ORIGINAL RESEARCH

Oral Health Illness Perception and Dental Caries: A Cross-sectional Study among Adult Dental Patients, Hyderabad, Telangana, India

Pandi Sudarshan Shulamithi[1], Suhas Kulkarni[2], Dolar Doshi[3], Madepu Padma Reddy[4], Adepu Srilatha[5], Dantala Satyanarayana[6]

Received on: 30 April 2022; *Accepted on:* 04 July 2022; *Published on:* 26 August 2022

Abstract

Aim: To evaluate and assess the relationship between oral health illness perception and caries status among adult dental patients according to variables (age, gender, and presence of dental problems other than dental caries).

Materials and methods: A total of 311 adult dental patients with self-reported dental caries were recruited by systematic random sampling method. Oral health illness perception was assessed by using revised illness perception questionnaire for oral health (IPQ-R-OH) and caries status by caries assessment spectrum and treatment (CAST) index. Data were analyzed with Statistical Package for the Social Sciences (SPPS) version 24.0.

Results: The overall illness perception towards oral health was higher among study participants. However, when individual dimensions were considered, study participants had higher illness perception for control, emotional representation, hopelessness, and illness coherence. Based on CAST severity, higher percentage of study participants (43.8%) had pulpitis and abscess or fistula (severe morbidity). There was no significant gender difference for illness perception and CAST severity. However, study participants in the age-group of <30 years of age and who had other dental problems had significant higher illness perception and CAST severity.

Conclusion: Oral health illness perception was observed high among the study participants. Age and presence of dental problems other than dental caries were the significant predictors for illness perception.

Clinical significance: The oral health illness perception among the study participants associates with number of important outcomes such as dental care utilization, treatment adherence, and functional recovery. Further, earlier perception of dental caries reduces the progression of the disease and can be prevented.

Keywords: Caries assessment spectrum and treatment index, Dental caries, Illness perception, Oral health, Revised illness perception questionnaire for oral health.

World Journal of Dentistry (2022): 10.5005/jp-journals-10015-2116

Introduction

Oral health is integral to general health and vital for well-being.[1] Fédération Dentaire Internationale described oral health as multifaceted, which conveys a range of emotions.[2] Good oral health is a determinant factor for self-esteem, social confidence, esthetics, and communication. However, oral diseases are major public health problems affecting a significant proportion globally and exact a heavy toll in terms of morbidity and mortality.[3] The psychosocial impact on the individuals as a result of pain and suffering and function impairment due to oral diseases diminishes the quality of life and has adverse consequences.[1]

Dental caries is one of the most prevalent oral diseases in India (50, 52.5, 61.4, 79.2, and 84.7% in 5, 12, 15, 35–44, and 65–74 years old, respectively).[4] It is a behavioral[5] and dynamic disease[6] caused due to consequence of a diet increasingly rich in processed carbohydrates and refined sugar. If left untreated, decay can result in tooth pain, abscess, tooth loss and resulting bone loss, and systemic infection. In severe cases, it may even lead to death.[7] As most dental diseases can be preventable, and in order to avoid these consequences, individual illness perception of oral health status is important.

Oral health illness perceptions are the organized cognitive representations or beliefs that patients have about their oral health conditions.[8] They are processed in parallel through three stages. Firstly, the individual forms the representation of the illness or health threat; it comprises a number of interrelated beliefs about

[1]Department of Public Health Dentistry, G Pulla Reddy Dental College and Hospital, Kurnool, Andhra Pradesh, India

[2,4,5]Department of Public Health Dentistry, Panineeya Institute of Dental Sciences and Research Centre, Hyderabad, Telangana, India

[3]Department of Public Health Dentistry, Govt Dental College and Hospital, Hyderabad, Telangana, India

[6]Department of Public Health Dentistry, MNR Dental College and Hospital, Sangareddy, Telangana, India

Corresponding Author: Pandi Sudarshan Shulamithi, Department of Public Health Dentistry, G Pulla Reddy Dental College and Hospital, Kurnool, Andhra Pradesh, India, Phone: +91 9550254087, e-mail: dr.shulamithi@gmail.com

How to cite this article: Shulamithi PS, Kulkarni S, Doshi D, *et al.* Oral Health Illness Perception and Dental Caries: A Cross-sectional Study among Adult Dental Patients, Hyderabad, Telangana, India. World J Dent 2022;13(6):545–550.

