Inclusion criteria: Participants who were willing to participate in the study.

Exclusion criteria

- i. Participants who included in the pilot study.
- ii. Subjects not willing to participate in the study.
- iii. Physically and mentally disabled person.

Sample size: Slovin's formula

$$n = \frac{N}{1 + (N)(e)^2}$$

Desired sample size = $n = ?$

Population = $N = 1000$

Margin of error = $e = 0.1\%$ (If confidence interval 95%)

For the present study, the sample should be sufficiently large to represent the population yet not so large that the data collection and analysis is prohibitively difficult. At a 95% confidence interval and a 5% confidence level, the sample size calculated was 100. The epidemiological study was carried out on 279 subjects (128 males and 151 females) in the age range of 30–50 years were randomly selected. The mean age of all the pilgrims (in years) was 39.5 ± 24.4 .

Ethical Consideration

Consent was obtained from the participants and was assured of the confidentiality, the anonymity of the collected data, and that the resultant information would be used only for the research purposes.

Research Tool

The survey proforma was a self-administered structured questionnaire after checking its content and face validity were distributed to assess the oral health knowledge, attitude, and behavior of the pilgrims. Data on oral health behavior were collected using the English version of the Hiroshima University-Dental Behavioral Inventory (HU-DBI) questionnaire, which was initially developed by Kawamura.⁶

The survey translated into four languages (Hindi, English, Tamil, and Telugu) for a better understanding of the people. The questionnaire was subjected to linguistic validation to ensure that the questions translated reliably.

The questionnaire pretested by conducting a pilot study among 10% of the sample size to assess the pilgrim's ability to understand the questions and answers them without any help.

Validation of KAB was in the questionnaire.

- *Part I:* Incorporated 5 demographic characteristics including age, gender, educational level, and resource of health knowledge.
- *Part II:* Ten questions assessed oral health knowledge. A three-point Likert scale (ordinal

scale) was used to evaluate the responses: Agree, disagree, and no comments.

- *Part III:* Incorporated 13 questions assessed oral health attitude and practice. A three-point Likert scale (ordinal scale) was used to evaluate the responses for each item.

Six experts did content validity process.

Data Gathering Plan

All the pilgrims were invited to participate in the survey. The purpose of the study was informed and explained according to the response format provided in the questionnaire.

All questionnaires completed and data collected. The principal investigator was available to clarify their doubts about any point while completing the survey.

The nature, purpose, and full explanation of how to fill in the questionnaire of the study explained. Interpersonal communication was not allowed – surveys completed under the supervision of investigators. The pilgrims took an average of 15 minutes to complete the procedure. All data were analyzed by supporting related studies that gave an in-depth presentation of results.

In a sample of 279 pilgrims, the HU-DBI had excellent test-retest reliability (0.73) over four weeks.

Statistical Analysis

The data gathered were tallied, encoded, and interpreted using descriptive statistics. Scoring is done, and the data were analyzed using SPSS Version 21 (SPSS Inc., Chicago, USA). The individual scores were summed up to yield a total score.

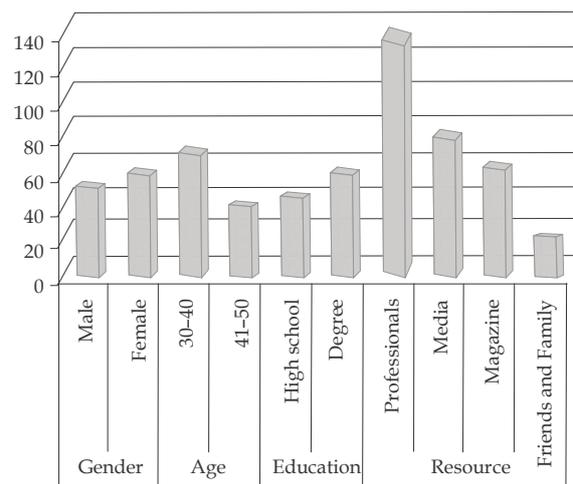
Descriptive statistics obtained, and mean percentage scores, standard deviation, and frequency distribution calculated for oral health knowledge, attitude, and behavior items – the level of significance set at $p \leq 0.05$.

