



Perceived barriers in accessing dental care among patients attending dental institute using decision-making trial and evaluation laboratory method

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ABSTRACT:

Introduction: Utilization of dental service is a concept of expressing the extent of interaction between the service provider and the people for whom it is intended. However, one of the major issues in social welfare is the equitable provision of these services to the population. **Aim:** To determine the perceived barriers affecting access to the dental services in the dental institute. **Materials and Methods:** A cross-sectional survey was conducted in the dental institute during the month of February in the year 2014 using decision-making trial and evaluation laboratory (DEMATEL) method. The study sample included the 364 subjects. The required data were collected using a specially designed and pretested questionnaire. The data were analyzed using SPSS 18.0 (SPSS Inc., Chicago, IL, USA) and MATLAB 7.6.0. The mean, standard deviations were used to describe the data, and inferential statistics included one-way ANOVA and DEMATEL. **Results:** The five determinants of cost, inconvenience, fear, organization, and patient-dentist relationship were determined as barriers to access dental services. Based on subjects' responses to the questions, the cost (54.75% agreed or strongly agreed) was identified as the most important factor affecting the access to dental health care followed by dentist-patient relationship (48.57%), inconvenience (36.55%), fear (23.70%), and organization (14.02%). The difference was found to be statistically significant ($P = 0.0001$). When the hierarchy of the affecting and affected factors was calculated, based on the factor analysis by using DEMATEL method, the cost ($R-J = 0.16$) and organization ($R-J = 1.15$), were certain affecting determinant which influenced the access to dental services and inconvenience. **Conclusion:** The major barriers to oral health care utilization among our patients were cost, fear, and organization. Policymakers, administrators, and insurance organizations have a major role. Hence, the policies should be fair and equitable.

Key words:

Barriers, dental care, dental health

INTRODUCTION

Oral diseases qualify as major public health problems owing to their high prevalence and incidence in all regions of the world, and the greatest burden of oral diseases is among disadvantaged and socially marginalized populations.^[1] Preserving, restoring, and promoting the public health are the goals of health care providers, and one of the major issues in social welfare is the equitable provision of health services to the population.^[2]

Better access to health services means the provision of "appropriate services in the right place and at the right time." Access to health resources has been taken into consideration as an indicator of public health, which is considered as unitary of the social justice determinants and scarce resource of services through a suitable

planning.^[2,3] Access to professional dental care has been delineated as the ability to obtain and make use of dental service.^[4]

Dental health professionals often have difficulties when they try to serve their patients and defend natural processes, which are contributing to preserving their

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dental health. The patients' behavior, however, is just one aspect of the noncompliant story.^[5]

Patients' feelings, beliefs, and attitude are some of the psycho-social determinants of dental health which modify or change the patient's dental health behavior, but may also provide the basis for the barriers to accessing dental health care. Therefore, it may be suggested that these psycho-social factors could be likened to "a knife that cuts both ways."^[5]

Whether or not people have dental insurances can also affect the use of dental services. Dental insurance mitigates the possible barrier of upfront costs, meaning insured people visit the dentist more regularly than uninsured people. While there is substantial evidence that the monetary value of attending a dentist and dental anxiety are barriers to receiving care. People who are afraid to visit the dentist are also more potential to cancel dental appointments or to not show up on the day of a scheduled engagement.^[2,3]

A study in Tehran in 2013 by Bahadori *et al.* showed that cost, inconvenience, fear, organization, and patient-dentist relationship were determined as barriers to access dental services, among which the cost and patient-dentist relationship were identified as the first and last priorities^[2] whereas in India, Nandhini *et al.* found that unpleasant experiences and factors of appreciation and laziness were the self-reported barriers to regular dental care.^[6] Jain *et al.* in Virajpet, reported that barriers for utilization of oral health care were knowledge, attitude, fear, cost, and transport.^[7] Thus, these barriers to access dental care have been shown to vary from region to region.

The previous studies have utilized the questionnaire to assess the barriers in utilization, which had certain methodological issues. To address this issue, we used decision-making trial and evaluation laboratory (DEMATEL) method to assess the perceived barriers in accessing of dental care in Modinagar, Uttar Pradesh.