Source of support: Nil

Conflict of interest: None

© The Author(s). 2022 Open Access This article is distributed under the terms of the Creative Commons Attribution 4.0 International License (https://creativecommons.org/licenses/by-nc/4.0/), which permits unrestricted use, distribution, and non-commercial reproduction in any medium, provided you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license, and indicate if changes were made. The Creative Commons Public Domain Dedication waiver (http://creativecommons.org/publicdomain/zero/1.0/) applies to the data made available in this article, unless otherwise stated.

an illness and what it means for the patient's life. Secondly, they adopt behaviors to cope with the illness, and lastly, they appraise the efficacy of the behaviors.[9,10]

Individuals' perceptions of their oral health illness vary widely; even patients with the same illness can hold very disparate views of their illness.[8] Also, they are the important predictors of how individuals will behave during their illness,[5] and identifying them earlier provides an opportunity for prevention. Thus, the illness perception is associated with a number of important outcomes, such as dental care utilization,[11] treatment adherence, and functional recovery.[8] Furthermore, earlier perception of carious lesions is also as important as it can be controlled through various health promotion and preventive measures in a way that makes such lesions very unlikely to progress to severe stages. Also, Mafla et al.[5] reported that oral health promotion could be used to improve the capacity to obtain, process, and understand basic oral health information, which eventually increases the early detection of caries.[5]

In recent years, research investigating the role of illness perceptions in medical conditions has grown rapidly.[8] However, there is a dearth of literature in the field of dentistry regarding oral health illness perception. Hence, the purpose of the present study was to assess oral health illness perception and its relationship with caries status among adult dental patients.

Materials and Methods

A cross-sectional study was carried out to assess oral health illness perception and its relationship with caries status among adult dental patients. Ethical approval for the study was obtained from the Institutional Review Board (PMVIDS&RC/IEC/PHD/PR/0264-18). The study conducted was in accordance with Declaration of Helsinki and fulfilled the strengthening the reporting of observational studies in epidemiology (STROBE) guidelines.

Pilot study was done to evaluate the feasibility of the study, sample size estimation, validity, reliability, and comprehensibility of the questionnaire among 35 adult dental patients. The reliability, validity, and comprehensibility of the questionnaire were good. Based on the pilot study data, we have calculated sample size N = [(Zα + Zβ)\C] 2 + 3, where r = 0.19, Zα = 1.960, Zβ = 0.842, and C = 0.192 was 215. The study was conducted in the outpatient department (OPD) from June 2018 to August 2018.

The participation of study participants was voluntary, and those who provided informed written consent and study participants aged 18 years or above, with self-reported dental caries, who could read and understand the English language, were included in the study. Study participants with a history of systemic diseases and partially filled questionnaires were excluded from the study. The confidentiality of study participants was maintained. Every third person from the OPD was selected based on the eligibility criteria, that is, study participants aged 18 years or above, with self-reported dental caries, and who could read and understand the English language by the method of systematic random sampling.

The study included a clinical oral examination and a self-administered questionnaire which had two parts. The first part included demographic details like age, gender, and presence of any other dental problem other than dental caries, and the second part included a self-reported questionnaire—IPQ-R-OH. It was a 36-item questionnaire developed by Villalobos-Galvis et al.[12] that was used to assess oral health illness perception. It had seven dimensions, namely timeline–cyclical (items 1–4), control (items 5–15), consequences (items 16–20), timeline–chronic (items 21–23), emotional representations (items 24–29), hopelessness (items 30–31), and illness coherence (items 32–36). Each item was rated on five-point Likert scale ranging from strongly disagree to strongly agree. The items 13, 14, 15, 29, 30, 31, 32, 33, 34, 35, and 36 were reversely scored. The overall scores were obtained by summing up of scores of all items in each dimension which ranged from 36 to 180.