Results

The Profiles of Respondents (Table 1)

A cross-sectional analytical study of 300 was conducted among pilgrims to assess oral health knowledge, attitude, and behavior amongst pilgrims visiting Tirumala.

The principal investigator excluded 21 participants due to incomplete surveys. Data from 279 questionnaires were analyzed yielding a response rate of 93% out of which 45.8% ($n = 128$) males and 54.1% ($n = 151$) females and the average age was 39.



Graph 1: Social-demographic variables of respondents.

Table 1: Social-demographic variables of respondents ($N = 279$)

Individual Scenario			
Variables	Respondents	Frequency	Response n (%)
Total no. of respondents		279	93
Gender	Male	128	45.8
	Female	151	54.1
Age	30-40 years	183	65.5
	41-50 years	96	34.4
Degree of education	High school	113	40.5
	Degree	166	54.4
Resource of oral health knowledge	Doctors, dentist or nurse	133	47.6
	Media (TV, radio, internet)	75	20.7
	Print (Magazine, Newspaper, Posters Pamphlet)	58	26.8
	Friends and Family	18	4

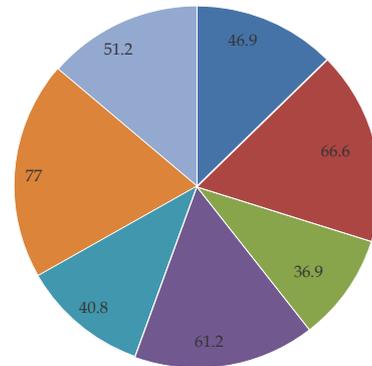
Response to Knowledge-based Questions on Oral Health (Table 2)

Majority of participants were worried if their gums would bleed during brushing 46.9% (*n* = 131) and about the color of their teeth and gums 45.5% (*n* = 127) which was statistically significant (*p* < 0.0001).

Most of the participants were concerned about calculus formation on their teeth 78.4% (*n* = 219), but significantly less number of participants visited the Dentist for their check-up regularly 22.9% (*n* = 64). The majority of respondents 77% (*n* = 215) reported visiting the Dentist only when experiencing pain. The most common reasons for not attending the Dentist were fear 51.2% (*n* = 143) and high cost 48.7% (*n* = 136), which was statistically significant (*p* < 0.0001). 25.8% (*n* = 72) disagreed to “eating sweets does not affect oral hygiene,” and 36.9% gave response for “ill effects of carbonated drinks

on oral health” which was statistically significant (*p* < 0.0001).

Only 25.3% (*n* = 68) participants used Dental floss regularly, which was statistically significant (*p* < 0.0001).



Graph 2: Questionnaire regarding oral health-knowledge of respondents.

Table 2: Questionnaire regarding oral health-knowledge of respondents

Variables	Individual Scenario				
	Respondents	Response <i>n</i> (%)	Mean ± SD	Z-value	Inferential Statistics
Artificial teeth have fewer problems than natural teeth.	Agree	126 (45)	93 ± 25.4	7.303	<i>p</i> < 0.0001 SS
	Disagree	64 (22.9)			
	No comments	89 (31.8)			
Bleeding on brushing is the first sign of gingivitis.	Agree	131 (46.9)	93 ± 45.5	4.08	<i>p</i> < 0.0001 HS
	Disagree	119 (42.6)			
	No comments	29 (10.3)			
Consuming too much sweet food causes tooth decay/Dental caries.	Agree	186 (66.6)	93 ± 68.9	2.69	<i>p</i> = 0.007 SS
	Disagree	72 (25.8)			
	No comments	21 (7.5)			
Dental plaque and calculus can lead to gum problems.	Agree	219 (78.4)	93 ± 89.3	2.08	<i>p</i> = 0.037 SS
	Disagree	38 (13.6)			
	No comments	22 (7.8)			
Fizzy drinks affect the teeth adversely.	Agree	103 (36.9)	93 ± 9.6	19.32	<i>p</i> < 0.0001 HS
	Disagree	96 (34.4)			
	No comments	80 (28.6)			
General body health has a relationship with oral health and dental diseases.	Agree	197 (70.6)	93 ± 78.3	2.37	<i>p</i> = 0.0176 SS
	Disagree	74 (26.5)			
	No comments	8 (2.8)			
Use toothpaste containing fluoride	Yes	171(61.2)	93 ± 56.87	3.27	<i>p</i> = 0.011 SS
	No	37(13.2)			
	Don't know	71(25.4)			
Regular brushing of teeth can protect oneself from gum bleeding.	Agree	114 (40.8)	93 ± 31.8	5.84	<i>p</i> < 0.0001 HS
	Disagree	117 (41.9)			
	No comments	48 (17.2)			
Dental Check-up	Within a year	64 (22.9)	139.5 ± 75.5	2.12	<i>p</i> = 0.033 SS
	Experiencing pain	215 (77)			
Reason for Not visiting Dentists	Fear	143 (51.2)	139.5 ± 6.5	21.45	<i>p</i> < 0.0001 HS
	High cost	136 (48.7)			