MATERIALS AND METHODS

The study was conducted in Modinagar, which is located in Western part of Uttar Pradesh India. A cross-sectional survey was carried out among the patients attending the outpatient section of the dental institute during the month of February in the year 2014. A total of 385 subjects were selected for the study along the basis of convenient judgment sampling. The patients who were above 15 years of age for better comprehension and understanding were included. Ethical approval was received from the institutional review board, and informed consent was obtained from all the study

participants. Participation in the study was voluntary and confidentiality of data was maintained.

Questionnaire

The questionnaire was constructed by two-step approach. The first part included the patients' demographic data and the second one included the barriers. A 5-point scale was used to assess the determinants. When the barriers were identified, another questionnaire was designed using the categorized barriers and sent to 10 experts specializing in dental care. This questionnaire had five closed questions and one open question regarding the identified barriers. The closed questions were rated using a 5-point Likert scale. The open question was designed so that they were able to express their viewpoints on the mentioned determinants [Table 1].

Questionnaire validation

The questionnaire was pretested by conducting a pilot study on 73 patients who comprised 20% of the study sample. Reliability of the questionnaire was assessed using Test-Retest and the values of measured kappa (k) were 0.86 and weighted kappa (k) was 0.9. Internal

Table 1: The recognized variables and barriers and their categorizations

Determinants (barriers)	Variables
Cost	High costs of dental services Travel costs Low levels of dental insurance coverage Low income
Inconvenience	Annoying methods and procedures used by the provider Long distance from home to the clinic Complex and prolonged dental treatments Lack of service providers' attention to simple treatments
Fear	Fear of the dentist Fear of the injection of the anesthetic materials into the teeth Fear of encountering serious problems after treatment
Patient-provider relationship	Patients' unwillingness to be examined Lack of proper communication
Organization	Failure to respond to the patients' questions Not giving enough information to the patients Lack of modern equipment and supplies Improper methods for infection control Long waiting times Inappropriate waiting rooms Lack of proper parking space Not clean clinic Lack of trust in the service provider

consistency of the questionnaire was assessed by applying chronbach's-alpha (α) and the value of $\alpha = 0.78$ was obtained. Criterion and construct validity of the questionnaire was assured by using Spearman's correlation coefficient ($P < 0.001$). The construct validity was calculated for each construct/parameter including cost, fear, inconvenience, organization, and patient-provider relation by calculating Spearman correlation between individual items for the particular construct and overall score of that construct.

Statistical analysis

The collected data were analyzed using statistical package for social sciences (SPSS) version 18.0 (SPSS Inc., Chicago, IL, USA) and MATLAB 7.6.0 (Mathworks, 1970, Simulink and Stateflow). Results were summarized by descriptive as well as analytical tests, including mean, standard deviation, and one-way ANOVA and DEMATEL.

Decision-making trial and evaluation laboratory method

The DEMATEL method, developed by the Science and Human Affairs Program of the Battelle Memorial Institute of Geneva between 1972 and 1976, was used to research and solve complicated and intertwined problem groups. This method is based on graph theory, enabling us to plan and solve problems visually, so that we may divide the relevant factors into cause and effect groups in order to better understand causal relationships.^[8] This method is applied to derive interrelationship among factors and categorizes the studied factors into two groups: Affecting factors and affected one as explained in Figure 1.^[8]

RESULTS

The questionnaire-based study was carried out among the 385 subjects regarding the perceived barriers to the

dental health care. The total of 364 subjects responded to the questionnaire, generating the response rate of 94.5%. The study sample comprised 201 (55.2%) males and 163 (44.8%) females and the most of them (31.3%) were in the 20–30 age groups [Table 2].

Based on the subject's responses to the questionnaire, the five factors cost, fear, organization, inconvenience, and relationship were identified as the key factors affecting the utilization of dental health services. Based on analysis of the responses of the subjects on the Likert scale, the cost (54.75% agreed or strongly agreed) was identified as the most important factor affecting the access to dental health care followed by dentist-patient relationship (48.57%), inconvenience (36.55%), fear (23.70%), and organization (14.02%). The difference was found to be statistically significant ($P = 0.0001$) [Table 3].