The questionnaire survey was conducted in person, and for the study participants who gave informed consent, the questionnaire was distributed to them, and the study participants filled out the entire questionnaire, and individual study participants were clinically examined by a pre-trained and calibrated examiner in order to have good reliability and validity. Clinical examinations were done using a plane mouth mirror and CPI probe under artificial illumination. Caries status was assessed by using the CAST index by Frencken et al.[6] Each tooth was given a CAST score.[13] The maximum CAST score was given per study participant based on their maximum teeth CAST score. The maximum CAST score per study participant was grouped according to the severity of the disease[14] as enamel caries (premorbidity), dentinal caries with and without cavitation (morbidity), pulpitis or abscess or fistula (severe morbidity), and loss of a tooth (mortality).

Statistical Analysis

The collected data were analyzed using SPSS version 24.0. The Chi-square test was used to compare categorical variables. Mann–Whitney *U* test was used for the mean comparison of IPQ-R-OH dimension for quantitative variables. A mean score comparison of IPQ-R-OH dimensions with CAST severity and age was made using Kruskal–Wallis test. Linear regression analysis was done using total dimension (IPQ-R-OH) as a dependent variable. Statistical significance was set at $p \leq 0.05$.

Results

A total of 311 adults with self-reported dental caries were included in the study (Fig. 1). The overall mean IPQ-R-OH among the study participants was 112.87 ± 10.78 indicating a higher perception towards oral illness. However, when individual dimensions were considered, high oral illness perception was observed for the dimensions—control (36.87 ± 3.97), emotional representation (48.04 ± 5.07), hopelessness (6.34 ± 1.53), and illness coherence (17.71 ± 3.86) (Fig. 2).

With respect to age-groups, study participants in the age-group of <30 years of age had a significantly higher mean for

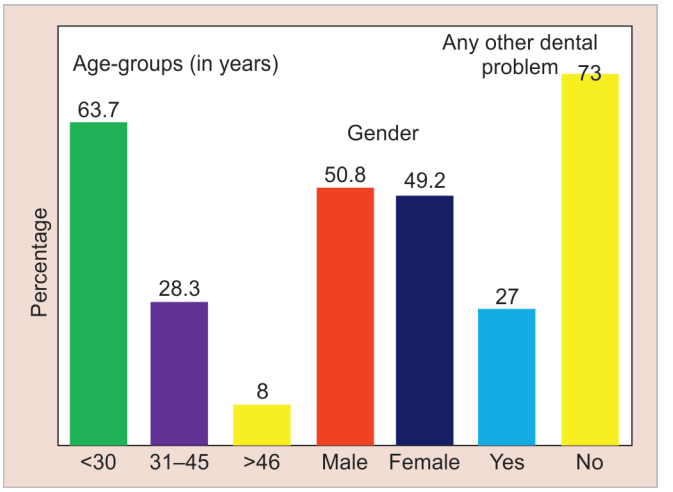

Fig. 1: Demographic distribution of the study population

overall IPQ-R-OH perception (113.89 ± 10.38, $p = 0.04$) and for the dimensions—emotional representation (18.63 ± 5.03, $p = 0.004$) and hopelessness (6.48 ± 1.45, $p = 0.04$). Similar findings were also observed upon pair-wise comparison (Table 1).

As regards gender, female study participants had higher mean perception with respect to most of the dimensions and overall IPQ-R-OH compared to males. However, a significant difference was not observed.

The study participants who had dental problems other than dental caries had higher mean perception for overall IPQ-R-OH (114.86 ± 11.50) and for the dimensions—timeline–cyclical (12.18 ± 3.62), control (37.00 ± 3.99), emotional representation (18.25 ± 5.34), hopelessness (6.62 ± 1.58), and illness coherence (18.30 ± 3.46). However, significantly higher perception is observed only for dimension—hopelessness ($p = 0.04$).

