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Original Research Article

Oral health behavior: Structure equation modeling approach

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ABSTRACT

Background: Oral health contributes significantly to the quality of life. Oral health behavior comprises awareness, nutritional preferences, and oral hygiene habits. Dental caries and periodontal diseases are the two most commonly prevalent conditions. Behavioral and social interventions are needed to adopt desirable oral health behavior. Before implementing any interventions, there is a need to identify the predictors by using the situation analysis followed by the descriptive study method.
Objective: This study aimed to provide significant predictors for oral health behavior.
Materials and Methods: This descriptive cross-sectional study was conducted in Gujarat. 1000 adults were included in the study. A predesigned, pretested questionnaire was used to get the objective of the study.
Results: Socioeconomic status was significantly associated with oral health behavior. A study found an R-value of- .931>0.4, R square value-.867>0.5, and an adjusted R-value was 866. Cronbach alpha of the study was 0.705. Awareness about tobacco chewing, the impact of oral health on general health, bleeding gums, irregularly placed teeth, brushing habits, direction and time of brushing, brush changing pattern, preference for dentist visit, anxiety, and perceived anxiety for dental treatment were had the causal relationship with latent variables of the oral health variables.
Conclusion: Awareness about risk factors, dental conditions, and treatment-seeking behavior were significantly associated with oral health behavior, whereas attitude failed to affect behavior. Before implementing any new interventions, oral health behavior and socioeconomic status need to address to remove disparities.

1. Introduction

The Global Burden of Disease study mentioned that oral disease has affected approximately 3.5 billion people.[1] Optimum status of Oral Health is one of the keys to maintaining general health and quality of life. Pain, disabilities, sufferings, low self-esteem, and less productive life are the consequences of impaired oral health.[2] Dental caries and periodontal diseases are the two commonly prevalent oral ill health conditions.[3] Severe periodontal diseases occupied the 11^{th} rank among the most prevalent diseases in the globe. Oral cancer stands among the top three cancers.[4,5] National Family Health Survey V (NFHS V) mentioned Although oral cancer is one of the highly prevalent cancers, only 1.20% of males and 0.90% of females have gone under screening for oral cavity examination.

The disease pattern of oral health conditions has changed rapidly as a result of lifestyle.[6] Dental caries in permanent teeth can be preventable if treated is in the early stages.[7] As oral health conditions play a contributory role in the global burden of disease, it is important to focus on

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subjective aspects along with surgical aspects i.e. oral health literacy, treatment-seeking behavior and desirable oral health behavior.[8] Oral health is the gateway to overall health. Before planning any intervention, it is necessary to assess the self-consciousness of individuals.[9,10] 5 to 20% of adults have periodontal disease owing to tooth loss.[11] As per the fact sheet of World Health Organization (WHO), oral conditions amount 5% of total health expenditure and 20% of out-of-pocket expenditure in high-income countries.[12]

It is significant to find out risk factors of the oral health conditions to develop effective intervention strategy.[13] Preventive behaviors depend on several factors. The model of knowledge-Attitude-Behavior (KAB) that is a proposed tool to assess behavior change. It has narrated that individuals' knowledge affects directly to the attitude, and affects behavior indirectly via attitude.[14] Oral health knowledge and positive attitude are significantly associated with the Socio-Economic Status (SES).[15,16] Although, in the previous studies, several factors associated to oral health have been identified by the multivariate regression, direct or indirect influence of factors on oral health is yet not clear.[13,17] Therefore, it is significant to cram the multidimensional factors leading to oral health behavior. Structure Equation Modeling (SEM) is an investigative technique to disentangle the complex relationship and casual pathways when it is concerned with latent constructs. To look at the factors relate to oral health behavior and relationship, we proposed SEM of oral health awareness, oral health hygiene behavior, and oral health treatment seeking behavior.

2. Objectives

The present study aimed to narrate the association of latent and observant variables of oral health behavior by using the structure equation modeling approach.

3. Materials and Methods

The study was descriptive and cross-sectional. By using a combination of random and convenient sampling, 1000 samples of adults were drawn from the residential areas and institutions of Gujarat. Data on socio-economic status and self-rated oral health behavior were collected. A pre-tested predesigned questionnaire was used to collect the data. Statistical package of Social Science (SPSS) was used to analyze the data. A reliability test was performed to locate the internal consistency of data. 0.705 was Cronbach's Alpha of the data. 5% level of significance was considered for the statistical analysis. The structure equation model was performed after doing factor analysis.