Statistical Inference: HS – Highly significant, SS – Statistical significant

Response to Attitude and Behavior-based Questions on Oral Health (Table 3)

Forty-four percent ($n = 123$) of the pilgrims disagreed, they were not taught how to brush teeth professionally, which was statistically significant ($p < 0.0001$).

Concerning the frequency of brushing, 31.8% ($n = 89$) brushed their teeth “ ≥ 3 times a day” and only 22.2% ($n = 62$) “once a day” which was

statistically significant ($p < 0.0001$).

The pilgrims believed that using a toothbrush with hard bristles will damage the gums 42.6% ($n = 119$), which was statistically significant ($p < 0.0001$).

Besides, significantly fewer pilgrims reported that they could not help having false teeth when they are old 63.4% ($n = 177$).

Table 3: Questionnaire regarding oral health-attitude and behavior of respondents

Individual Scenario					
Variables	Respondents	Response n (%)	Mean \pm SD	Z-value	Inferential Statistics
Never been taught how to brush.	Agree	123 (44)	93 \pm 38.94	4.77	$p < 0.0001$ HS
	Disagree	118(42.2)			
	No comments	38(13.6)			
Often check the teeth in a mirror after brushing alone.	Agree	195(69.8)	93 \pm 72.49	2.094	$p = 0.036$ NS
	Disagree	51(18.2)			
	No comments	33 (11.8)			
I think I can clean my teeth thoroughly without using toothpaste.	Agree	76 (27.2)	93 \pm 93.66	1.98	$p = 0.047$ SS
	Disagree	194 (69.5)			
	No comments	9 (3.2)			
Dental flossing at least once a day.	Agree	68 (24.3)	93 \pm 18.4	10.07	$p < 0.0001$ HS
	Disagree	112 (40)			
	No comments	99 (35.4)			
I think that I cannot help having false teeth when I am old.	Agree	177 (63.4)	93 \pm 80.29	2.31	$p = 0.0209$ SS
	Disagree	85 (30.4)			
	No comments	17 (6)			
Use of toothbrush which has hard bristles recommended	Agree	119 (42.6)	93 \pm 32.90	5.65	$p < 0.0001$ HS
	Disagree	56 (20)			
	No comments	104 (37.2)			
Bad breath makes worry	Agree	125 (44.8)	93 \pm 42.33	4.39	$p < 0.0001$ HS
	Disagree	109 (39)			
	No comments	45 (16.1)			
Color of the teeth and gums bothers.	Agree	127 (45.5)	93 \pm 41.32	4.50	$p < 0.0001$ HS
	Disagree	105 (37.6)			
	No comments	47 (16.8)			
Losing teeth is a natural sequence of getting old.	Agree	154 (55.1)	93 \pm 55.65	3.34	$p < 0.0001$ HS
	Disagree	45 (16.1)			
	No comments	80 (28.6)			
Toothbrush often to be changed	Once in 6 months	18 (6.4)	69.75 \pm 81.12	2.57	$p = 0.0099$ SS
	Once in a year	0			
	When bristles become distorted	55 (19.7)			
	Once in 3 months	206 (73.8)			
Toothbrush frequency	Once/day	62 (22.2)	93 \pm 27.09	6.86	$p < 0.0001$ HS
	Twice/day	128 (45.8)			
	Three times/day	89 (31.8)			
Means of cleaning	Brush and paste	165(59.1)	93 \pm 58.7	3.16	$p = 0.0016$ SS
	Brush, paste, and miswak	93(33.3)			
	Others	21(7.52)			
How to brush the teeth?	Up and down (vertical)	121 (43.3)	93 \pm 23.7	7.81	$p < 0.0001$ HS
	To and fro (horizontal)	61 (21.8)			
	Circular	97 (34.7)			