Based on CAST severity, a higher percentage of study participants [136 (43.8%)] had pulpitis and abscess or fistula (severe morbidity), whereas the least percentage of study participants [38(12.2%)] had dentinal caries with and without cavitation (morbidity). Pulpitis and abscess or fistula (severe morbidity) are most common among all age-groups. However, in comparison, a high number of study participants in the age-group of <30 years had enamel caries (premorbidity) and pulpitis and abscess or fistula (severe morbidity), and study participants of 31–45 years, >45 years of age had a loss of tooth (mortality) and dentinal caries with and without cavitation (morbidity). Furthermore, significant relation ($p < 0.001$) was observed among age-groups with CAST severity. With regards to gender, pulpitis and abscess or fistula (severe morbidity) is most common and are followed by enamel caries (premorbidity) among male and female study participants. Nevertheless, a significant relation was not observed with CAST severity. Enamel caries (premorbidity) is most common among the study participants who had dental problems other than dental caries, whereas pulpitis and abscess or fistula (severe morbidity) is most common among study participants who did not have dental problems other than dental caries. Nonetheless, significant relation ($p = 0.02$) was observed with CAST severity based on the presence of dental problems other than dental caries.

Though study participants with severe morbidity had an overall higher mean perception (114.04 ± 7.58), a significant difference was not observed. When the individual dimensions were considered, study participants with severe morbidity had significantly higher mean perception for the dimension—timeline–cyclical (12.73 ± 2.86, $p < 0.001$), timeline–chronic (8.45 ± 2.49, $p = 0.01$), and emotional representation (18.85 ± 4.62, $p = 0.002$). Further, the pair-wise analysis revealed that study participants with severe morbidity had a significant overall perception toward oral illness and most of its dimensions (Table 2).

Linear regression analysis revealed that the independent variables age and dental problems other than dental caries had significant relation ($p = 0.005$ and $p = 0.01$, respectively) with the overall oral health illness perception (IPQ-R-OH) (Table 3).

Discussion

Oral health illness perceptions are the cognitive representations that people have about their oral health conditions[8] and are important predictors for professionals to know how people will behave during their illness.[11] Furthermore, they can provide a framework for the patients to make sense of their symptoms, which assesses health risk and direct their action during recovery. However, these illness beliefs may be regarded as personal factors that influence health and interact with functioning and may facilitate understanding differences in how patients manage their illness.[15] In the oral health context, most oral diseases are predictable with a wide spectrum of symptoms; thus, an early perception leads to prevention and further complication of oral diseases. Moreover, if the patients have a better oral health illness perception, they will become more aware and know about their illness; thus, they will comply more with the treatment, and this consequently will give a better treatment outcome. Hence, the present study was undertaken to assess oral health illness perception and its relationship with caries status among adult dental patients.

In the present study, to assess oral health illness perception, IPQ-R-OH with seven dimensions was used. Apart from IPQ-R-OH, other illness perception questionnaires[9,16–18] are available. However, most of these questionnaires were used for general health illnesses, whereas IPQ-R-OH developed by Villalobos-Galvis et al.[12] focuses only on oral health illness perception for the most common dental problems.

Furthermore, CAST index[13] was used to assess caries status as it has the integral capacity to record the whole progressive spectrum of dental caries from the initial to advanced stages of carious lesions, which will be useful for caries risk assessment and prevention. Also, it guides the epidemiologist to focus on individuals who are in need to provide better treatment.[19]

