International Journal of Medicine

journal homepage: www.ijmjournal.org

Research Article

Knowledge, Attitude and Practice of Oral Hygiene in Patients Coming to Pulmonary Medicine OPD and IPD

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HIGHLIGHTS

1. Knowledge of oral hygiene impacts overall health.
2. Attitude towards oral hygiene affects dental health.
3. Practices of oral hygiene influence disease prevention.
4. Patients in pulmonary medicine may neglect oral care.
5. Educating patients improves oral health outcomes.

GRAPHICAL ABSTRACT

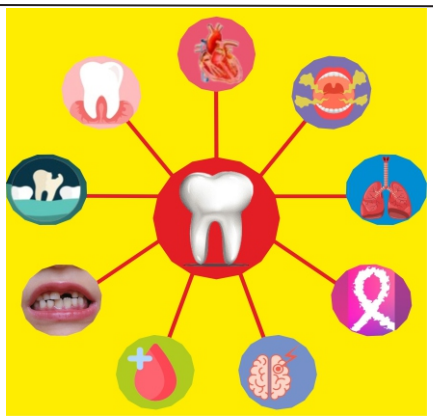

Figure: A dental cavity or mild jaw discomfort might appear minor and low-risk at present.

ARTICLE INFO

Handling Editor: Dr. S. K. Singh

Key words:

Oral Hygiene

Knowledge

Behavior

Practice

ABSTRACT

Background: Oral health-related conditions among Indian population have been a big issue in every Indian state for the past 10 years. Even basic oral health education has become unachievable to major Indian population.To assess the knowledge, attitude and practice of oral hygiene in patients attending Respiratory Medicine IPD and OPD with the help of preformed questionnaire and educating patients of good oral hygiene practices. ***Methods:*** A cross sectional study was conducted at Victoria Hospital, Bangalore Medical College and Research Institute, Bangalore, a tertiary care hospital for a period of 2 months from October 2023 to November 2023. Data collection was carried out using a validated questionnaire. ***Results:*** About 38.5% had poor knowledge and 61.5% had good oral hygiene knowledge. Overall, 26.45% had a negative attitude, 73.5% had a positive attitude and 63.7% had adequate behavior towards oral health .There is high statistically significant correlation between knowledge and attitude (p value:0.0003) and between attitude and practice (p value:0.0005) and significant correlation between knowledge and practice(0..044). ***Conclusions:*** Although individuals with a good level of knowledge towards oral health had inadequate attitude and practice towards oral health, which is basically due to least importance they give towards their oral health

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Received 20 February 2024; Received in revised form 1 March 2024; Accepted 8 April 2024

INTRODUCTION

The WHO defines oral health as the state of the mouth, teeth and orofacial structures that enables individuals to perform essential functions, such as eating, breathing and speaking, and encompasses psychosocial dimensions, such as self-confidence, well-being and the ability to socialize and work without pain, discomfort and embarrassment [1]. About 3.5 billion people worldwide were affected by oral diseases in 2019, making them the most widespread conditions among the more than 300 diseases and conditions that affect humanity [2]. Among the major oral diseases, untreated caries of permanent teeth is the most prevalent with around 2 billion cases, severe periodontal disease follows with around 1 billion cases, then untreated caries of deciduous teeth with about 510 million cases and edentulism with 350 million cases (all in 2019)[3-5].

Numerous factors contribute to oral health considerations. Elements such as tobacco and alcohol usage, oral hygiene practices, dietary habits, and overall nutrition significantly impact the development of dental caries and periodontal diseases. In developed nations, the implementation of preventive initiatives has shown promising signs in enhancing oral health [6, 7]. These programs focus on regulating sugar intake, promoting fluoride use, and fostering healthier lifestyles. Research indicates that effective oral health education correlates with improved oral care routines. Moreover, cultivating a positive outlook towards oral health practices encourages individuals to adopt better habits. To design an effective health education program, it is crucial to evaluate the populace's knowledge, attitudes, and behaviors concerning oral health[8-10].