Statistical Inference: HS – Highly significant, SS – Statistical significant

Discussion

Health is a universal human need. Optimal health cannot be independent of oral health.

The general public looks up to the Dentist as their role model, and so Dentist themselves must have the right attitude towards their oral hygiene.

This cross-sectional study aims to study the Oral Health Knowledge, Attitude, and Behavior among 279 Pilgrims who were randomly selected visiting Tirumala.

In the present study, the prevalence of daily brushing was reported as similar to Saudi Arabian survey conducted in 2003 and found that 65% of students were brushing at least once in a day.⁷

Jamjoum H conducted a study among the Arabian population in Jeddah, Saudi Arabia, a large percentage of respondent 90.7%, did not floss their teeth. The mass media are not yet propagating the usage of floss, and people are not aware because the Dentist had prescribed it.⁸

In the present study, 44% agreed that they were never taught how to brush their teeth which was consistent with the survey conducted by Dagli et al., 2008; Alam et al., 2013.^{9,10}

Lang P et al. concluded that oral health information was Dental office/Clinic (82.3%), followed by magazines/books (74.4%), newspapers (53.9%), TV/Radio (52.4%), friends/neighbors/family (38.2%) and Physicians office/health clinic (38.0%) which was in par with the present study.¹¹

Tanwir F et al. stated more than 70% used a toothbrush, but in the present, (64.8%).¹² Al-Beirut N et al. conducted a study among school teachers, physicians, and nurses in the Syrian Arab Republic, 86 (41.0%). They used toothpaste with fluoride, 32 (15.2%) used toothpaste without fluoride, and 92 (43.8%) did not know if the toothpaste contained fluoride or not. While in the present study, 61.2% were using fluoridated toothpaste, 13.2% were not, and 25.4% did not know. In India, most of the toothpaste available in the market are fluoridated toothpaste and the kinds of toothpaste. The mass media propagates usually tend to be fluoridated, which people tend to buy.¹³

Permi SR et al., 2015 reported 4% practiced horizontal brushing technique, 19% used a circular method, 7.3% used vertical, and others combination of all which was in par to the present study.¹⁴

Muttineni N et al., 2014 concluded that 53.7% of nursing student changed once in 3 months, and 8.2% responded to brush replacement when it gets

spoiled, which was in par with the present study.¹⁵

Saha et al., 2000, in their research on nurses reported that the majority of nurses changed their toothbrush after 3 months. These studies were following the present study (73%).

This study conducted among Pilgrims Visiting Tirumala, which limits the study findings. This study forms a baseline description of knowledge, attitude, and practice of oral health among pilgrims.¹⁶

Limitations of the Study

This study had limitations

- (a) A self-reported questionnaire; answers may be biased, and subjects may also forget relevant details which may affect the results.
- (b) The non-availability of comparable study instruments and screening of the intraoral clinical status of the study participants.
- (c) This study was among Pilgrims Visiting Tirumala with small sample size.

Recommendations

Oral/Dental health awareness among the general public for which the oral health professionals are working need to support the development of a 'sound strategy.'

Conclusion

This study revealed that the overall understanding of oral health behaviors among the Pilgrims was good, although there were shortages in their insight in a few areas.

The oral health attitudes and behavior of the general public enhanced with increasing level of education.

Ethical Approval: Non-invasive study.

Ethical disclosures

- *Protection of human and animal subjects:* The author declare that no experiments on humans or animals for this study.
- *Confidentiality of data:* The author declare that no patient data appear in this article.
- *Right to privacy and informed consent:* The author have obtained the written informed consent of the patients or subjects mentioned in the article. The corresponding author owns this document.

Conflict of Interest & Source of Funding

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