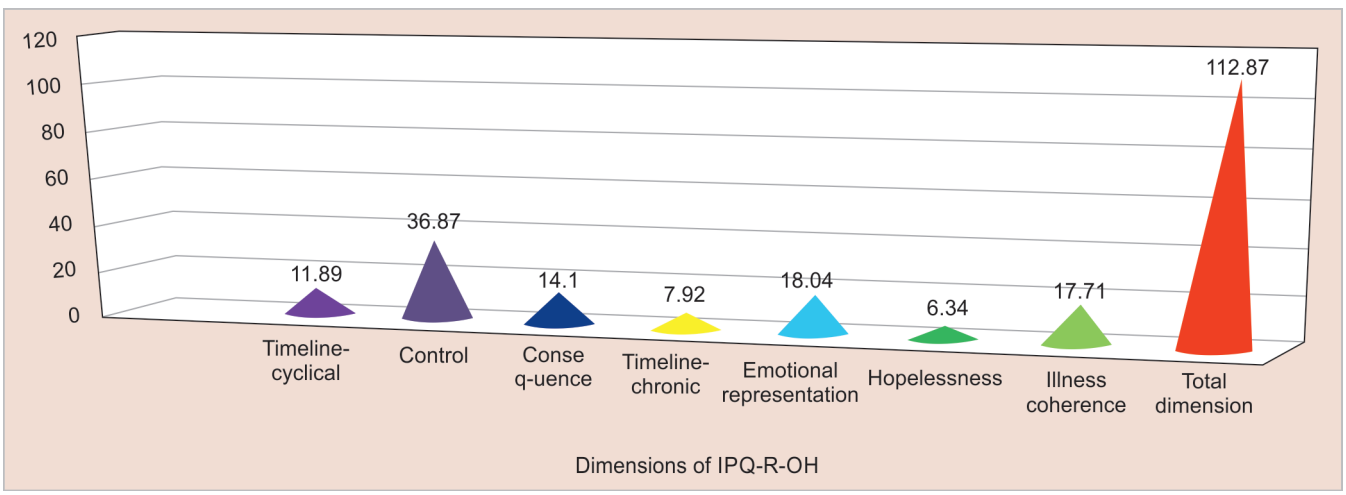

Fig. 2: Mean scores of IPQ-R-OH and its dimensions

Table 1: Mean score comparison of IPQ-R-OH and its dimensions based on age-groups

IPQ-R-OH dimensions	*Age (years)*		*Kruskal–Wallis test*		*Mann Whitney U test*		
		Mean ± SD	*Chi-square value*	*p-value*	*<30 vs 31–45*	*<30 vs >45*	*31–45 vs >45*
Timeline–cyclical	<30	11.80 ± 3.46	0.86	0.65	–	–	–
	31–45	11.90 ± 3.37					
	>45	12.56 ± 3.11					
Control	<30	37.11 ± 3.63	0.65	0.72	–	–	–
	31–45	36.53 ± 4.46					
	>45	36.16 ± 4.63					
Consequence	<30	14.47 ± 4.16	5.01	0.08	–	–	–
	31–45	13.55 ± 3.74					
	>45	13.12 ± 4.15					
Timeline–chronic	<30	7.94 ± 2.68	0.78	0.68	–	–	–
	31–45	7.95 ± 2.29					
	>45	7.56 ± 2.06					
Emotional representation	<30	18.63 ± 5.03	11.3	**0.004***	0.09	**0.001***	**0.04***
	31–45	17.42 ± 5.22					
	>45	15.60 ± 3.97					
Hopelessness	<30	6.48 ± 1.45	6.72	**0.04***	0.16	**0.02***	0.14
	31–45	6.22 ± 1.59					
	>45	5.72 ± 1.77					
Illness coherence	<30	17.46 ± 4.08	2.23	0.33	–	–	–
	31–45	18.15 ± 3.56					
	>45	18.16 ± 3.02					
Total dimension	<30	113.89 ± 10.38	6.38	**0.04***	0.16	**0.02***	0.14
	31–45	111.72 ± 11.18					
	>45	108.88 ± 11.58					

Bold values are statistically significant, showed by *; *$p \leq 0.05$ statistically significant

The present study comprised 158 (50.8%) males and 153 (49.2%) females, illustrating a slight male predilection for self-reporting dental caries. Whereas studies conducted by Mafla et al.[5] and Villalobos-Galvis et al.,[12] showed female predilection of self-reporting dental caries. However, the distribution of study participants based on age was similar to these studies,[5,12] wherein the majority of them were <30 years.