The conditions affecting the oral cavity can profoundly impact an individual's social interactions. For instance, periodontal disease can result in tooth loss, which not only affects physical well-being but also has emotional and financial repercussions. The pathology of oral cavity ailments often compromises both the aesthetics and functionality of the teeth and jaws. These factors are pivotal in shaping one's daily experiences and social connections, ultimately influencing overall quality of life. Implementing a robust health education initiative can enhance awareness about oral diseases and preventive measures, thus substantially reducing their adverse effects[11-13].

However, it's essential to recognize that oral health serves as a reflection of overall well-being. The connection between oral health and general health is significant, with untreated oral problems often indicating poor overall health. Neglecting oral health concerns can result in unnecessary and potentially preventable health complications and various diseases.

People who are on low incomes, people living with disabilities, older people living alone or in care homes, people who are refugees, in prison or living in remote and rural communities, children and people from minority and or other socially marginalized groups generally carry a higher burden, similar to other NCDs [14]. For a developing nation like India, the rate of general language literacy is relatively low andawareness towards oral health is much lower. Health education based oral health promotion strategy will be an ideal choice for India instead of endorsing conventional oral health promotion methods, which are unsuccessful to attain alteration that is being followed among developed nations[15].

The oral microecosystem, situated within the mouth, comprises a complex ecosystem encompassing the oral microbiome, various anatomical structures of the oral cavity, saliva, and the interactions between oral microbiota and both other microbes and the host. Increasing evidence from epidemiological, microbiological, and molecular studies is establishing a significant association between the oral microecosystem and respiratory diseases. The microbiota residing in the oral microecosystem serve as the primary source of the lung microbiome and have been linked to the onset and progression of respiratory ailments such as pneumonia, chronic obstructive pulmonary disease (COPD), lung cancer, cystic fibrosis lung disease, and asthma[16].

Notably, indigenous oral microbes not only promote or directly cause respiratory infections and inflammation upon inhalation into the lower respiratory tract but also create an internal environment within the oral microecosystem that acts as a reservoir for opportunistic respiratory pathogens. Furthermore, compromised oral health and oral diseases resulting from dysbiosis within the oral microecology, especially periodontal disease, are associated with an increased risk of multiple respiratory illnesses[17].

This study examines the current research landscape concerning respiratory diseases linked to the oral health. It also outlines potential mechanisms by which respiratory pathogens colonize the oral microecosystem and the role of native oral microbes in the pathogenesis of respiratory diseases. Recognizing the crucial role of oral plaque control and oral health interventions in managing or preventing respiratory infections and diseases, we also summarize oral health management strategies and considerations, targeting not only populations vulnerable to respiratory infections such as the elderly and hospitalized patients but also dental professionals and oral hygienists involved in oral healthcare. The relationship between respiratory diseases and the oral health is increasingly supported by a growing body of literature. However, the etiological evidence regarding the involvement of the oral microecosystem in the development of respiratory diseases remains incomplete. Further in-depth studies focusing on specific mechanisms through which the oral health participates in the pathogenesis of respiratory diseases could significantly aid in the prevention and treatment of such conditions.

AIMS AND OBJECTIVES OF THE STUDY

To assess the knowledge, attitude and practice of oral hygiene in patients attending Respiratory Medicine IPD and OPD with the help of preformed questionnaire and educating patients of good oral hygiene practices.

METHODS

A cross sectional study was conducted at Victoria Hospital, Bangalore Medical College and Research Institute, Bangalore, a tertiary care hospital for a period of 2 months from October 2023 to November 2023. This study was cleared from Institutional Ethical Committee, BMCRI to which the hospital is attached.