3.1. Variables of the study

In this study, area of residence, education, Occupation, and income were considered as the independent variables. Whereas, awareness, attitude, treatment-seeking behavior, and habits of oral health behavior were considered dependent variables. To find out the latent variable, observant variables were focused on.

3.2. Data analysis

Table 1: Socio-demographic profile of respondents

Socio-demographic variables	Frequency
Age in years	
20-29 years	68.7%
30-39 years	31.3%
Types of area	
Urban	48.9%
Rural	51.1%
Gender	
Male	49.3%
Female	50.7%
Socio-Economic Class	
Upper (I)	7.8%
Upper Middle (II)	39.0%
Lower Middle (III)	32.9%
Upper Lower (IV)	18.9%
Lower (V)	1.4%

Table 2 as shown the multiple responses of respondents in the form of frequencies. Majority of statement needs to be addressed. Before any interventions, it is significant to find statistical association of latent variables and observant variable relate to socio-economic status. Data were analyzed in the SPSS.

Table 3 depicted the Cronbach's Alpha value that was 0.705, higher than 0.700. Therefore, the data has shown consistency and reliability of the primary data.

a. Predictors: (Constant), Income, Gender, Area of residence, Occupation of a head of a family, Age, Education ahead of the family, District

Table 4 depicts that theR-value- .931>0.4, the R square value-.867>0.5, and the adjusted R-value is .866 which is not too far from 0.500. On the base of this satisfactory model summary, a structure equation model was developed.

To add on multiple regression analysis was performed to find the influence of independent variables on the socio-economic class. The result shows a positive impact on gender, age, districts, residential area, education, income, and occupation.

3.3. Structure equation modeling

The variables which were not set in Barlett's Test were excluded from the study. Confirmatory analysis was done on the base of three variables i.e., oral health awareness, oral health practice behavior, and oral health treatment-seeking behavior.

Table 2: Multiple responses upon oral health behavior of respondents n (%)

Statement for oral health behavior	Response (%)
Awareness of Oral Health	
A habit of smoking and chewing tobacco can impair oral health	72.1%
The health of teeth and mouth can affect the general health of the body	60.4%
Meaning of dental plaque	38.5%
Tooth paste should contain fluoride content	33%
Meaning of gum bleeding	46.6%
Believed Myth/taboo	
Scaling makes teeth weaker	68.1%
Do not visit dentist until it required	62.9%
Teeth removal is better than its treatment	59.9%
Treatment seeking behavior towards Oral Health	
Rinsing mouth with plain water after food	61.9%
Usage of mouthwash	12.9%
Have oral health insurance	5.7%
Aid used to remove food particles (Dental floss)	28.8%
Previous dentist visit (once in 6 months)	16.6%
Perception for expensive dental treatment	71.3%
Perceived anxiety for dental treatment	55.2%
Need of replacement of missing teeth by artificial teeth	56.4%
Reason for taking care of teeth (To maintain healthy teeth and mouth)	74.7%
Perceived requirement for full coverage of oral health insurance	68.1%

Table 3: Reliability statistics

Cronbach's Alpha	N of Items
.705	18

Table 4: Model summary

Model	R	R Square	Adjusted R Square	Std. An error in the Estimate
1	.931[a]	.867	.866	.33504

Oral Health Awareness (OHAW), Oral Health Hygiene Behaviour (OHHB), and Oral Health Treatment Seeking Behaviour (OHTSB) were the latent variables (mentioned in oval shape) whereas hereafter mentioned variables were considered as the observed variables (mentioned in square shape).

4. Discussion

The purpose of this study was to identify the significant predictors for oral health behavior. The hereafter mentioned variable has shown a causal relationship.