On a positive note, the overall mean IPQ-R-OH among the study participants was 112.87 ± 10.78, indicating a higher perception towards oral illness, which may be due to their self-experience with an oral problem or acquired from their family or peer group experience. However, when individual dimensions were considered, high oral health illness perception was observed for the dimensions—control, emotional representation, hopelessness, and illness coherence. These findings indicate that the individuals had good knowledge and personal understanding of dental problems, especially that dental caries can be controlled by personal measures and/or by professional treatment. Further, if not treated initially, it progresses and can lead to arousal of emotions such as anger, depression, anxiety, fear, upset, and worry, eventually leading to the hopelessness of the patient that any of their actions cannot alter their dental problem or outcome of the dental treatment.

With respect to age-groups, study participants in the age-group of <30 years of age had high significant overall oral health illness perception (IPQ-R-OH) as well as for the dimensions—emotional representation and hopelessness. This illustrates that as people age, oral conditions may assume relatively less importance in the presence of more serious chronic conditions.[20] These findings are in contrast with the study conducted by Mafla et al.[5] among adult dental patients in Colombia, where the perception of emotional representation, consequences, illness coherence, and personal control increased with age.

As regards with gender, female study participants had higher oral health illness perception with respect to most of the dimensions and overall IPQ-R-OH compared to males. However, a significant difference was not observed. This may be due to the fact that the illness beliefs may be regarded as a personal factor that influences health and interacts with functioning and may facilitate understanding differences in how patients are managing their illness on every individual, irrespective of gender.

The current study revealed that the study participants who had other dental problems apart from dental caries such as periodontal problems, malocclusion, and dental fluorosis had high significant oral health illness perception for the dimension—hopelessness. This may be due to oral conditions, which are chronic and irreversible.

In this study, based on CAST severity, a higher percentage of study participants [136 (43.8%)] had pulpitis and abscess or fistula (severe morbidity), whereas least percentage of study participants [38 (12.2%)] had dentinal caries with and without cavitation (morbidity). This insinuates that the study participants had sought oral health care professional assistance only in severe stages of caries with a symptom of pain. Furthermore, severe morbidity is most common among all age-groups, irrespective of gender and study participants who did not have dental problems other than caries. However, enamel caries (premorbidity) is most

Table 2: Mean score comparison of IPQ-R-OH and its dimensions with CAST severity

IPQ-R-OH dimensions	*CAST severity*	*Mean ± SD*	*Kruskal–Wallis test*	
			Chi-square value	*p-value*
Timeline–cyclical	Premorbidity	11.16 ± 3.56	19.64	**<0.001***
	Morbidity	10.58 ± 3.36		
	Severe morbidity	12.73 ± 2.86		
	Mortality	11.98 ± 4.01		
Control	Premorbidity	37.23 ± 4.30	2.33	0.51
	Morbidity	36.24 ± 5.28		
	Severe morbidity	37.05 ± 2.87		
	Mortality	36.11 ± 4.75		
Consequence	Premorbidity	14.13 ± 4.14	9.33	**0.03***
	Morbidity	12.29 ± 3.83		
	Severe morbidity	14.41 ± 4.02		
	Mortality	14.64 ± 3.94		
Timeline–chronic	Premorbidity	7.35 ± 2.62	10.97	**0.01***
	Morbidity	7.50 ± 2.60		
	Severe morbidity	8.45 ± 2.49		
	Mortality	7.82 ± 2.12		
Emotional representation	Premorbidity	18.20 ± 5.42	14.67	**0.002***
	Morbidity	15.50 ± 4.69		
	Severe morbidity	18.85 ± 4.62		
	Mortality	17.39 ± 5.35		
Hopelessness	Premorbidity	6.63 ± 1.51	13.33	**0.004***
	Morbidity	6.87 ± 1.26		
	Severe morbidity	6.14 ± 1.51		
	Mortality	5.91 ± 1.65		
Illness coherence	Premorbidity	18.59 ± 3.46	31.38	**<0.001***
	Morbidity	19.71 ± 3.64		
	Severe morbidity	16.41 ± 3.93		
	Mortality	18.14 ± 3.37		
Total dimension	Premorbidity	113.30 ± 11.69	5.98	0.11
	Morbidity	108.68 ± 11.80		
	Severe morbidity	114.04 ± 7.58		
	Mortality	111.98 ± 14.97		