Sample size was estimated by using nMaster software Version 2.0 by applying following details in the above formula. Based on the study "Selvaraj S, Naing NN, Wan-Arfah N, Abreu MHNG. Assessment on oral health knowledge, attitude, and behaviour and its association with socio demographic and habitual factors of South Indian population. About 97.9% of the participants in our study had good knowledge, 33.3% had a pos-itive attitude and 48.2% had adequate oral health behavior, so the overall KAP outcome is 59.8%). Based on the above parameter with an alpha of 0.05 (2 sided) and precision level of 7% the estimated sample size using the sample size formula for Single proportion. The above parameter and formula give us a sample size of 188 subjects with including the attrition rate of 5% the total of 188+9.4 ≈197 sample will be used in this present study [18].

Sample Size Calculation

Formula

$$n = \frac{Z^2_{1-\alpha/2}\, p(1-p)}{d^2}$$

Where,

p : Expected proportion

d : Absolute precision

1- α/2 : Desired Confidence level

Single Proportion - Absolute Precision	
Expected Proportion	0.598
Precision (%)	7
Desired confidence level (1- alpha) %	95
Required sample size	**188**

Inclusion criteria:

Age more than 18 years

Patient willing to give informed consent

Individuals who can read and write English and kannada

Individuals who volunteered themselves to be a part of our research were included.

Exclusion Criteria:

Individuals who were physically, mentally, or legally incapacitated

RESULTS

Among 212 patients,107 (50%) patients were females, 105 (49.5%) were males. Majority of the patients (24.5%) belong to 41-50 year age group.

Table 1: Age wise distribution of the study population

AGE	Frequency	Percent
18 - 30 yrs	41	19.3
31 - 40 yrs	41	19.3
41 - 50 yrs	52	24.5
51 - 60 yrs	38	17.9
61 - 70 yrs	16	7.5
71 - 80 yrs	17	8.0
Above 80 yrs	7	3.3
Total	212	100.0

Table 2: Gender wise distribution of study population

GENDER	Frequency	Percent
Male	105	49.5
Female	107	50.5
Total	212	100.0

The distribution of knowledge among the study population listed in Table 3 to 28 indicates the majority of the participants had positive response for 16(61.5%) out of 26 questionnaires.
The distribution of attitude among the study population listed in Table 29 to 38 indicates the majority of the participants had po-
-sitive response for 7(73.5%) out of 10 questionnaires.
The distribution of behavior among the study population listed in Table 39 to 49 indicates the majority of the participants had negative response for 7(63.7%) out of 11 questionnaries.

Table 3: Response of the study population for the question: Do you think brushing of teeth helps the gums also?

Knowledge(K) Questionnaires
K1

	Frequency	Percent
Correct Response	212	100.0

Table 4: Response of the study population for the question: At the present time, do you have any gum problem?

K2

	Frequency	Percent
Correct Response	49	23.1
Incorrect Response / I do not know	163	76.9
Total	212	100.0

Table 5: Response of the study population for the question: Do you think dental diseases are preventable?

K3

	Frequency	Percent
Correct Response	185	87.3
Incorrect Response / I do not know	27	12.7
Total	212	100.0

Table 6: Response of the study population for the question:Do you know that proper method and frequency of tooth brushing plays an important role in maintaining good oral hygiene?

K4

	Frequency	Percent
Correct Response	153	72.2
Incorrect Response / I do not know	59	27.8
Total	212	100.0

Table 7: Response of the study population for the question:Do you know that mal-alignment of teeth can cause dental disease?

K5

	Frequency	Percent
Correct Response	107	50.5
Incorrect Response / I do not know	105	49.5
Total	212	100.0

Table 8: Response of the study population for the question:Do you know oral health is related to systemic health?

K6

	Frequency	Percent
Correct Response	141	66.5
Incorrect Response / I do not know	71	33.5
Total	212	100.0

Table 9: Response of the study population for the question: Do you know anything about oral habits and how they affect the oral health?

K7

	Frequency	Percent
Correct Response	129	60.8
Incorrect Response / I do not know	83	39.2
Total	212	100.0

Table 10: Response of the study population for the question: Mouth washes contain medications that can prevent or reduce gum problems?

K8

	Frequency	Percent
Correct Response	87	41.0
Incorrect Response / I do not know	125	59.0
Total	212	100.0

Table 11: Response of the study population for the question Do you feel dental treatment is expensive?