The factors identified by patients responses were further analyzed using DEMATEL method, based on the viewpoints of the 10 (out of which five responded)

Table 2: Demographic data of study subjects

Characteristic	Frequency percentage
Gender	
Male	55.2
Female	44.8
Age groups (years)	
<20	11.5
20-30	31.3
31-40	29.1
41-50	14.8
More than 50	13.2
Marital status	
Married	89.0
Unmarried	11.0

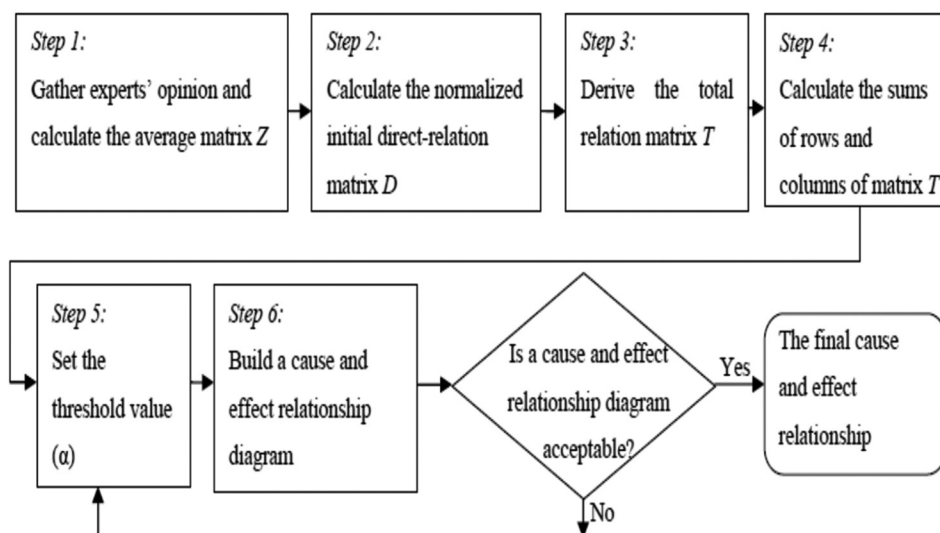


Figure 1: The process of the decision-making trial and evaluation laboratory method^[8]

Table 3: Perceived access barriers to the dental services

Perceived barriers	Respondents' comments					Mean±SD	P
	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree		
Cost	34.35	20.4	30.67	23.7	0.12	2.2±0.75	0.001*
Fear	7.8	15.97	4.5	55.57	16.2	3.5±1.10	
Inconvenience	1.4	35.15	8.0	40.92	4.4	2.6±1.10	
Organization	0.71	13.31	8.0	40.92	4.4	1.9±0.92	
Relationship	12.31	36.26	14.5	30.2	6.7	2.6±0.97	

*P=0.001 (highly significant), P<0.001 (highly significant), P<0.05 (significant). SD: Standard deviation

subject experts on the Perceived Access Barriers to the Dental Services. All the experts who responded agreed with the proposed barriers affecting access to dental services [Table 4]. When the hierarchy of the affecting and affected factors was calculated based on the factor analysis, the results showed that the cost (R-J = 0.16) and organization (R-J = 1.15), were certain affecting determinant which influenced the access to dental services and inconvenience, fear, and the patient-dentist relationship were affected factors and did not influenced the utilization of dental health services [Table 5 and Figure 2].

Table 4: Experts' viewpoints on the perceived access barriers to the dental services

Perceived barriers	Response of experts on perceived barriers to access				
	Strongly agree (n)	Agree (n)	Neither agree nor disagree (n)	Disagree (n)	Strongly disagree (n)
Cost	3	1	1	0	0
Fear	2	2	1	0	0
Inconvenience	2	1	2	0	0
Organization	2	1	1	0	1
Relationship	2	1	1	0	0

DISCUSSION

In our work, we have established the five determinants including cost, fear, inconvenience, patient-provider relationship, and organization for dental services, systematically to achieve a greater apprehension of these determinants. Based on subject responses to the questions and analysis of the expert's viewpoints by DEMATEL method, the cost was identified as the most important access factor of dental service utilization. The study findings are in agreement with the findings of Bahadori *et al.*^[2] who identified cost as an affecting determinant of dental service utilization on the first priority basis. Curtis *et al.*^[9] in their study examined some of the barriers to access to dental services and concluded that the direct and indirect costs such as travel costs in remote areas had effect on access to dental care and was considered as an important barrier.

Among Canadian adults, travel costs and having a low income had been considered as two access barriers.^[10] The results of a study^[11] conducted in India showed that the cost and the felt need influenced the number of dental visits. In India, where the majority of dental services are provided by the private practitioners, and there is limited availability and access to affordable dental care, the cost can be considered as the most important factor affecting the access and utilization of dental health services.