Bold values are statistically significant, showed by *; *$p \leq 0.05$ statistically significant

Table 3: Linear regression analysis of the oral health illness perception (IPQ-R-OH) based on variables

	Unstandardized coefficients		*Standardized coefficients*			*95% confidence interval for B*	
Variables	*B*	*Std. error*	*Beta*	*t*	*p-value*	*Lower bound*	*Upper bound*
(Constant)	121.3	4.06		29.86	**<0.001***	113.3	129.29
Age	–0.21	0.07	–0.16	–2.84	**0.005***	–0.35	–0.06
Gender	1.00	1.22	0.05	0.82	0.41	–1.40	3.41
Dental problem other than dental caries	–3.50	1.38	–0.14	–2.53	**0.01***	–6.22	–0.77
CAST overall score	0.48	0.35	0.08	1.38	0.17	–0.21	1.16

Bold values are statistically significant, showed by *; *$p \leq 0.05$ statistically significant

common among the study participants who had dental problems other than dental caries. On the contrary, a study conducted by Mehta[21] on the adult population of New Delhi, India, reported that a higher percentage of study participants (74.5%) had morbidity, whereas the least percentage of study participants (27.2%) had premorbidity.

The study participants with severe morbidity had significantly higher overall mean perception and also for the dimensions—timeline–cyclical, timeline–chronic, and emotional representation indicating that study participants experienced recurrent or unpredictable nature of health condition, where the symptoms fluctuate over time and last over a longer duration associated with negative emotions (anger, depression, anxiety, fear, upset, and worry) and the psychosocial impact with pain. Likewise, study participants with morbidity had significantly higher mean perception for the dimension—hopelessness and illness coherence, illustrating that they had good knowledge of oral health problems and understood that their actions cannot alter the condition and thus approached the health professional for treatment. As evidenced, tooth loss will eventually affect the functional and social aspects of daily life; in the present study also study participants with tooth loss had significantly high mean perception for the dimension—consequence.

It is worth to be noted that age and dental problems other than dental caries were significant predictors of the overall oral health illness perception (IPQ-R-OH). This could be due to the reason that the response to illness is not the same in all age-groups; as age increases, oral conditions presumably worsen, tooth loss and periodontal disease increase, and the incidence of dental caries decreases with age.[20] Moreover, Reisine and Bailit[20] stated that age is an important factor in the evaluation of symptoms, social functioning, and overall health, as well as oral health status.

The present study showed certain limitations, that is, the self-reporting nature of questions might lead to social desirability bias, recall bias, and one's own perception changes from time to time. The sample was drawn from adult dental patients attending a single institute; thus, the findings can be generalized with caution. However, this is the only study that assessed the oral health illness perception, which indicates that early perception of illness in individuals is important as it leads to coping strategies which prevent further complications.

Conclusion

Oral health illness perception was observed to be high among the study participants. However, when individual dimensions were considered, high oral illness perception was observed for the dimensions—control, emotional representation, hopelessness, and illness coherence. Furthermore, age and the presence of dental problems other than dental caries were significant predictors of oral health illness perception. This study paves the direction for future research to know about the illness perception of oral health among different populations, including various socioeconomic statuses.

Clinical Significance

The oral health illness perception among the study participants is associated with a number of important outcomes, such as dental care utilization, treatment adherence, and functional recovery. Further, earlier perception of dental caries reduces the progression of the disease and can be prevented.