K9

	Frequency	Percent
Correct Response	115	54.2
Incorrect Response / I do not know	97	45.8
Total	212	100.0

Table 12: Response of the study population for the question Do you think professional cleaning of teeth in dental clinic cause harm to the teeth?

K10

	Frequency	Percent
Correct Response	64	30.2
Incorrect Response / I do not know	148	69.8
Total	212	100.0

Table 13: Response of the study population for the question Do you think pregnancy can affectoral hygiene?

K11

	Frequency	Percent
Correct Response	43	20.3
Incorrect Response / I do not know	169	79.7
Total	212	100.0

Table 14: Response of the study population for the question Do you think dental visits are necessary during pregnancy?

K12

	Frequency	Percent
Correct Response	66	31.1
Incorrect Response / I do not know	146	68.9
Total	212	100.0

Table 15: Response of the study population for the question Do you believe that preventive dental care is beneficial and essential?

K13

	Frequency	Percent
Correct Response	184	86.8
Incorrect Response / I do not know	28	13.2
Total	212	100.0

Table 16: Response of the study population for the question Do you know soft toothbrushes are good for brushing?

K14

	Frequency	Percent
Correct Response	199	93.9
Incorrect Response / I do not know	13	6.1
Total	211	99.5

Table 17:Response of the study population for the question Do you believe that oral health can be achieved by adhering to self-care practices or measures?

K15

	Frequency	Percent
Correct Response	134	63.2
Incorrect Response / I do not know	78	36.8
Total	212	100.0

Table 18: Response of the study population for the question there are two sets of teeth during lifetime

K16

	Frequency	Percent
Correct Response	69	32.5
Incorrect Response / I do not know	143	67.5
Total	212	100.0

Table 19: Response of the study population for the question brushing teeth twice a day improves oral hygiene

K17

	Frequency	Percent
Correct Response	206	97.2
Incorrect Response / I do not know	6	2.8
Total	212	100.0

Table 20: Response of the study population for the question Tooth infection causes gum bleeding

K18

	Frequency	Percent
Correct Response	180	84.9
Incorrect Response / I do not know	32	15.1
Total	212	100.0

Table 21: Response of the study population for the question Replacement of missing tooth improvesoral hygiene

K19

	Frequency	Percent
Correct Response	46	21.7
Incorrect Response / I do not know	166	78.3
Total	212	100.0

Table 22: Response of the study population for the question the dental caries of deciduous teeth need not be treated

K20

	Frequency	Percent
Correct Response	70	33.0
Incorrect Response / I do not know	142	67.0
Total	212	100.0

Table 23: Response of the study population for the question Bacteria is one of the reasons to cause gingival problems

K21

	Frequency	Percent
Correct Response	187	88.2
Incorrect Response / I do not know	25	11.8
Total	212	100.0

Table 24: Response of the study population for the question soft drinks affect the teeth adversely

K22

	Frequency	Percent
Correct Response	130	61.3
Incorrect Response / I do not know	82	38.7
Total	212	100.0

Table 25: Response of the study population for the question Loss of teeth can interfere with speech

K23

	Frequency	Percent
Correct Response	122	57.5
Incorrect Response / I do not know	90	42.5
Total	212	100.0

Table 26: Response of the study population for the question Irregularly placed teeth can be moved into correct position by dental treatment

K24

	Frequency	Percent
Correct Response	165	77.8
Incorrect Response / I do not know	47	22.2
Total	212	100.0

Table 27: Response of the study population for the question Scaling is harmful for gums

K25

	Frequency	Percent
Correct Response	59	27.8
Incorrect Response / I do not know	153	72.2
Total	212	100.0

Table 28: Response of the study population for the question Decayed teeth can affect the appearance of a person

K26

	Frequency	Percent
Correct Response	134	63.2
Incorrect Response / I do not know	78	36.8
Total	212	100.0

Table 29: Response of the study population for the questionIn addition to the tooth brush andtooth paste do you use tongue cleaner,toothpicks to maintain your oral hygiene?