In our study, the organization was another factor identified to be the one, affecting the utilization of dental health services. The results are in agreement with the study of

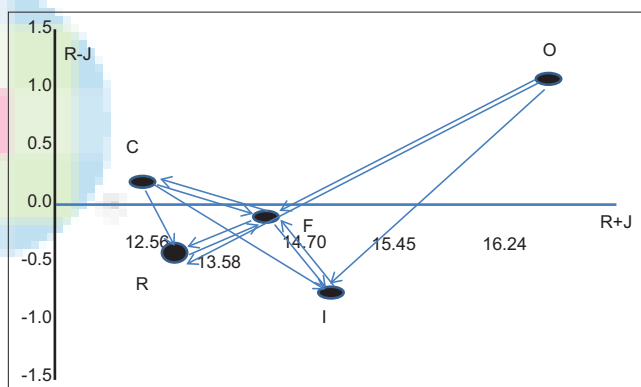


Figure 2: The prioritization of and relationship between access barriers to dental services, C: Cost, F: Fear, I: Inconvenience, O: Organization, R: Relationship

Telleen *et al.*^[12] The organization in the present study includes the location of the dental facility. Improving access to healthcare requires the optimal establishment of health care facilities.^[13] If service providers do not find the right location, it will increase the patients' costs and the travel time for receiving the needed care. Therefore, this determinant has been considered by many planners so that they try various models and methods out, especially mathematical models, to establish the health service facilities in the proper places and whereby they can remove one of the access barriers. Wu *et al.* had also reviewed this determinant in his study.^[14]

The other less important factors that were identified in the present study include dentist – patient relationship,

Table 5: The hierarchy of affecting and affected access barriers to preventive dental services

Determinants	Cost	Fear	Inconvenience	Organization	Relationship	R* (α)	J* (α)	R+J	R-J
Cost	1.6033	1.5636	1.0543	0.9835	1.0232	6.3336	6.2276	12.5612	0.106
Fear	1.3501	1.7380	1.3253	1.7632	1.5708	7.706	7.7534	15.4594	-0.047
Inconvenience	1.3705	1.5883	1.0537	1.9832	1.3215	7.0933	7.63172	14.72502	-0.5384
Organization	0.6895	1.7783	1.8968	1.7332	1.4215	8.7005	7.5493	16.2498	1.1512
Relationship	1.3205	1.0378	1.7632	1.4372	6.6987	6.6987	6.8842	13.5829	-0.1855

Above table shows the *t*-matrix value of all the factors studied. *R: Rows, *J: Columns, *α: Threshold value

fear, and inconvenience. The effective and appropriate dentist-patient relationship is necessary for increasing confidence of the patient in dentist and thus influences the health seeking behavior of the patient. The results of Mohammad Pour's study showed that 22% of people had not referred to the physician in a health center because of the lack of confidence in him/her.^[15] Al-Shammari *et al.* in a study in Kuwait concluded that fear, bad habits, and false beliefs were the major access barriers.^[16] The results of Patouillard *et al.*^[17] concluded that fear has a direct relationship with not referring to the dentist, which are not in agreement with the present study, where fear is the one of the components which took the last priorities.

The present study comprehensively assessed the barriers to the utilization of dental health services using the DEMATEL method based on expert's viewpoints. The DEMATEL method is a methodology, which can confirm interdependence among variables and reflect the interrelationships between variables, and can be used for researching and solving complicated and intertwined problem groups. Thus, the uses of DEMATEL method strengthen the study by determining the causal relationships between the determinants.

However in this study, only the determinants were studied; the variables associated with each determinant were not reviewed because of patients' fatigue and tiredness and, therefore, can lead to lowered patients' accuracy in their responses to some extent.

RECOMMENDATIONS

The results of this study supported the idea that in order to motivate people successfully, one has to pay attention to the individual reasons, which restrict their behavior. Since the people's conditions and characteristics affect their access to health services, the policies on distribution of health services for the population should be fair and equitable.

CONCLUSION

Preserving, restoring, and promoting the public health are the goals of healthcare providers, and one of the major issues in social welfare is the equitable provision of health services to the population. Identifying perceived

access barriers to dental services is one of the basic steps to improve the public health. However, within the limits of the present study, it can be concluded that the highly reported barriers for utilization of oral health care were: Fear, cost, and organization.

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