References

1. Petersen PE. World Oral Health Report 2003: continuous improvement of oral health in the 21st century—the approach of the WHO Global Oral Health Programme. Community Dent Oral Epidemiol 2003;31(1):3–23. DOI: 10.1046/j..2003.com122.x
2. Glick M, Williams DM, Kleinman DV, et al. A new definition for oral health developed by the FDI World Dental Federation opens the door to a universal definition of oral health. J Public Health Dent 2017;77(1):3–5. DOI: 10.1111/jphd.12213
3. Watt RG. Strategies and approaches in oral disease prevention and health promotion. Bull World Health Organ 2005;83(9):711–718. DOI: 10.1590/S0042-96862005000900018
4. Narayan A, Thomas SJ, Daniel A, et al. An overview of oral health in India: current scenario and challenges. Int J Oral Care Res 2016;4(4):280–283. DOI: 10.5005/jp-journals-10051-0063
5. Mafla AC, Villalobos-Galvis FH, Heft MW. Illness perceptions amongst individuals with dental caries. Community Dent Health 2018;35(1):16–22. DOI: 10.1922/CDH_4098Mafla07
6. Frencken JE, de Amorim RG, Faber J, et al. The caries assessment spectrum and treatment (CAST) index: rational and development. Int Dent J 2011;61(3):117–123. DOI: 10.1111/j.1875-595X.2011.00022.x
7. Hummel J, Phillips KE, Holt B, et al. Oral health: an essential component of primary care. Seattle Qualis Health 2015:1–67.
8. Petrie KJ, Jago LA, Devcich DA. The role of illness perceptions in patients with medical conditions. Curr Opin Psychiatry 2007;20(2):163–167. DOI: 10.1097/yco.0b013e328014a871
9. Broadbent E, Petrie KJ, Main J, et al. The brief illness perception questionnaire. J Psychosom Res 2006;60(6):631–637. DOI: 10.1016/j.jpsychores.2005.10.020
10. Abdullah B, Shari NFC, Faisal GG, et al. Assessment of illness perception of diabetic patients with periodontitis. J Int Dent Med Res 2017;10(1):100–107.
11. Petrie KJ, Weinman J. Patients' perceptions of their illness: the dynamo of volition in health care. Curr Dir Psychol Sci 2012;21(1):60–65. DOI: 10.1177/0963721411429456
12. Villalobos-Galvis FH, Mafla AC, Burbano-Trujillo WF, et al. Psychometric properties of the revised illness perception questionnaire for oral health. Caries Res 2017;51(3):244–254. DOI: 10.1159/000468993
13. Frencken JE, de Souza AL, van der Sanden WJM, et al. The caries assessment spectrum and treatment (CAST) instrument. Community Dent Oral Epidemiol 2013;41(1):e71–e77. DOI: 10.1111/cdoe.12027
14. Leal SC, Ribeiro APD, Frencken JE. The caries assessment spectrum and treatment (CAST): a novel epidemiological instrument. Caries Res 2017;51(5):500–506. DOI: 10.1159/000479042
15. Jaremo P, Arman M, Gerdle B, et al. Illness beliefs among patients with chronic widespread pain-associations with self-reported health status, anxiety and depressive symptoms and impact of pain. BMC Psychol 2017;5(1):24–34. DOI: 10.1186/s40359-017-0192-1
16. Weinman J, Petrie KJ, Moss-Morris R, et al. The illness perception questionnaire: a new method for assessing the cognitive representation of illness. Psychol health 1996;11(3):431–445. DOI: 10.1080/08870449608400270
17. Moss-Morris R, Weinman J, Petrie K, et al. The revised illness perception questionnaire (IPQ-R). Psychol health 2002;17(1):1–16. DOI: 10.1080/08870440290001494
18. Slusar MB, Nelson S. Caregiver illness perception of their child's early childhood caries. Pediatr Dent 2016;38(5):425–431.
19. Shyam R, Manjunath BC, Kumar A, et al. Newer concept of measuring dental caries—a review. Saudi J Oral Dent Res 2017;2(8):192–196. DOI: 10.21276/sjodr
20. Reisine ST, Bailit HL. Clinical oral health status and adult perceptions of oral health. Soc Sci Med Med Psychol Med Sociol 1980;14(6):597–605. DOI: 10.1016/0160-7979(80)90063-6
21. Mehta A. Assessment of dental caries experience of an adult population using caries assessment spectrum and treatment index. SRM J Res Dent Sci 2017;8(1):21–24. DOI: 10.4103/srmjrds.srmjrds_65_16