ATTITUDE QUESTIONARE
A1

	Frequency	Percent
Correct Response	126	59.4
Incorrect Response / I do not know	86	40.6
Total	212	100.0

Table 30: Response of the study population for the question How often do you visit a dental clinic?

A2

	Frequency	Percent
Correct Response	97	45.8
Incorrect Response / I do not know	115	54.2
Total	212	100.0

Table 31: Response of the study population for the question brushing teeth twice a day improves oral hygiene

A3

	Frequency	Percent
Correct Response	148	69.8
Incorrect Response / I do not know	64	30.2
Total	212	100.0

Table 32: Response of the study population for the questionkeeping your teeth clean and healthy is beneficial

A4

	Frequency	Percent
Correct Response	145	68.4
Incorrect Response / I do not know	67	31.6
Total	212	100.0

Table 33: Response of the study population for the questionImproper brushing leads to gum disease

A5

	Frequency	Percent
Correct Response	127	59.9
Incorrect Response / I do not know	85	40.1
Total	212	100.0

Table 34: Response of the study population for the question Sweet's retention leads to tooth decay

A6

	Frequency	Percent
Correct Response	105	49.5
Incorrect Response / I do not know	107	50.5
Total	212	100.0

Table 35: Response of the study population for the question Brushing with fluoridated toothpaste prevent

A7

	Frequency	Percent
Correct Response	143	67.5
Incorrect Response / I do not know	69	32.5
Total	212	100.0

Table 36: Response of the study populationfor the question Dentists care only about treatment & not

A8

	Frequency	Percent
Correct Response	66	31.1
Incorrect Response / I do not know	146	68.9
Total	212	100.0

Table 37: Response of the study populationfor the question Gum bleeding denotes gum infection

A9

	Frequency	Percent
Correct Response	134	63.2
Incorrect Response / I do not know	78	36.8
Total	212	100.0

Table 38: Response of the study populationfor the question Improper cleaning after food intake is harmful for gums

A10

	Frequency	Percent
Correct Response	68	32.1
Incorrect Response / I do not know	144	67.9
Total	212	100.0

Table 39: Response of the study populationfor the question Do you brush your teeth twice a day?

PRACTICE QUESTIONARRE
P1

	Frequency	Percent
Correct Response	6	2.8
Incorrect Response / I do not know	206	97.2
Total	212	100.0

Table 40: Response of the study population for the questionDo you avoid consuming snacks in between meals?

P2

	Frequency	Percent
Correct Response	72	34.0
Incorrect Response / I do not know	140	66.0
Total	212	100.0

Table 41: Response of the study population for the question Do you avoid consuming sweets in between meals?

P3

	Frequency	Percent
Correct Response	56	26.4
Incorrect Response / I do not know	156	73.6
Total	212	100.0

Table 42: Response of the study populationDo you take minimum 2-3 minutes for brushing?

P4

	Frequency	Percent
Correct Response	210	99.1
Incorrect Response / I do not know	2	.9
Total	212	100.0

Table 43: Response of the study populationfor the question Do you change your tooth brush once in 3-6 months?

P5

	Frequency	Percent
Correct Response	212	100.0

Table 44: Response of the study population for the question Do you rinse your mouth with water after eating?

P6

	Frequency	Percent
Correct Response	131	61.8
Incorrect Response / I do not know	81	38.2
Total	212	100.0

Table 45: Response of the study populationfor the question Do you frequently take carbonated drinks?

P7

	Frequency	Percent
Correct Response	212	100.0

Table 46: Response of the study population for the questionDo you practice preventive measures such asflossing, use of mouthwashetc..?