Generally, awareness about risk factors and dental conditions was significantly associated with oral health

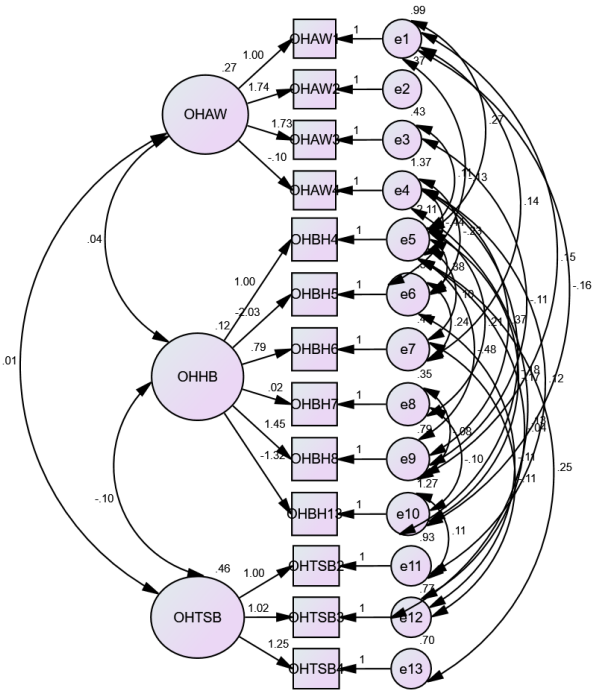

Fig. 1: Structure Equation Modeling

Table 5: Causal relationship

Coding	Variable	Sub Variable Name
OHAW1	**Oral Health Awareness among Adults**	A habit of smoking and chewing tobacco can impair oral health.
OHAW2		The health of teeth and mouth can affect the general health of the body
OHAW3		Irregularly placed teeth can impair oral health
OHAW4		Meaning of bleeding gum.
OHBH4	**Oral Health Habitual Behavior of Adults**	A habit of brushing at night
OHBH5		Type of brush used by respondents
OHBH6		Brush changing pattern of respondents
OHBH7		Direction of brushing
OHBH8		Timing of brushing
OHBH13		The aid is used to remove food particles from teeth
OHTSB2	**Oral Health Treatment seeking Behavior of Adults**	Preference for dentist visit until it is required
OHTSB3		Dental treatment is too expensive
OHTSB4		Perceived anxiety about dental treatment

behavior, whereas attitude failed to affect behavior. Meanwhile, this model study found that brushing pattern and direction, night brushing, and time had a causal relationship with oral health behavior. Individuals were more likely to use dental services for Pain management rather than regular checkups. It is perceived that dental treatment is expensive and acts as a barrier to dentist visits and preventive dental treatments. As socio-economic factors were also strongly associated with oral health behavior, it is crucial to address and to reduce disparities in the socio-economic class.

Followed to a literature review, the socio-demographic status of individuals, notably education, income, occupation, and area of residence are significantly associated with oral health behavior. Numbers of authors have stressed the inequality in the accessibility of oral healthcare services to individuals.

Based on literature review, along with perceived oral health behaviour, there are other several risk factors. Ever since gutkha has introduced in South-East Asia, consumption of it has incresingly become popular among the folks. There is a positive association between periodontal conditions and gutkha smoking. A study found that Gutkha is one of the hazardous predictors for periodontium ailment.[18] Chewing of Erica nuts leads to chewing problems, swallowing problems, mouth pain, and burning sensations. Even chewing gutkha is also strongly associated with submucous fibrosis.[19] Pan and Gutkha are known as smokeless tobacco. They lead to mouth ulcers. Moreover added sugar leads to cavities and sand in tobacco can harm the teeth. Gum disease and discoloration of teeth are common complications of smokeless tobacco. Oral malignancy and oropharyngeal squamous cell malignancy are significantly associated with the etiological risk factors i.e history of tobacco and alcohol use.[20]

5. Conclusion

Conventionally, two broad sets of behavior are at the roots of good oral health practices. First; habits relate to self-care i.e. dental hygiene, cutting down and/or restriction on sugar products, and proper use of fluoride products, second; utilization of oro-dental services.In this study, to support the predicators of oral health behavior statistically, structure equation model was developed. A study suggests the necessity to focus on the barriers and perceived susceptibility of oral conditions. Mutual participation from the Govt. and community will be needed to address and enhance long-run oral health. There is a need for a multi-dimensional community-based oral health program that encompasses effective delivery of preventive treatments, uplifting levels of awareness, and increasing public education to adopt a healthy lifestyle. Formulation of feasible and clear strategies needs to be focused on.

6. Conflict of Interest

There are no conflicts of interest in this article.

7. Source of Funding

None.

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