P8

	Frequency	Percent
Correct Response	212	100.0

Table 47: Response of the study population for the question I give importance to my teeth as much as any part of my body

P9

	Frequency	Percent
Correct Response	99	46.7
Incorrect Response / I do not know	113	53.3
Total	212	100.0

Table 48: Response of the study populationfor the question I experience toothache while chewing food

P10

	Frequency	Percent
Correct Response	90	42.5
Incorrect Response / I do not know	122	57.5
Total	212	100.0

Table 49: Response of the study population for the questionI have bleeding gums during Brushing

P11

	Frequency	Percent
Correct Response	79	37.3
Incorrect Response / I do not know	133	62.7
Total	212	100.0

Table 50 Distribution of overall oral health knowledge, attitude, behavior scores of adult population.

VARIABLES	NUMBER %
1.KNOWLEDGE	
Good	129(61.5%)
Poor	83(38.5%)
2.ATTITUDE	
Positive	156(73.5%)
Negative	56(26.45%)
3.PRACTICE	
Adequate	77(36.3%)
Inadequate	135(63.7%)

According to Table 50, only 38.5% had poor knowledge and 61.5% had good oral hygiene knowledge.

Overall, 26.45% had a negative attitude, 73.5% had a positive attitude and 63.7% had adequate behavior towards oral heal.

Table51 shows high statistically significant correlation between knowledge and attitude (p value: 0.0003) and between attitude and practice (p value: 0.0005) and significant correlation between knowledge and practice (0..044).

Table 51: Correlation between oral health knowledge,attitude and behavior.

Correlations				
			A	P(Practice)
Spearman's rho	Knowledge(K)	Correlation Coefficient	.247**	-.139*
		p-value	.0003	.044
		N	212	212
	Attitude(A)	Correlation Coefficient		.295**
		p-value		.0005
		N		212

p - value	** Highly Statistical Significant at p < 0.01

p - value	* Statistical Significant at 0.01 = p = 0.050

p - value	# No Statistical Significant at p > 0.050

DISCUSSION

Among 212 patients, the majority of the participants exhibited fairly higher knowledge on oral health and general facts. A total of 61.5% of participants belonged to the high knowledge group. Though the present study population exhibited a high knowledge of oral health, it did not correspond to the positive attitude and adequate oral health and hygiene behaviour. Our current study has some limitations. As our study is cross-sectional, it is difficult to identify the causal direction of oral health knowledge, attitude, and behaviour towards oral health. To add upon, individuals who were physically, mentally, or legally incapacitated, so that informed consent cannot be obtained were not included in our study. Exploring the level of oral health knowledge, attitude, and behaviour at the proper time frame would help achieve an ideal improvement of oral hygiene among the population by establishing a better oral heal-th care promotion and policy based on the study outcome[19, 20].

A similar study conducted by Siddharthan Selvaraj et. al conducted a cross sectional study titled Assessment on Oral Health Knowledge, Attitude, and Behaviour and its Association with Sociodemographic and Habitual Factors of South Indian Population in 288 adults living in a residential community situated in Chennai in February 2021 showed 97.9% of the participant had good knowledge, 33.3% had a positive attitude and 48.2% had adequate oral health behaviour. Sociodemographic and habitual factors like diet (p=0.006), education (p=0.009), and employment (p=0.003) were significantly associated with knowledge whereas diet (p=0.012) was the only factor significantly associated with attitude and ownership of house (p= 0.030) was significantly associated with behavior and absence of correlation were identified between Knowledge-Attitude (r=0.11, p=0.23), Knowledge-Behaviour (r= -0.037, p= 0.68) and Attitude-Behaviour (r =0.01, p=0.94) and therefore concluded that a massive nu-

-mber of participants possessed a high knowledge level towards oral health. On the other hand, less than half of the participants had a positive attitude and adequate behaviour towards oral health[21].

CONCLUSION

Individuals with a good level of knowledge towards oral health had inadequate attitude and practice of oral health, which is basically due to least importance they give towards their oral health due to their busy schedule of personal or professional work. The improper oral hygiene practices predisposes the patients to variety of infections. Our findings shed light on the imbalance of oral health attitude and practice, regardless of better oral health knowledge. Our study findings might fill the vacuum and help to give a proper idea to formulate evidence-based oral health reinforcement programs to minimize the disparity between knowledge, attitude, and behavior towards oral health.

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